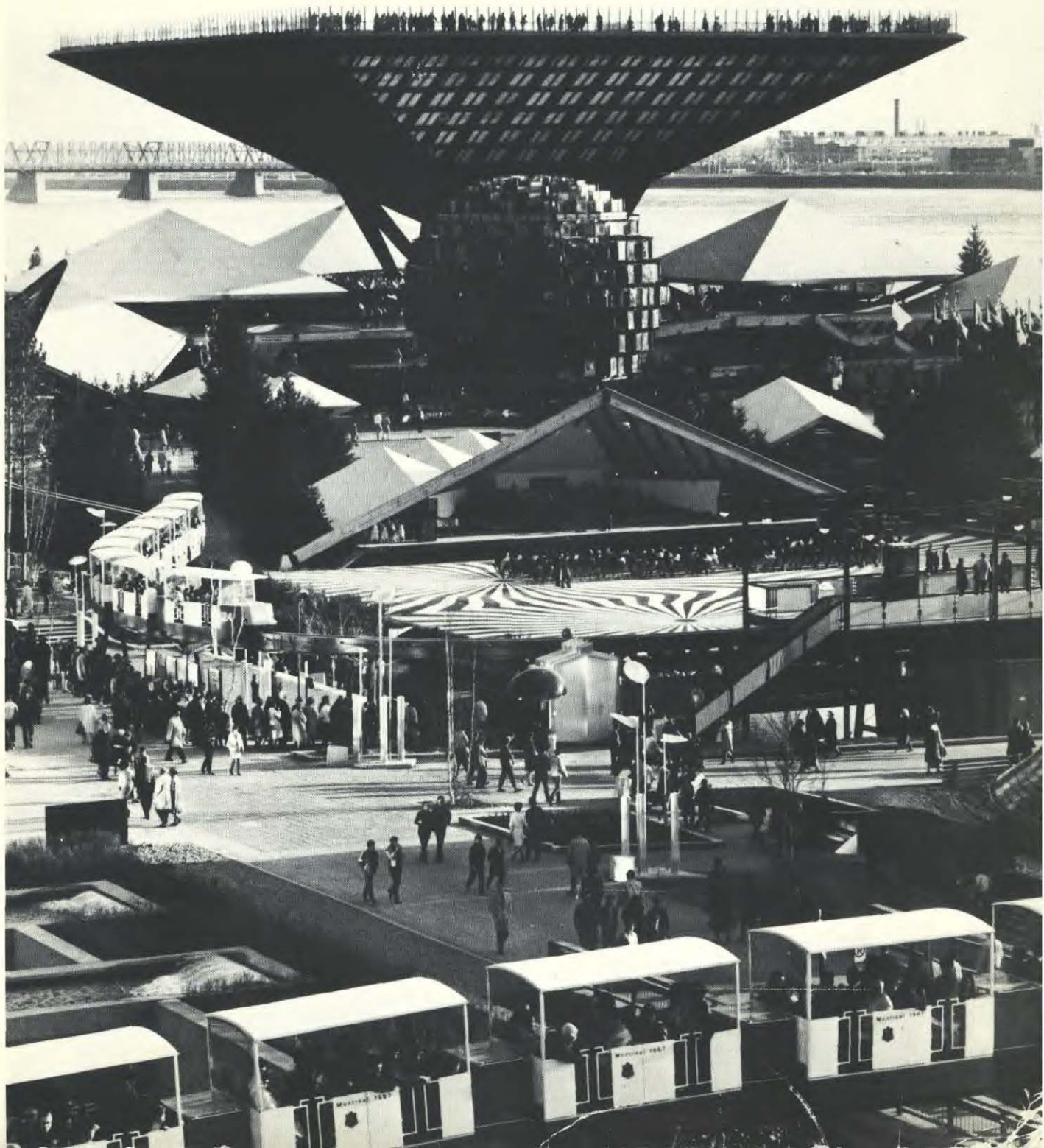


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# EXPO '67 Building Materials, Systems and Techniques

Materials Branch  
Departments of Industry and Trade and Commerce  
Ottawa, Canada

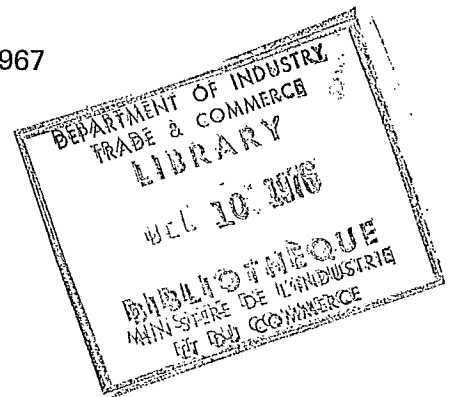


# EXPO '67

Survey of Building Materials, Systems and Techniques

used at the Universal and International Exhibition of 1967

Montreal, Canada



prepared by I. Kalin

Materials Branch

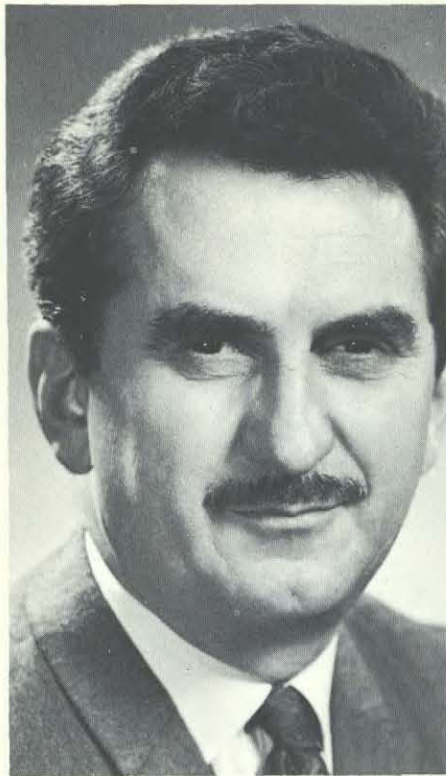
Department of Industry, Trade and Commerce

Ottawa, Canada



THE QUEEN'S PRINTER  
OTTAWA, 1969

## FOREWORD



Expo '67 received world wide acclaim for its general excellence and for its buildings in particular. It is therefore fitting that there should be provided a permanent technical record of these, which will be of interest to designers, builders and manufacturers in the construction industry.

This publication, which covers some 140 pavilions and structures, is the outcome of a study conducted by the Department of Industry to identify new materials, systems, methods and equipment which were either developed or used for the first time in Expo buildings, or which are unique or unusual to Canada. The purpose of the study was to establish which innovations have commercial potential, and to encourage their production in Canada for sale on the general market. Additional information of a technical and non-technical nature on all pavil-

ions and structures was also gathered. It is hoped that by combining all this information and presenting it in one comprehensive publication, it will be of value to the construction industry as a whole.

The study was carried out in co-operation with the Business Development Bureau, and The Bureau of Installations of The Canadian Corporation for the 1967 World Exhibition, which made use of its findings for the information of interested visitors. We are also grateful for the co-operation of the Royal Architectural Institute of Canada which, through the staff members of its journal, Architecture Canada, was of great assistance in the preparation of this publication.

This book will bring back fond memories of Expo '67 to the Canadian construction industry and, we hope, will be instrumental in transforming some of these memories into practical applications for further successes in the future.

Jean-Luc Pepin,  
Minister,  
Department of Industry,  
Trade and Commerce.

## INTRODUCTION

Any international exhibition is a forum on a world-wide scale, where nations display their aspirations, characteristics and achievements. Arts, sciences and techniques take part. From this confrontation stems a dialogue which represents another milestone in the unrelenting progress in the evolution of civilization.

The forum is, however, not an end in itself. It must find echoes, or extensions. This publication meets this requirement by presenting a survey and critical analysis of one of the most meaningful aspects of the Exhibition: its Architecture.

The publication is, in this respect, an extension of the Exhibition. It informs the researcher, the builder and those interested in art of processes and methods which determined forms and conditioned functions. It simultaneously consecrates the research and sophistication efforts of designers who participated in the realization of Expo and places architectural analysis on an objective and scientific level, making it a worthwhile medium of publicizing the new architectonic achievements.

While in the past one would have made a survey of forms, here, against strictly factual data, an analytical study of the object of those forms is made. Consideration of "style" is rightly cast aside. The conclusions will be all the more sound.

The Architecture Service of the Canadian Corporation for the 1967 World Exhibition encouraged research and innovation ever since the expo concept was formulated. This influence was brought to bear more directly and with a greater impact in the Corporation's projects while it varied for exhibitors. It nonetheless oriented the composition of the various elements of Expo towards bolder, freer and more "delightful" solutions. This considerable freedom of expression within the framework of the general planning, where "intent" came before conventional regulations and where visual continuity was established, permitted a coexistence or harmony of the most diversified forms. Notions of harmony or even of zoning may now have to be reconsidered or redefined in the light of Expo's results. Also, building codes can be more flexible and their application need not strain a technology serving creative genius. If the Expo experience helped to step up this evolution, it will certainly have served a most useful purpose.

This publication, published through the initiative of the Department of Industry, is a significant contribution to the attainment of these goals.

Edouard Fiset, SM, DPLGF, MIUC, FRAIC,  
Chief Architect,  
Expo 67.



## ACKNOWLEDGEMENTS

The information, data and comments about the Expo '67 pavillions and structures presented in this Report were edited and prepared for publication by the editors of "Architecture Canada", the Journal of the Royal Architectural Institute of Canada. The text is based on technical reports on each project produced for the Department of Industry by George F. Eber, MRAIC, Montreal. In addition, the Department gratefully acknowledges the courtesy of the editors of the Architectural Review, the Architects' Journal and Progressive Architecture for making available drawings of the various pavilions which originally appeared in the Expo '67 issues of those publications. Specific credits are given at the end of this report.

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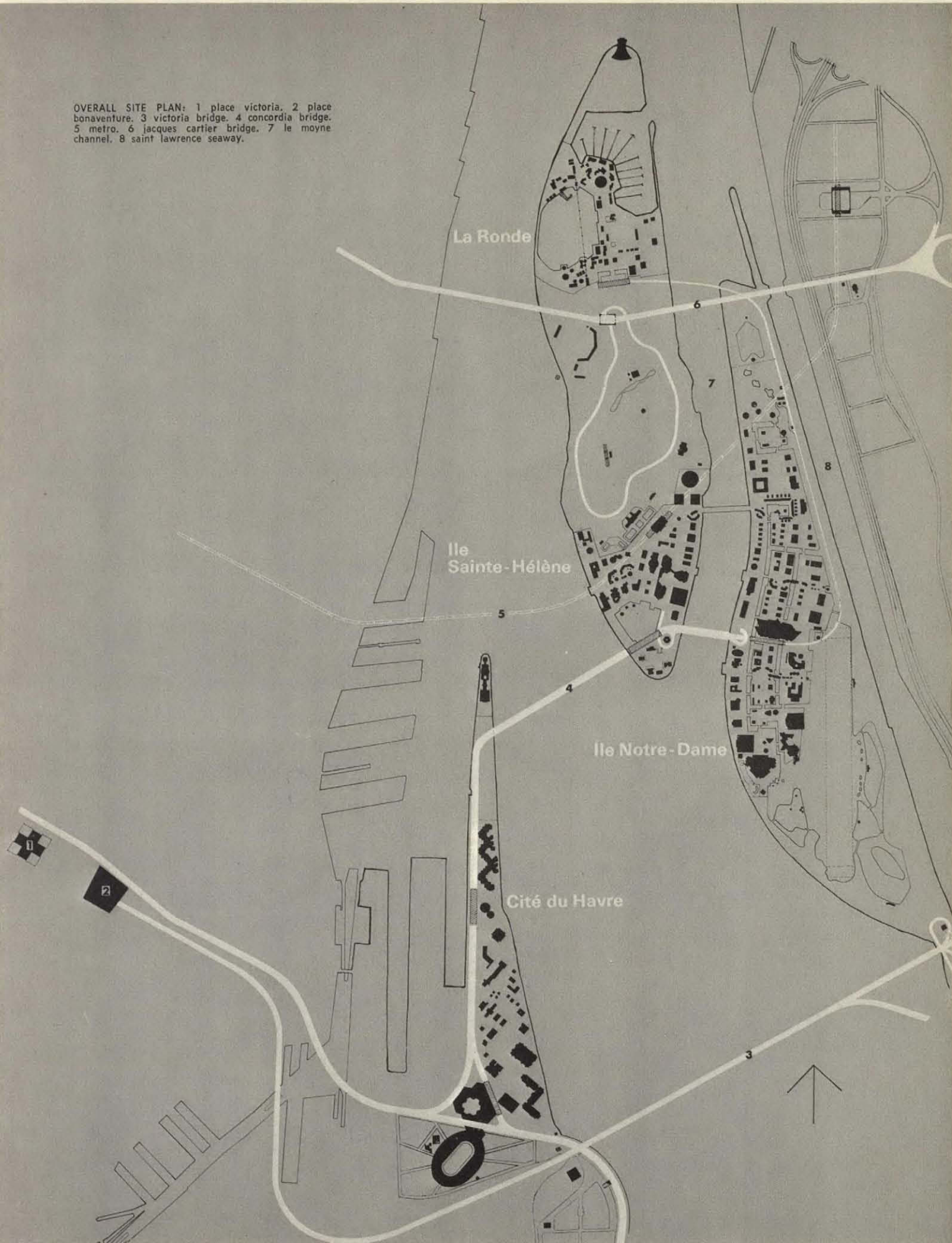
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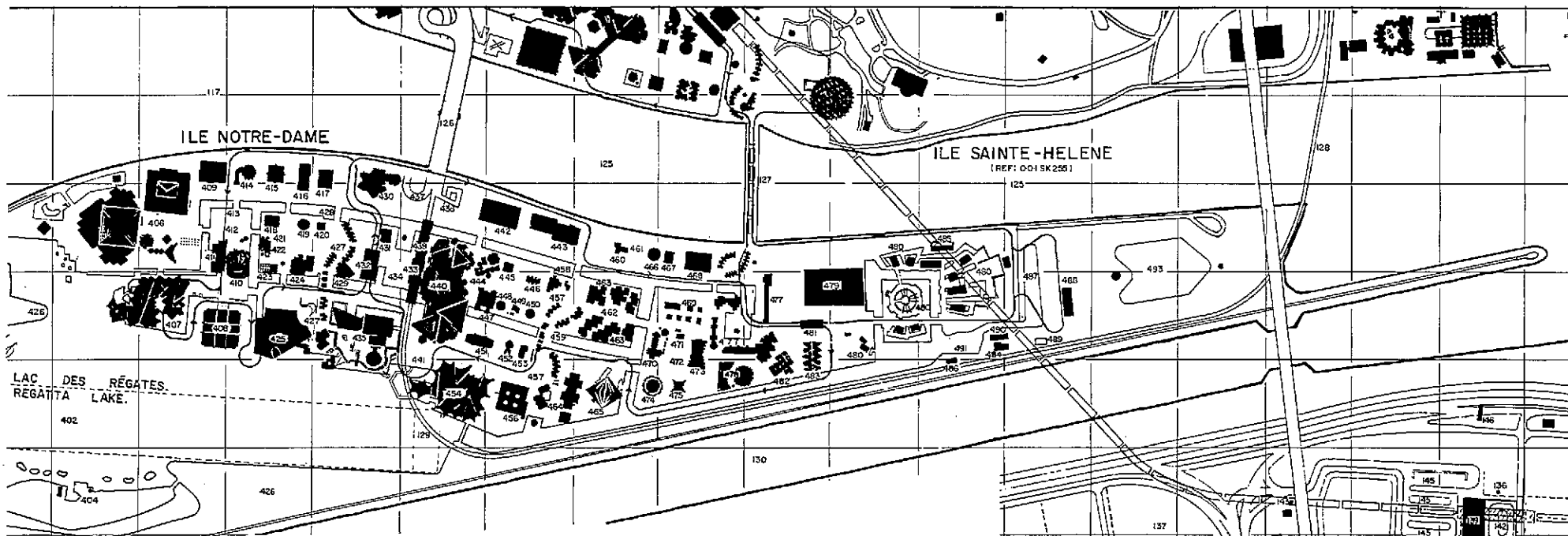
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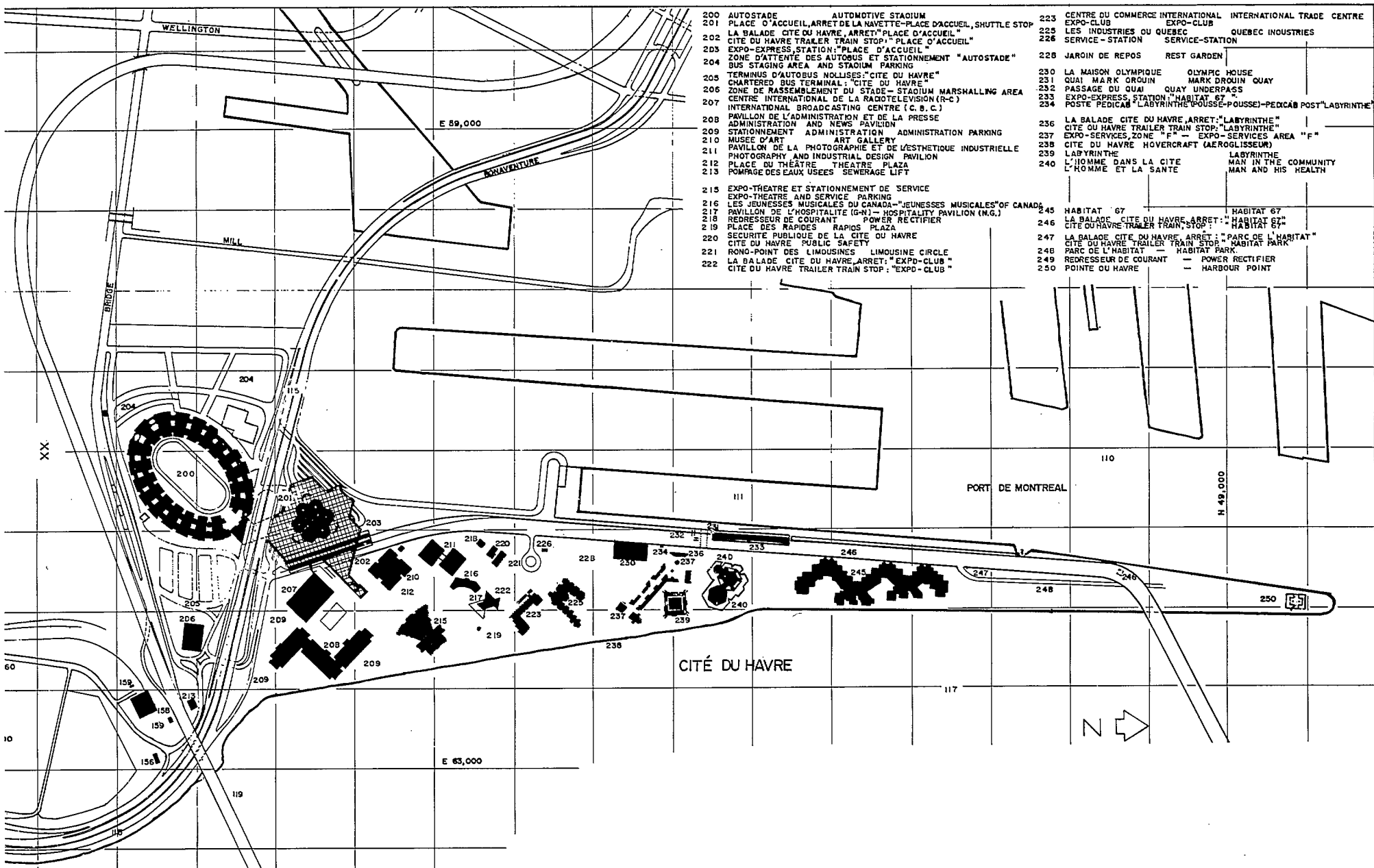


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419	ÎLE MAURICE	MAURITIUS	484	SERVICE-STATION	SERVICE-STATION
420	ORGANISATION DE COOPÉRATION ET DE DÉVELOPPEMENT ÉCONOMIQUE	ORGANIZATION FOR ECONOMIC DEVELOPMENT AND COOPERATION	485	TRANSFORMATEURS DE COURANT	POWER TRANSFORMERS
421	PLACE DES INGÉNIEURS	ENGINEERS' PLAZA	486	REDRESSEUR DE COURANT	POWER RECTIFIER
422	MONACO	MONACO	487	LAC DU DOIGT	FINGER LAKE
423	HAÏTI	HAÏTI	488	COUR DE TRIAGE DU MINIRAIL	MINIRAIL MAINTENANCE YARD
424	YOUgoslavie	YUGOSLAVIA	489	VENTILATION DU METRO	METRO VENTILATION
425	FRANCE	FRANCE	490	SÉCURITÉ PUBLIQUE DE L'ÎLE NOTRE-DAME	PUBLIC SAFETY
426	PIQUE-NIQUE (TERRAINS)	PICNIC GROUNDS	491	ENTRETIEN DU TRAVERSIER	FERRY BOAT MAINTENANCE
427	EXPO-SERVICES, ZONE "A"	EXPO-SERVICES AREA "A"	493	LA MARE AU DIABLE	DEVIL'S POND
428	VAPORETTO, ARRÊT "NATIONS UNIES"	VAPORETTO STOP "UNITED NATIONS"			
429	VAPORETTO, ARRÊT "THEME"	VAPORETTO STOP "THEME"			
430	ISRAËL	ISRAEL			
431	TRINIDAD & TOBAGO ET GRENADE	TRINIDAD & TOBAGO AND GRENADA			
432	MINIRAIL NOTRE-DAME, STATION: "THEME"				
433	EXPO-EXPRESS, STATION: "ÎLE NOTRE-DAME"				
434	PLACE DU TRANSPORT	TRANSPORTATION PLAZA			
435	GRANDE-BRETAGNE	BRITAIN			



- |     |                                                                     |                    |     |                                                  |                            |
|-----|---------------------------------------------------------------------|--------------------|-----|--------------------------------------------------|----------------------------|
| 200 | AUTOSTADE                                                           | AUTOMOTIVE STADIUM | 223 | CENTRE DU COMMERCE INTERNATIONAL                 | INTERNATIONAL TRADE CENTRE |
| 201 | PLACE D'ACCUEIL, ARRET DE LA NAVETTE-PLACE D'ACCUEIL, SHUTTLE STOP  | EXPO-CLUB          | 225 | LES INDUSTRIES DU QUEBEC                         | QUEBEC INDUSTRIES          |
| 202 | LA BALADE, CITE DU HAVRE, ARRET: "PLACE D'ACCUEIL"                  | EXPO-CLUB          | 226 | SERVICE-STATION                                  | SERVICE-STATION            |
| 203 | CITE DU HAVRE TRAILER TRAIN STOP: "PLACE D'ACCUEIL"                 | EXPO-CLUB          | 228 | JARDIN DE REPOS                                  | REST GARDEN                |
| 204 | EXPO-EXPRESS STATION: "PLACE D'ACCUEIL"                             | EXPO-CLUB          | 230 | LA MAISON OLYMPIQUE                              | OLYMPIC HOUSE              |
| 205 | ZONE D'ATTENTE DES AUTOBUS ET STATIONNEMENT "AUTOSTADE"             | EXPO-CLUB          | 231 | QUAI MARK OROUIN                                 | MARK OROUIN QUAY           |
| 206 | TERMINUS D'AUTOBUS NOLISES: "CITE DU HAVRE"                         | EXPO-CLUB          | 232 | PASSAGE DU QUAI                                  | QUAY UNDERPASS             |
| 207 | CHARTERED BUS TERMINAL: "CITE DU HAVRE"                             | EXPO-CLUB          | 233 | EXPO-EXPRESS STATION "HABITAT 67"                | HABITAT 67                 |
| 208 | ZONE DE RASSEMBLEMENT DU STADE-STADIUM MARSHALLING AREA             | EXPO-CLUB          | 234 | POSTE PEDICAB "LABYRINTHE-POUSSE-POUSSE"         | PEDICAB POST "LABYRINTHE"  |
| 209 | CENTRE INTERNATIONAL DE LA RADIO-TELEVISION (R-C)                   | EXPO-CLUB          | 236 | LA BALADE, CITE DU HAVRE, ARRET: "LABYRINTHE"    | LABYRINTHE                 |
| 210 | INTERNATIONAL BROADCASTING CENTRE (C.B.C.)                          | EXPO-CLUB          | 237 | CITE DU HAVRE TRAILER TRAIN STOP: "LABYRINTHE"   | LABYRINTHE                 |
| 211 | PAVILLON DE L'ADMINISTRATION ET DE LA PRESSE                        | EXPO-CLUB          | 238 | EXPO-SERVICES, ZONE "F" - EXPO-SERVICES AREA "F" | EXPO-SERVICES AREA "F"     |
| 212 | ADMINISTRATION AND NEWS PAVILION                                    | EXPO-CLUB          | 239 | CITE DU HAVRE HOVERCRAFT (AEROGLESSEUR)          | AEROGLESSEUR               |
| 213 | STATIONNEMENT ADMINISTRATION ADMINISTRATION PARKING                 | EXPO-CLUB          | 240 | L'ABYRINTHE                                      | LABYRINTHE                 |
| 214 | MUSEE D'ART ART GALLERY                                             | EXPO-CLUB          | 241 | L'HOMME DANS LA CITE                             | MAN IN THE COMMUNITY       |
| 215 | PAVILLON DE LA PHOTOGRAPHIE ET DE L'ESTHETIQUE INDUSTRIELLE         | EXPO-CLUB          | 242 | L'HOMME ET LA SANTE                              | MAN AND HIS HEALTH         |
| 216 | PHOTOGRAPHY AND INDUSTRIAL DESIGN PAVILION                          | EXPO-CLUB          |     |                                                  |                            |
| 217 | PLACE DU THEATRE THEATRE PLAZA                                      | EXPO-CLUB          |     |                                                  |                            |
| 218 | POMPAGE DES EAUX USEES SEWERAGE LIFT                                | EXPO-CLUB          |     |                                                  |                            |
| 219 | EXPO-THEATRE ET STATIONNEMENT DE SERVICE                            | EXPO-CLUB          |     |                                                  |                            |
| 220 | EXPO-THEATRE AND SERVICE PARKING                                    | EXPO-CLUB          |     |                                                  |                            |
| 221 | LES JEUNESSES MUSICALES DU CANADA - "JEUNESSES MUSICALES" OF CANADA | EXPO-CLUB          |     |                                                  |                            |
| 222 | PAVILLON DE L'HOSPITALITE (G-N) - HOSPITALITY PAVILION (M.G.)       | EXPO-CLUB          |     |                                                  |                            |
| 223 | REDRESSEUR DE COURANT POWER RECTIFIER                               | EXPO-CLUB          |     |                                                  |                            |
| 224 | PLACE DES RAPIDES RAPIDS PLAZA                                      | EXPO-CLUB          |     |                                                  |                            |
| 225 | SECURITE PUBLIQUE DE LA CITE DU HAVRE                               | EXPO-CLUB          |     |                                                  |                            |
| 226 | CITE DU HAVRE PUBLIC SAFETY                                         | EXPO-CLUB          |     |                                                  |                            |
| 227 | ROMO-POINT DES LIMOUSINES LIMOUSINE CIRCLE                          | EXPO-CLUB          |     |                                                  |                            |
| 228 | LA BALADE, CITE DU HAVRE, ARRET: "EXPO-CLUB"                        | EXPO-CLUB          |     |                                                  |                            |
| 229 | CITE DU HAVRE TRAILER TRAIN STOP: "EXPO-CLUB"                       | EXPO-CLUB          |     |                                                  |                            |
| 230 |                                                                     | EXPO-CLUB          |     |                                                  |                            |
| 231 |                                                                     | EXPO-CLUB          |     |                                                  |                            |
| 232 |                                                                     | EXPO-CLUB          |     |                                                  |                            |
| 233 |                                                                     | EXPO-CLUB          |     |                                                  |                            |
| 234 |                                                                     | EXPO-CLUB          |     |                                                  |                            |
| 235 |                                                                     | EXPO-CLUB          |     |                                                  |                            |
| 236 |                                                                     | EXPO-CLUB          |     |                                                  |                            |
| 237 |                                                                     | EXPO-CLUB          |     |                                                  |                            |
| 238 |                                                                     | EXPO-CLUB          |     |                                                  |                            |
| 239 |                                                                     | EXPO-CLUB          |     |                                                  |                            |
| 240 |                                                                     | EXPO-CLUB          |     |                                                  |                            |
| 241 |                                                                     | EXPO-CLUB          |     |                                                  |                            |
| 242 |                                                                     | EXPO-CLUB          |     |                                                  |                            |
| 243 |                                                                     | EXPO-CLUB          |     |                                                  |                            |
| 244 |                                                                     | EXPO-CLUB          |     |                                                  |                            |
| 245 |                                                                     | EXPO-CLUB          |     |                                                  |                            |
| 246 |                                                                     | EXPO-CLUB          |     |                                                  |                            |
| 247 |                                                                     | EXPO-CLUB          |     |                                                  |                            |
| 248 |                                                                     | EXPO-CLUB          |     |                                                  |                            |
| 249 |                                                                     | EXPO-CLUB          |     |                                                  |                            |
| 250 |                                                                     | EXPO-CLUB          |     |                                                  |                            |

## STANDARD FORMAT

The following is the standard format used for presenting the data on each pavilion/structure. Numbering of articles was kept the same in all cases for ready reference. Where no data occurred for a given article, that number and heading was omitted.

(NAME OF PAVILION)

### A. GENERAL DATA

1. NATURE OF PAVILION/STRUCTURE
2. LOCATION — Expo Area:  
Lot No.  
Key Plan No.
3. OWNER (or contracting body)
4. DESIGN ARCHITECT
5. LOCAL ASSOCIATE ARCHITECT
6. CONSULTING ENGINEERS
  - a. Structural :
  - b. Mechanical :
  - c. Electrical :
  - d. Other :
7. LOCAL ASSOCIATE CONSULTING ENGINEERS
  - a. Structural :
  - b. Mechanical :
  - c. Electrical :
  - d. Other :
8. OTHER CONSULTANTS
9. GENERAL CONTRACTOR
10. OTHER CONTRACTORS OF SPECIAL INTEREST

### B. GENERAL DESCRIPTION OF PAVILION/STRUCTURE

1. FUNCTIONAL DESCRIPTION
2. DIMENSIONS
  - a. Size :
  - b. Area :
  - c. Height :
  - d. Stories :
3. FOUNDATIONS
4. STRUCTURE
5. WALLS & EXTERIOR CLADDING

### 6. ROOF

### 7. WINDOWS & ENTRANCES

### 8. INTERIOR FINISHES

- a. Floors :
- b. Walls :
- c. Ceilings :

### 9. MECHANICAL SYSTEMS

- a. Plumbing :
- b. Heating, ventilation, air conditioning :
- c. Kitchen :
- d. Other :

### 10. ELECTRICAL

- a. Power :
- b. Lighting :
- c. Audio-visual systems :
- d. Other :

### 11. SPECIAL TRAFFIC CONVEYING EQUIPMENT

### 12. FIRE PROTECTION

### 13. SAFETY FEATURES

### 14. EXTERIOR WORK (where part of the construction contract)

### 15. OTHER ITEMS OF PARTICULAR INTEREST

- a. Brief description :
- b. Location :
- c. Manufacturer or producer :
- d. Nearest source of more information :

### C. DATA ON INNOVATION — (NAME OF PAVILION)

#### 1. NAME OF ITEM

#### 2. LOCATION

#### 3. DESIGNER OR SELECTOR INVOLVED

#### 4. WHY WAS ITEM SELECTED?

#### 5. WAS ITEM PRODUCED SPECIFICALLY FOR EXPO?

#### 6. MANUFACTURER

7. DISTRIBUTOR (nearest)
8. NEAREST SOURCE OF ADDITIONAL INFORMATION
9. INSTALLER OR SUBCONTRACTOR
10. MARKETING
  - a. If the item is of foreign manufacture,
    - (i) is it now also manufactured in Canada?
    - (ii) could it be manufactured in Canada?
    - (iii) what patents are involved?
  - (or)
  - a. If the item is of Canadian manufacture,
    - (i) is it now also manufactured abroad?
    - (ii) could it be manufactured abroad?
    - (iii) what patents are involved?
  - b. Is the item now commercially available?
  - c. Is further research and development required before marketing in Canada?
  - d. What is the marketing feasibility and/or potential of the item?
11. TECHNICAL DATA AND EVALUATION
  - a. Generic and functional description
  - b. Dimensions and weights (units)
  - c. Physical characteristics
  - d. Durability and resistance to exposures (weather, chemicals, etc.)
  - e. Standards covering item
  - f. Test data
  - g. Alternate method of evaluation, used in lieu of applicable standard
12. PERFORMANCE RECORD
  - a. When and where was item first manufactured?
  - b. When and where was item first installed?
  - c. Experience in manufacture?
  - d. Experience in installation? (at Expo or elsewhere)
  - e. Service performance since installation
  - f. Experience with Canadian climate
  - g. Was item used for other purposes before?
  - h. Other suggested uses
13. COST DATA
14. COMMENTS

## **CANADIAN PAVILIONS**

## **GOVERNMENTAL PAVILIONS**

## ADMINISTRATION & NEWS BUILDING

### A. GENERAL DATA

1. NATURE OF PAVILION/STRUCTURE — Permanent.
2. LOCATION — Expo Area: Cité du Havre;  
Lot No. 2140;  
Key Plan No. 208.
3. OWNER (or contracting body) — The Canadian Corporation for the 1967 World Exhibition.
4. DESIGN ARCHITECT — Irving Grossman, Toronto.
6. CONSULTING ENGINEERS —
  - a. Structural: M. S. Yolles & Associates, Toronto.
  - b. Mechanical: R. T. Tamblyn & Partners, Toronto.
  - c. Electrical: Jack Chisvin & Associates, Don Mills.
  - d. Other: Kitchen Consultants — Bernard & Associates, Montreal.
8. OTHER CONSULTANTS —  
Sculptors: Ulysse Comtois, Montreal, Quebec (Wing 1).  
Tom Bieler, Toronto, Ontario (Wing 2).  
Armand Vaillancourt, Montreal, Quebec (Wing 3).
9. GENERAL CONTRACTOR — Desourdy Construction Ltee., City of Lafleche, Quebec.

### B. GENERAL DESCRIPTION OF PAVILION/STRUCTURE

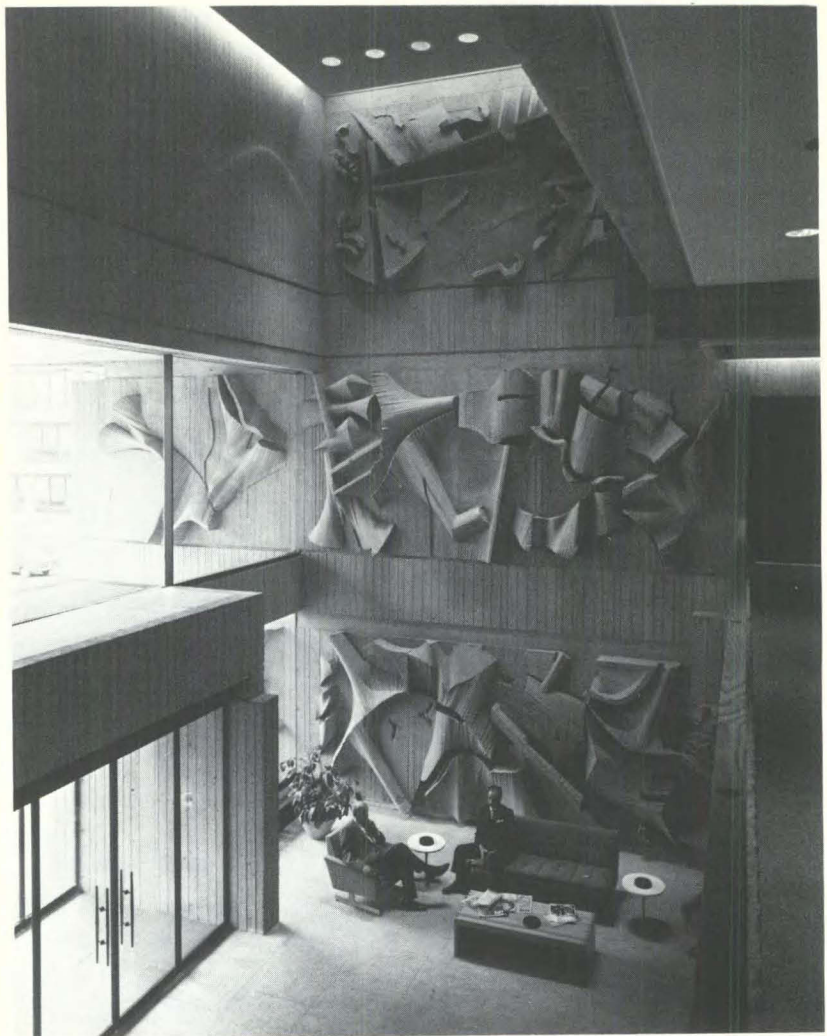
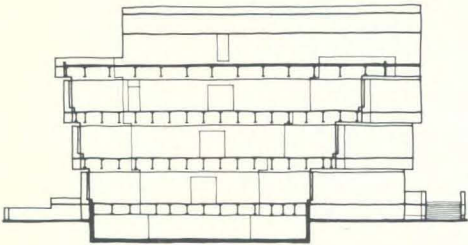
1. FUNCTIONAL DESCRIPTION — A three-storey structure, this building consists of three wings, each of which contains its own entrance hall and is designed to operate independently if desired. During Expo, it housed the administrative and executive offices of the Corporation, the public relations and photography departments, a 320 seat cafeteria, the News Center, a press lounge with bar, four studios for TV and radio broadcasting, a work area for visiting members of the press and a briefing theatre seating 178 persons. The theatre, which constitutes the only inflexible part of this column-free building, includes a small stage, projection facilities, an audio control room, radio booths and dressing rooms.
2. DIMENSIONS —
  - a. Size: 890' long, 85' wide ("S" plan).
  - b. Area: 66,000 sq. ft. (one floor).
  - c. Height: 42' plus penthouses for mechanical services.
  - d. Stories: Three plus underground parking.
3. FOUNDATIONS — Franki piles, reinforced concrete.
4. STRUCTURE — Reinforced concrete with stepped walls, long span joists and steel beams (50'-0" planning module).





*Concrete sculpture in one  
of the foyers.*

*Cross section*



*Entrance*

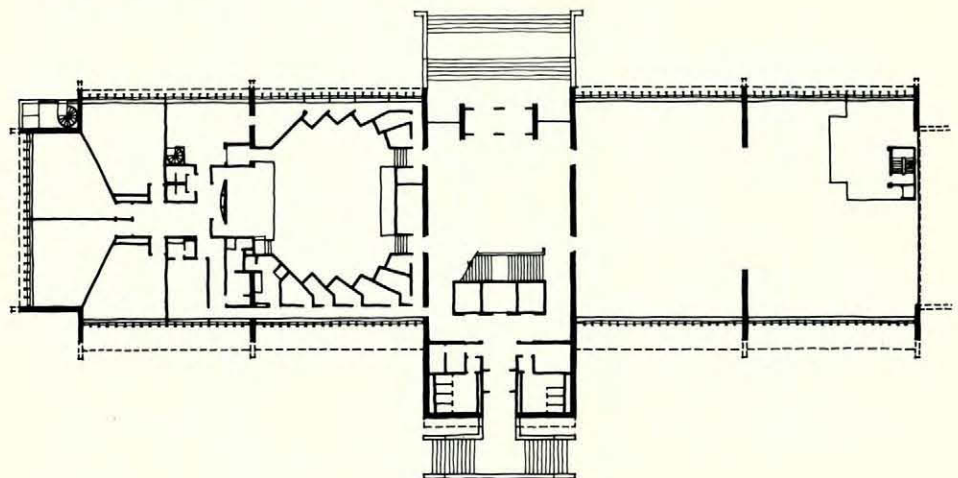


5. WALLS & EXTERIOR CLADDING — Anodized aluminum curtain walls with painted stucco spandrels and exposed board patterned concrete.
6. ROOF — 4-ply tar and gravel roofing, anodized aluminum flashing.
7. WINDOWS & ENTRANCES — Anodized aluminum curtain walls and entrances (hard color).
8. INTERIOR FINISHES —
  - a. Floors: Terrazo (lobby), vinyl asbestos (offices), wool carpeting (executive offices), velour carpeting (press lounge).
  - b. Walls: Sculptured exposed concrete (lobbies), painted 2" solid gypsum partitions.
  - c. Ceilings: In general, suspended acoustic tile with concealed "T" bars. Tile is textured with perforations for plenum system. Stucco in lobbies
9. MECHANICAL SYSTEMS —
  - a. Plumbing: Standard commercial type plumbing and fixtures.
  - b. Heating, ventilation, air conditioning: Oil fired boilers, 200 HP each, low pressure. Hot air unit heaters for all entrances. Induction units around perimeter of entire building; high velocity system. Units are totally readjustable to suit future office partitioning systems. Air conditioning based on chilled water and provided by one 650 ton electric hermetic centrifugal refrigeration machine.
  - c. Kitchen: Commerical type for cafeteria.
  - d. Other: Small commercial type for press lounge.
10. ELECTRICAL —
  - a. Power: 12.5 KV primary service with 120/208 secondary distribution.
  - b. Lighting: Fluorescent throughout the offices, incandescent decorative elsewhere. Emergency lighting.
  - c. Audio-visual systems: Briefing room equipped with Radio and TV broadcasting equipment and facilities.
11. SPECIAL TRAFFIC CONVEYING EQUIPMENT — Three escalators and one dumbwaiter.
12. FIRE PROTECTION — Automatic fire alarm system provided by automatic smoke and fire detectors. Standpipe system with fire hose cabinets. CO2 portable fire extinguishers in kitchen area.
14. EXTERIOR WORK (where part of the construction contract) — Landscaping by owner.
16. COMMENTS — Awarded a 1967 Massey Medal, this building contains 200,000 sq. ft. of regular office space, built at \$23 per sq. ft.  
 The following factors were considered vital in the approach to the initial design:
  - i) respect for surrounding buildings.
  - ii) maximum clear floor open for flexible use of spaces.
  - iii) controlled interior environment for maximum human comfort.

Since the building was not to be a pavilion, it was decided, that it should not be too dramatic in appearance. It was treated, in fact, as a background wall to act as a foil for exhibition buildings open to the public. Nevertheless, it is of very high architectural quality both because of well chosen materials and the dramatic way in which the poured concrete walls of the three-storey entrance halls were molded into robust mural sculptures. Perhaps the only drawback with the building's design is that the formal nature of the three wing plan results in a sometimes forced and not too functional interior layout.

The stepping out of the exterior wall profile varies from 2'-6" to 7'-6" and was based on close analysis of the annual and daily positions of the sun in relation to the building.

*ground floor plan, wing of  
administration building*





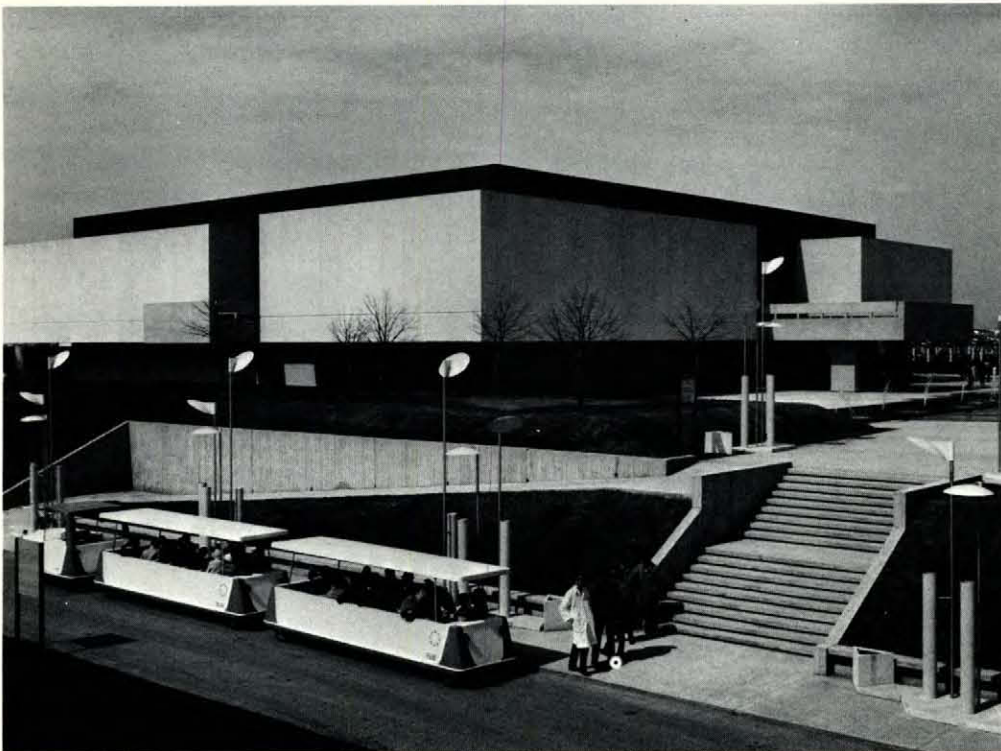
## ART GALLERY

### A. GENERAL DATA

1. NATURE OF PAVILLION/STRUCTURE — Permanent.
2. LOCATION — Expo Area: Cité du Havre;  
Lot No. 2190;  
Key Plan No. 210.
3. OWNER (or contracting body) — Canadian Corporation for the 1967 World Exhibition.
4. DESIGN ARCHITECT — Gauthier, Guité & Côté, Neufchâtel, Quebec.
6. CONSULTING ENGINEERS —
  - a. Structural: Beaulieu & Poulin, Quebec, Quebec.
  - b. Mechanical and Electrical: Picard & Painchaud, Quebec, Quebec.
8. OTHER CONSULTANTS — John Bland, Consulting Architect, Montreal.
9. GENERAL CONTRACTOR — Terrebonne Construction Inc., Montreal.

### B. GENERAL DESCRIPTION OF PAVILLION/STRUCTURE

1. FUNCTIONAL DESCRIPTION — This theme pavilion was concerned with Man and his Own Image, Man and the Universe, Man the Creator and Man the Infinite. It contained works executed by the greatest names in art within a completely fireproofed and humidity controlled environment.
2. DIMENSIONS —
  - a. Size: 158' x 173'.
  - b. Height: 40'-0".
  - c. Stories: Two.
3. FOUNDATIONS — Pile foundations and reinforced concrete walls.
4. STRUCTURE — Poured reinforced concrete.
5. WALLS & EXTERIOR CLADDING — First Floor: Prefabricated concrete panels.
6. ROOF — Four-ply asphalt and gravel, copper flashing. Walls of penthouses in copper.
7. WINDOWS & ENTRANCES — Triple glazed windows and doors in aluminum frames.
8. INTERIOR FINISHES —
  - a. Floors: Quarry tiles (hallways, stairs and guard rooms), oak floors (exhibition space), cement finish (service areas),



- b. Walls: Concrete block and painted plaster (service areas), precast concrete (halls and exhibition areas), plywood on steel framing (exterior).
  - c. Ceilings: Coffered concrete slab sand blasted and suspended gypsum board (service areas).
9. MECHANICAL SYSTEMS –
- a. Plumbing: Standard commercial fixtures and plumbing.
  - b. Heating, ventilation, air conditioning: Hot water heating system. Oil fired boilers (Dominion Bridge Model W-450). Cooling by chilled water. Chiller by Ferro Metal Limited (Model C-17 Pre-Krete). Distributed from diffusers at ceilings and walls.
10. ELECTRICAL –
- a. Power: 12,500 V service stepped through 3 transformers of 333 KVA each to 600 V, reduced again through 3 transformers of 150 KVA to 120/208 V.
  - b. Lighting: Incandescent and spot lights (general). Fluorescent (service areas).
11. SPECIAL TRAFFIC CONVEYING EQUIPMENT – Elevators by F-X Drolet Inc., Montreal.
12. FIRE PROTECTION – Extinguishers and full security guard.
13. SAFETY FEATURES – Colour TV closed circuit observation system.
14. EXTERIOR WORK (where part of the construction contract) – Landscaping by CCWE.
15. OTHER ITEMS OF PARTICULAR INTEREST – Triple glazing of doors and windows.
- b. Location: All glazed windows and doors.
  - c. Manufacturer or producer: Canadian Pittsburgh Industries Limited.
16. COMMENTS – A most up-to-date gallery, using very high quality materials, both inside and out, it was based on sound research and put together with great sensitivity and taste but without significant innovations in the architectural field. It would be a very suitable building for permanent use.



## ATLANTIC PROVINCES

### A. GENERAL DATA

1. NATURE OF PAVILION/STRUCTURE — Temporary.
2. LOCATION — Expo Area: Ile Notre-Dame; Lot No. 4422; Key Plan No. 409.
3. OWNER (or contracting body) — Commissioner for the Participation of the Atlantic Provinces (1967 World Exhibition).
4. DESIGN ARCHITECT — Duffus, Romans, Single & Kundzins, Halifax.
6. CONSULTING ENGINEERS —
  - a. Structural: Duffus, Romans, Single & Kundzins, Halifax.
  - b. D.J. Morris Engineering Limited, Halifax.
  - c. Electrical: F.C. O'Neill & Associates, Halifax.
8. OTHER CONSULTANTS — Professor Ojars Biskaps and Douglas Shadbolt MRAIC, Halifax.
9. GENERAL CONTRACTOR — Leasehold Construction Corporation, Montreal.

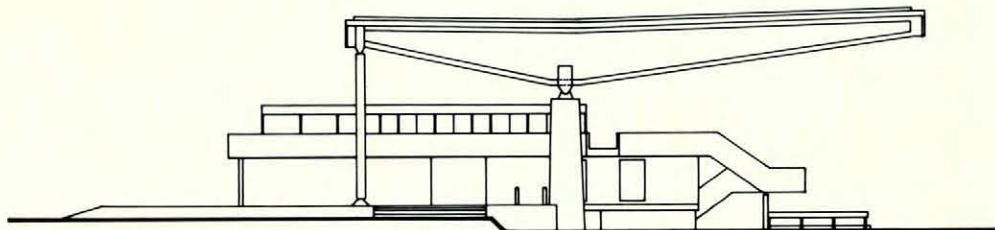
### B. GENERAL DESCRIPTION OF PAVILION/STRUCTURE

1. FUNCTIONAL DESCRIPTION — Within the pavilion was told the story of the Atlantic Provinces by means of sculptural, graphic and boat building exhibits. The building consisted of a basement and two upper levels both of which were open on all sides. The basement housed kitchens, staff quarters, and the boat building exhibit. The ground floor contained reception, administration and exhibition areas. On the second floor was an in and out-door restaurant, with chowder bar, which seated 260 people. The pavilion was covered with a large roof made up of unequal wood cantilevered trusses which, at the same time, were part of an exhibit showing the use of Eastern Spruce.
2. DIMENSIONS —
  - a. Size: 100' x 125'.
  - b. Area: 16,700 sq. ft.
  - c. Height: 65'.
  - d. Stories: Three.
3. FOUNDATIONS — Expanded concrete base piles with steel grade beams forming part of concrete mat.



4. **STRUCTURE** — Reinforced concrete walls, columns and flat slabs to grade. Rigid structural steel column and beam structure with 2-1/2" concrete slab on metal pans. Spruce cantilevered roof structure which was constructed of black spruce trusses cantilevered up to 75'.
5. **WALLS & EXTERIOR CLADDING** — Spruce studs with plywood lining on the exterior and gyproc on the interior. The exterior was finished with exposed aggregate in cement on metal lath.
6. **ROOF** — Neoprene-hypalon on plywood trough-deck.
7. **WINDOWS & ENTRANCE** — 3/8" clear glass windows with 3/8" clear glass vertical mullions. Solid core wood doors in wood framing.
8. **INTERIOR FINISHES** —
  - a. Floors: Vinyl asbestos tiles on concrete (basement), carpet on concrete (ground floor and upper floor restaurants), epoxy on concrete (upper floor).
  - b. Walls: 1/2" gyproc on wood studs with taped joints.
  - c. Ceilings: 1/2" gyproc on wooded furring with taped joints.
9. **MECHANICAL SYSTEMS** —
  - a. Plumbing: Standard vitreous china fixtures in staff and public washrooms.
  - b. Heating, ventilation, air conditioning: Heating: electrically operated forced air installed in air conditioning system. Air conditioning: Package type units serving basement, kitchens, and main floor.
  - c. Kitchen: Food preparation kitchens located in the basement contained walk-in refrigerators, freezer, garbage refrigerator, dishwashers, ranges etc. for a complete restaurant type operation.
10. **ELECTRICAL** —
  - a. Power: One 15 KV station. Three phase, 4 wire, 120/208 volt.
  - b. Lighting: Mercury arc roof canopy lighting. Individual incandescent restaurant table lighting. Incandescent lighting throughout basement and ground floor areas.
  - c. Audio-visual systems: P.A. system for kitchens and restaurants. Complete tape recorder system provided music and sounds.
12. **FIRE PROTECTION** — Fire alarm system. Portable extinguishers.
14. **EXTERIOR WORK** (where part of the construction contract) — Landscaping, wood decking, wood terrace retaining walls, rocks and trees, 50' tall spruce flagpole.
16. **COMMENTS** — While trying to capture the spirit of the Atlantic Provinces, the designer worked hard to avoid any "quaint" effects. the result was an interesting contemporary building which helped to tell the desired story without duplicating actual Maritime-type structures.

*Side elevation*





## CANADA

### A. GENERAL DATA

1. NATURE OF PAVILION/STRUCTURE – Temporary.
2. LOCATION – Expo Area: Ile Notre-Dame;  
Lot No. 4430;  
Key Plan No. 406.
3. OWNER (or contracting body) – Government of Canada.
4. DESIGN ARCHITECT – Ashworth, Robbie, Vaughn & Williams/Schoeler, Barkham & Heaton/Z.M. Stan-kiewicz, Ottawa.
6. CONSULTING ENGINEERS –
  - a. Structural: M.S. Yolles, Toronto.
  - b. Mechanical: G. Granek & Associates Limited, Don Mills, Ontario.
  - c. Electrical: Jack Chisvin & Associates Limited, Don Mills, Ontario.
  - d. Other: D.W. Graham & Associates Ottawa, (landscape); Bernard & Associates, Montreal (kitchen).
7. LOCAL ASSOCIATE CONSULTING ENGINEERS –
  - a. Structural, mechanical and electrical: Dagenais Dupras Gauthier Gendron, Montreal.
8. OTHER CONSULTANTS – Arthur Erickson and Evans St. Gelais, Vancouver (Consulting Architects).
9. GENERAL CONTRACTOR – Perini Quebec Inc., Montreal.

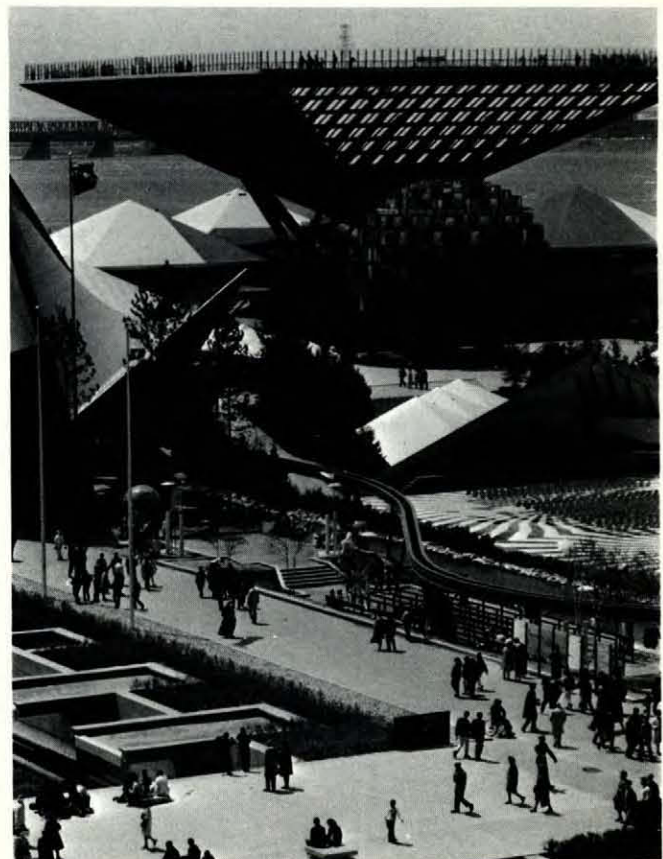
### B. GENERAL DESCRIPTION OF PAVILION/STRUCTURE

1. FUNCTIONAL DESCRIPTION – Spread over an eleven and a half acre site, the Canadian Pavilion consisted of nine related buildings and structures. Most dominant of these was the Katimavik, a 100' high inverted pyramid. It was constructed with a steel frame, resting on four V-shaped steel columns, and surrounded on each of its 192' long open sides by a promenade offering magnificent views of Expo. Directly under the Katimavik was a revolving theatre with five pie-shaped auditoria, each seating 190 spectators. It moved carousel-like, around an enclosed central stairway, which led up to a large outdoor terrace surrounding the base of the Katimavik. Extending out from the exhibit area on three sides was the 90,000 square foot main exhibit

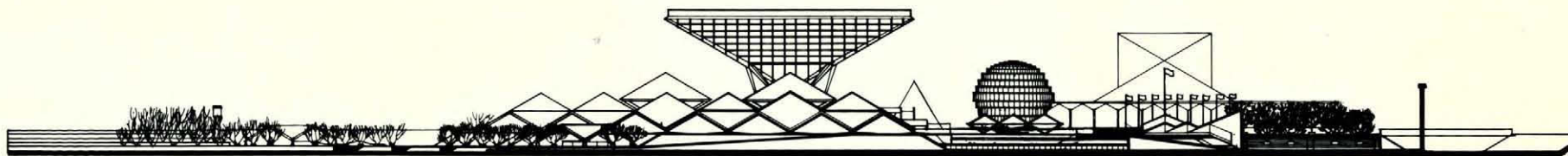
area sheltered under 14 pyramidal roofs of translucent white vinyl.

The other major parts of the Canadian pavilion consisted of the Arts Centre (which included an art gallery, library, 500 seat performing arts theatre and two restaurants), a bandshell and outdoor performing areas, and the People Tree, a 66' high stylized maple tree hung with nylon autumn-coloured "leaves" covered with silk screen reproductions of the people of Canada. This structure was made of laminated wood, with two spiral ramps connecting interlocking platforms. Other smaller structures in the complex included snack bars, an information kiosk, a Sanctuary and a childrens' creative centre consisting of a nursery school, art, music and drama studios and an outdoor "adventure" playground.

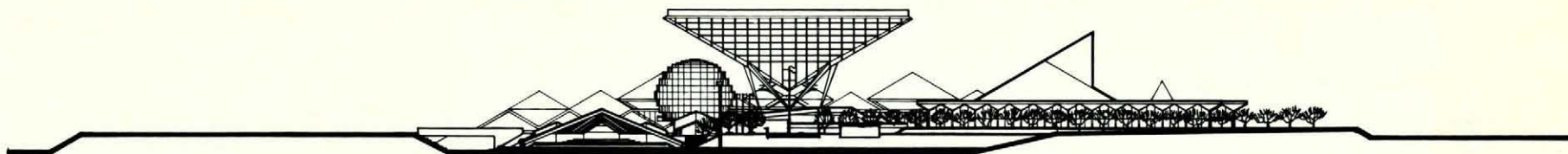
The arts Centre was a 252' by 234' classical structure with a bronze glass curtain wall enclosing a steel frame. In the centre, facing the square and People Tree, was the performing arts theatre, with, to its south, the two level art gallery section. The library was at the rear of the upper level. The restaurants occupied the opposite side of the building and the administrative areas were to the rear.



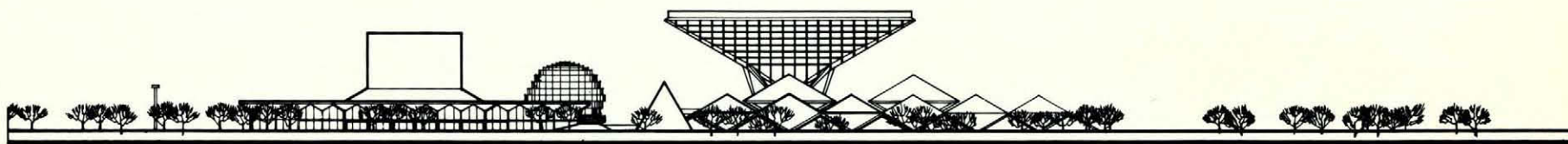




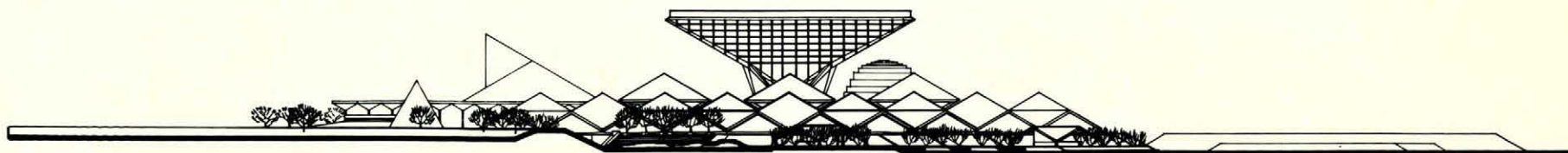
EAST ELEVATION



NORTH ELEVATION

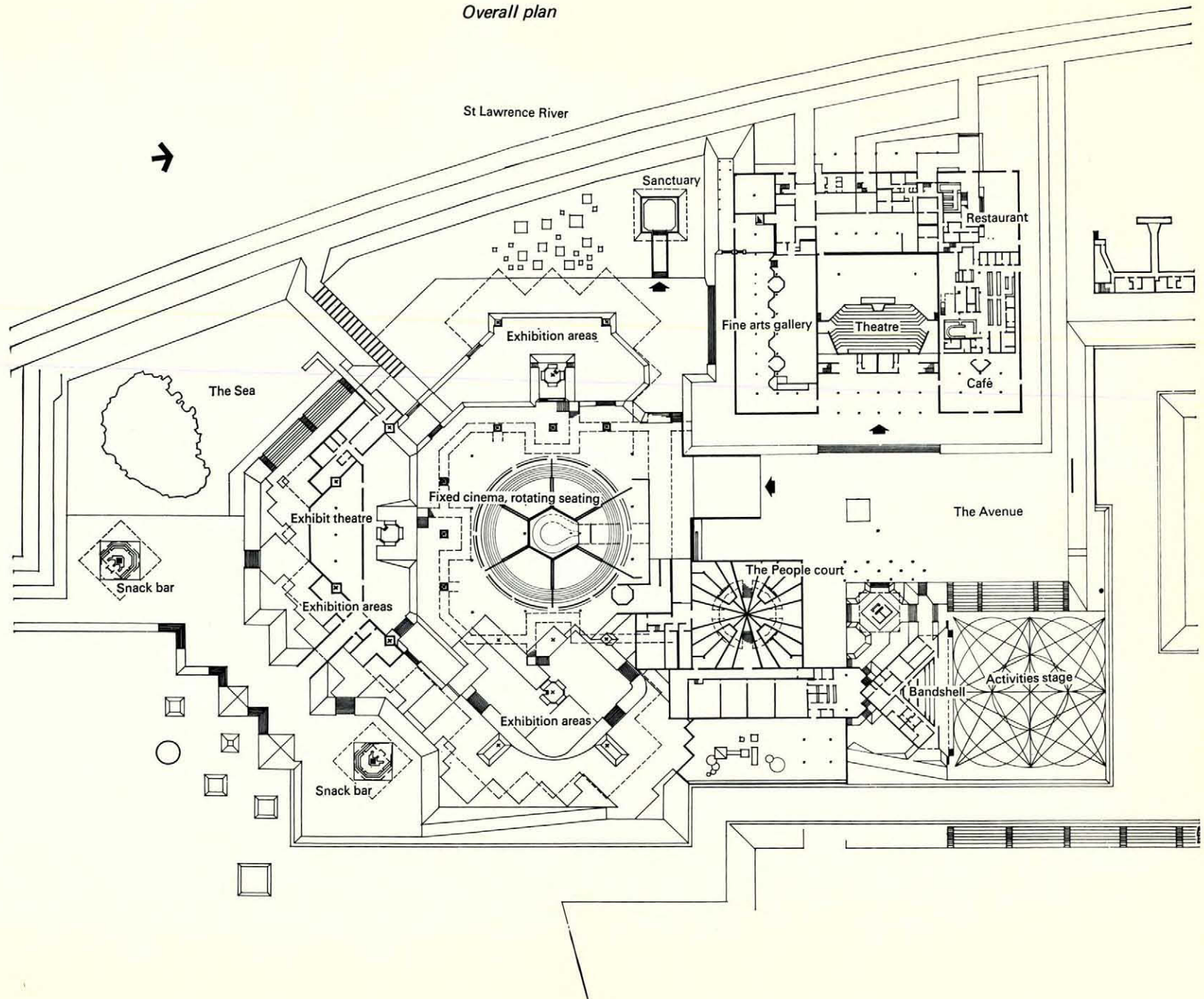


WEST ELEVATION



SOUTH ELEVATION

Overall plan







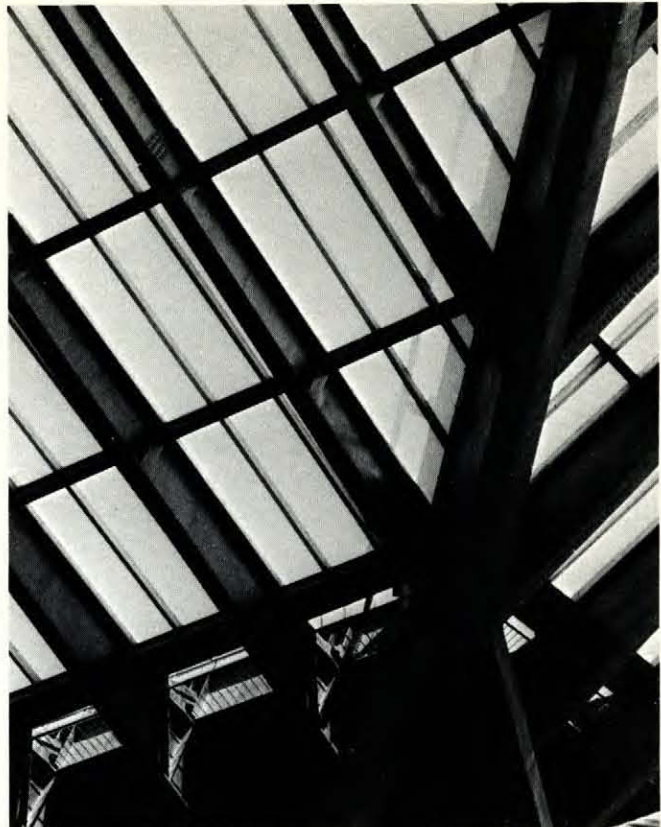
*Section through Katimavik*

2. DIMENSIONS –
  - a. Size: 9 differently sized structures over 11.5 acres.
  - b. Area: 270,000 sq. ft. (building space).
  - c. Height: 100' (Katimavik).
  - d. Stories: Five levels.
3. FOUNDATIONS – Expanded base concrete piles with pile caps and grade beams and spread reinforced concrete footings.
4. STRUCTURE – Combination of structural steel and B.C. Fir Laminated wood.
5. WALLS & EXTERIOR CLADDING – Steel curtain wall with clear glazing and P.V.C. plastic (part of roof covering).
6. ROOF – 4-ply asphalt and gravel, reinforced p.v.c. "Climate".
7. WINDOWS & ENTRANCES – Varnished rolled steel sections (store front type) with 1/4" polished plate glass.
8. INTERIOR FINISHES –
  - a. Floors: Brick laid in sand bed, vinyl-asbestos tile on concrete, painted concrete, carpet on concrete.
  - b. Walls: Gyproc on metal studs.
  - c. Ceilings: Gyproc on metal suspension.
9. MECHANICAL SYSTEMS –
  - a. Plumbing: Copper and cast iron with standard washroom fixtures.
  - b. Heating, ventilation, air conditioning: Electric heating coils in ductwork of air conditioning system; package type air conditioning units with ductwork distribution system.
  - c. Kitchen: Specially designed stainless steel equipment serving three restaurants.
10. ELECTRICAL –
  - a. Power: 12-1/2K.V., 3 phase; 5,700 K.V.A. incoming capacity.
  - b. Lighting: Fluorescent (administrative areas), incandescent (exhibition areas).
  - c. Audio-visual systems: Paging and music system, AM – FM tuner, record player.
11. SPECIAL TRAFFIC CONVEYING EQUIPMENT – Sloped elevators on corner spines of Katimavik.
12. FIRE PROTECTION – Standpipe system, sprinklers, fire alarm system.
13. SAFETY FEATURES – 8' high acrylic railing on top of Katimavik.

14. EXTERIOR WORK (where part of the construction contract) — Brick paving, landscaping, water exhibits.
15. OTHER ITEMS OF PARTICULAR INTEREST — Curtain wall.
  - a. Brief description: Steel curtain wall system, corroded and varnished surface.
  - b. Location: Arts Building.
  - c. Manufacturer or producer: Canadian Pittsburgh Industries Limited, St. Laurent, Quebec.
  - d. Nearest source of more information: Same.

16. COMMENTS — The largest complex at Expo, the Canadian Pavilion was made up of several interesting structures, including the Katimavik, on the 30 degree interior slopes of which were displayed various works of art. The inverted pyramid form was especially dominant at night when its translucent, turquoise colored, vinyl fabric glowed from within due to interior floodlighting.

The open-sided, multi-level, indoor-outdoor exhibit beneath the Katimavik, although somewhat confusing in their circulation patterns, possessed a pleasant airy feeling of informality, heightened by the tent-like, roof system and the hexagon-shaped, red brick with which they were paved. The laminated wood and steel structural systems emphasized very well some of Canada's major native materials.



*Underside of Katimavik*

*Exhibition area*





C. DATA ON INNOVATION – CANADA

1. NAME OF ITEM – P.V.C. "Climatite" Roofing.
2. LOCATION – Roofing throughout.
3. DESIGNER OR SELECTOR INVOLVED – Robbie/Schoeler/Stankiewicz, Ottawa, (architects).
4. WHY WAS ITEM SELECTED? To meet design requirements at an economical price.
5. WAS ITEM PRODUCED SPECIFICALLY FOR EXPO? Yes.
6. MANUFACTURER – Shawinigan Chemicals Limited, Montreal.
7. DISTRIBUTOR (nearest) – Manufacturer.
8. NEAREST SOURCE OF ADDITIONAL INFORMATION – Manufacturer.
9. INSTALLER OR SUBCONTRACTOR – Perini Quebec Inc., Montreal.

10. MARKETING –

- a. If the item is of Canadian Manufacture:
  - (i) Is it now also manufactured abroad? : Unknown.
  - (ii) Could it be manufactured abroad? : Yes.
  - (iii) What patents are involved? : Unknown.
- b. Is the item now commercially available? Yes, from Manufacturer.
- c. Is further research and development required before marketing in Canada? No.
- d. What is the marketing feasibility and/or potential of the item? A do-it-yourself material for domestic use.

11. TECHNICAL DATA AND EVALUATION –

- a. Generic and functional description: Translucent colored, flexible, reinforced polyvinyl chloride with a synthetic fabric scrim.

- b. Dimensions and weights (units): Rolls of unlimited length up to 54" wide, weighing 32 oz. per lin. yard (54" wide).
- c. Physical characteristics: Polyvinyl chloride.
- d. Durability and resistance to exposures (weather, chemicals, etc.): Good weather resistance as far as rain, snow and cold are concerned. Tends to break down under ultraviolet rays.
- e. Standards covering item: None.
- g. Alternate method of evaluation used in lieu of applicable standard: None.

12. PERFORMANCE RECORD –

- a. When and where was item first manufactured? : Fall, 1964, in Montreal.
- b. When and where was item installed? : Test structure at the National Research Council, Ottawa, in winter of 1964/65.
- c. Experience in manufacture: One and half years.
- d. Experience in installation (at Expo or elsewhere) – Other Expo pavilions:– Place d'Accueil, Man in the Community and Theme pavilions on Ile Sainte-Hélène.
- e. Service performance since installation: Unknown.
- f. Experience with Canadian climate: Good, remains resilient.
- g. Was item used for other purposes before? : No.
- h. Other suggested uses: Summer camps, carports, temporary structures.
- i. Other comments on performance: Remarkably strong, fulfilling design requirements.

13. COST DATA – Available from Shawinigan Chemicals Limited, Montreal.

14. COMMENTS – Extremely lightweight, the material provided a weather-tight cover at an economical price. Manufactured in roll form, its joints have to be waterproofed. For additional information, consult the manufacturer's literature available and test data possessed by the National Research Council in Ottawa.



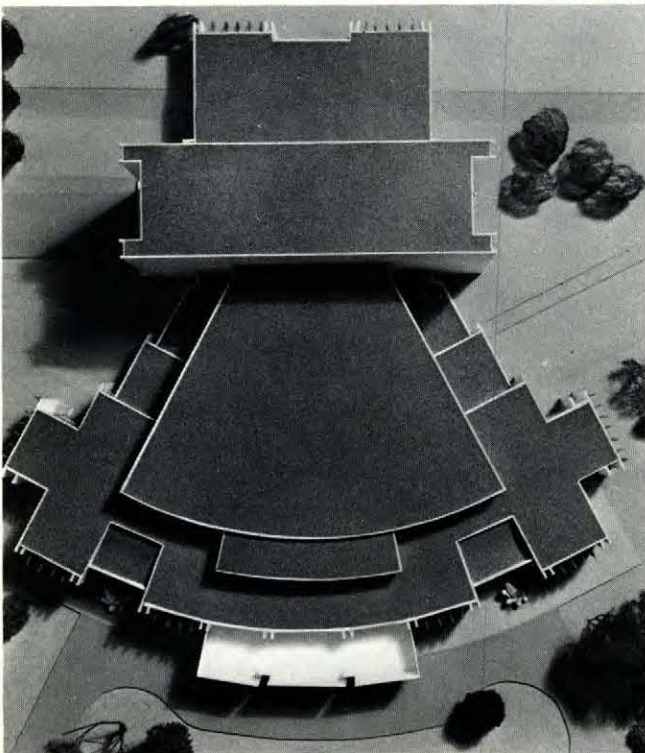
## EXPO THEATRE

### A. GENERAL DATA

1. NATURE OF PAVILION/STRUCTURE — Temporary.
2. LOCATION — Expo Area: Cité du Havre;  
Lot No. 2170;  
Kay Plan No. 215.
3. OWNER (or contracting body) — Canadian Corporation for the 1967 World Exhibition.
4. DESIGN ARCHITECT — John B. & John C. Parkin, Montreal.
6. CONSULTING ENGINEERS —
  - a. Structural: John B. & John C. Parkin, Montreal.
8. OTHER CONSULTANTS — Abe Feder, New York (theatrical lighting); Ben Schlanger, New York (seating and sight lines); Robert Tanner, Ottawa (acoustics).
9. GENERAL CONTRACTOR — J. Serrentino Construction Co. Ltd., Montreal.

### B. GENERAL DESCRIPTION OF PAVILION/STRUCTURE

*Roof "plan" showing shape of building*



1. FUNCTIONAL DESCRIPTION — Wedge shaped, the theatre was designed to hold 2,000 persons, 1,350 in the orchestra (continental seating with no aisles) and 650 in the balcony. Because of its temporary nature, economical exterior materials, primarily concrete block, were used. The building included extensive backstage facilities housed in the rear two storey section: rehearsal rooms, dressing rooms, green room, wardrobe, work shops, etc.
2. DIMENSIONS —
  - a. Size: 250' x 200'.
  - b. Area: 60,000 sq. ft.
  - c. Height: 90' (fly loft block), 79' (auditorium block).
  - d. Stories: Two.
3. FOUNDATIONS — Concrete piles, reinforced concrete grade beams.
4. STRUCTURE — Structural steel and reinforced concrete.
5. WALLS & EXTERIOR CLADDING — Painted concrete block (16" thick) and asbestos panels.
6. ROOF — Built up roofing on steel deck.
7. WINDOWS & ENTRANCES — Plate glass in black anodized aluminum frames.
8. INTERIOR FINISHES —
  - a. Floors: Carpet (auditorium), vinyl asbestos floor tile (lobby and public service areas), wood, concrete (exposed or monolithic colored).
  - b. Walls: Painted concrete block (service areas, backstage), cedar planking and fabric (auditorium), painted drywall.
  - c. Ceilings: Acoustic plaster, acoustic tile, plaster, limpet asbestos fire proofing (to exposed steel).
9. MECHANICAL SYSTEMS —
  - a. Plumbing: Standard; electric hot water heating (public areas), gas boiler (backstage area).
  - b. Heating, ventilation and air conditioning: The A.C. system was made up of 3 separate air handling sub-systems serving different areas of the building. The lobby, lounge and backstage areas were fed by separate multi-zone units; the auditorium by an all air handling unit. Exterior cooling tower; equipment within central mechanical room; total capacity 225 T. Heat was provided by electrical heating coils in ductwork (backstage areas), hot water heating coils in ductwork (lobby and lounges), supply air



(tempered) (auditorium). Heating was kept to a minimum since building was temporary and primary occupancy was to be during the summer months. All areas were mechanically ventilated.

c. Kitchen: Domestic type for staff.

10. ELECTRICAL —

- a. Power: 12,470 V incoming service; step down to 120/208 V service with 1,500 KVA transformer sub-station; 2 feeder entry with automatic transfer switch.
- b. Lighting: Incandescent.
- c. Audio-visual systems: Altec system of sound columns placed over proscenium arch.

11. SPECIAL TRAFFIC CONVEYING EQUIPMENT — Service elevator serving two levels (backstage area).

12. FIRE PROTECTION — Hose cabinet, extinguishers, stand pipe, fire retardant to wood and fabric, fire proofing of steel.

13. SAFETY FEATURES — Emergency lighting, smoke detection fire alarm system.

16. COMMENTS — Built of conventional economical materials suitable to a temporary building, this well designed (except for poor acoustics) structure directly expressed in its form the functions contained within. Of particular note was the use of many small, bare, incandescent bulbs which, at night, provided a gray theatrical atmosphere. At this writing, it is felt that the building could be easily converted to permanent use.

## HABITAT 67

### A. GENERAL DATA

1. NATURE OF PAVILION/STRUCTURE — Permanent.
2. LOCATION — Expo area: Cité du Havre;  
Lot No. 2600;  
Key Plan No.: 245.
3. OWNER (or contracting body) Canadian Corporation for the 1967 World Exhibition.
4. DESIGN ARCHITECT — Moshe Safdie and David Barott & Boulva, Montreal.
6. CONSULTING ENGINEERS —
  - a. Structural: Monti, Lavoie & Nadon & Assoc., Montreal
  - b. Mechanical and electrical: Nicholas Fodor & Associates, and Huza-Thibault, Montreal.
8. OTHER CONSULTANTS — Dr. A.E. Komendant, Montclair, New Jersey (Structural consultant); Community Development Consultants Ltd. (Development Consultants); George Fekete, Montreal, (wind tunnel test consultant).
9. GENERAL CONTRACTOR — Anglin Norcross Quebec Limited, St. Laurent, Quebec.
10. OTHER CONTRACTORS OF SPECIAL INTEREST — Francon 1966 Ltd., Montreal, Precast contractors for the entire structure.

### B. GENERAL DESCRIPTION OF PAVILION/STRUCTURE

1. FUNCTIONAL DESCRIPTION — Habitat consists of 354 precast concrete boxes, each 38'-6" long x 17'-6" wide x 10'-0" high, arranged on pile foundations to form an elongated, pyramid-type, apartment structure of 158 houses. (One house is made up of one,





two or three boxes, containing from one to four bedrooms.) Below grade are parking facilities for 175 cars. Horizontal circulation occurs at the ground, plaza and 6th and 10th street levels and connects vertically with three pairs of elevators and stair systems.

## 2. DIMENSIONS —

- a. Size: 950' long; width up to 250'
- b. Area: 400,000 sq. ft. (total floor area).
- c. Height: 120'
- d. Stories: 12

## 3. FOUNDATIONS — Expanded concrete base Franki piles, without casings, average 40' long. Pile caps support poured-in-place plaza slab which in turn supports the box structure.

## 4. STRUCTURE — Precast, prestressed concrete boxes post-tensioned in place using stress-steel bars connecting adjacent boxes. Boxes act structurally in clusters of 8 so that loads are taken down vertically

through box clusters and resolved horizontally in elevated streets. Streets act as beams spanning between elevator cores and other boxes or stairs. Streets are made of precast concrete members joined by means of posttensioning using Freyssinet cables stressed to 200 tons. There are also a few prestressed columns in the building.

## 5. WALLS & EXTERIOR CLADDING — 5" thick, sand blasted, precast, prestressed concrete, forming exterior part of boxes; on the interior, 2" thick beadboard insulation, laminated to concrete, finished with 1/2" gypsum wallboard with taped joints and painted.

## 6. ROOF — Neoprene-hypalon over precast concrete on standard roofs; cedar deck over neoprene-hypalon over precast concrete on terraces; concrete topping over precast concrete on streets.

## 7. WINDOWS & ENTRANCES — Standard residential, sash-type windows, a combination of extruded, anodized aluminum frames with neoprene sash units. All building entrance doors are extruded anodized aluminum (store front type); entrance doors to





houses are solid core wood.

## 8. INTERIOR FINISHES —

- a. Floors: 3/8" thick x 4-3/4" square, Birch parquet on plywood sub-floor on combination of 4" x 4" and 2" x 6" sub-floor framing which houses 10" high space for all plumbing and mechanical pipes, ducts etc.
- b. Walls: 1/2" thick gypsum wallboard (taped joints, painted) fastened to steel stud partitions.
- c. Ceilings: 1/2" gypsum wallboard generally glued to 2" thick beadboard insulation (in some cases on metal framing).

## 9. MECHANICAL SYSTEMS —

- a. Plumbing: A collection of external risers with fiberglass casings. Horizontal distribution through streets. Bathtubs and washbasins are made of fiberglass and form part of the floor and walls of the fiberglass bathroom. The water closets are standard vitreous china.

- b. Heating, ventilation, air conditioning: Central heating plant with hot and cold water piped to each individual unit. Below the floor of each box is a fan-coil unit which converts the hot or cold water into heat or cool air, feeding all areas of each box through a system of metal ducts. All piping copper insulated with fiberglass.
- c. Kitchen: Kitchen units consist of inside and outside plastic laminate counters and cupboards with aluminum extrusions and trim. All electric appliances such as range, oven and refrigerator are built-in. Kitchens are prefabricated and shipped to the site in sections.
- d. Other — Complete, centrally located irrigation system for watering and fertilization of landscaping and house terraces.

## 10. ELECTRICAL —

- a. Power: Drytype power and lighting transformers, Power — 125KV/600V, 3 $\phi$ ; Lighting — 600/120/240V, 1 $\phi$  and 600/120/208 V, 3 $\phi$ . Gasoline driven, emergency diesel generator, 500 V-3 phase. Snow melting M.I, copper clad — 600/347V.
- b. Lighting: Residential quality.

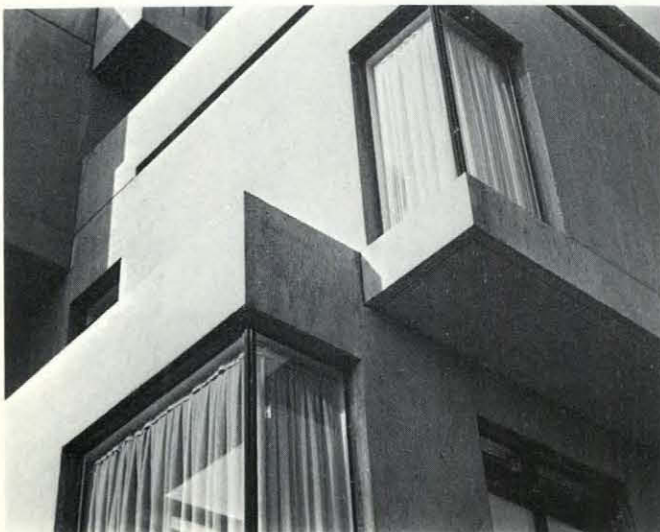
- 12. FIRE PROTECTION — Standpipe system with wall type hydrants on streets.

- 13. SAFETY FEATURES — Street shelter system consisting of continuous curved acrylic screens on one side of each elevated street which reduce air turbulence to equal that found at ground floor level.

- 14. EXTERIOR WORK — (where part of the construction contract) Top soil, grading, retaining walls and ground floor benches.

## 16. COMMENTS —

- a. General: Habitat, as an integrated urban community, was intended to show the layman how a downtown environment could be made desirable for family living. Whether or not it succeeded in this aim has been hotly debated, although there is no question that the basic idea and structural methods employed are very much worthy of future development. Construction costs, however, will have to be greatly reduced in order for this type of project to be completely feasible economically.
- b. Structure: A factory was established on the site at the end of Cité du Havre to produce the concrete





box units under controlled conditions. Reinforcing steel was set up in the form of a box cage to which a standard mold was applied and filled with concrete. When the concrete matured, the unit was moved into a time and money saving, assembly line type operation in which each sub-trade performed his particular task before the housing unit (completely finished) was lifted into place.

*Rail riding 100T derrick lifts 85T precast box into position with assistance of mobile crane*

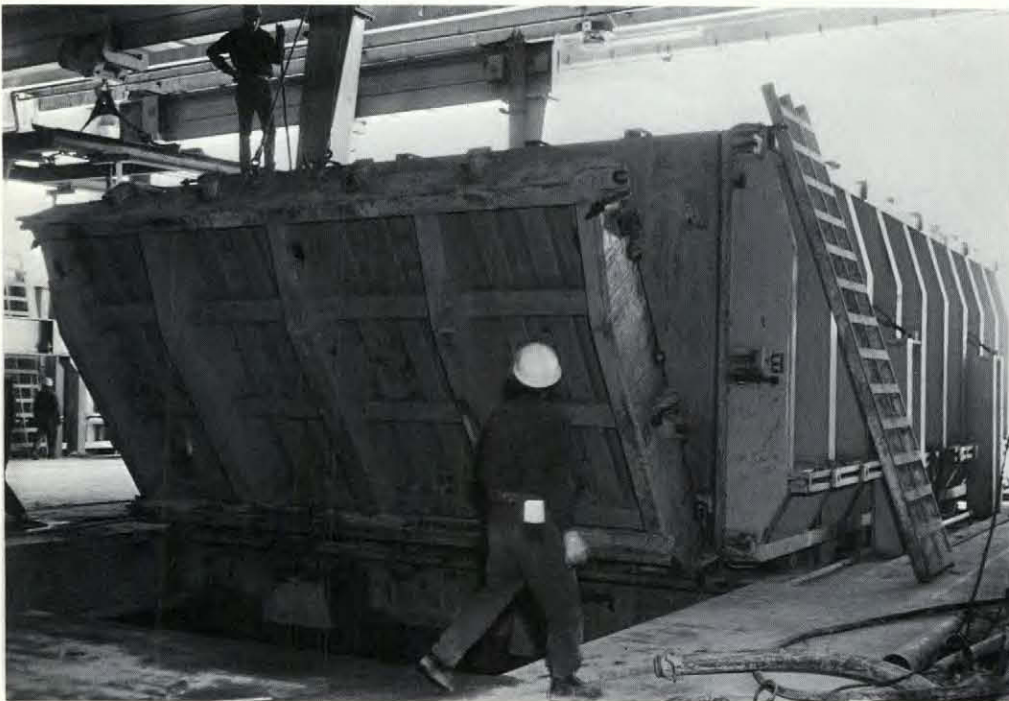


## C1 – DATA ON INNOVATION – HABITAT 67

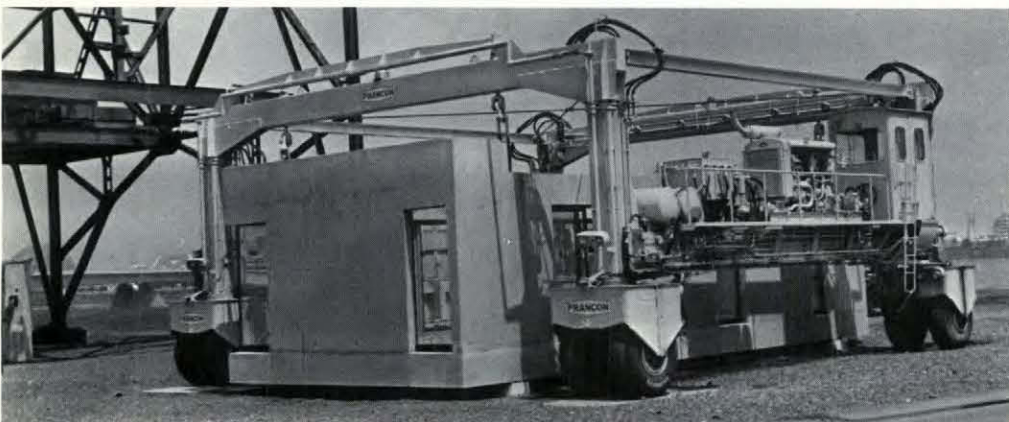
1. NAME OF ITEM – STRUCTURE
2. LOCATION – Superstructure.
3. DESIGNER OR SELECTOR INVOLVED – Dr. A.E. Kommendant, Montclair, New Jersey (Structural Consultant)
4. WHY WAS ITEM SELECTED? – to demonstrate potential of load bearing, three dimensional, precast concrete elements for multi-storey use.
5. WAS ITEM PRODUCED SPECIFICALLY FOR EXPO – Yes
6. MANUFACTURER – Francon 1966 Ltd., Montreal
7. DISTRIBUTOR (nearest) – Manufacturer
8. NEAREST SOURCE OF ADDITIONAL INFORMATION – Manufacturer
9. INSTALLER OR SUBCONTRACTOR – Manufacturer
10. MARKETING –
  - a. If the item is of Canadian manufacture:
    - (i) Is it now also manufactured abroad? : No
    - (ii) Could it be manufactured abroad? : Yes, under design copyright
    - (iii) What patents are involved? : None



*Prefabricated reinforcement cage brought to forms by special travel-lift.*



*Hinged forms for casting boxes in site plant*



*Precast box being rolled out of plant*



- b. Is the item now commercially available? : Yes, in present or adapted form from Francon 1966 Ltd., Montreal.
- c. Is further research and development required before marketing in Canada? : No.
- d. What is the marketing feasibility and/or potential of the item? : Contact manufacturer.

#### 11. TECHNICAL DATA AND EVALUATION —

- a. Generic and functional description: Arrangement of loadbearing precast elements with structural connections.
- b. Dimensions and weights(units): Each unit measures 38'-6" x 17'-6" wide x 10' high: Weight varies from 70 to 90 tons.
- c. Physical characteristics; The reinforcement of each box has an ultimate stress of 40,000 p.s.i. with connecting high tensile steel of 120,000 p.s.i. The concrete strength is 5000 and 6000 p.s.i. Connections between boxes are through 1" structural slotted neoprene pads.
- d. Durability and resistance to exposures (weather, chemicals, etc): The exterior surfaces of the boxes were sand blasted and left unfinished with no surface treatment. No problems concerning durability and resistance are anticipated due to the high concrete strength used.
- e. Standards covering item: No standards available to cover the technique (design technique within by-laws did not apply).
- f. Test data: Consult manufacturer.
- g. Alternate method of evaluation, used in lieu of applicable standard: unknown.

#### 12. PERFORMANCE RECORD: —

- a. When and where was item first manufactured? : 1965, McKay Pier, Expo '67.
- b. When and where was item first installed? : 1965, McKay Pier, Expo '67.
- c. Experience in manufacture: Due to the unknown accumulative load variations in the structural reinforcements, placement difficulties arose in the forms. This had to be resolved before critical levels (in height of building) were reached.
- d. Experience in installation (at Expo or elsewhere): Good, except for areas where final loads exceed original estimates. Two cranes instead of

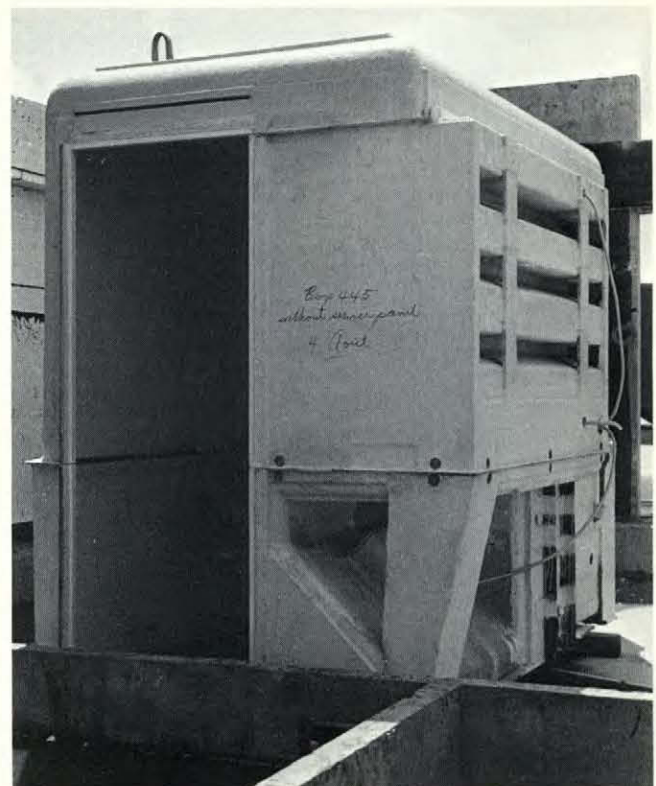
one were needed.

- e. Service performance since installation: No sign of settlement or movement. Erection stresses were far greater than actual in-place load stresses.
- f. Experience with Canadian climate: The system was designed to meet the conditions of the Canadian climate.
- g. Was item used for other purposes before? : No.
- h. Other suggested uses: Any type of multi-cellular building.

#### 13. COST DATA — Available from Francon 1966 Limited, Montreal.

- 14. COMMENTS — Advantages can be derived only from use for large scale multi-level developments. Its use is limited if applied only to loadbearing situations, but it is capable of incorporation within a structural frame system. Duplication of walls, floors and roofs constituted one of the reasons for the high costs encountered at Expo. The system, as used for Habitat, would be more suitable to a tropical climate.

*Prefabricated glass fibre reinforced plastic bathroom*





## C2 - DATA ON INNOVATION - HABITAT 67

1. NAME OF ITEM - Fiberglass bathrooms.
2. LOCATION - Bathrooms.
3. DESIGNER OR SELECTOR INVOLVED - Moshe Safdie, Montreal, (Designer)
4. WHY WAS ITEM SELECTED? To demonstrate assembly line techniques within the housing industry.
5. WAS ITEM PRODUCED SPECIFICALLY FOR EXPO? : Yes.
6. MANUFACTURER - Tielmans Inc., Montreal.
7. DISTRIBUTOR (Nearest) - Manufacturer.
8. NEAREST SOURCE OF ADDITIONAL INFORMATION - Manufacturer.
9. INSTALLER OR SUBCONTRACTOR - Singer Plumbing & Heating Co., Montreal; Meco Electric, Dorval, Quebec; Polar Air Conditioning Co. Ltd. Lachine, Quebec.
10. MARKETING -

- a. If the item is of Canadian manufacture:
  - (i) Is it now also manufactured abroad? : No.
  - (ii) Could it be manufactured abroad? : Yes, under license
  - (iii) What patents are involved? Design copy-write
- b. Is the item now commercially available? A similar unit is available based on the same principle from Reff Products Toronto, or Tielmans, Montreal.
- c. Is further research and development required before marketing in Canada? : Yes, in order to reduce costs. In addition, the fiberglass water closet is not permitted as yet by building codes.
- d. What is the marketing feasibility and/or potential of the item? : Good potential if manufacture can be streamlined to reduce the cost of the unit.

## 11. TECHNICAL DATA AND EVALUATION -

- a. Generic and functional description: The entire room and its contents were fabricated of reinforced fiberglass with a gelcoat finish. Connection stubs for plumbing, ventilation and electrical installation were cast in.

- b. Dimensions and weights (units): The size of a typical unit is 5'-0" x 9'-3". It weighs 1,500 lbs.
- c. Physical characteristics: Reinforced fiberglass lay-up type process with gelcoat finish contoured to form various bathroom fixtures, floor, walls and ceiling.
- d. Durability and resistance to exposures (weather, chemicals, etc.): Durability under normal use is good. If damaged, repairs can be made on the site.
- e. Standards covering item: Bylaw on flame spread rating.
- f. Test data: Consult manufacturer.
- g. Alternate method of evaluation, used in lieu of applicable standard: Unknown.

## 12. PERFORMANCE RECORD -

- a. When and where was item first manufactured? : 1965, Montreal
- b. When and where was item first installed? : 1965, Habitat.
- c. Experience in manufacture: Rather expensive
- d. Experience in installation (at Expo or elsewhere) Favourable.
- e. Service performance since installation: Unknown.
- f. Experience with Canadian climate: Not applicable, an indoor installation.
- g. Was item used for other purposes before? : No.
- h. Other suggested uses: None, bathrooms only.
- i. Other comments on performance: The gelcoat finish is vulnerable to cigaret burns. In addition, the material can shatter under abnormal impact.

## 13. COST DATA - Available from Tielmans Inc., Montreal.

14. COMMENTS - The unit has considerable potential if manufacturing costs can be reduced. Installation is most economical when handled, as at Expo, in an assembly line operation. Although the unit was developed for bathroom purposes, future research should be able to extend application of the idea to other kinds of indoor spaces.

C3 - DATA ON INNOVATION - HABITAT 67.

1. NAME OF ITEM - Municipal Sewer and Water Distribution.
2. LOCATION - Sewer and Water distribution throughout the building.
3. DESIGNER OR SELECTOR INVOLVED - Col. E. Churchill, Director of Installations for the Canadian Corporation for the 1967 World Exhibition.
4. Why was item selected? : As part of the requirement to use Expo as a testing ground for new developments.
5. WAS ITEM PRODUCED SPECIFICALLY FOR EXPO? : Yes

8. NEAREST SOURCE OF ADDITIONAL INFORMATION - Canadian Corporation for the 1967 World Exhibition, Montreal.

9. INSTALLER OR SUBCONTRACTOR - Singer Plumbing and Heating Co., Montreal

11. TECHNICAL DATA AND EVALUATION -

- a. Generic and functional description: Standard municipal sewer and water distribution system facilitating multi-level communities on each different street level.

14. COMMENTS - Facilitates development of multi-level communities. Recommended for further engineering and economic study.



## INDIANS OF CANADA

### A. GENERAL DATA

1. NATURE OF PAVILION/STRUCTURE — Temporary.
2. LOCATION — Expo Area: Ile Notre-Dame;  
Lot No. 4420;  
Key Plan No. 414.
3. OWNER (or contracting body) — Indian Affairs  
Branch, Department of Indian Affairs & Northern  
Development, Ottawa.
4. DESIGN ARCHITECT — J. W. Francis, Indian Affairs  
Branch.
5. LOCAL ASSOCIATE ARCHITECT — Douglass &  
Ross, Ottawa.
6. CONSULTING ENGINEERS —
  - a. Structural: Robert Halsall & Associates Limited,  
Toronto.
  - b. Mechanical & electrical: J. L. Richards &  
Associates Limited, Ottawa.
9. GENERAL CONTRACTOR — Douglas Bremner  
Contractors & Builders Limited, Montreal.

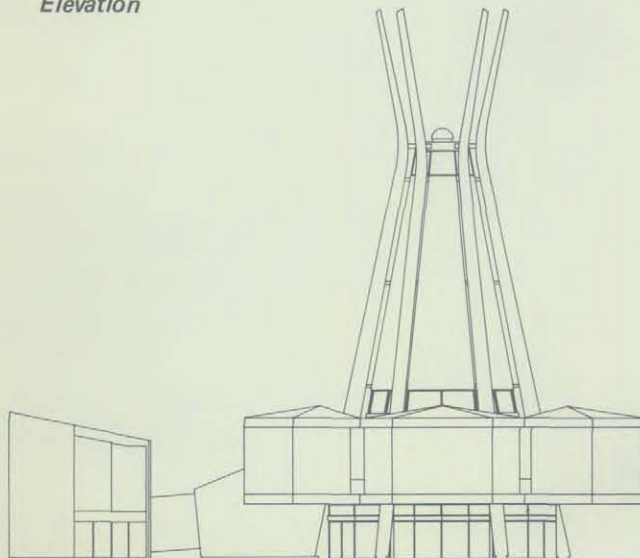
### B. GENERAL DESCRIPTION OF PAVILION/ STRUCTURE

1. FUNCTIONAL DESCRIPTION — The pavilion consisted of four separate sections linked by raised "tunnels". They were the Reception building (entered first); the "Land" building, with a forest-like interior representing the Indian environment before the white man came; the "People" building, which displayed the implements of daily life; and the main "Teepee", the largest element, in which was represented a typical Indian home.
2. DIMENSIONS —
  - a. Size: 80' diameter (teepee cluster); 20' x 40' (other structures).
  - b. Area: 6,900 sq. ft.
  - c. Height: 100' (teepee) and 20'.
  - d. Stories: Two plus basement (teepee); one (remaining).
3. FOUNDATIONS — Concrete piles (Franki expanded base type).



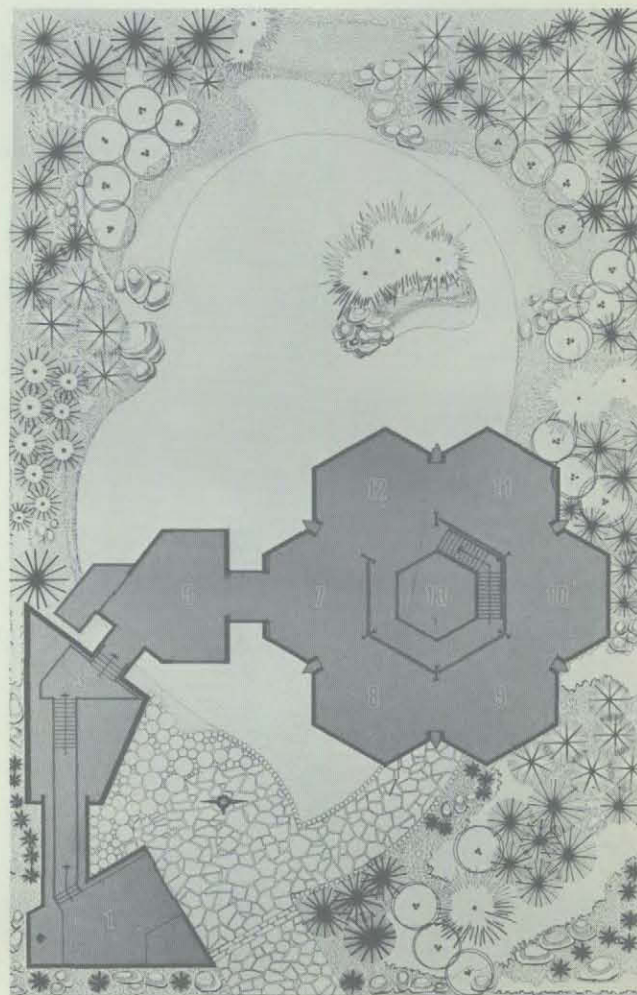
4. STRUCTURE — Steel frame.
5. WALLS & EXTERIOR CLADDING — Cedar boards on wood framing between steel framing members; plywood stressed-skin panels, site fabricated, covered with vinyl sheeting on teepee sides (to represent canvas) applied with special adhesive (3M).
6. ROOFS — Flat lower roofs covered with Neoprene-Hypalon; teepee was topped with large plastic sky-dome.
7. WINDOWS & ENTRANCES — Pella wood sliding doors, fixed single glazing in redwood frames.
8. INTERIOR FINISHES —
  - a. Floors: Maple hardwood strip floors finished with polyurethane.
  - b. Walls: Drywall (1/2" gypsum board, taped joints), old wood boarding (for used effect).
  - c. Ceilings: Cedar, 4" T & G, V-groove boarding (1/2" firecode gypsum behind for fireproofing).
9. MECHANICAL SYSTEMS —
  - a. Plumbing: Conventional washroom.
  - b. Heating, ventilation, air conditioning: Heating and cooling by fan-coil units in ceilings; pond outside and inside building used for cooling; some ducting in places; no ventilation.
10. ELECTRICAL —
  - a. Power: Shared transformer vault with neighbouring UN Pavilion.

*Elevation*



**Plan key**

- 1 *Reception*
- 3 *The land*
- 5 *The people*
- 7 *The white man*
- 8 *Wars, treaties and betrayals*
- 9 *Religion*
- 10 *Government interest and reserves*
- 11 *Work life*
- 12 *Education*
- 13 *The future*





b. Lighting: Incandescent.

c. Audio-visual systems: Sounds of forest in forest area and taped commentary were part of exhibit contracts.

12. FIRE PROTECTION — Firehose cabinets, standpipe.

14. EXTERIOR WORK (where part of the construction contract) — 65' Totem Pole, installed by general contractor, supplied by B.C. Indians (Kwakiutl tribe), on steel grid and concrete foundations; exterior shrubs and landscaping; sawed log sections for patio platform.

15. OTHER ITEMS OF PARTICULAR INTEREST —

a. Brief Description — Vinyl wall sheeting with special 3M adhesive.

b. Location: Exterior of teepee.

c. Manufacturer or producer: Canadian Industries

Limited, Montreal (vinyl); 3M Company, Montreal (adhesive).

d. Nearest source of more information: Same.

16. COMMENTS — The pavilion's design was originated by the Indian Affairs Branch in conjunction with the Indians of Canada and approved by all Canadian Indian Chiefs. Achieved were traditional Indian structures "clothed in contemporary fashion", in which was told the story of the Indian's life, both before and after the white man came.

Certain structural problems were encountered due to the building having been designed without enough regard for winter conditions. The result was serious interior condensation causing the hypalon (with which the gypsum board over the link structures was covered) to bubble. The coverings had to be changed to plywood with neoprene-hypalon and vented.



## LABYRINTH

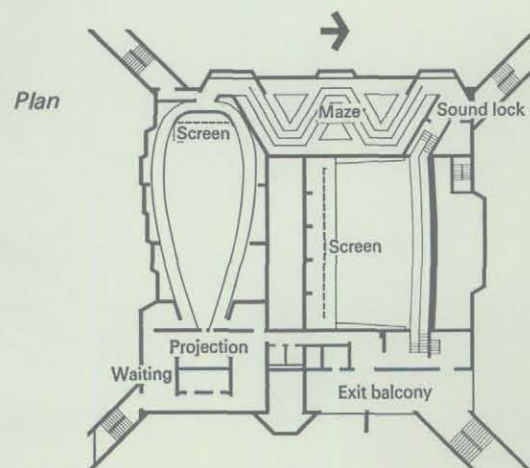
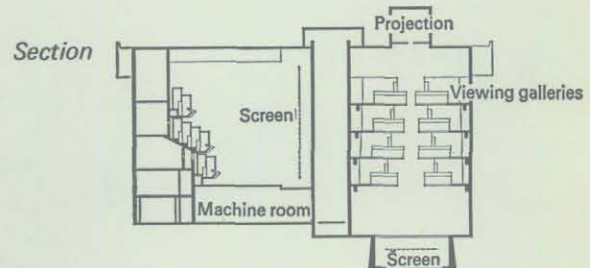
### A. GENERAL DATA

1. NATURE OF PAVILION/STRUCTURE — Temporary.
2. LOCATION — Expo Area: Cité du Havre;  
Lot No. 2500;  
Key Plan No. 239.
3. OWNER (or contracting body — Canadian Corporation for the 1967 World Exhibition.
4. DESIGN ARCHITECT — Bland, Lemoyne, Edwards, Shine, Montreal.
6. CONSULTING ENGINEERS —
  - a. Structural: R.R. Nicolet & Assoc., Montreal.
  - b. Mechanical & electrical: N.J. Pappas & Assoc., Montreal.
8. OTHER CONSULTANTS — N.J. Pappas & Assoc., Montreal (acoustics).
9. GENERAL CONTRACTOR — Ron Engineering & Construction (Quebec) Ltd., Montreal.

### B. GENERAL DESCRIPTION OF PAVILION/STRUCTURE

1. FUNCTIONAL DESCRIPTION — Housed within this rather unusual architectural form, were two, four-level, film viewing chambers, connected by an exhibition mirror maze, in addition to work shops administration offices, a V.I.P. lounge and service areas. This pavilion, with its significant new developments in cinematography, was one of the most successful at Expo.
2. DIMENSIONS —
  - a. Size 110' x 110'.
  - b. Area: 60,000 sq. ft.
  - c. Height: 68'.
  - d. Stories: Five.
3. FOUNDATIONS — Reinforced concrete foundation walls on spread concrete footings.
4. STRUCTURE — Reinforced concrete with structural steel roof trusses.

5. WALLS & EXTERIOR CLADDING — Exposed concrete, fascia of stained vertical wood planking.
6. ROOF — Built up roofing on concrete slab.
7. WINDOWS & ENTRANCES — Plate glass in wood frames.
8. INTERIOR FINISHES —
  - a. Floors: Vinyl asbestos floor tile, sisal carpet, painted concrete.
  - b. Walls: Exposed concrete (plain or sandblasted), sisal carpet panels, plaster, exposed concrete block.
  - c. Ceilings: Exposed concrete painted, acoustical tile, plaster.
9. MECHANICAL SYSTEMS —
  - a. Plumbing: Standard; oil heated water system.
  - b. Heating, ventilation, air conditioning: Central AC system; air handling system with direct expansion cooling coils, multiple zone hot water reheat coils, thermostatically controlled; reciprocating compressor with roof mounted cooling tower;



storage tank with heat exchanger fed by hot water boiler; total AC capacity 110 tons. All public, administration and projection areas were fully ventilated (mechanically).

- c. Kitchen: Domestic type for staff.

10. ELECTRICAL —

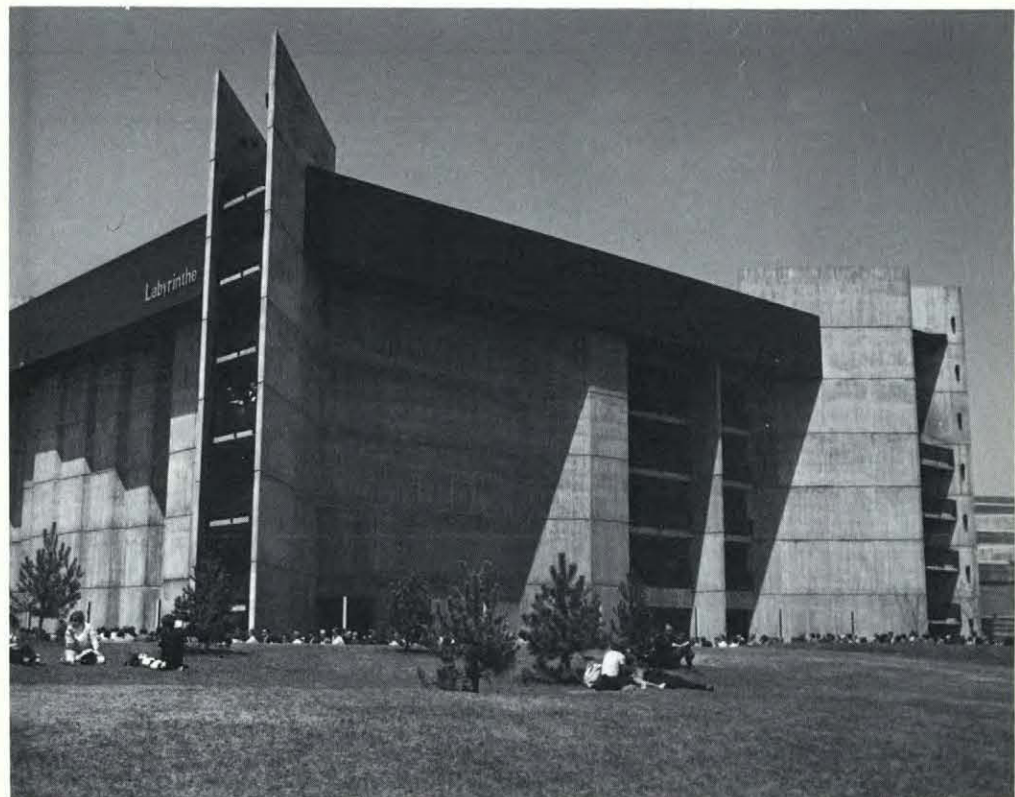
- a. Power: 12,000 V incoming service step down to 600 V service for equipment with 600 KVA dry transformer and to 120/208 V service with 225 KVA dry transformer.
- b. Lighting: Incandescent generally, fluorescent (services areas and administration offices); 10 ft. candles (exhibit areas), 30-50 ft. candles (public areas), 75 ft. candles (administration offices).
- c. Audio-visual systems: Part of exhibits contract.

- 11. SPECIAL TRAFFIC CONVEYING EQUIPMENT — 2 public and one service elevator, each 3,000 lbs capacity, serving all levels of building.

- 12. FIRE PROTECTION — Hose cabinets, fire extinguishers, exposed wood and sisal carpet fire retardant treated.

- 13. SAFETY FEATURES — Emergency lighting, smoke detection fire alarm system.

- 16. COMMENTS — The building was designed in extremely good taste. The film exhibitions and the architecture were very well integrated, as exemplified by the quality of the spaces which complemented the theme and helped produce some exciting effects. The pavilion was set on open ground affording views of the river and Montreal from the corner exit balconies.





## MAN AND HIS HEALTH

### A. GENERAL DATA

1. NATURE OF PAVILION/STRUCTURE — Temporary.
2. LOCATION — Expo Area: Cité du Havre;  
Lot No. 2550;  
Key Plan No. 240.
3. OWNER (or contracting body) — Canadian Corporation for the 1967 World Exhibition.
4. DESIGN ARCHITECT — Erickson & Massey, Montreal.
6. CONSULTING ENGINEERS —
  - a. Structural: Janos Baracs, Montreal.
  - b. Mechanical & electrical: Bouthillette & Parizeau, Montreal.
8. OTHER CONSULTANTS — Jeffrey Lindsay & Assoc. Hollywood, California (structural).
9. GENERAL CONTRACTOR — Secant Construction Co., Montreal.
10. OTHER CONTRACTORS OF SPECIAL INTEREST — Triodetic Structures, Ottawa (spaceframe) and Tower — Lamco Structures Ltd., Montreal (laminated beams).
3. FOUNDATIONS — Concrete piles, reinforced concrete foundations.
4. STRUCTURE — The central roof structure was a triodetic spaceframe (over inner theatre core), supported on five structural steel columns. The remaining structure was made up of plywood boxed beams in hexagonal rings (same as "Man in the Community").
5. WALLS & EXTERIOR CLADDING — Stained, rough B.C. fir wood planking.
6. ROOF — Built up roofing over wood deck.
7. WINDOWS & ENTRANCES — Plate glass in wood frames (VIP lounge only).
8. INTERIOR FINISHES —
  - a. Floors: Carpet (predominant), sheet vinyl with non-slip finish on ramps, wood pavers.
  - b. Walls: Painted dry wall.
  - c. Ceilings: Painted plaster (inner core where space-frame structure is not exposed); exposed stained wood structure.
9. MECHANICAL SYSTEMS —
  - a. Plumbing: Standard.
  - b. Heating, ventilation, air conditioning: Six separate systems served the various areas of the building. They were made up of 5 package condensing fan coil units complete with compressor receiver and evaporative condensers and 2 self contained heat pump units; total capacity, 119T. Heating by gas vacuum, single high temperature, radiation system (CO-RI-VAC system). Ductwork from AC units led to ceiling or wall grilles. Building was fully ventilated mechanically.

### B. GENERAL DESCRIPTION OF PAVILION/STRUCTURE

1. FUNCTIONAL DESCRIPTION — The building was constructed in the same hexagonal shape but without the spire of the adjoining "Man in the Community" pavilion. It consisted primarily of two parts: a hexagonal perimeter, which contained varied exhibits in five large sectors of "graphic walls" and free standing modular "islands", and an inner theatre core where live demonstrations were held, visible from two spiral ramps.
2. DIMENSIONS —
  - a. Size: Hexagonal shape (100' length of each wall; 200' across).
  - b. Area: 26,000 sq. ft.
  - c. Height: 42'.
  - d. Stories: One.
10. ELECTRICAL —
  - a. Power: 12,000 V incoming service step down to 600 V service for equipment with 225 KVA dry transformer and 110/208V service with 1500 KVA dry transformer. The station served both this building and the "Man in the Community" pavilion in which it was located.
  - b. Lighting: Incandescent (house lighting) and fluorescent (public service areas). Main sources of light came from the exhibits.



- c. Audio-visual systems: Part of Exhibits contract.
12. FIRE PROTECTION — Hose cabinets, extinguishers, fire retardant of all exposed wood, plaster on structural steel members (columns and spaceframe), sprinkler system over central core and viewing ramps.
13. SAFETY FEATURES — Emergency lighting, smoke detector fire alarm system.
14. EXTERIOR WORK (where part of the construction contract) — Exterior crib walls on landscaped terraces, extensive landscaping.

16. COMMENTS — Although directly linked to the "Man in the Community" pavilion, this low completely enclosed building was not meant to be an imposing structure. It was more of an "inward" building in which the inner-core theatre with its viewing ramps was the most important area.

The two buildings were well integrated into a unified complex through use of the same materials and forms (the hexagonal ring beams) and connecting landscaped terraces.

*Section of Man and His Health, and Man In the Community*



## MAN IN THE COMMUNITY

### A. GENERAL DATA

1. NATURE OF PAVILION/STRUCTURE — Temporary.
2. LOCATION — Expo Area: Cité du Havre;  
Lot No. 2550;  
Key Plan No. 240.
3. OWNER (or contracting body) — Canadian Corporation for the 1967 World Exhibition.
4. DESIGN ARCHITECT — Erickson and Massey, Montreal.
6. CONSULTING ENGINEERS —
  - a. Structural: Janos Baracs, Montreal.
  - b. Mechanical and electrical: Bouthillette & Parizeau, Montreal.
8. OTHER CONSULTANTS — Jeffrey Lindsay and Assoc., Hollywood, California (structural).
9. GENERAL CONTRACTOR — Secant Construction Co., Montreal.
10. OTHER CONTRACTORS OF SPECIAL INTEREST — Triodetic Structures, Ottawa (Spaceframe) and Tower-Lamco Structures Ltd., Montreal (laminated beams).

### B. GENERAL DESCRIPTION OF PAVILION/STRUCTURE

1. FUNCTIONAL DESCRIPTION — The pavilion was built up of 29 layers of overlapping plywood box beams, laid in a diminishing, hexagonal arrangement to form a graceful, lattice-like, concave cone. Covered by this structure were a central garden and pond and, on the periphery, six enclosed exhibition theatres and several landscaped courtyards. The top of the cone was left uncovered, as was the open lattice-work of the upper half of the beam structure, to allow natural light and rain to enter. (Rainwater was collected in the central pool which contained several kinds of colored fish.) The openings of the lower half of the beam structure were covered with strips of translucent laminated plastic.

The pavilion was entered and exited through transitional courtyards, one containing sculpture and trees, the other banked with brightly colored flowers.

### 2. DIMENSIONS —

- a. Size: 285' in diameter at base.
- b. Area: Approx. 50,000 sq. ft.
- c. Height: 140'.
- d. Stories: One.

### 3. FOUNDATIONS — Concrete piles, reinforced concrete foundation.

### 4. STRUCTURE — The cone structure was open at ground level and supported by circular, reinforced concrete columns located in pairs. The six plywood boxed beams making up each structural layer were connected end to end to form a hexagonal ring, each of which was smaller than the one below. The exhibition theatres were covered by steel triodetic space frames.

### 5. WALLS & EXTERIOR CLADDING — Stained rough-sawn B.C. fir wood cribbing (planking) and tinted textured glass (St. Gobain).

### 6. ROOF — Plywood box beams with spaces between, some of which were framed by wood purlins to which translucent vinyl fabric was fastened.

### 7. WINDOWS & ENTRANCES — No windows, open entrances.

### 8. INTERIOR FINISHES —

- a. Floors: Exposed aggregate (garden and pond area), 14" x 14" wood (3" thick timber) pavers, wood planking on bridges, carpet (exhibition theatres).
- b. Walls: Exposed concrete block, painted or covered with exhibits, (exhibition theatres), wood cribbing (planking).
- c. Ceilings: Plywood box beams, translucent vinyl, exposed spaceframe or plastic (suspended ceiling) in theatres.

### 9. MECHANICAL SYSTEMS —

- a. Plumbing: Standard
- b. Heating, ventilation, air conditioning: 5 separate systems served the various areas of the building. They were made up of 1 package condensing fan coil unit with separate compressor and receiver and 12 self contained heat pump units, total





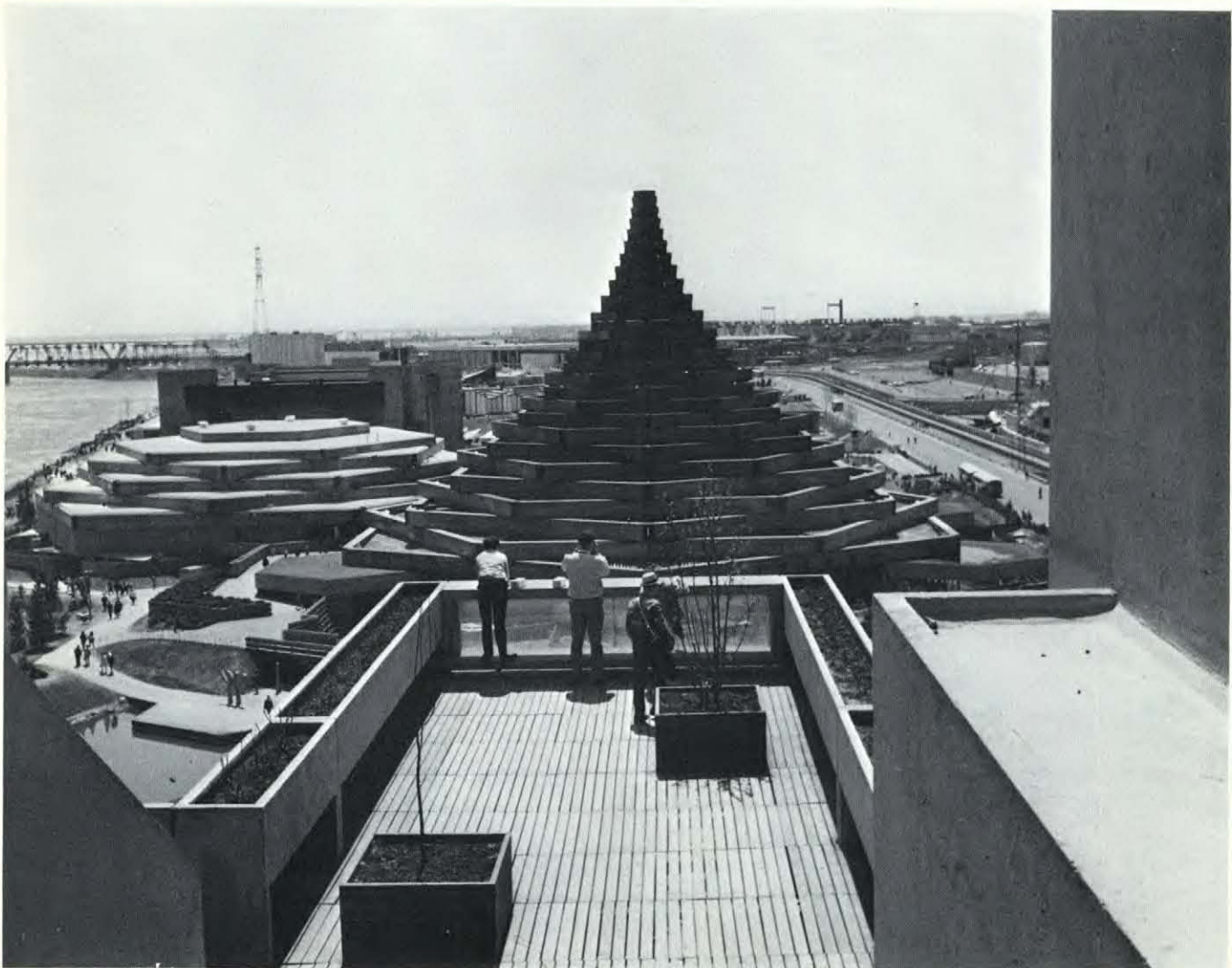
*Underside of roof*



*Looking up into open cone roof*

*Man and His Health*

*Man in the Community*





capacity 86T; ductwork from AC units led mainly to wall grilles. (Units housed in wall cribbing.) Heating by electric coils in ductwork. Enclosed areas were mechanically ventilated.

- c. Kitchen: Domestic type for staff.
- d. Other: Aeration system for pond pools.

#### 10. ELECTRICAL —

- a. Power: 12,000V incoming service step down to 600 V service for equipment with 225 KVA dry transformer and 110/208V service with 1500 KVA dry transformer. Substation served both this building and adjoining "Man and his Health" but was situated in this pavilion.
- b. Lighting: Incandescent throughout, roof was also lighted producing soft indirect effect at night through translucent fabric roofing.
- c. Audio-visual systems: Part of exhibits contract.

#### 12. FIRE PROTECTION — All wood was treated with fire retardant coating. Hose cabinets, extinguishers.

#### 13. SAFETY FEATURES — Emergency lighting, smoke detection fire alarm system.

#### 14. EXTERIOR WORK (where part of the construction contract) — Landscaping; ramps; exterior wall cribbing and box beams out of which were created terraces leading up and into the building.

#### 15. OTHER ITEMS OF PARTICULAR INTEREST — Plywood box beams.

- a. Brief description: 3' wide x 5' deep x 110' long (max. sized beams), made up of series (max. 3) of laminated component plywood box beams constructed of 1-1/4" thick B.C. fir plywood sides and laminated wood caps. Component box beams measured 11-1/4" wide and were laminated together to form actual beams.
- b. Location: Hexagonal beam rings of roof structure.
- c. Manufacturer or producer: Tower — Lamco Structures Ltd.
- d. Nearest source of more information: Lamco Structures Ltd., Montreal.

#### 16. COMMENTS — The use of boxed plywood hexagonal beams arranged in diminishing and staggered hexagonal rings created a graceful exterior and a powerfully serene interior. Structurally, the system was both stable and logical and could easily be adopted for

other purposes. The hexagon pattern was effectively carried throughout the building complex (including "Man and his Health") as a unifying module.

Due to the long spans of the structural system, a vast clear central space, bounded only by a geometric lattice pattern of beams and purlins, was created which was very dramatic in character. Its overall effect upon the visitor, in fact, was one of almost hypnotic calm and serenity, a strong contrast to the noisy, image-packed, interiors of the surrounding exhibition theatres. The one-way circulation route through the pavilion enhanced this effect, as the visitor constantly re-entered the open space to get from one exhibition theatre to another.

Another important factor contributing to the quality of the space was the use of translucent vinyl roofing fabric, which permitted the interior to be illuminated both by natural light during the day and borrowed light at night.

The following comments were taken from a paper by Mr. Jeffrey Lindsay, Space Frame Consultant for the project. Entitled, "Space Structures As Preoccupation", it was written for the 1966 International Conference on Space Structures prior to construction of the pavilion at Expo.

"This pavilion is to house the exhibits for Man in the Community and Man in Health. The general requirement was the same as for the other Theme Pavilions.\* Two planning differences are to be noted. The exhibitors had requested one large free span volume enclosure, and timber was suggested as the preferred material.

"The form of the Pavilion had to be distinctive and complement the neighbouring buildings which had already been designed. The architecture was fairly quickly envisioned as a rough textured concave cone defined by box section hexagons stacked one on top of another with alternate courses slewed 30 degrees. The enclosing membrane was to be translucent and non-structural.

"As detailed, the beams have glue-laminated fir or sawn fir top and bottom chords spaced by solid fir plywood webs. The larger beams have multiple webs. Sizes progressively diminish from 38" x 60" x 86' to 4" x 24" x 6' for each of the twenty-nine hexagonal courses.

"The enclosing membrane is a laminate of two polyethylene films, sealed together through the open weave of a polyester filament reinforcement. This translucent plastic is stapled and glued in strips between pairs of fir purlins set at 1' centres and

forming flat triangular rafts. The purlins are cut from 2" thick stock with the depth dependent on span. The rafts are hung from under the beams, and pitch down towards the lower inside face of the hexagon below. Rainwater runs from level to level off the lower edges of the plastic covered rafts and is caught by the 3' underlap of the rafts immediately below.

"After the preliminary design had been approved, the exhibitors requested blacked out enclosures for motion picture displays. There were accommodated both inside and outside the original configuration by similar but conventionally enclosed additions. Also included was a standard Fentiman Triodetic octahedron tetrahedron truss in aluminum.

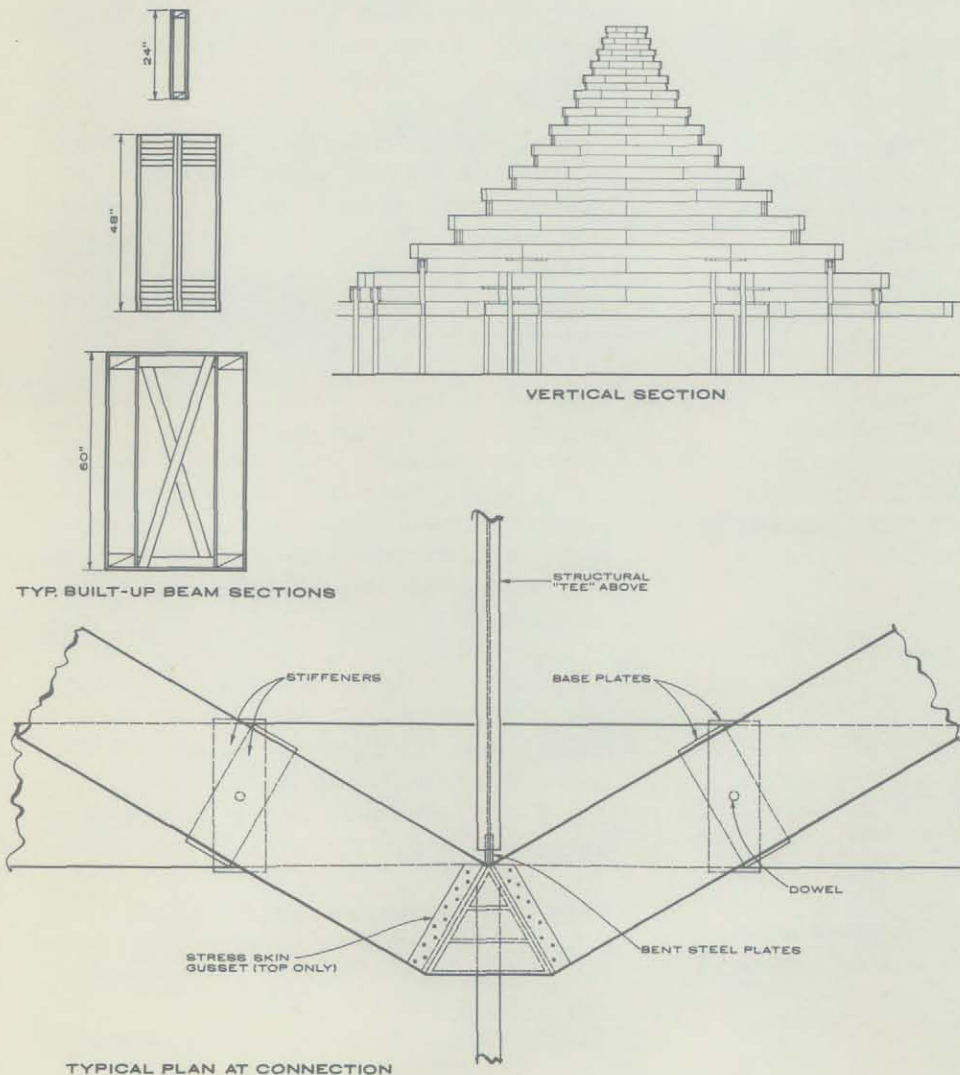
"This timber space structure is the antithesis of the steel system used for the other Theme Pavilions. It happened easily and without contention. It conforms to the modern premise in that the components and fastenings are clearly standardised, and closely regulated industrial processes are used to produce the main structural members. Although these are large they can be efficiently handled by machine. Toler-

ances are not an issue because there are relatively few joints and the triangulation is stacked, rather than met.

"There are relatively few pieces for so large a structure. Erection is expected to take about ten working days. The purlins and the membranes should take an additional twenty working days. There are also lateral steel braces to install which join the top corners of the hexagons to the under centres of the next beam above.

"The justification for this disarmingly simple and structurally circuitous system rests in the merit of the integral architecture. Note that each beam ends on the centre of the beam below. The live and dead loads are therefore routed the longest way down through the configuration, and six concrete columns reduce the moments in the lowest and longest beams. This Pavilion demonstrates that proficient space structure standardisation can swallow inefficient engineering."

\* Man the Producer and Man the Explorer.





## MAN THE EXPLORER

### A. GENERAL DATA

1. NATURE OF PAVILION/STRUCTURE — Temporary.
2. LOCATION — Expo Area: Ile Sainte-Hélène;  
Lot No. 3010, 3280, and 3310;  
Key Plan No. 320.
3. OWNER (or contracting body) — Canadian Corporation for the 1967 World Exhibition.
4. DESIGN ARCHITECT — Affleck, Desbarats, Dimakopoulos, Lebensold, Sise, Montreal.
6. CONSULTING ENGINEERS —
  - a. Structural: Eskenazi, Baracs, de Stein & Associates, Montreal.
  - b. Mechanical and electrical: Cote, Leclair, Langlois & Boisvert, Montreal.
  - c. Other: Jeffrey Lindsay and Associates, Montreal,

(Space frame systems).

8. OTHER CONSULTANTS — Bolt, Beranek and Newman Inc., Cambridge, Mass. (Acoustics); Helyar, Vermuelen, Rae & Mauchan, Montreal (Quantity Surveyors); Wm. M.C. Lam, Cambridge, Mass. (Lighting); Ben Schlanger, New York, (Circulation Control); Smith, Sommerville & Co. Ltd., Montreal, (Project Scheduling).
9. GENERAL CONTRACTOR — Perini Quebec Ltd., Montreal.
10. OTHER CONTRACTORS OF SPECIAL INTEREST — Dominion Bridge Co. Ltd., Lachine, Quebec (fabricators and erectors of steel space frame).

### B. GENERAL DESCRIPTION OF PAVILION/STRUCTURE

1. FUNCTIONAL DESCRIPTION — This complex consisted of three separated building units which not







only housed four theme exhibit areas but also served as orientation markers for visitors. They were connected by aerial decks and walkways and arranged to enclose a large plaza.

## 2. DIMENSIONS —

- a. Size: 3 buildings, hexagonal in shape, each 130' across.
- b. Area: 132,000 sq. ft.
- c. Height: 100'.
- d. Stories: varied from one to three.

## 3. FOUNDATIONS — Reinforced concrete pile caps on steel tube piles, reinforced concrete foundation walls.

## 4. STRUCTURE — Structural steel spaceframe (truncated tetrahedron), concrete floor and roof slabs over spaceframe.

## 5. WALLS & EXTERIOR CLADDING — 1/2" thick stained plywood shingles.

## 6. ROOF — Standard built-up roofing over concrete deck.

## 7. WINDOWS & ENTRANCES — Translucent, polyester reinforced, vinyl, triangular openings in wood frames; wood doors and frames for entrances.

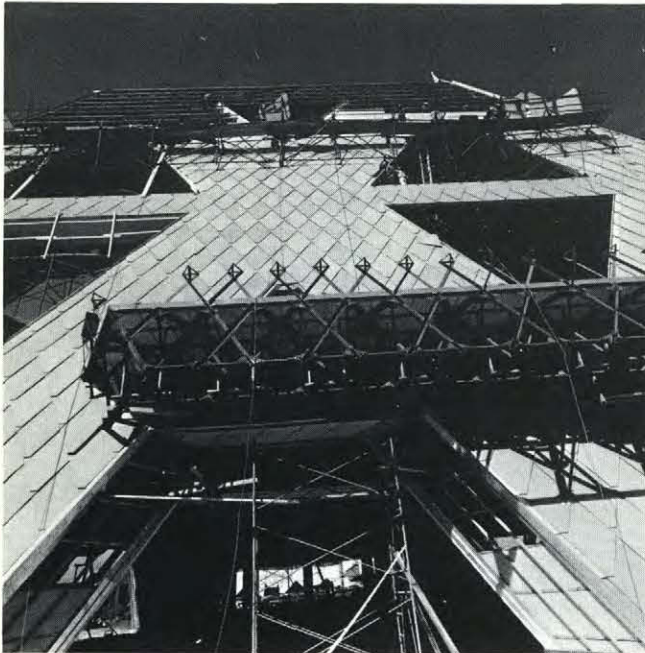
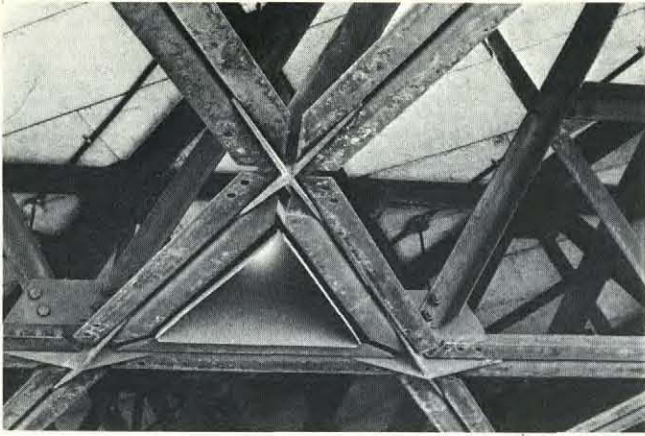
## 8. INTERIOR FINISHES —

- a. Floors: Exposed concrete, rubber non-slip sheeting, plexiglas.
- b. Walls: Exposed steel structure, painted drywall, cement wood fiber.
- c. Ceilings: Exposed steel structure, painted drywall, cement wood fiber.

## 9. MECHANICAL SYSTEMS —

- a. Plumbing: Standard; gas fired domestic hot water system.
- b. Heating, ventilation, air conditioning: Air conditioning in isolated areas only such as theatres,





*Upper — detail of steel framing*

*Lower — under construction*

VIP and administration, with package fan coil units, distribution ductwork, chilled water system from central cooling tower; total of 3 separate systems, capacity 200 T; gas fired heating system; exhaust fan ventilation of washrooms and ancillary areas, remaining, part of A.C. system.

- c. Kitchen: Commercial type of kitchen equipped by concessionaire; domestic type for VIP lounge.
- d. Other: Gas service, plumbing to exterior pools and special exhibits.

#### 10. ELECTRICAL —

- a. Power: 12,000 V, 2 feeder service entry, step

down to 120/208 V service with 3 separate, dry type transformers each in different locations, 2-750 KVA and 1-450 KVA.

- b. Lighting: Incandescent houselighting, mercury lighting (maintenance areas), incandescent exterior lighting.
- c. Audio-visual systems: Part of exhibits contract.
- d. Other: Special electrical services to exhibits.

#### 11. SPECIAL TRAFFIC CONVEYING EQUIPMENT —

Glass sided escalators, total of 4, rising approx. 20'.

#### 12. FIRE PROTECTION —

Hose cabinets, extinguishers, wood painted with fire retardant paint, heat detection and manual station fire alarm system.

#### 13. SAFETY FEATURES —

Battery operated emergency lighting system.

#### 14. EXTERIOR WORK (where part of the construction contract) —

Pools, decorative fountains, landscaping, plaza, terraces.

#### 15. OTHER ITEMS OF PARTICULAR INTEREST —

##### 1. Structural steel spaceframe.

- a. Brief description: Steel spaceframe, the geometry of which was defined by truncated tetrahedrons, 3'-3" node to node, to form a three dimensional modular system. This system was composed of welded plate node assemblies bolted to folded steel angle chord and web members.

- b. Location: Wall, roof and floor.

- c. Manufacturer or producer: Dominion Bridge Co. Ltd., Lachine, Quebec.

- d. Nearest source of more information — Same.

##### 2. Cement fibre board.

- a. Brief description: Composite cement binder and wood fibre rigid board used for sound absorbing, thermal insulation and formboard throughout the project; product name "TECTUM".

- b. Location: Walls, roof and floors.

- c. Manufacturer or Producer: National Gypsum (Canada) Ltd., Montreal.

- d. Nearest source of more information: Same.

#### 16. COMMENTS —

See "Man The Producer".



## MAN THE PRODUCER

### A. GENERAL DATA

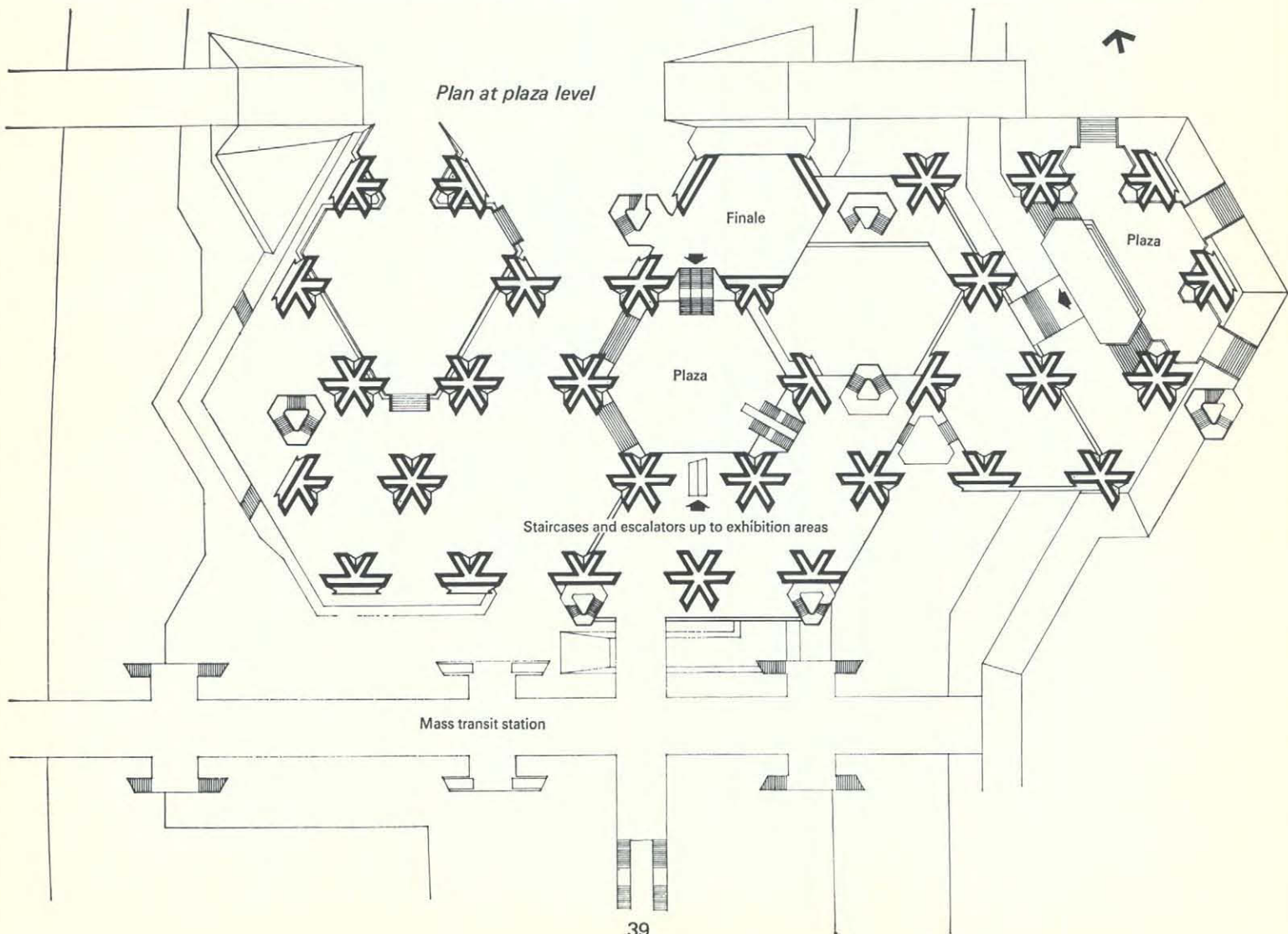
1. NATURE OF PAVILION/STRUCTURE — Temporary.
2. LOCATION — Expo Area: Ile Notre-Dame;  
Lot No. 4137, 4237 and 4238;  
Key Plan No. 440.
3. OWNER (or contracting body) — Canadian Corporation for the 1967 World Exhibition.
4. DESIGN ARCHITECT — Affleck, Desbarats, Dimakopoulos, Lebensold, Sise, Montreal.
6. CONSULTING ENGINEERS —
  - a. Structural: Eskenazi, Baracs, de Stein & Associates, Montreal.
  - b. Mechanical and electrical: Coté, Leclair, Langlois & Boisvert, Montreal.
  - c. Other: Jeffrey Lindsay and Associates, Montreal (space frame systems).
8. OTHER CONSULTANTS — Bolt, Beranek and Newman Inc., Cambridge, Mass. (Acoustics); Helyar, Vermuelen, Rae & Mauchan, Montreal (Quantity Surveyors); Wm. M.C. Lam, Cambridge Mass. (Lighting); Ben Schlanger, New York (Circulation Control); Smith, Sommerville & Co. Ltd., Montreal, (Project Scheduling).
9. GENERAL CONTRACTOR — Desourdy Construction Ltd., Montreal.
10. OTHER CONTRACTORS OF SPECIAL INTEREST — Dominion Bridge Co. Ltd., Lachine, Quebec (fabricators and erectors of steel space frame.)

### B. GENERAL DESCRIPTION OF PAVILION/STRUCTURE

1. FUNCTIONAL DESCRIPTION — Directly linked to the Ile Notre-Dame Expo Express Station along side it, this massive building housed three separate theme complexes, spread over seven levels, each of which was directly accessible from the central plaza at the third level. It was raised above the ground in order to allow a main service and circulation road, two canals and a wide footpath to pass under it.
2. DIMENSIONS —
  - a. Size: 500' x 270'.

- b. Area: 190,000 sq. ft.
- c. Height: average 135'; tower 150'.
- d. Stories: 7 levels.
3. FOUNDATIONS — Reinforced concrete pile caps on steel tube piles, reinforced concrete foundation walls.
4. STRUCTURE — Structural steel spaceframe (truncated Tetrahedon), concrete floor and roof slabs over spaceframe.
5. WALLS & EXTERIOR CLADDING — 1/2" thick stained plywood shingles.
6. ROOF — Standard built-up roofing over concrete deck; plexiglas covering for high tower.
7. WINDOWS & ENTRANCES — Translucent, polyester reinforced, vinyl, triangular openings in wood frames; wood doors and frames for entrances.
8. INTERIOR FINISHES —
  - a. Floors: Exposed concrete, rubber non-slip sheeting, glass.
  - b. Walls: Exposed steel structure, painted drywall, cement wood fiber.
  - c. Ceilings: Exposed steel structure, painted drywall, cement wood fiber.
9. MECHANICAL SYSTEMS —
  - a. Plumbing: Standard; gas fired domestic hot water system.
  - b. Heating, ventilation, air conditioning: Air conditioning provided only in administration and VIP lounge areas, with package fan coil units, air cooled condenser, distribution ductwork, 30 T capacity; electric heating coils in ductwork; ventilation part of A.C. system with separate exhaust for ventilation of washrooms, kitchen, transformer room etc.
  - c. Kitchen: Commercial type kitchen equipped by concessionaire.
  - d. Other: Gas service.
10. ELECTRICAL —
  - a. Power: 12,000 V, 2 feeder service entry, step down to 120/208 V service with 1850 KVA dry type transformer.





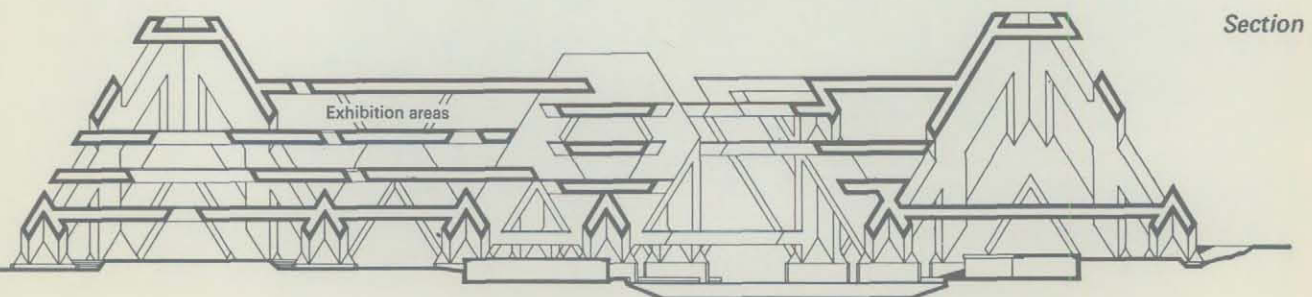
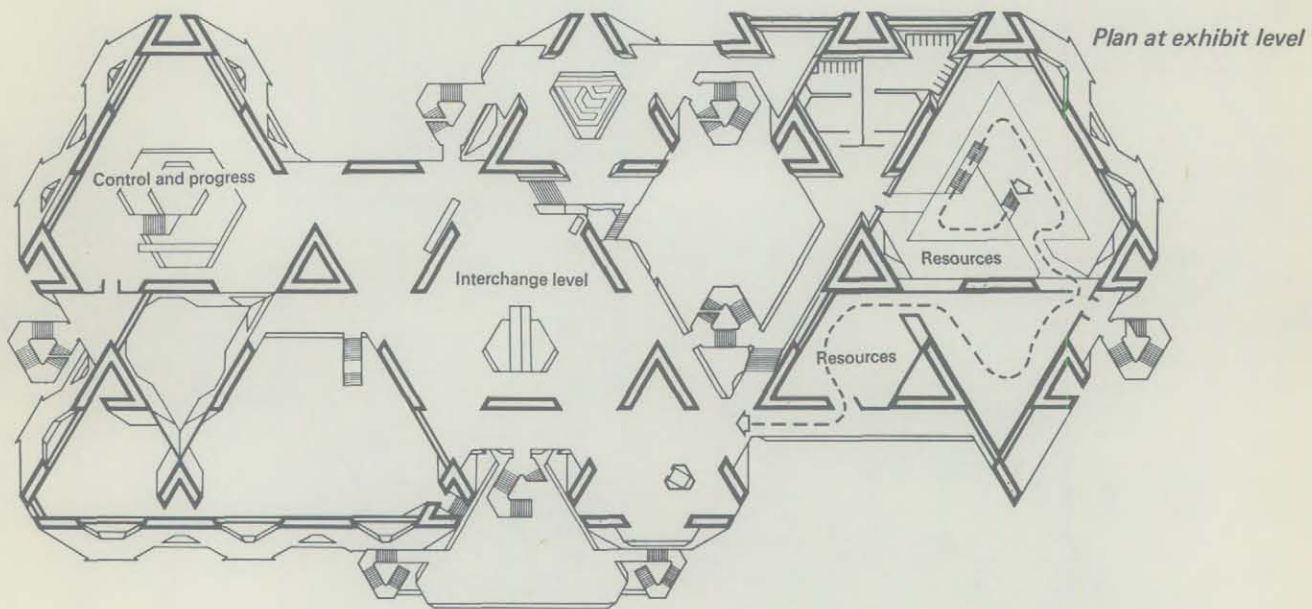
- b. Lighting: Incandescent exterior illumination and houselighting.
  - c. Audio-visual systems: Part of exhibits contract.
  - d. Other: Special electrical services of exhibits.
11. SPECIAL TRAFFIC CONVEYING EQUIPMENT — Glass sided escalators, total of 6, rising from 20' to 26'; hydraulic elevator.
12. FIRE PROTECTION — Hose cabinets, extinguishers; wood painted with fire retardant paint; heat detection and manual station fire alarm system.
13. SAFETY FEATURES — Battery operated emergency lighting system.
14. EXTERIOR WORK (where part of the construction contract) — Landscaping, plaza.
15. OTHER ITEMS OF PARTICULAR INTEREST —
- 1. Structural steel spaceframe.
    - a. Brief description: Steel spaceframe, the geometry of which was defined by truncated

tetrahedrons, 3'-3" node to node to form a three dimensional modular system. This system was composed of welded plate node assemblies bolted to folded steel angle chord and web members.

- b. Location: Wall, roof and floor structures.
- c. Manufacturer or producer: Dominion Bridge Co. Ltd., Lachine Quebec.
- d. Nearest source of more information: Same.

2. Cement fibre board.

- a. Brief description: Composite cement binder and wood fibre, rigid board used for sound absorption, thermal insulation and form-board throughout the project; product name "TECTUM".
- b. Location: Walls, roof and floors.
- c. Manufacturer or producer: National Gypsum (Canada) Ltd., Montreal.





d. Nearest source of more information: Same.

3. Plexiglass covering.

- a. Brief description: Plexiglas cladding, made up of large plastic glass sheets, rectangular in shape, with overlapping joints (no caulking or frames) held down by metal mounting clips.
- b. Location: High tower.
- c. Manufacturer or producer: Rohm & Haas Co. of Canada Ltd.
- d. Nearest source of more information: Rohm & Haas Co. of Canada Ltd., Montreal or Hickey Plastic Co. Ltd., Montreal.

16. COMMENTS —

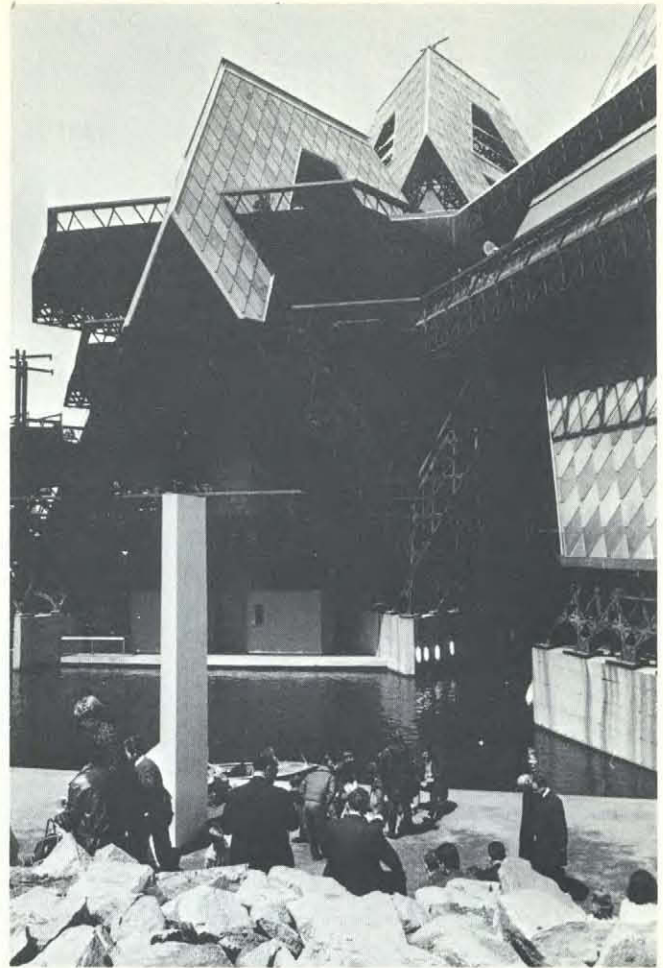
First from the Architect: "The buildings for the theme pavilions 'Man and the Producer' and 'Man the Explorer' are the result of the development of a closely integrated system of structural, mechanical and electrical components combined to form space enclosures. A space frame geometry was devised which would give a high degree of flexibility and permit construction to begin before all exhibit criteria (of very diverse designs) had been established. The building system devised constituted one of the first 'total space enclosure' solutions (flexible in all three directions) that has ever been realized. Because of their large bulk and dramatic form, the theme pavilions will establish a strong visual focus for each island, while restrained detail and muted colours will tend to unify their appearance and ease their relationship with smaller pavilions nearby."

The most interesting and controversial aspect of this building (as well as "Man the Explorer") was, of course, its structure (steel space frame of truncated tetrahedrons), which was not fully successful. Its basic concepts were somehow diluted during the transition to reality and the result was a tangled mass of rusty steel, bolts and plates. The structure turned out to be, in the words of Mr. Jeffrey Lindsay, the Space Frame Consultant, "relatively uneconomical".

The potential future use of translucent, polyester reinforced, vinyl windows should be further investigated.

The following comments were taken from the paper, "Space Structures As Preoccupation", written by Mr. Lindsay for the 1966 International Conference on space Structures prior to completion of the pavilions at Expo:

"In the early planning it was decided that the



buildings should not be huge unobstructed volumes containing exhibits parked in orderly corrals. This implied the expectation of a full range of architectural experience which would be effective considering the selected sites, anticipated traffic, and the variety of exhibition material. It was estimated that most of the ten million visitors expected would at some time or another move through or around the Theme Pavilions and exhibits.

"Most people unfamiliar with exhibition work are not aware of the number of early and irrevocable decisions which have to be made solely on assumption. The requirement for Theme Pavilions was especially vulnerable to this condition. In those early days there was no indication of the exhibitor's response to the format described. Even after a participating trend became apparent, the exhibits had yet to be designed. The Pavilions, nevertheless, were expected to accommodate these major exhibits and the preliminary sketches had to encourage prospective exhibitors to participate.

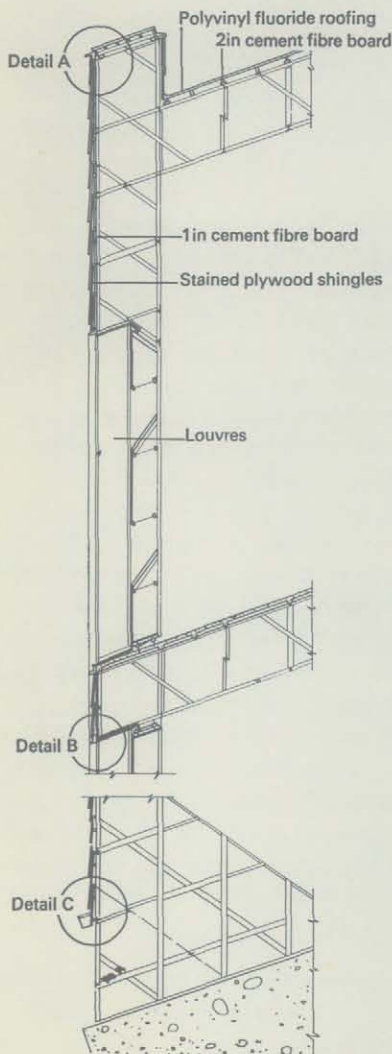
"It was decided to investigate the feasibility of using a space structure in Expo '67 which would consistently and adjustably frame all floors, walls,

ceilings, balconies, etc., while also inherently pre-determining the total architecture. The preliminary study was affirmative, but no known system was suitable. An original space structure thus had to be commissioned. The approach would be founded on endorsed but generally unfamiliar first principles which would have to be transmitted and accepted before the outcome of the project could be assured. It was clear that in Expo '67 only a precedent setting approach for their major pavilions would confirm confidence in the future and be worthy of the theme.

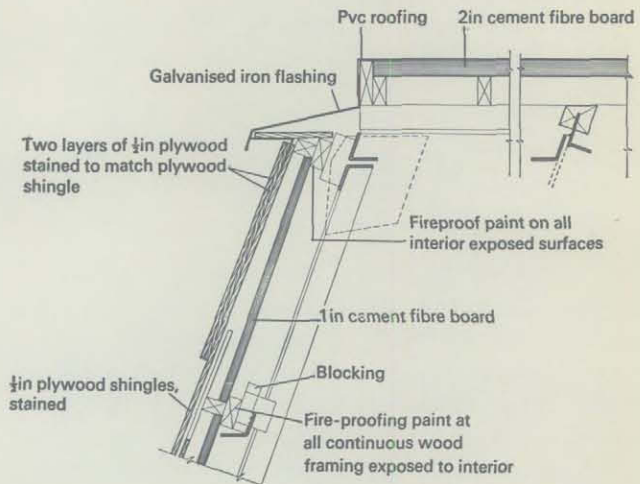
"The architect was then appointed for his predisposition to the requirement and for his reputation for organisation in carrying through work to a given schedule. Many people in this project were to be co-ordinated. The Pavilions would internationally reflect the resourcefulness of Canada's design and construction capacity.

"Within hours after the first general briefing, a matrix of truncated tetrahedron cells was considered a suitable geometry. These cells are one of the few simple polyhedrons which can by themselves completely occupy a space, and do so in a way that all conforming walls are steep enough (71 degrees) not to restrict significantly the adjacent floor space. Hundreds of individual cells, 2" high, were quickly

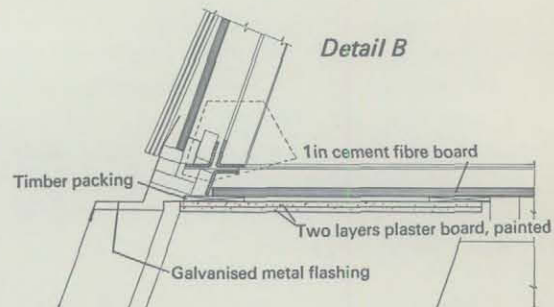
Wall section



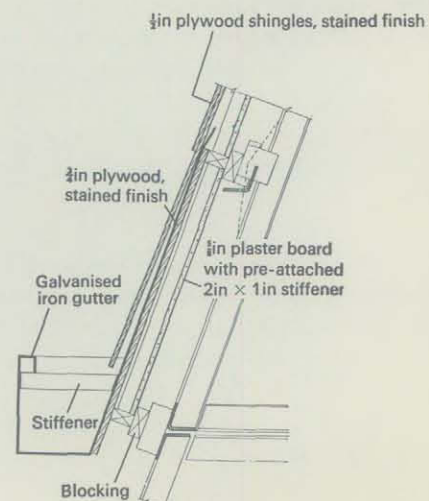
Detail A



Detail B



Detail C





mass produced to help the design team visualise the overall potential. These visual aids were made up of four regular hexagons, folded or taped at alternate edges, forming the four open equilateral triangles. They were steel rule die cut from 120 pound tagboard on a letterpress.

"Shortly afterwards, these schematic models were replaced by a realistically framed truncated tetrahedron 5" high. There were similarly produced, but from a more complicated die. The genetics of the Pavilions as finally realized were implicit in these cells.

"The ensuing development was time consuming, intense and contentious. There were incessant discussions, demonstrations, and challenges of every imaginable sort to coerce and stimulate intellectual allowance of the unfamiliar logic. However, this opportunity to establish up to date space structure principles as an operative and effective architectural discipline made the dialogue well worth while.

"The first sections were bolted to concrete foundations early in April, 1966 and the pavilions should be nearing completion by late autumn. The details are straightforward and have a rudimentary appearance which successfully enriches and disguises the pristine symmetry usually the distinction of space structures. Not all pieces are as interchangeable as they might have been, the industrialization was not as precise or as extensive as could have been wished, but a pragmatic balance was reached between ultimate adherence to the principles of space structuring and human willingness to depart from normal conventions.

"The space structure is a bolted steel system made up of short lengths of spacially folded angles. The basic module is 3' -3" and this is the spacing between all nodes. The surface grids are built from angle sections nominally 3" x 3" x 1/4" thick arranged in pairs back to back, one of each pair having an angle of 71 degrees and the other 109 degrees. These pieces used for building the structure are all approximately 3' long.

"The web members, which lace and brace the surface grids together, are angles, nominally 2" x 2" x 1/4" thick, all having an angle of 109 degrees and all approximately 6' long. The surface nodes consist of two slotted, interlocked, and pre-welded plates, each plate nominally 18" x 11" x 1/2" thick. A larger variation of these nodes incorporating gusset plates is used at the intersection of wall surface grids and deck surface grids. The web nodes are formed by the back-to-back congruency of the web angles at their mid points, where they are bolted together. 1/2" spacing washers accommodate the eccentricity.

"Sectional areas of pieces vary as indicated by stress analysis. In order to maintain an homogeneous appearance, the variations are primarily in the thickness and secondarily in the widths.

"All bolts are nominally 3/4" diameter x 2" long throughout. The section through one truncated tetrahedron is 5' measured from the centre of one hexagonal face to the centre of the triangular face opposite.

"790,000 steel angles, 2.5 million bolts, and 100,000 surface nodes make up into 200,000 sq. ft. for circulation areas, and 40,000 sq. ft. for service areas, concessions, etc.

"Decks and enclosing walls do not necessarily form an integral part of the space structure, but surface nodes project to key a steel/concrete composite construction where convenient. Ceilings are sound-absorbing cement-fiberboard. Floors are fibreboard topped with concrete. Roofs are fibreboard topped with a plastic membrane. The walls are shingled with stained plywood, backed up with gypsum shingles. These are set over glass-fibre sound and thermal insulation contained between expanded metal lath. Mechanical and electrical equipment is tailored to exhibition and circulation necessities.

"This type of space structure is particularly affected by component tolerances. Bolt holes must not be significantly oversize. Shimming must be avoided. The labour savings effected by self alignment more than offset the expense of controlling production accuracy. The tolerances are not cumulative if the bolts are not torqued up until after the assemblies are installed. If the bolts are initially tightened, off-centre tolerances are locked in. Shimming or re-drilling is not advisable as there are too many joints within these systems for this to be economically practical. Also, it is expensive to specify closer tolerances than are actually useful. Any one particular set of space structure pieces has a corresponding set of optimum tolerances; components have to be designed so that tolerances are not restrictive.

"Configurational flexibility in space structured buildings is an architectural and planning reality, but after the foundations are in place, it is relatively uneconomical. As a result of this limitation, and other planning preferences, it was decided that the third Theme Pavilion\* would be a separate project altogether. This decision provided the extraordinary opportunity to design a second system\*\* to solve virtually the same requirement."

\*Man in the Community.

\*\*Wood cone structure.

## MAN THE PROVIDER

### A. GENERAL DATA

1. NATURE OF PAVILION/STRUCTURE — Temporary.
2. LOCATION — Expo Area: Ile Notre-Dame;  
Lot No. 4016, 4036, and 4040;  
Key Plan No. 480.
3. OWNER (or contracting body) — Canadian Corporation for the 1967 World Exhibition.
4. DESIGN ARCHITECT — Longpré, Marchand, Goudreau, Dobush, Stewart, Bourke, Montreal.
6. CONSULTING ENGINEERS —
  - a. Structural: Deslauriers & Mercier, Montreal.
  - b. Mechanical & electrical: Leblanc & Montpetit, Montreal.
8. OTHER CONSULTANTS — Jack Vincelli Jr., Cote St. Luc. (landscaping).
9. GENERAL CONTRACTOR — Desourdy Construction Ltee., Montreal.

### B. GENERAL DESCRIPTION OF PAVILION/STRUCTURE

1. FUNCTIONAL DESCRIPTION — Devoted to agricultural exhibits, the complex covered seven and a half acres of land. It was made up of ten open pavilions set into sculptured mounds of structurally reinforced earth, covered with grass. The entire area was open to the air with modular roof structures provided for shelter.
2. DIMENSIONS —
  - a. Size: 10 units vary in size.
  - b. Area: 35,000 sq. ft. (covered areas).
  - c. Height: 15'.
  - d. Stories: One.
3. FOUNDATIONS — Concrete piles, grade beams for the occasional walls.
4. STRUCTURE — Laminated 6" x 6" eggcrate wood roof structure on a 4'-6" grid, supported on steel

tube columns; average span, 22'-6".

5. WALLS & EXTERIOR CLADDING — Basically, the walls were the mounds of earth, except for washrooms and service facilities where wood planking was used.
6. ROOF — Built up roofing over 2" wood deck.
8. INTERIOR FINISHES —
  - a. Floors: Wood planking set on gravel bed (walkways), wood planking, (washrooms).
  - b. Walls: Wood planking.
  - c. Ceilings: Exposed wood grid roof structure, vinyl sheet (washrooms).
9. MECHANICAL SYSTEMS —
  - a. Plumbing: Standard; electric hot water tank.
  - b. Heating, ventilation, air conditioning: No heating or A.C.; ventilation provided for chicken house only; remaining areas were in open air.
  - d. Extensive drainage and sprinkler systems.
10. ELECTRICAL —
  - a. Power: 12,000 V incoming service, step down to 600 V service with 1000 KVA dry transformer, and further step down to 120/208 V service, with separate dry transformers (3-75 KVA, 1-100 KVA, 1-10 KVA and 2-37.5 KVA) for each of the pavilions.
  - b. Lighting: Incandescent (low level of 5-10 ft. candles).
12. FIRE PROTECTION — Extinguishers, hydrants.
14. EXTERIOR WORK (where part of the construction contract) — Extensive earth work (mounds), landscaping and walkways.
16. COMMENTS — This complex constitutes a very logical and economical solution to the problem of housing agricultural exhibits. The structurally reinforced, sculptured earth mounds were especially well used.



## ONTARIO

### A. GENERAL DATA

1. NATURE OF PAVILION/STRUCTURE — Temporary.
2. LOCATION — Expo Area: Ile Notre-Dame;  
Lot No. 4431, 4432;  
Key Plan No. 407.
3. OWNER (or contracting body) — Government of Ontario.
4. DESIGN ARCHITECT — Fairfield & Dubois, Toronto and Mr. Alister Justason (Designer) Toronto.
6. CONSULTING ENGINEERS —
  - a. Structural: Morrison, Hershfield, Millman & Huggins Ltd., Toronto.
  - b. Mechanical: G. Granek & Associates Ltd., Toronto.
  - c. Electrical: Jack Chisvin & Associates Ltd., Toronto.
8. OTHER CONSULTANTS — Sasaki, Strong & Associates, Toronto (Landscape Architects); Ports-of-Call

International, Toronto (Kitchen and Restaurant); Stewart & Morrison Ltd., Toronto (Exhibit Designers).

9. GENERAL CONTRACTOR — Cook & Leitch — Perrini Ltd. (Joint venture), Montreal.
10. OTHER CONTRACTORS OF SPECIAL INTEREST — Kleinert's (Canada) Ltd., Scarborough, Ontario (Roof fabric).

### B. GENERAL DESCRIPTION OF PAVILION/STRUCTURE

1. FUNCTIONAL DESCRIPTION — The pavilion consisted of three main elements: a tent-like roof structure, an exhibit platform and an auditorium with restaurant. (The roof covered all of the platform and auditorium.) Entrance was at ground level below the open sided exhibit platform which was raised high enough to allow the mini-rail to pass underneath and through the pavilion. The auditorium sat 600 persons and enclosed a 65' x 30' high projection screen. Below it was located the restaurant, seating 700 persons. The pavilion was surrounded by water and landscaped with trees and 1500 granite blocks of varying sizes.



2. DIMENSIONS —

- a. Size: 200' x 470'.
- b. Area: 100,000 sq. ft.
- c. Height: 90' (highest roof peak).
- d. Stories: Two.

3. FOUNDATIONS — Steel piles supported columns and auditorium footings.

4. STRUCTURE — Round, tubular steel columns and roof beams manufactured from steel plate (roof); standard structural steel (auditorium); standard, round tubular steel, welded (platform).

5. WALLS & EXTERIOR CLADDING — Walls of Auditorium and elsewhere white pine cladding, natural finish.

6. ROOF — Woven fibre glass fabric coated with vinyl (3 coat application).

7. WINDOWS & ENTRANCES — Wood frames and coloured acrylic glass (restaurant); standard aluminum entrances.

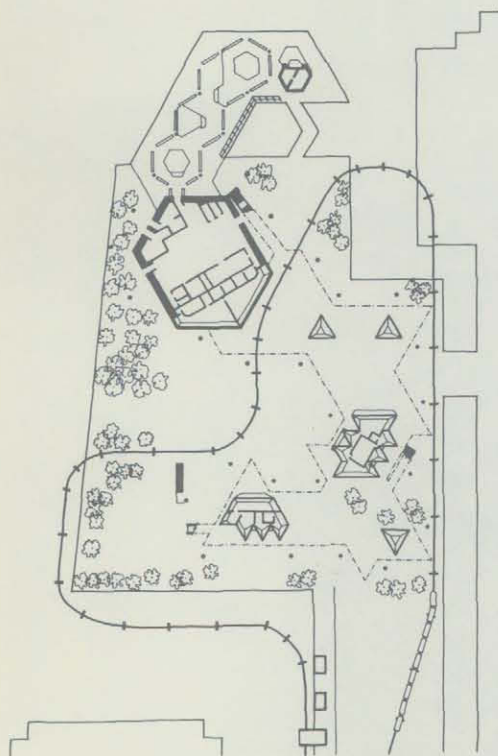
8. INTERIOR FINISHES —

- a. Floors: Texama carpet (platforms and auditorium), Harding Wool carpet (restaurant).
- b. Walls: Texama carpet (platform balustrading), prefabricated masonite (auditorium), plaster or gypsum board (service areas).
- c. Ceilings: Vinyl, reinforced with lead, heavy material for sound control (auditorium), sprayed on foam insulation, (restaurant), exposed roof fabric (platforms).

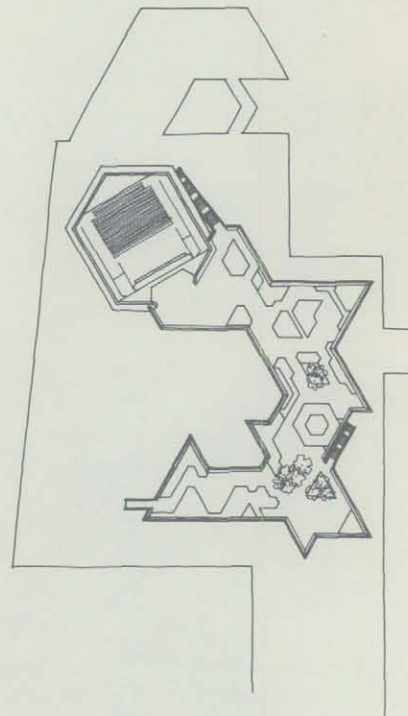
9. MECHANICAL SYSTEMS —

- a. Plumbing: Standard toilet fixtures, some equipped with automatic flushers.
- b. Heating, ventilation, air conditioning: Cooling and heating throughout including open plat-

*Ground floor plan*



*Upper level plan*





forms. Air distributed by duct system and diffusers, each 6,000 CFM (Cavier Equipment). Infra red heaters for service areas.

- c. Kitchen: Standard commercial gas operated equipment.
- d. Other: Recirculation pumps for water movement in decorative pools.

#### 10. ELECTRICAL —

- a. Power: Separate sub-station, 12 KV transformer; total capacity, 2,750 KVA.
- b. Lighting: Motorized dimmers. Incandescent generally; fluorescent (kitchen and service areas). Landscape lighting was incandescent with a special lamp to simulate sun rays.
- c. Audio-visual systems: Two 70 mm. film projectors for multi-image film on large auditorium screen; three projectors on exhibit platform.

- 2. FIRE PROTECTION — Stand pipe system on platform, fire hose cabinets, automatic fire-alarm system, fire retardant treatment used for finished wood.

- 13. SAFETY FEATURES — First aid station with required equipment; St. Johns ambulance service on site.

- 4. EXTERIOR WORK (where part of the construction contract) — Landscaping, asphalt penetration method. (Separate contract for supply and placing of granite blocks.)

#### 16. COMMENTS —

- a. General: With its many pointed, sail-like roof, this pavilion was one of the most striking in appearance at Expo. Its completely water-bound site was imaginatively landscaped (granite blocks and trees) and well used (natural slope exploited to allow passage of mini-rail through the building).

The atmosphere of the pavilion, due to the unusual structure, landscaping and exhibits, was one of fun-filled prosperity — an effect complemented by the accompanying, specially commissioned and highly contemporary works of art executed by Ontario artists, and heightened by one of the best movies at Expo. "A Place to Stand".

- b. Structure: Apart from the architectural form and sensitive layout, the most interesting feature of the pavilion was the tubular steel, column and

roof framing system, but the practicality of creating such tubes out of steel plate is doubted. The system itself is reminiscent of tensile systems used at the Lausanne exhibition but the structural principles embodied seem somewhat less significant.

#### C. DATA ON INNOVATION — ONTARIO

- 1. NAME OF ITEM — Roof Material.
- 2. LOCATION — Roof.
- 3. DESIGNER OR SELECTOR INVOLVED — Macy Dubois (Architect) and C.H. Hershfield (Structural Consultant).
- 4. WHY WAS ITEM SELECTED? — To provide a roof structure which would reflect the temporary nature of the building.
- 5. WAS ITEM PRODUCED SPECIFICALLY FOR EXPO? — Yes.
- 6. MANUFACTURER — Toronto Iron Works Ltd. & Kleinert's (Canada) Ltd.
- 7. DISTRIBUTOR (nearest) — Manufacturer.
- 8. NEAREST SOURCE OF ADDITIONAL INFORMATION — Kleinert's (Canada) Ltd.
- 9. INSTALLER OR SUBCONTRACTOR — Toronto Iron Works Ltd.
- 10. MARKETING —

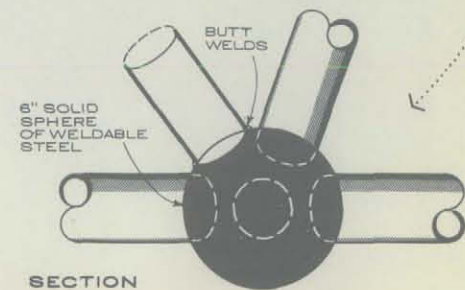
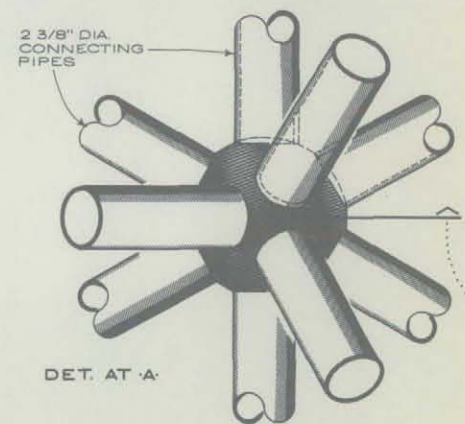
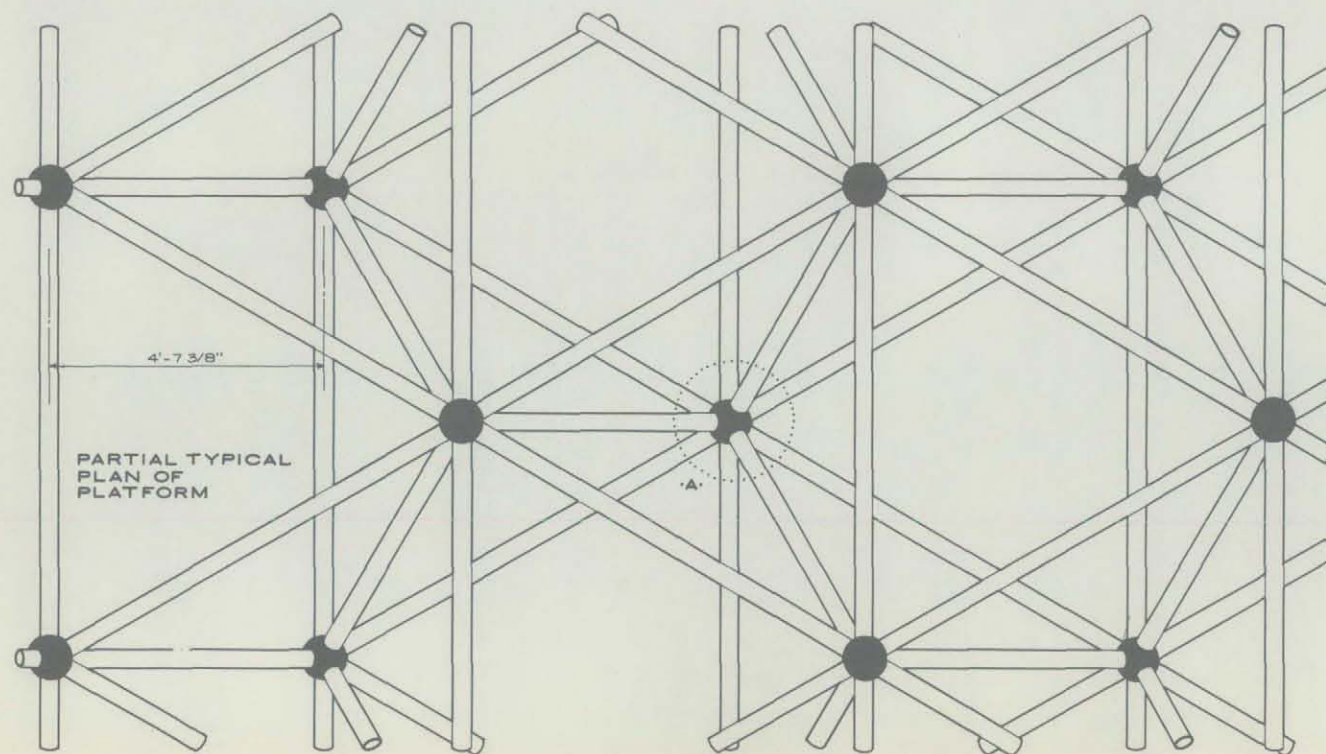
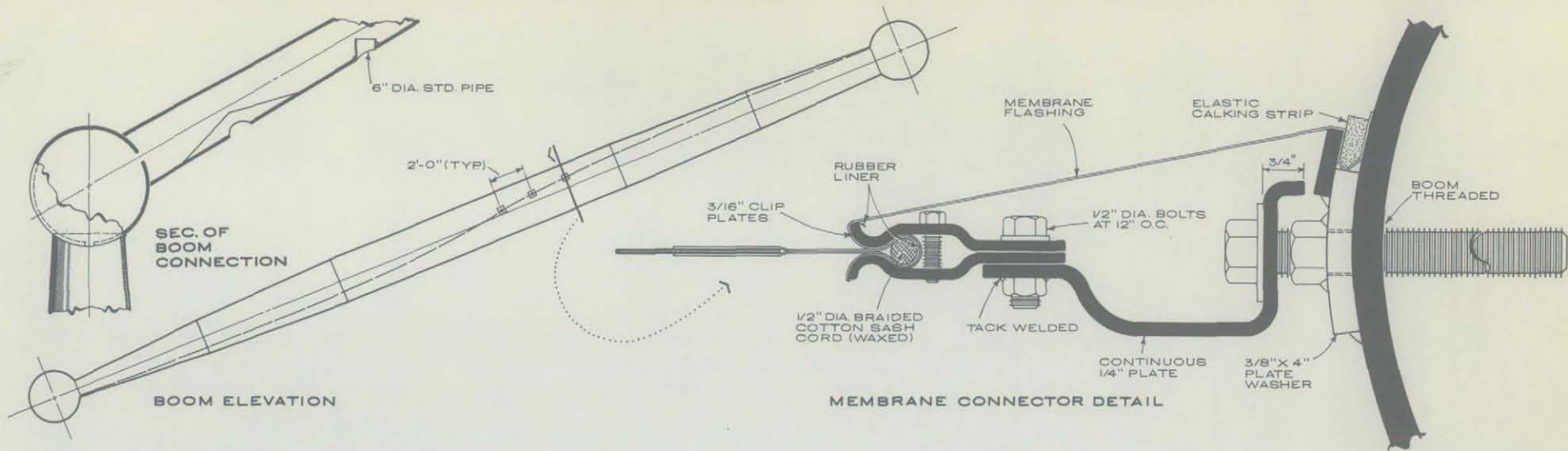
- a. If the item is of foreign manufacture (in this case, partly):

(i) Is it now also manufactured in Canada? : Partly, the fibreglass was woven by BAY MILLS, Georgian Bay, Ontario. The coating was supplied by the Corda Co. in Connecticut.

(ii) Could it be manufactured in Canada? Yes. No special agreements are required. Anyone can produce and put it on the market.

(iii) What patents are involved? : None.

- b. Is the item now commercially available? : No, although a similar material is being used for Air Structures (Volumes under air pressure).





- c. Is further research and development required before marketing in Canada? : Yes, to develop better installation skills.
- d. What is the marketing feasibility and/or potential of the item? : Unknown.

#### 11. TECHNICAL DATA AND EVALUATION —

- a. Generic and functional description: Structural, vinyl coated, fibre glass fabric.
- b. Dimensions and weights: 5'-0" wide and available in any practical length.
- c. Physical characteristics: Flexible, obscure, water proof, does not actively support combustion.
- d. Durability and resistance to exposures (weather, chemicals, etc.): Satisfactory for 10 years after which it will begin to deteriorate if not maintained.
- e. Standards covering item: None.
- f. Test data: Not available.

#### 12. PERFORMANCE RECORD —

- a. When and where was item first manufactured? : Spring, 1966.
- b. When and where was item first installed? : Fall, 1966, Ontario Pavilion, Expo 67.
- c. Experience in manufacture: Attempted first in Canada but with unsuccessful results. Later attempt in the United States was very successful.
- d. Experience in installation (at Expo or elsewhere): Speedy, no difficulties.
- e. Service performance since installation: No problems encountered.
- f. Experience with Canadian climate: No problem.
- g. Was item used for other purposes before? : Not as a roof material, but for raincoats.
- h. Other suggested uses — Unknown.

13. COST DATA — Available from the general contractor (approximate cost was \$4.00 per sq. ft.).

14. COMMENTS — The material served very satisfactorily the purpose for which it was selected. Ideal for temporary roofs, it requires no maintenance within 10 years. It seemed to show less wear than similar applications at Expo.

*Photography and Industrial  
Design Pavilion*



## PHOTOGRAPHY AND INDUSTRIAL DESIGN

### A. GENERAL DATA

1. NATURE OF PAVILION/STRUCTURE — Temporary.
2. LOCATION — Expo Area: Cité du Havre;  
Lot No. 2200;  
Key Plan No. 211.
3. OWNER (or contracting body) — Canadian Corporation for the 1967 World Exhibition.
4. DESIGN ARCHITECT — Gilles Côté, Neufchâtel, Quebec.
6. CONSULTING ENGINEERS —
  - a. Structural: André Risi, Quebec City.
  - b. Mechanical and electrical: Leblanc, Monpetit & Lagace, Quebec City.
8. OTHER CONSULTANTS — Morley Markson & Associates, Toronto (Photography) and Wardie Limited, Montreal (Industrial Design).
9. GENERAL CONTRACTOR — Sestock Construction Limited, Montreal.

### B. GENERAL DESCRIPTION OF PAVILION/STRUCTURE

1. FUNCTIONAL DESCRIPTION — Photography and industrial design exhibits were housed within two 10,000 sq. ft. building units which were constructed of demountable 20' x 20' module sections.
2. DIMENSIONS —
  - a. Size: 120' x 80' and 100' x 100'.
  - b. Area: 19,600 sq. ft.
  - c. Height: 17'.
  - d. Stories: One.

3. FOUNDATIONS — Spread footings under columns only.
4. STRUCTURE — Square tube steel framing and steel "I" beams.
5. WALLS & EXTERIOR CLADDING — Prefabricated plywood panels fixed to columns.
6. ROOF — Canvas over pyramid steel tube framing, prefabricated and installed on site.
7. WINDOWS AND ENTRANCES — Openings (no doors).
8. INTERIOR FINISHES —
  - a. Floors: BC fir wood decking.
  - b. Walls: Plywood panels.
  - c. Exposed canvas.
10. ELECTRICAL —
  - a. Power: 600 V service supplied by CCWE through an exterior transformer, 150 KVA to 120/208V.
  - b. Lighting: Incandescent. Plug outlets let into tubular columns.
12. FIRE PROTECTION — Fire extinguishers.
14. EXTERIOR WORK (where part of the construction contract) — Paving and landscaping by CCWE.
15. OTHER ITEMS OF PARTICULAR INTEREST — Prefabricated structural system demountable for future use elsewhere.
  - d. Nearest source of more information: Sestock Construction Ltd., General Contractor.
16. COMMENTS — The most interesting aspect of this building was its demountable, prefabricated wall and roof panel systems, supported on steel square tube framing and beams. Although these systems were not innovations in their field, they were nonetheless well used and can be recommended for other structures of this type.



## PLACE D'ACCUEIL & MASS TRANSIT STATION

### A. GENERAL DATA

1. NATURE OF PAVILION/STRUCTURE — Temporary.
2. LOCATION — Expo Area: Cité du Havre;  
Lot No. 2000;  
Key Plan No. 201.
3. OWNER (or contracting body) — Canadian Corporation for the 1967 World Exhibition.
4. DESIGN ARCHITECT — Smith Carter Searle Associates, Winnipeg.
5. LOCAL ASSOCIATE ARCHITECT — David, Barott, Boulva, Montreal.
6. CONSULTING ENGINEERS —
  - a. Structural: W.L. Wardrop & Associates, Montreal.
  - b. Mechanical and electrical: Scouten Mitchell Sigurdson & Associates, (H.H. Angus — Toronto), Winnipeg.

### 7. LOCAL ASSOCIATE CONSULTING ENGINEERS —

- a. Structural: Beaulieu, Trudeau & Associates, Montreal.
- b. Mechanical and electrical: Nicholas Fodor & Associates, Montreal.
- c. Other: Beauchemin-Beaton-LaPointe, Montreal; Paul Arthur & Associates, Montreal; Harper Lantzus (Landscape), Montreal.

### B. GENERAL DESCRIPTION OF PAVILION/STRUCTURE

1. FUNCTIONAL DESCRIPTION — Place D'Accueil was the main entry point to Expo '67. In keeping with the triangular shape of the site, all design elements were variations on the triangular theme. This structure housed a V.I.P. section, lounges, a bar and a variety of services such as coin shops, a lost & found, barber shops, beauty parlors, travel agencies, tobacco shops, information booths, liquor store, souvenir shops, post office, coffee shops, etc. In addition, it included the ticket booths and turnstiles through which visitors passed after having arrived at the transportation terminus at ground level, which



served charter buses, taxis, V.I.P. vehicles and shuttle buses connecting with the main visitor's parking lot. Also at this level was located the south terminal station of the Expo Express.

Place D'Accueil was directly linked to the Expo Stadium, the Communications Centre and the Art Gallery.

## 2. DIMENSIONS —

- a. Size: 508' (N-S) x 504' (E-W) (Wood deck area).
- b. Area: 312,858 sq. ft. (Wood deck area).
- c. Height: 84'.
- d. Stories: Three.

## 3. FOUNDATIONS — Steel pipe piles to bedrock, filled with concrete.

## 4. STRUCTURE —

Grade level: Steel stud & concrete block load bearing walls, sheet metal roof joists, steel deck.

Deck level: Steel columns, beams, joists, wood decking.

High roof: Built up steel columns on concrete, steel trusses, triodetic space frame.

## 5. WALLS & EXTERIOR CLADDING — Stucco, wood battens, plywood, asbestos board.

## 6. ROOF — Built up roof (Low buildings); polyester reinforced vinyl fabric on wood frames (high roof); FRP gutters.

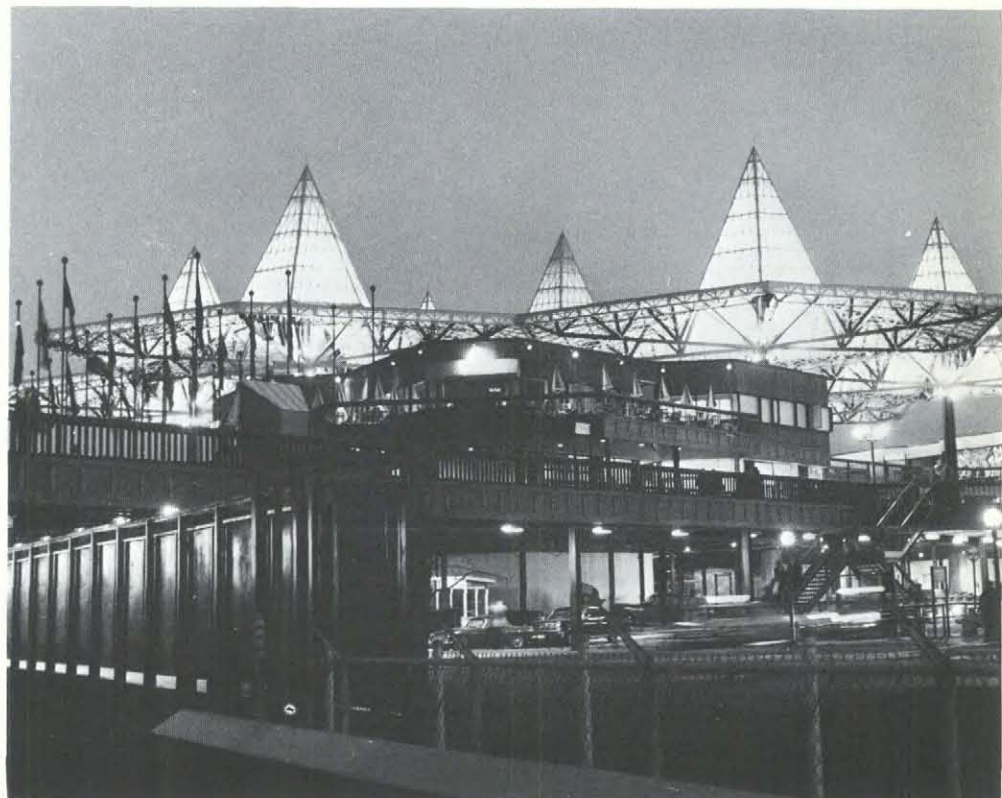
## 7. WINDOWS & ENTRANCES — Wood frames, single glazing.

## 8. INTERIOR FINISHES —

- a. Floors: Wood decking, vinyl asbestos tile, concrete.
- b. Walls: Drywall, concrete block, glazed wall finish.
- c. Ceilings: Exposed steel deck & joists, drywall, acoustic tile, exposed wood deck.

## 9. MECHANICAL SYSTEMS —

- a. Plumbing: Hot & cold water supply, sanitary sewage, storm drains, sprinkler, system, fire hose cabinets.
- b. Heating, ventilation, air conditioning: Gas fired





hot water heating, mainly wall fin units. Packaged air conditioning units; exhaust ventilation from certain areas.

- d. Other — Carbon monoxide exhaust system beneath deck level.

#### 10. ELECTRICAL —

- a. Power: 120 volt, single phase system; 600 volt, and 120/208 volt, 3 phase systems.
- b. Lighting: Floodlighting, battery emergency lighting, fluorescent and incandescent lighting.
- c. Other: P.A. system, fire alarm system, smoke detectors, conduit for communications system, lightning protection system, conduit for telephone system, electric heating.

#### 11. SPECIAL TRAFFIC CONVEYING EQUIPMENT — Escalators.

#### 12. FIRE PROTECTION — Fire alarm system, smoke

detectors, fire hose cabinets, fire extinguishers, sprinklers, fire-retardant treatments.

#### 13. SAFETY FEATURES — Carbon monoxide system.

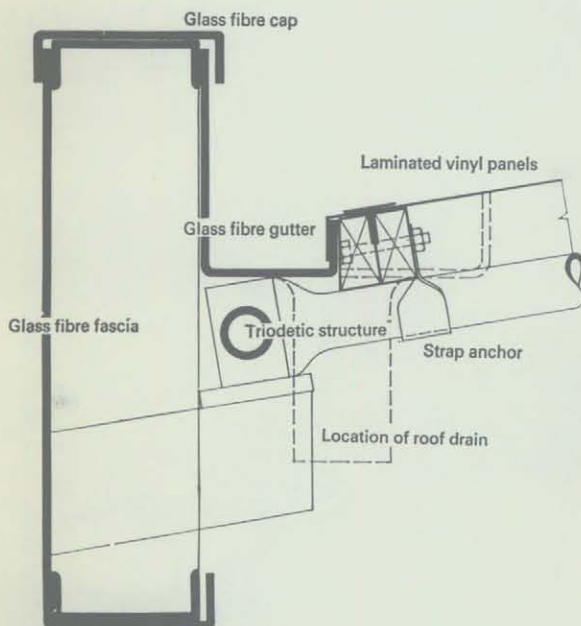
#### 14. EXTERIOR WORK (where part of the construction contract) — Paving of roads and walks, exterior stairs, etc.

#### 15. OTHER ITEMS OF PARTICULAR INTEREST — Polyester vinyl fabric over triodetic space frame roofing system.

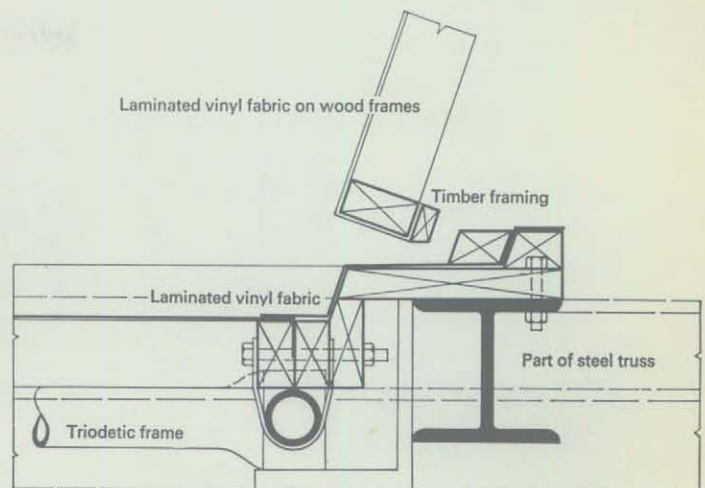
#### 16. COMMENTS — Functionally, this building was never completely resolved. As a result, in spite of various experimental arrangements and modifications, traffic just forced its way through. Everyone, young and old included, had to climb up to enter, and then down again to reach the express train. The space under the main roof was unpleasant and possessed no architectural merit.

The deck's mill-flooring system, which proved adequate at other Expo Express stations, did not work out as well here. On the upper deck, (which was exposed to weather), for example, it became very slippery when wet and allowed water to drip through to the lower levels.

Detail A



Detail B



Section



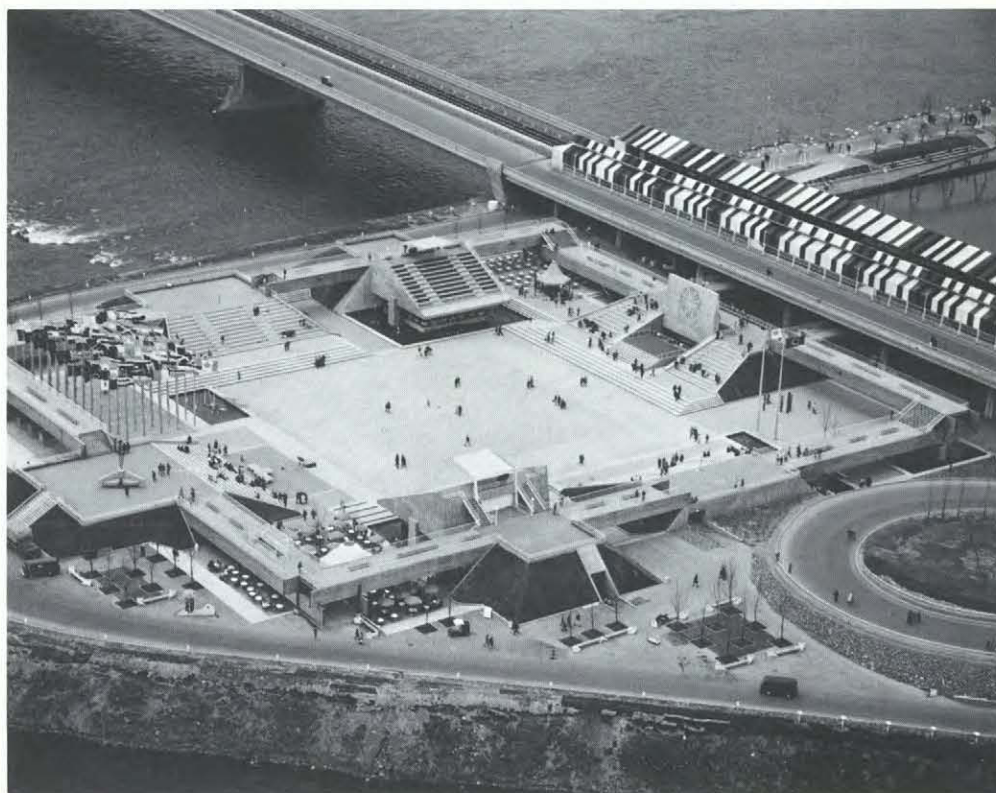
## PLACE DES NATIONS

### A. GENERAL DATA

1. NATURE OF PAVILION/STRUCTURE — Temporary.
2. LOCATION — Expo Area: Ile Sainte-Hélène;  
Lot No. 3000;  
Key Plan No. 300.
3. OWNER (or contracting body) — Canadian Corporation for the 1967 World Exhibition.
4. DESIGN ARCHITECT — Andre Blouin, Montreal
6. CONSULTING ENGINEERS —
  - a. Structural — Cyr & Houle, Montreal
  - b. Mechanical: Bouthillette & Pariseau, Montreal
8. OTHER CONSULTANTS — Leslie Doelle, Montreal (Acoustics); David W. Frick, Valois, Quebec, (illumination).
9. GENERAL CONTRACTOR — Ron Engineering & Construction(Quebec) Ltd., Montreal.

### B. GENERAL DESCRIPTION OF PAVILION/STRUCTURE

1. FUNCTIONAL DESCRIPTION — This was a multi-purpose gathering place for the witnessing of official, popular and cultural events. It consisted of a large open plaza with seating facilities and a restaurant along its periphery.
2. DIMENSIONS —
  - a. Size: 360' X 450'
  - b. Area: 67,300 sq. ft.
  - c. Height: 39' — 2" (max.)
  - d. Stories: 4 levels.
3. FOUNDATIONS — Expanded concrete base piles with pile caps, grade beams and spread concrete footings.
4. STRUCTURE — Textured reinforced concrete and B.C. Fir glued laminated wood beams.
5. WALLS & EXTERIOR CLADDING — Exposed textured reinforced concrete.





6. ROOF — Neoprene "Dexotex" roof deck over restaurant areas.
  7. WINDOWS & ENTRANCES — Extruded, anodized aluminum entrances and window sections (store front type)
  8. INTERIOR FINISHES —
    - a. Floors: Concrete, broomed and troweled finish,
    - b. Walls: Textured, formwork finish concrete.
    - c. Ceilings: Exposed concrete and metal suspension with metal lath and gypsum plaster.
  9. MECHANICAL SYSTEMS —
    - a. Plumbing: Standard fixtures in public and private restaurant washrooms.
    - b. Heating, ventilation, air conditioning: Electric baseboard heating and centrally located fresh air ventilation system. No air conditioning.
    - c. Kitchen: Not in contract.
    - d. Other: Water jet fountains and pools.
  10. ELECTRICAL —
    - a. Power: 1200 KW (lighting); 55 KW (power).
    - b. Lighting: Incandescent reflector lamps, Quartzline lamps, fluorescent lighting.
    - c. Audio-visual systems: Music — announcing system.
    - d. Other: Automatic sound control system for raising the level of the sound system whenever the Expo express passed.
  12. FIRE PROTECTION — Fire hydrants, fire extinguishers.
  14. EXTERIOR WORK (where part of the construction contract) — Landscaping, paving, lighting.
  15. OTHER ITEMS OF PARTICULAR INTEREST — Laminated wood beams —
    - a. Brief description: 84" high X 11" wide X 135' long, B.C. Fir, glued laminated beams. Largest span, 106'. Largest cantilever, 27'.
      - b. Location: Elevated walkways linking roof terraces.
      - c. Manufacturer or Producer: Structurlam Products Ltd., Penticton, B.C.
      - d. Nearest source of more information: Same.
  16. COMMENTS — Well designed in relation to the stands, the plaza was executed with meticulous care and considerable architectural feeling. Most impressive were the large, cantilevered, laminated beams which were well related to the exposed concrete structure.
- C. DATA ON INNOVATION — PLACE DES NATIONS
    1. NAME OF ITEM — CONCRETE FLAGPOLES.
    2. LOCATION — At entrance and just off plaza.
    3. DESIGNER OR SELECTOR INVOLVED — Ron Engineering & Construction (Quebec) Ltd., Montreal (General Contractor)
    4. WHY WAS ITEM SELECTED? — To keep the cost of the required number of flagpoles within the budget (cheaper than wood or metal poles).
    5. WAS ITEM PRODUCED SPECIFICALLY FOR EXPO? — No.
    6. MANUFACTURER — Les Betons Centrifuges Limitee, Kirkland, Quebec.
    7. DISTRIBUTOR (nearest) — Manufacturer.
    8. NEAREST SOURCE OF ADDITIONAL INFORMATION — Manufacturer.
    9. INSTALLER OR SUBCONTRACTOR — Ron Engineering & Construction (Quebec) Ltd.
    10. MARKETING —
      - a. If the item is of Canadian manufacture:
        - (i) Is it now also manufactured abroad? Unknown.
        - (ii) Could it be manufactured abroad? Yes, but conditions unknown.

(iii) What patents are involved? Unknown.

- b. Is the item now commercially available? Yes, from manufacturer.
- c. Is further research and development required before marketing in Canada? : No.
- d. What is the marketing feasibility and/or potential of the item? : Limited to flagpoles and light standards.

#### 11. TECHNICAL DATA AND EVALUATION —

- a. Generic and functional description: Hollow spun concrete lamp posts converted to flagpoles.
- b. Dimensions and weights (units): Different sizes and weights to suit varying heights. See manufacturer's catalogue.
- c. Physical characteristics: Reinforced spun concrete.
- d. Durability and resistance to exposures (weather, chemicals, etc.): Stands up very well under Canadian climatic conditions.
- e. Standards covering item: C.S.A. standard for concrete and reinforcing steel.
- f. Test data: Not available.

#### 12. PERFORMANCE RECORD —

- a. When and where was item first manufactured? : Unknown.
- b. When and where was item first installed? : Unknown.
- c. Experience in manufacture: Unknown.
- d. Experience in installation (at Expo or elsewhere): Unknown.
- e. Service performance since installation: Unknown.
- f. Experience with Canadian climate: Not affected by Canadian climate.
- g. Was item used for other purposes before? : Lamp standards.

13. COST DATA — Available from Les Betons Centrifuges Limitee, Kirkland, Quebec.

14. COMMENTS — This item was well converted from previous use as a lamp standard. Compared to a metal flagpole, it is cheaper and more durable. In addition, there is no noise from halyards slapping against it in the wind.



## QUÉBÉC

### A. GENERAL DATA

1. NATURE OF PAVILION/STRUCTURE — Temporary.
2. LOCATION — Expo Area: Ile Notre-Dame;  
Lot No. 4433;  
Key Plan No. 408.
3. OWNER (or contracting body) — Province of Quebec.
4. DESIGN ARCHITECT — Papineau, Gerin-Lajoie,  
Leblanc & Durand, Montreal.
6. CONSULTING ENGINEERS —
  - a. Structural: Boulva, Wermlinger & Associates,  
Montreal.
  - b. Mechanical & electrical: Bouthillette & Parizeau,  
Montreal.
9. GENERAL CONTRACTOR — A.N. Bail Company  
Limited, Montreal.

### B. GENERAL DESCRIPTION OF PAVILION/STRUCTURE

1. FUNCTIONAL DESCRIPTION — The dominant form of the pavilion was a 50' high, glass-enclosed, truncated pyramid (a box with slightly inclined sides) raised above a completely open platform. Contained was a large exhibition space with a mezzanine level. Below a restaurant, an open terrace and administrative offices. Visitors entered the exhibition volume from the platform underneath by four circular elevators which took them up inside to the mezzanine level. From here, they walked down a gently sloping ramp around the building past the various exhibits to the floor of the box. Exit was made by an outside ramp back down to the platform.

### 2. DIMENSIONS —

- a. Size: 160' x 160'.
- b. Area: 26,000 sq. ft.
- c. Height: 115'.
- d. Stories: Four levels.

3. FOUNDATIONS — Spread concrete footings for ground floor structure; enlarged base concrete filled tube piles supporting towers of super structure, 13' to 14' long.



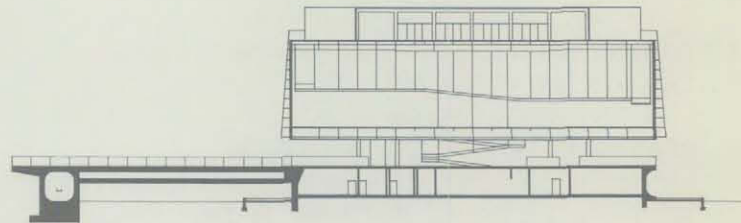
4. **STRUCTURE** — The sides of the box were Vierendeel-type, multi-storey, structural steel frames supported by four structural steel towers set in 32' from the cantilevered periphery. 16' square in plan, the towers were hollow and rose through the full interior volume of the building enclosing service elevator shafts and emergency stairways. The result was a 64' square, support-free, central area surrounded by the 32' cantilevered portion. (Towers were placed 80' on centre.) All bracing was provided within the floors, beyond the towers. Floors were reinforced concrete with structural steel framing members,

from metal suspension system. Exposed building structure and equipment in exhibit areas. Suspended metal lath and acoustical plaster in restaurant.

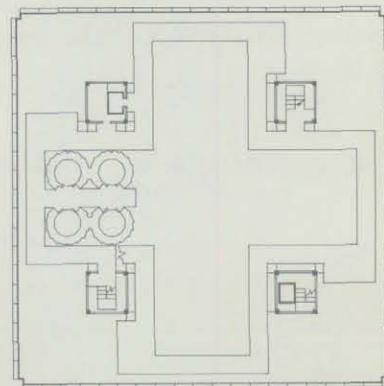
## 9. MECHANICAL SYSTEMS —

- a. **Plumbing:** Standard commercial type washroom fixtures.

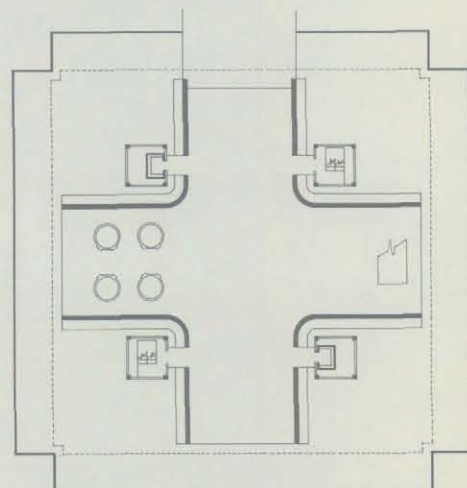
*Section*



*Ground floor plan*



*Mezzanine plan*



5. **WALLS & EXTERIOR CLADDING** — Special glass curtain wall treated as reflecting surface consisting of:

- a. Vierendeel type structural steel framing running vertically at 8' centres.
- b. Square tube steel glass framing.
- c. Canadian Pittsburgh Industries LHR Solargray 4' x 8' panels without horizontal mullions, retained by means of silicone sealant.

6. **ROOF** — Standard four ply tar and gravel; "Dexotex" neoprene roofing on promenade.

7. **WINDOWS & ENTRANCES** — Curtain wall as described under No. 5 above. Entrance via elevators. Exit doors, 1/2" thick "Herculite".

## 8. INTERIOR FINISHES —

- a. **Floors:** Specially woven dark grey carpet called "Zenith" (restaurant, art gallery and mezzanine), "Quartzite" seamless polyurethane flooring (remaining exhibit and administration areas), sand finish concrete (platform).
- b. **Walls:** Concrete block (basement), gypsum plaster on metal lath on metal studs throughout, covered with canvas.
- c. **Ceilings:** Suspended removable metal ceiling at platform level consisting of a 4' x 4' No. 16 gauge modular sheet steel ceiling tile, suspended



- b. Heating, ventilation, air conditioning: Electric coils located in air conditioning units. Two 185 ton Trane Centravac centrifugal refrigeration units installed in parallel. For economy purposes, water from the lagoon was pumped to cool the condensers instead of using a cooling tower. 25 individual Nybcan air conditioning and ventilating units.

- c. Kitchen: Standard stainless steel units serving the restaurant.

#### 10. ELECTRICAL:

- a. Power: One 12 KV transformer, separate substation; total capacity, 2,500 KVA.
- b. Lighting: Mainly forming part of exhibits. Incandescent (plaza), fluorescent (restaurant and administration).
- c. Audio-visual systems: Intercommunication system forming part of exhibits.

#### 11. SPECIAL TRAFFIC CONVEYING EQUIPMENT — Four circular, transparent, piston type elevators manufactured by Otis Elevator Company, Hamilton, Ontario.

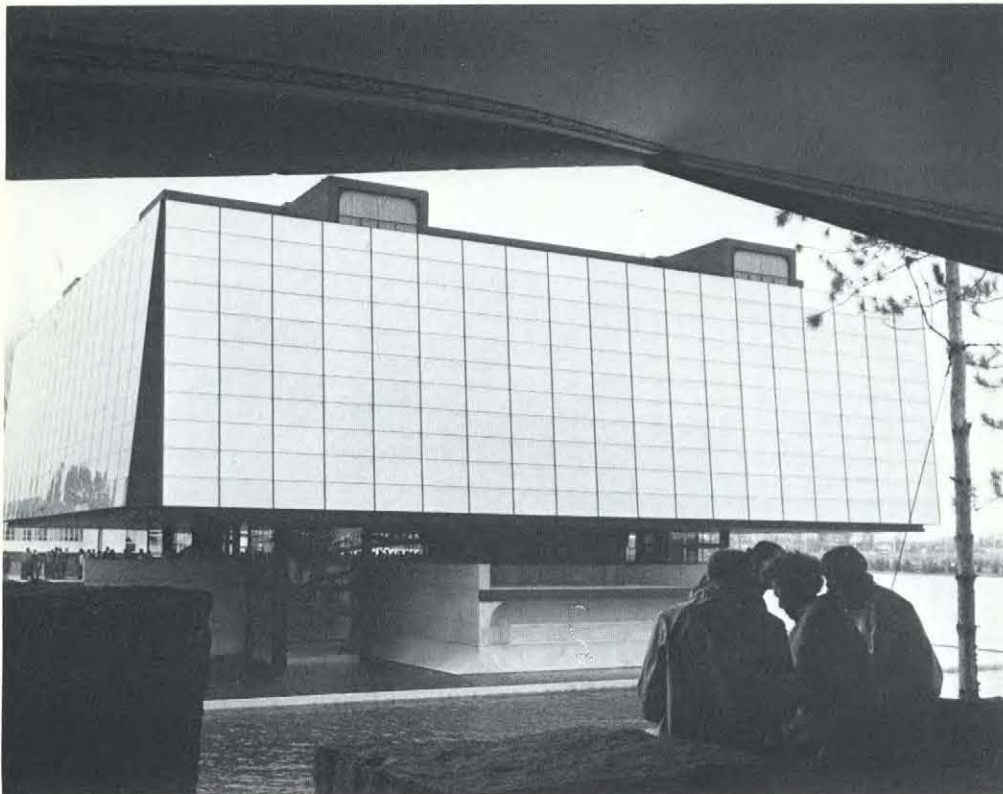
#### 12. FIRE PROTECTION — Standpipe system; smoke

detection and fire alarm system.

#### 14. EXTERIOR WORK (where part of the construction contract) — Concrete retaining walls with concrete bridge, slightly sandblasted, with four built-in waterfalls. Ground floor reflecting pool.

#### 16. COMMENTS —

- a. General: The total effect of the building was one of restrained elegance indicating a high level of industrial design, excellent workmanship and up-to-date familiarity with available materials. Its dominant feature was the glass curtain wall which appeared opaque in daylight, reflecting clouds and surrounding buildings, and transparent at night, when it became an illuminated showcase revealing interior levels and exhibits. It was a fortunate decision which entrusted the architects with the responsibility of designing the exhibits as well as the building. The result was a most harmonious and effective utilization of interior space with building elements almost becoming part of the exhibits themselves. The concept embodied within this pavilion will undoubtedly be applied to future buildings.
- b. Flooring: The use of polyurethane flooring should be further investigated, especially with regard to durability, possible discoloration, exposure to heat and ultra violet radiation.



## WESTERN PROVINCES

### A. GENERAL DATA

1. NATURE OF PAVILION/STRUCTURE — Temporary.
2. LOCATION — Expo Area; Ile Notre-Dame;  
Lot No. 4426;  
Key Plan No. 410.
3. OWNER (or contracting body) — Provinces of British Columbia, Alberta, Saskatchewan and Manitoba.
4. DESIGN Architect — Gilbert R. Beatson, Calgary.
6. CONSULTING ENGINEERS —
  - a. Structural, mechanical and electrical: Reid, Crawther & Partners.
9. GENERAL CONTRACTOR — A. M. Bail Company Limited, Montreal.

### B. GENERAL DESCRIPTION OF PAVILION/STRUCTURE

1. FUNCTIONAL DESCRIPTION — The pavilion was designed to symbolize the transition from the hori-

zontal plane of the prairies (Manitoba and Saskatchewan) to the vertical scale of the mountains of Alberta and British Columbia (an upward curving roof with live trees projecting from its centre). The visitor entered first, through a corridor, into a theatre where a slide show presented the people of the West. He then entered a mine shaft cage which, after providing the illusion of descent, brought him to a mine tunnel exhibit. From here, the visitor moved through ten exhibits and exited by means of a dockwalk.

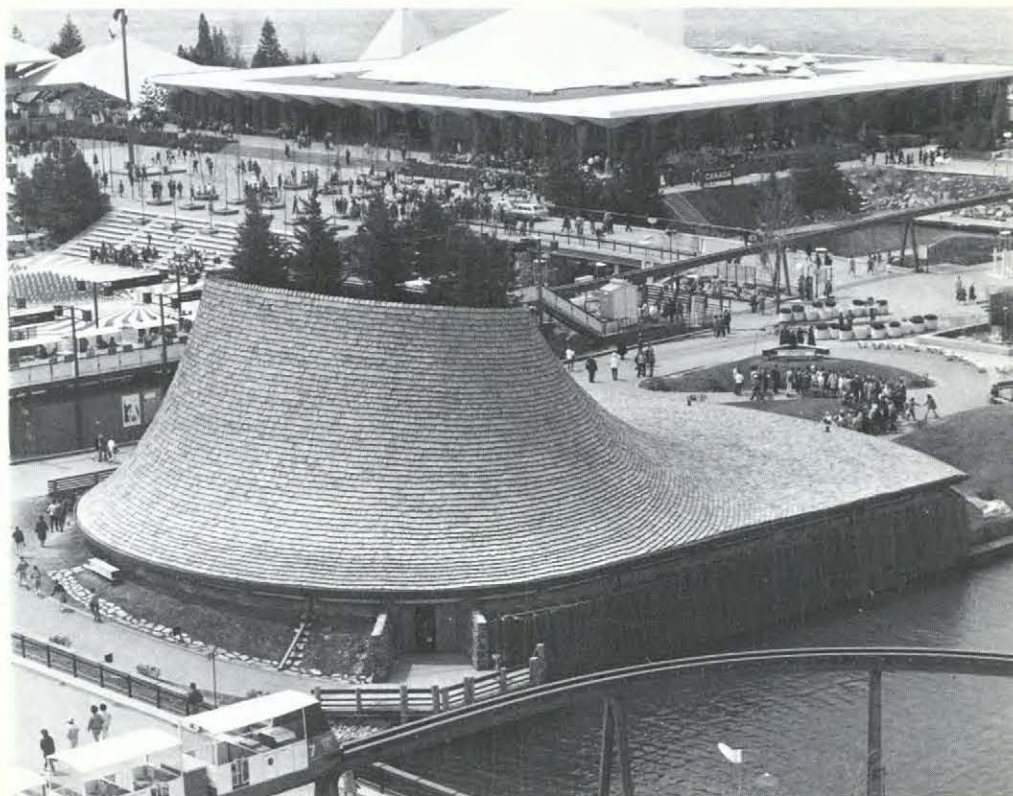
### 2. DIMENSIONS —

- a. Size: 104' x 117'
- b. Area: 12,500 sq. ft.
- c. Height: 48'-6".
- d. Stories: One.

### 3. FOUNDATIONS — Expanded base concrete piles and concrete pile caps supporting concrete walls.

### 4. STRUCTURE — Reinforced concrete wall and floor structure; laminated B.C. Fir roof structure with wood decking.

### 5. WALLS & EXTERIOR CLADDING — Reinforced





concrete covered by landscaping and where exposed finished with cement plaster.

6. ROOF — 1/2" plywood roof panels with stiffeners, finished with hand-split Cedar shakes. Tar and gravel built-up roofing on wood deck over flat roofs.

7. WINDOWS & ENTRANCES — Wood frames with fixed frosted glass. Folding type wood entrance doors in wood frame.

8. INTERIOR FINISHED —

- a. Floors: Vinyl asbestos tile and carpet on concrete.
- b. Walls: Painted concrete block and 5/8" gyproc on wood studs.
- c. Ceilings: 5/8" gyproc on wood furring and framing treated with fire retardant.

9. MECHANICAL SYSTEMS —

- a. Plumbing: Standard fixtures.

- b. Heating, ventilation, air conditioning: Electric baseboard heating in administration area only. Two package type Carrier units and three evaporator coolers in projection room and exhibit areas; window type air conditioning units in administration area.

10. ELECTRICAL —

- a. Power: 7.2/12.5KV, 3 phase, 4 wire, 120/208 volt.
- b. Lighting: Incandescent and fluorescent lighting, both direct and indirect.
- c. Audio-visual systems: Part of exhibits.

12. FIRE PROTECTION — Fire alarm system, Portable fire extinguishers.

14. EXTERIOR WORK (where part of the construction contract) — Sodding, wood dock along canal.





**CANADIAN PAVILIONS**

**INDUSTRIAL PAVILIONS**





## AIR CANADA

### A. GENERAL DATA

1. NATURE OF PAVILION/STRUCTURE — Temporary.
2. LOCATION — Expo Area: Ile Sainte-Hélène;  
Lot No. 3180;  
Key Plan No. 332 (Between H and J Streets).
3. OWNER (or contracting body) — Air Canada.
4. DESIGN ARCHITECT — Crang & Boake, Architects, Toronto.
5. LOCAL ASSOCIATE ARCHITECT — Charbonneau & Charbonneau, Montreal.
6. CONSULTING ENGINEERS —
  - a. Structural: Morrison, Hershfield, Millman and Huggins Limited, Toronto.
  - b. Mechanical: R. T. Tamblyn & Partners Limited, Toronto.
  - c. Electrical: G. E. Mulvey & Company Limited, Toronto.
8. OTHER CONSULTANTS — Gerard Van Duyn Associates, Westport, Connecticut (Exhibition Consultant).

9. GENERAL CONTRACTOR — Camston Limited, Toronto.

### B. GENERAL DESCRIPTION OF PAVILION/STRUCTURE

1. FUNCTIONAL DESCRIPTION — The pavilion contained a display of aviation's history and progress. All service areas were housed in a basement, the roof of which formed an exterior podium. Three circular "pods" on top of the podium housed the various exhibits and were connected by means of a central foyer. A helix covered most of the podium and the pods and wound to a height of 56' above grade.
2. DIMENSIONS —
  - a. Size: 125' x 89' (irregularly shaped).
  - b. Area: 12,470 sq. ft.
  - c. Height: 56'
  - d. Stories: One
3. FOUNDATIONS — Spread concrete footings supported concrete basement walls, podium and helix.
4. STRUCTURE — Reinforced concrete podium with steel structure supporting helix and pods. The 23 helix arms were cantilevered from a central structural steel tower.



5. WALLS & EXTERIOR CLADDING — Concrete basement and reinforced opaque coloured fibreglass pods. The exposed exterior of the concrete basement walls was finished with a marble chip type waterproofing finish called "Herculex".
6. ROOF — Podium: waterproofing membrane with emulsified asphalt over concrete; pods four-ply tar and gravel; helix: 3/4" exterior grade plywood painted with exterior type fire proof paint. Plywood sheets were mounted directly to steel structure.
7. WINDOWS & ENTRANCES — Anodized aluminum store front sections glazed with 1/4" plate glass for both windows and entrances.
8. INTERIOR FINISHES —
  - a. Floors: Exposed concrete (service areas), nylon pile on foam rubber carpets (exhibition areas), urethane finish (washrooms).
  - b. Walls: 1/2" gypsum wallboard on wood studs and painted concrete block walls.
  - c. Ceilings: Metal suspension system, 1/2" thick gypsum wallboard, to which, in some areas, fibreboard acoustical tiles were glued.
9. MECHANICAL SYSTEMS —
  - a. Plumbing: Standard commercial type vitreous

china fixtures.

- b. Heating, ventilation, air conditioning: Electric heating. Air conditioning throughout from central plant.
- c. Kitchen: Staff and guest kitchens for light meals and receptions only. Equipment consisted of hot plates and refrigerator.

#### 10. ELECTRICAL —

- a. Power: 300 KVA transformer, 12 KV Delta to 120/208 volt, 3 phase 4 wire star.
- b. Lighting: Fluorescent (administration) and incandescent (exhibit areas) plus emergency battery lighting system.
- c. Audio-visual system: AM-FM tuner, amplifier, tape recorder, record player and P. A. system.

#### 12. FIRE PROTECTION — Fire alarm and standpipe system.

#### 14. EXTERIOR WORK (where part of the construction contract) — Some flagpoles, planting area and asphalt paving.

#### 16. COMMENTS — Although a striking and unusual pavilion, it constituted a somewhat forced solution to the problem.

*Aquarium and Dolphin Pool  
at left*





## ALCAN-DOLPHIN POOL

### A. GENERAL DATA

1. NATURE OF PAVILION/STRUCTURE — Permanent.
2. LOCATION — Expo Area: La Ronde;  
Lot No. 5700;  
Key Plan No. 511.
3. OWNER (or contracting body) — Jointly sponsored by the Aluminum Company of Canada Limited and the City of Montreal.
4. DESIGN ARCHITECT — George F. Eber, Montreal.
6. CONSULTING ENGINEERS —
  - a. Structural: Blauer Horvath Associates, Montreal.
  - b. Mechanical and electrical: Keith Associates Limited, Montreal.
8. OTHER CONSULTANTS — Messrs. Paul Montreuil and Lucien Rodrigue (Zoological).
9. GENERAL CONTRACTOR — Pentagon Construction Company Limited, Montreal.

### B. GENERAL DESCRIPTION OF PAVILION/STRUCTURE

1. FUNCTIONAL DESCRIPTION — This circular building consists of two primary elements: a one storey, 950 seat, arena-type structure, containing an oval-shaped pool for dolphin show performances, and a two storey holding tank building containing day and quarantine quarters for the dolphins.
2. DIMENSIONS —
  - a. Size: 112' diameter.
  - b. Area: 22,889 sq. ft.
  - c. Height: 69' (maximum).
  - d. Stories: One.
3. FOUNDATIONS — Expanded base concrete piles with pile caps and reinforced concrete grade beams.
4. STRUCTURE — Reinforced concrete walls, columns, flat slabs and shell roof with ribs and pretensioned ring.

5. WALLS & EXTERIOR CLADDING — Formwork finish, textured concrete with 2" rigid insulation and cement plaster finish.

6. ROOF — Neoprene-Hypalon, aluminum rib cladding and pinnacle on main roof; 4 ply tar and gravel on flat roof over holding tank area.

7. WINDOWS & ENTRANCES — No windows; extruded bronze colored, anodized aluminum store front type entrances and side lights with 1/4" bronze colored, tempered plate glass.

### 8. INTERIOR FINISHES —

- a. Floors: Concrete with hardner and sealer.
- b. Walls: Exposed concrete and unpainted cement plaster.
- c. Ceilings: Exposed concrete slabs and beams.

### 9. MECHANICAL SYSTEMS —

- a. Plumbing: Standard washroom fixtures.
- b. Heating, ventilation, air conditioning: Hot air and hot water heating and ventilation system.
- d. Other: Diatomaceous earth filtration and water treating systems for salt water tanks and pool.

### 10. ELECTRICAL —

- a. Power: 600 Volt, 3 phase, 4 wire service entrances; 120/208 volt, 3 phase, 4 wire system.
- b. Lighting: Metal arc lighting (arena), incandescent (service areas).
- c. Audio-visual systems: Music system with paging facilities, AM — FM tuner and record player.

12. FIRE PROTECTION — Manual fire alarm system, smoke detection system, stand pipe system.

14. EXTERIOR WORK (where part of the construction contract) — Asphalt paving, landscaping and lighting.

16. COMMENTS — The building was designed for the maximum comfort of 12 dolphins complete with hospital facilities. The holding tanks in particular, were ingeniously arranged to allow for the continuous flow of dolphin teams from their living quarters to the show tank. The arena seating area was designed for optimum, above water viewing of the dolphins in action.

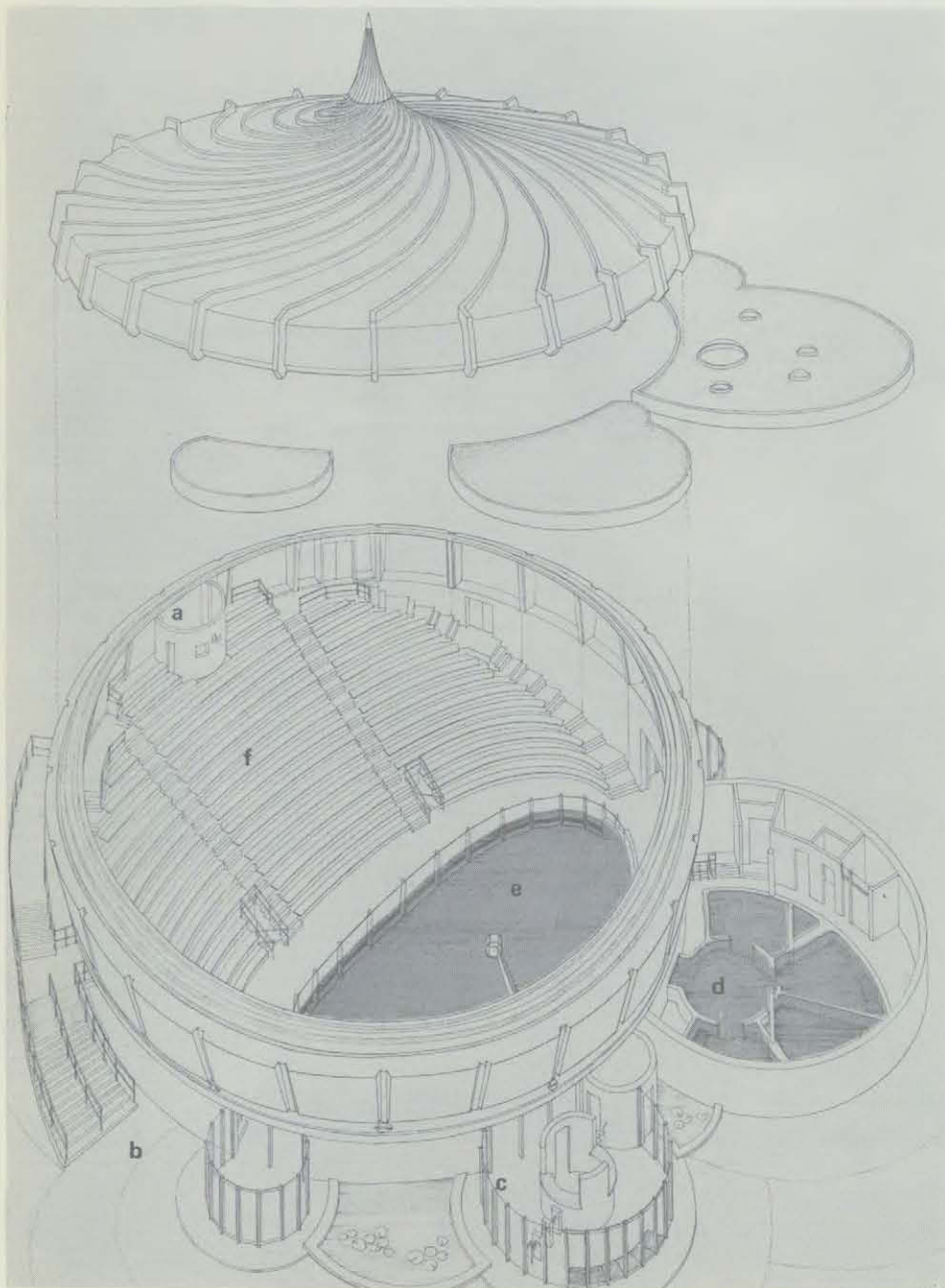
The buildings are noteworthy for the complex mechanical apparatus which provides both fresh and salt water systems with individually heated, aerated and filtered water. In both also, lighting has been subdued throughout for maximum effect. Common materials were chosen to provide continuity between the two buildings which are primarily of textured concrete and aluminum.

C. DATA ON INNOVATION — ALCAN-DOLPHIN POOL.

1. NAME OF ITEM — Metal Arc Lighting.
2. LOCATION — Wall cove of arena.

3. DESIGNER OR SELECTOR INVOLVED — Mr. H. Frier, Keith Associates Limited.
4. WHY WAS ITEM SELECTED? : For light output and colour rendition.
5. WAS ITEM PRODUCED SPECIFICALLY FOR EXPO? : No.

14. COMMENTS — Metal arc lighting itself is not an innovation, but using it for indoor purposes certainly is. No other similar application of this system is known to have taken place before Expo. Its use in this building is very successful, giving an interesting effect to the concrete and providing true color evaluation. Future use is recommended for other large indoor spaces such as arenas.



*Exploded view*

**Key**

- a — Projection booth
- b — Exit stair and exit
- c — Entrance and ticket booth
- d — Holding tanks
- e — Show pool
- f — 900 seats



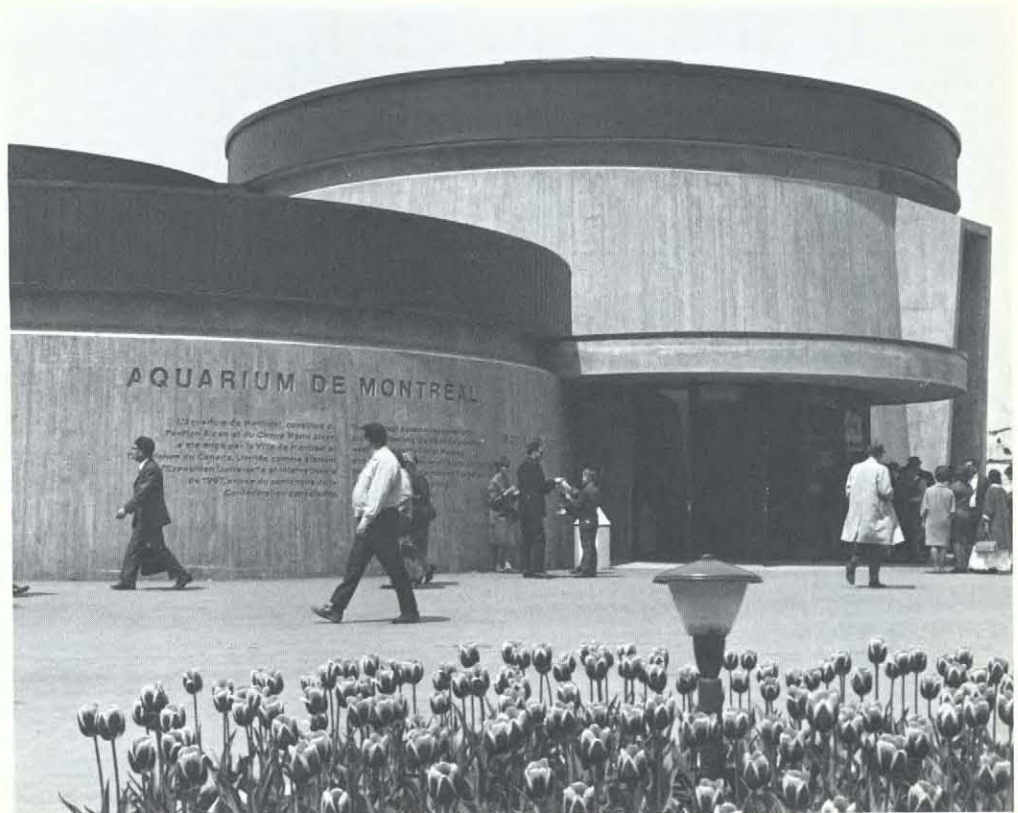
## ALCAN—MONTREAL AQUARIUM

### A. GENERAL DATA

1. NATURE OF PAVILION/STRUCTURE — Permanent.
2. LOCATION — Expo Area: La Ronde  
Lot No. 5700  
Key Plan No. 512
3. OWNER (or contracting body) — Jointly sponsored by the Aluminum Company of Canada, Limited and the City of Montreal.
4. DESIGN ARCHITECT — George F. Eber, Montreal
6. CONSULTING ENGINEERS —
  - a. Structural: Blauer Horvath Associates, Montreal
  - b. Mechanical and Electrical: Keith Associates Ltd., Montreal.
8. OTHER CONSULTANTS — Messrs. Paul Montreuil and Lucien Rodrigue, (Zoological).
9. GENERAL CONTRACTOR — Pentagon Construction Co. Ltd., Montreal.

### B. GENERAL DESCRIPTION OF PAVILION/STRUCTURE

1. FUNCTIONAL DESCRIPTION — A multi-level reinforced concrete building, the Aquarium contains a variety of fresh and salt water life. Visitors enter at ground level, travel first past a penguin exhibit, then through a series of a variously sized aquaria alcoves containing fish and other forms of marine life, finally entering a circular coral reef exhibit 19' above the ground floor level. From here, the descent is made down a ramp past a central reflecting pool, back to the main lobby and exit.
2. DIMENSIONS;
  - a. Size: 160'-8" X 122' (a collection of rounded forms).
  - b. Area: 28,662 sq. ft.
  - c. Height: 41' (maximum)
  - d. Stories: 9 levels
3. FOUNDATIONS — Expanded base concrete piles with pile caps and grade beams.



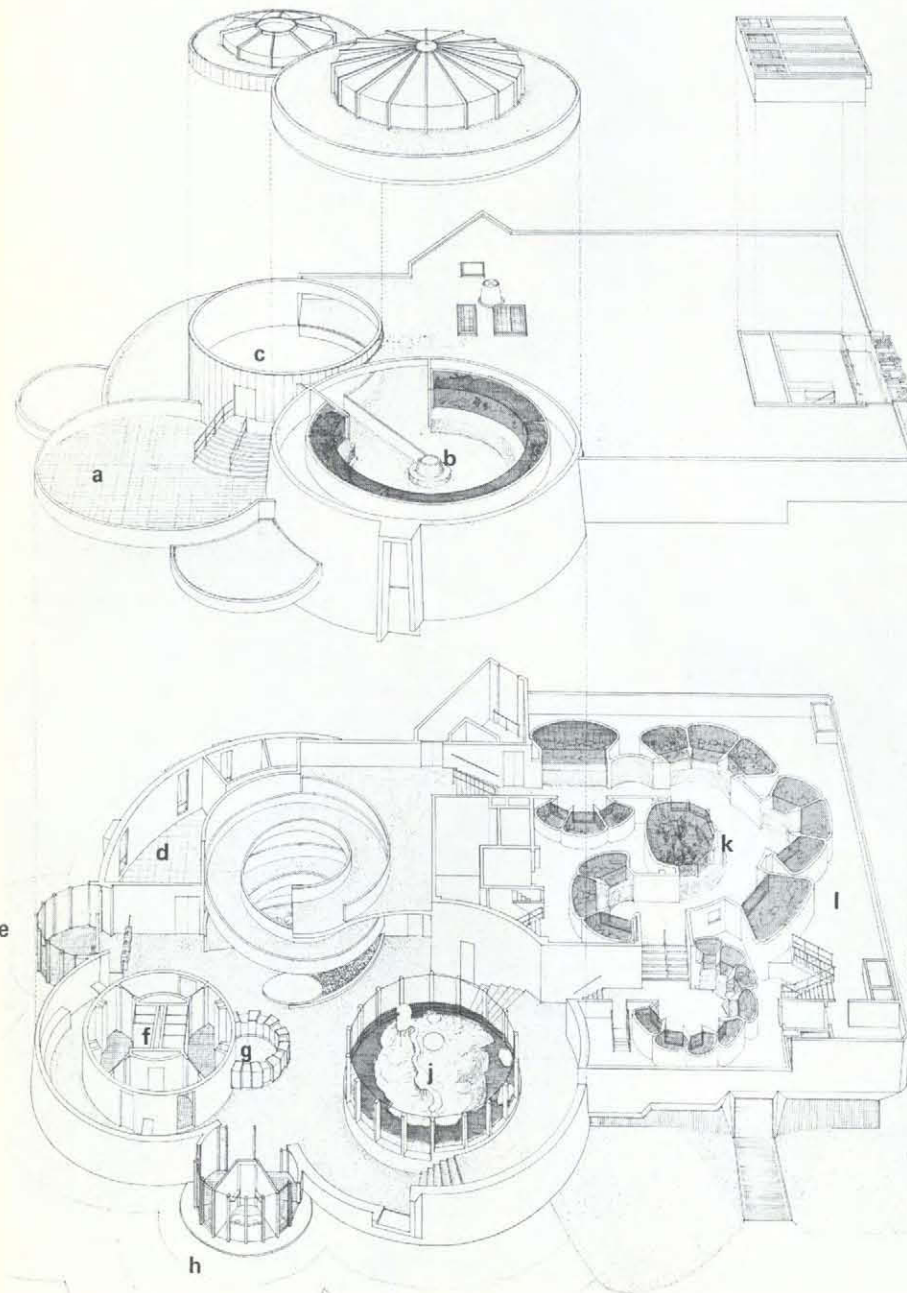
4. STRUCTURE — Reinforced concrete columns, beams, slabs and walls.
5. WALLS & EXTERIOR CLADDING — Form board finish, reinforced concrete with 2" rigid insulation and gypsum and/or cement plaster finish.
6. ROOF — Four ply tar and gravel over flat areas; neoprene-hypalon over ramp dome.
7. WINDOWS & ENTRANCES — Extruded, dark bronze, anodized aluminum window sections with hopper-type vents and 1/4" bronze coloured plate glass; extruded, dark bronze, anodized aluminum door sections, store front type with 1/4" bronze coloured, tempered plate glass.

#### 8. INTERIOR FINISHES —

- a. Floors: exposed concrete, carpet, vinyl-asbestos tile
- b. Walls: Gypsum and cement plaster on metal lath and metal studs, and on concrete and concrete block.
- c. Ceilings: Acoustical and gypsum plaster on metal lath and metal suspension system.

#### 9. MECHANICAL SYSTEMS —

- a. Plumbing: Standard washroom fixtures.
- b. Heating, ventilation, air conditioning: Hot water



*Exploded view*

#### Key

- a — Terrace
- b — Coral reef exhibit
- c — Lunch room
- d — Reception room and offices
- e — Exit
- f — Coats and toilets
- g — Souvenirs
- h — Entrance and ticket booth
- j — Penguin pool
- k — Fish galleries and display tanks
- l — Service area



heating system with central boiler plant; fan coil units in office area and forced-flow heaters in vestibules. The public area has its own air conditioning unit while the remainder of the air conditioning system contains hot water reheat coils. The service areas are ventilated only; the office area is provided with dehumidified neutral temperature ventilated air. The penguin exhibit is refrigerated at 43°F.

- d. Other: Fresh and salt water filtration systems through either sand or diatomaceous earth filters into tanks. The penguin exhibit water is refrigerated before entering the penguin pool proper.

#### 10. ELECTRICAL —

- a. Power: 600 volt, 3 phase, 4 wire service entrance.
- b. Lighting: 120–208 volt, 3 phase, 4 wire system.
- c. Audio-visual systems: music system with paging facilities, AM-FM tuner and record player.

12. FIRE PRODUCTION — Fire alarm system, smoke detection system, standpipe system with fire hose cabinets.

14. EXTERIOR WORK (where part of the construction contract) — Landscaping, asphalt and gravel paving, exterior lighting of landscaped areas.

#### 15. OTHER ITEMS OF PARTICULAR INTEREST:

- 1. Fiberglass penguin and coral reef exhibits.
  - a. Brief description: Metal reinforced, fiberglass moulded arctic ice and coral rock formations.
  - b. Location: Penguin and coral reef exhibits.
  - c. Manufacturer or Producer: CPF Plastics Ltd., Montreal.
  - d. Nearest source of more information: Same
- 2. Lucite rods.
  - a. Brief description: Insertion of lucite rods in coral reef ceiling in order to create impression of the Southern Hemisphere.
  - b. Location: Coral reef exhibit.
  - c. Manufacturer or producer: Dupont of Canada Ltd., Montreal.
  - d. Nearest source of more information: Same.

16. COMMENTS — Containing the latest developments in aquarium technology, the building was designed to exhibit marine life in as interesting a manner as possible, especially avoiding a museum-type approach. Interiors were completely subdued in order that the colorfully decorated show tanks would be dominant.

Both buildings are noteworthy for the complex, mechanical apparatus which provides both fresh and salt water systems with individually heated, aerated and filtered water. In both also, lighting has been subdued throughout for maximum effect. Common materials were chosen to provide continuity between the two buildings, which are primarily of textured concrete and aluminum.

*Upper — main fish gallery*

*Lower — interior view from entrance*



C. DATA ON INNOVATION – ALCAN–MONTREAL AQUARIUM

1. NAME OF ITEM – Revolving ticket trays
2. LOCATION – Main entrance ticket booth.
3. DESIGNER OR SELECTOR INVOLVED – George F. Eber, Montreal. (Architect).
4. WHY WAS ITEM SELECTED? – To avoid draft in ticket booth.
5. WAS ITEM PRODUCED SPECIFICALLY FOR EXPO? – No.
6. MANUFACTURER – N.V. Machinefabriek & Constructiewerkplaats A.W.O., The Hague, Netherlands.
7. DISTRIBUTOR (nearest) – None in Canada.
8. NEAREST SOURCE OF ADDITIONAL INFORMATION – Manufacturer.
9. INSTALLER OR SUBCONTRACTOR – Ramsay Industries Ltd., Lachine, Quebec.
10. MARKETING –

- a. If the item is of foreign manufacture:
  - (i) Is it now also manufactured in Canada? No.
  - (ii) Could it be manufactured in Canada? Yes although conditions of manufacture would have to be discussed with original manufacturer.
  - (iii) what patents are involved? Not known.
- b. Is the item now commercially available? Yes, from manufacturer.
- c. Is further research and development required before marketing in Canada? No.
- d. What is the marketing feasibility and/or potential of the item? For use in theatres, stadia, railway stations, banks, etc.

11. TECHNICAL DATA AND EVALUATION –

- a. Generic and functional description: The unit consists of a recessed, revolving, stainless steel circular ticket tray into which the visitor puts his money, on the exterior and the ticket seller puts the tickets on the interior. At the turn of the handle, the ticket tray revolves 180 degrees delivering the ticket to the visitor and the money to the ticket seller.

- b. Dimensions and weights (units): 215 mm X 30 mm X 130mm.

- c. Physical characteristics: Stainless steel.
- d. Durability and resistance to exposures (weather, chemicals, etc.): The material stands up very well to the weather as entire mechanism is sealed in a stainless steel box.
- e. Standards covering item: Unknown.
- f. Test data: Unknown
- g. Alternate methods of evaluation, used in lieu of applicable standard: Professional judgement.

12. PERFORMANCE RECORD –

- a. When and where was item first manufactured? : Unknown.
- b. When and where was item first installed? Unknown.
- c. Experience in manufacture: This item is a standard unit used throughout Western Europe and has been manufactured for a number of years.
- d. Experience in installation (at Expo or elsewhere): In railway stations, cinemas, theatres, etc., throughout Europe.
- e. Service performance since installation: Unknown.
- f. Experience with Canadian climate: Unknown due to shortness of time since installation, but would seem ideal for this country, based upon European experience.
- g. Was item used for other purposes before? Unknown.
- h. Other suggested uses: For maximum security in box offices and banks.

13. COST DATA – Available from Pentagon Construction Company Ltd., Montreal.

14. COMMENTS – This device should definitely be studied for future use in Canada (imported or manufactured here). As previously mentioned, climate would be no problem. It would certainly be a great improvement over the open type of wicket, both aesthetically and functionally (greater security).



## AUTOMOTIVE STADIUM

### A. GENERAL DATA

1. NATURE OF PAVILION/STRUCTURE — Temporary.
2. LOCATION — Expo Area: Cité du Havre (Bridge & University Sts);  
Lot No. 1000;  
Key Plan No. 200.
3. OWNER (or contracting body) — Canadian Corporation for the 1967 World Exhibition.
4. DESIGN ARCHITECT — Victor Prus, Montreal.
6. CONSULTING ENGINEERS —
  - a. Structural: Martineau & Samson, Montreal.
  - b. Mechanical & Electrical: Pageau & Morel, Montreal.
9. GENERAL CONTRACTOR — Foundation Company of Canada Limited, Montreal.
10. OTHER CONTRACTORS OF SPECIAL INTEREST — Western Caissons Limited, Chomedey, Quebec.

### B. GENERAL DESCRIPTION OF PAVILION/STRUCTURE

1. FUNCTIONAL DESCRIPTION — An oval shaped open air stadium, it had a seating capacity of 25,000. Additional facilities included dressing rooms, broadcasting and production booths, washrooms, offices, concession and mechanical and storage areas.
2. DIMENSIONS —
  - a. Size: 580' x 805'.
  - b. Area: 406,400 sq. ft.
  - c. Height: Top bleachers 50' above field.
3. FOUNDATIONS — Drilled caissons, poured in place concrete with steel shell to an average depth of 40' below grade; supporting pile caps connected with concrete grade beams.
4. STRUCTURE — Precast column and beam structure with precast concrete bleacher elements formed the main part of the structure. The structure consisted of 19 identical units each forming a complete bleacher section. The press and producer's boxes were of precast concrete, cantilevered from a steel beam



structure.

7. WINDOWS & ENTRANCES — Standard steel sash glazed with 1/4" clear plate glass. Entrance doors, extruded anodized aluminum, store front type, with 1/4" clear plate glass. Windows in press and producer's boxes were sliding anodized aluminum, single glazed.

8. INTERIOR FINISHES —

- a. Floors: Epoxy painted concrete, quarry tile (service areas).
- b. Walls: Epoxy painted concrete block.
- c. Ceilings: Exposed concrete with, in some areas, sprayed on asbestos insulation material.

9. MECHANICAL SYSTEMS —

- a. Plumbing: Copper and cast iron piping and standard fixtures in public and private wash-rooms.
- b. Heating, ventilation, air conditioning: Forced air throughout service and administrative areas. Fresh air ventilation in service and administrative areas and air conditioning in V.I.P. lounge.
- d. Other: Herringbone type field drainage system consisting of French tiles.

10. ELECTRICAL —

- a. Power: 12000 KV.
- b. Lighting: Incandescent and "Xenon" flood lighting.
- c. Audio-visual systems: "Altec Lansing" hi-fi system, AM-FM tuner, tape recorder and P.A. system.
- d. Other: T.V. conduit and outlet facilities.

12. FIRE PROTECTION — Standpipe and movable fire extinguisher system.

14. EXTERIOR WORK (where part of the construction contract) — Sodding and asphalt paving.

15. OTHER ITEMS OF PARTICULAR INTEREST —

1. Stadium Structure —

- a. Brief Description: Demountable, transportable and re-erectable stadium, capable of construction in parts or in total. At Expo, it consisted of 19 equal sections, each made of three identical elements. Bleachers were in the form of L-shaped beam units.
- c. Manufacturer or Producer: Francon (1966) Limitée, Montreal.
- d. Nearest source of more information: Same.

2. Overhead Floodlighting —

- a. Brief Description: Xenon floodlighting used for ease of maintenance, economy and for black and white T.V. coverage of events (able to simulate daylight conditions).
- c. Manufacturer or producer: Siemens A. G., West Germany.
- d. Nearest source of information: Siemens Canada Limited, Montreal.

16. COMMENTS — The most unusual and very ingeniously solved feature of this stadium is its demountability which has made it possible to either move it or rearrange its configuration. It has, as a result, considerable re-sale value. Its different sections, could be sold separately in order to create two or more smaller stadia or, conversely, it could to be enlarged by adding additional units to seat up to 40,000. The only flaw with this structure is the loss of valuable seating space resulting from the gaps between bleacher sections.

Due to the fact that the property had been a city dump, its soil had practically no bearing capacity at all and foundations had to be taken down 40' below grade in order to rest on adequate bearing strata. Large span precast elements were used, therefore, to minimize points of support.

The Xenon floodlighting imported from Germany was noteworthy for its economy and efficiency.



## BREWERS PAVILION

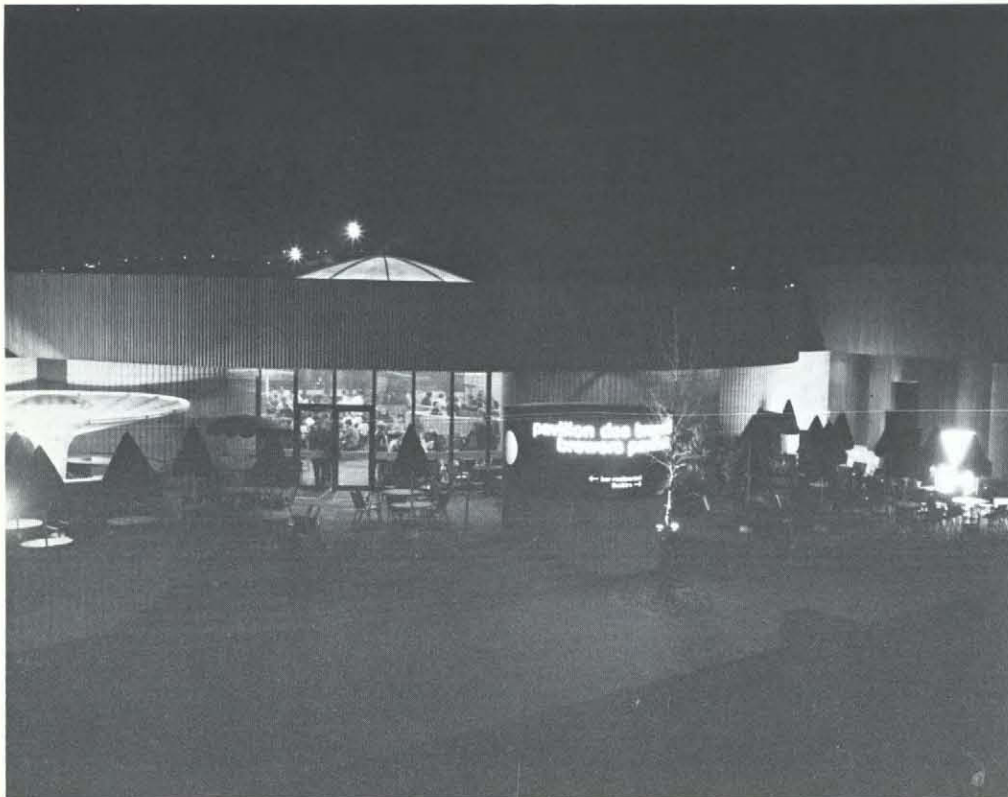
### A. GENERAL DATA

1. NATURE OF PAVILION/STRUCTURE — Temporary.
2. LOCATION — Expo Area: Ile Sainte-Hélène;  
Lot No. 3115;  
Key Plan No. 327.
3. OWNER (or contracting body) — Brewers Association of Canada.
4. DESIGN ARCHITECT — Fairfield & Dubois, Toronto.
6. CONSULTING ENGINEERS —
  - a. Structural, Mechanical & Electrical: Cartier, Cote, Piette, Boulva, Wermenlinger & Associates, Montreal.
  - b. Other: Keith Little Associates Limited, Toronto (Kitchen).
8. OTHER CONSULTANTS — D.W. Graham Associates, Ottawa (Landscape).
9. GENERAL CONTRACTOR — Cassy Construction

Company Limited, Montreal.

### B. GENERAL DESCRIPTION OF PAVILION/STRUCTURE

1. FUNCTIONAL DESCRIPTION — The pavilion consisted of a series of interlocking circles which housed a restaurant and bar, a theatre and exhibition space, and a kitchen and service area.
2. DIMENSIONS —
  - a. Size: 100' x 75' (irregular).
  - b. Area: 6,000 sq. ft.
  - c. Height: 24'.
  - d. Stories: One.
3. FOUNDATIONS — Spread footings, poured concrete for the basement.
4. STRUCTURE — Combination of concrete blocks & steel.
5. WALLS & EXTERIOR CLADDING — Special concrete block fascias, cedar battens.



6. ROOF — 4-ply tar and gravel; plastic flashing.

7. WINDOWS & ENTRANCES — Plate glass fixed in aluminum frames. One window was of curved plexiglass.

8. INTERIOR FINISHES —

- a. Floors: Exposed aggregate concrete with inserted round wood trunks, concrete (kitchen), Texama Carpet (theatre).
- b. Walls: Exposed special concrete block (exhibition and theatre areas), plaster on metal lath on free curved partitions (washrooms).
- c. Ceilings: 2" x 4" cedar in radial arrangement (restaurant), plaster (theatre).

9. MECHANICAL SYSTEMS —

- a. Plumbing: Standard fixtures in washrooms; basins were set in plaster vanity.
- b. Heating, ventilation, air conditioning: Hot air and full air conditioning; in some areas electric heating.
- c. Kitchen: Standard commercial.

10. ELECTRICAL —

- a. Power: 12 KV unit sub-station.
- b. Lighting: Fluorescent throughout; incandescent in exhibition areas.
- c. Audio-visual systems: Stage lighting for "Puppet Theatre".

12. FIRE PROTECTION — Sprinkler system in theatre. Stand pipe and automatic fire detectors.

14. EXTERIOR WORK (where part of the construction contract) — Terraces and landscaping.

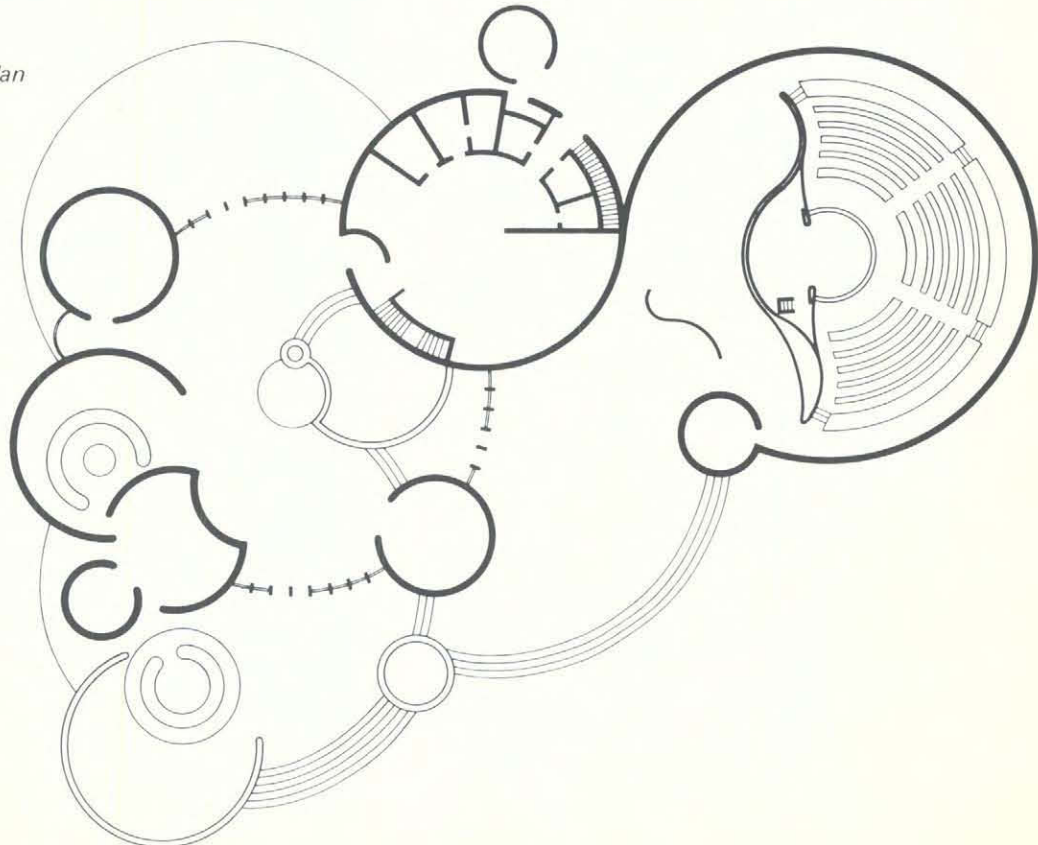
15. OTHER ITEMS OF PARTICULAR INTEREST — Floor, concrete block and fibre glass dome.

- a. Brief description:  
Floor: Exposed aggregate and wood rounds.  
Fibre glass dome: Translucent.  
Concrete block: Hollow concrete block specially designed for this project.

b. Location: Theatre.

16. COMMENTS: This was a successful building, noted particularly for the simple but elegant use that was made of special concrete blocks.

*Ground floor plan*





## CANADIAN KODAK

### A. GENERAL DATA

1. NATURE OF PAVILION/STRUCTURE — Temporary.
2. LOCATION — Expo Area: Ile Notre-Dame;  
Lot No. 4243;  
Key Plan No. 445.
3. OWNER (or contracting body) — Canadian Kodak Company Limited.
4. DESIGN ARCHITECT — John B. and John C. Parkin, Montreal.
6. CONSULTING ENGINEERS —
  - a. Structural: John B. and John C. Parkin, Montreal.
  - b. Mechanical and electrical: John H. Ross & Associates, Dollard des Ormeaux, Quebec.
9. GENERAL CONTRACTOR — J.L.E. Price & Company Limited, Montreal.

### B. GENERAL DESCRIPTION OF PAVILION/STRUCTURE

1. FUNCTIONAL DESCRIPTION — A simple one-storey block building, it accommodated an information centre, a display area and small theatre,

administration and staff areas.

### 2. DIMENSIONS —

- a. Size: 72' x 104'.
- b. Area: 7,500 sq. ft.
- c. Height: 14'.
- d. Stories: One.

3. FOUNDATIONS — Steel piles, reinforced concrete foundation walls.

4. STRUCTURE — Load bearing concrete walls and 7-1/2" x 36" glue-laminated wood roof beams overlapping walls to form an overhand.

5. WALLS AND EXTERIOR CLADDING — Painted bush hammered concrete; stucco on concrete block.

6. ROOF — Built-up roofing over wood deck.

7. WINDOWS AND ENTRANCES — Solar grey and clear plate glass in wood frames.

### 8. INTERIOR FINISHES —

- a. Floors: Carpet and vinyl asbestos floor tile.
- b. Walls: Painted bush hammered concrete, painted drywall, wood panelling and carpet (ozite).
- c. Ceilings: Exposed T & G wood deck, wood slats, planking.



9. MECHANICAL SYSTEMS –

- a. Plumbing: Standard; electric domestic hot water system.
- b. Heating: ventilation, air conditioning: Single, roof mounted, gas fired heating—cooling package unit; all air system; air cooled condenser, direct expansion cooling coils; served three separate areas, total capacity 45T.
- c. Kitchen: Domestic type servery.

manual transfer switch, step down to 120/208V service with 150 KVA dry transformer.

- b. Lighting: Incandescent and fluorescent.

10. ELECTRICAL –

- a. Power: 12,470 V 2 feeder service entrance;

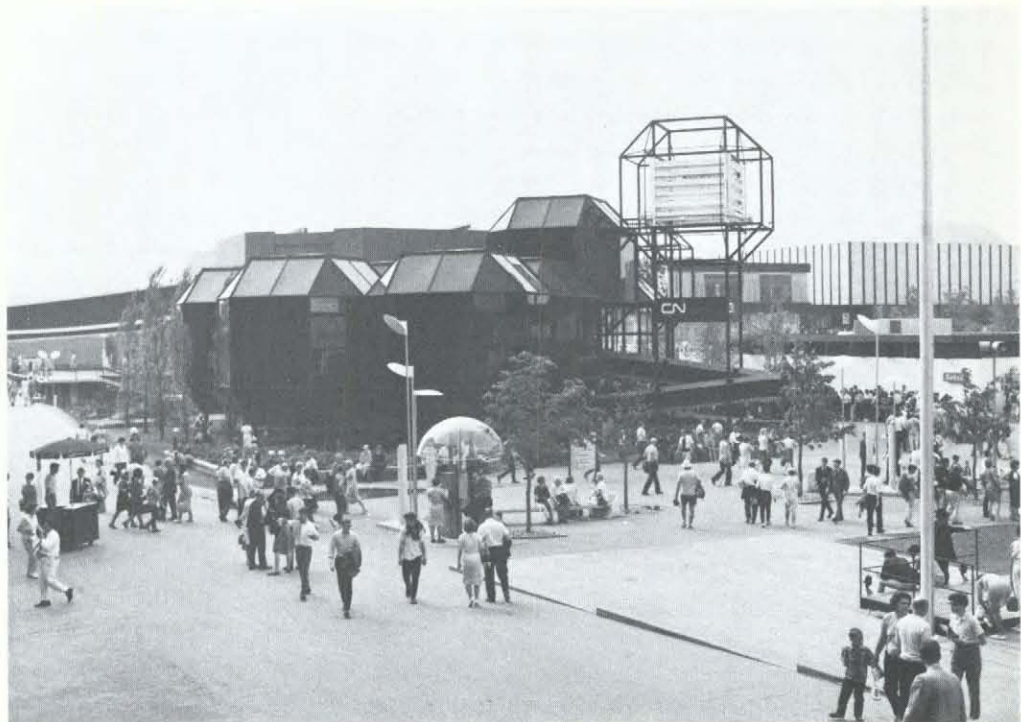
12. FIRE PROTECTION – Hose cabinet, fire retardant varnish to deck.

13. SAFETY FEATURES – Emergency lighting.

14. EXTERIOR WORK (where part of the construction contract) – Landscaping, picture garden.

16. COMMENTS – Built with appropriate structure and materials, this expertly executed and compact but neatly functional building accommodated its exhibits both simply and economically.

*Canadian National Railways*





## CANADIAN NATIONAL RAILWAYS

### A. GENERAL DATA

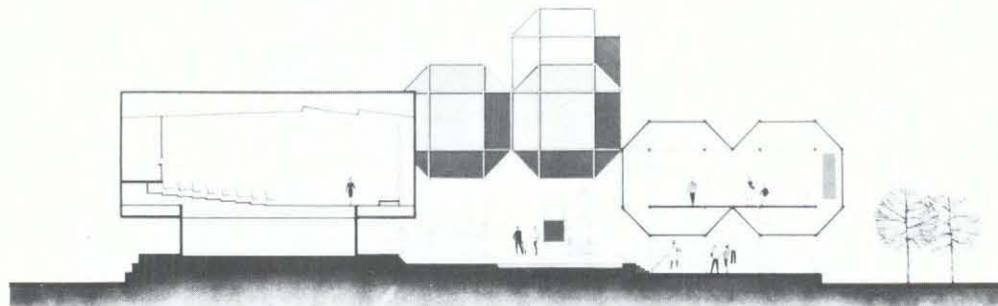
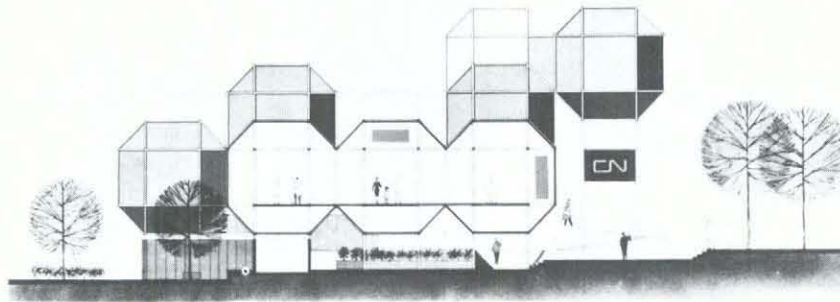
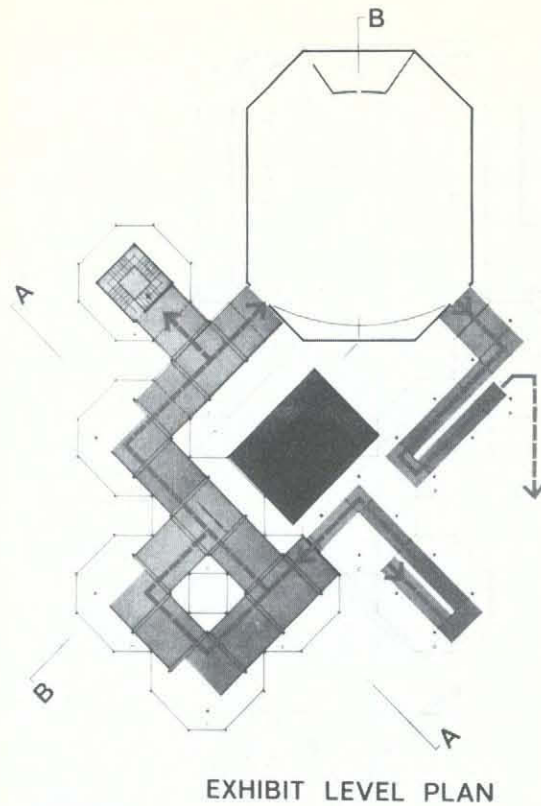
1. NATURE OF PAVILION/STRUCTURE — Temporary.
2. LOCATION — Expo Area: Ile Notre-Dame;  
Lot No. 4242;  
Key Plan No. 444.
3. OWNER (or contracting body) — Canadian National Railways.
5. DESIGN ARCHITECT — John B. and John C. Parkin;  
Papineau, Gerin-Lajoie and Le Blanc, Montreal.
6. CONSULTING ENGINEERS —
  - a. Structural, mechanical and electrical: John B. and John C. Parkin, Montreal.
9. GENERAL CONTRACTOR — Janin Construction Limited, Montreal

### B. GENERAL DESCRIPTION OF PAVILION/STRUCTURE

1. FUNCTIONAL DESCRIPTION — The Pavilion consisted of a cluster of geometric cells (polyhedrons) linked to a 200 seat octagonal movie theatre. Twin themes explored in the pavilion were Time and Motion. The Time exhibit was presented in nine cells, the walls of which were made of a dark grey acrylic. The cells were 24' across at their widest part and raised from the ground to different levels. Visitors first walked through the interconnected cells and then up a ramp into the adjacent octagonal theatre.
2. DIMENSIONS —
  - a. Size: 120' x 114'.
  - b. Area: 13,700 sq. ft.
  - c. Height: 52'.
  - d. Stories: One.
3. FOUNDATIONS — Steel piles, reinforced concrete foundations.

4. STRUCTURE — Structural steel.
5. WALLS AND EXTERIOR CLADDING — Acrylic (dark grey); painted steel panels.
6. ROOF — Built up roofing on steel deck.
7. WINDOWS AND ENTRANCES — Acrylic in metal frames, metal doors
8. INTERIOR FINISHES —
  - a. Floors: Carpet, wood planking on exterior ramps.
  - b. Walls: Acrylic, painted perforated metal.
  - c. Ceilings: Acrylic, painted steel deck (in auditorium).
9. MECHANICAL SYSTEMS —
  - a. Plumbing: Standard; electric hot water tank.
  - b. Heating, ventilation, air conditioning: Each contained exhibition cell was air conditioned by a self-contained packaged unit of 10T capacity which was hung on the underside of the floor structure. The theatre was served by a 30T air handling unit. A reciprocating compressor supplied chilled water to both air handling and package units. Heating was limited to the theatre only — evaporative condenser electrical heating coils.
10. ELECTRICAL —
  - a. Power: 12,470 V incoming service; step down to 120/208 V service with 300 KVA dry transformer.
  - b. Lighting: Incandescent.
  - c. Audio-visual systems: Part of exhibits contract.
12. FIRE PROTECTION — Hose cabinet, extinguishers.
13. SAFETY FEATURE — Emergency lighting, smoke detection fire alarm system.
14. EXTERIOR WORK (where part of the construction contract) — Landscaping.

16. COMMENTS – This building was one of the most expertly detailed and conceived industrial pavilions at Expo. The polyhedron cells, in particular, created an interesting special contrast with the movie theatre. On the other hand, while the site arrangement was also very well handled, the building's mournfully grey and black appearance did not suit its exhibition ground setting.





A. GENERAL DATA

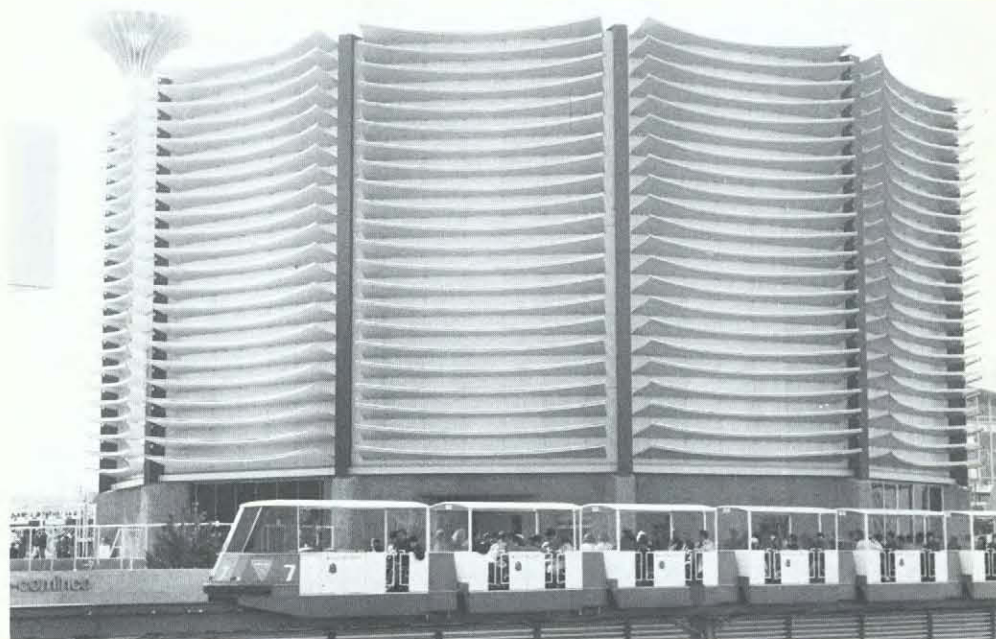
1. NATURE OF PAVILION/STRUCTURE — Temporary.
2. LOCATION — Expo Area: Ile Notre-Dame;  
Lot No. 4047;  
Key Plan No. 478.
3. OWNER (or contracting body) — Joint Ownership:  
Canadian Pacific Railway Company and Cominco Limited.
4. DESIGN ARCHITECT — Designers: De Martin-Marona of Canada Limited, Westmount, Que.
5. LOCAL ASSOCIATE ARCHITECT — Dobush, Stewart, Bourke, Longpré, Marchand & Goudreau, Montreal.
6. CONSULTING ENGINEERS —
  - a. Structural, mechanical and electrical: Strobel & Rongved, New York.
7. LOCAL ASSOCIATE CONSULTING ENGINEERS —
  - a. Structural: J.J. Dury and Associates, Montreal.
  - b. Mechanical and electrical: Huza-Thibault, Montreal.

8. OTHER CONSULTANTS —

- a. Acoustical: Goodfriend & Ostergaard, Cedar Knoll, N.J.
  - b. Projection: Will Szabo — Atlantic Films Limited, Montreal.
9. GENERAL CONTRACTOR — Hewson Construction Limited, Montreal.
10. OTHER CONTRACTORS OF SPECIAL INTEREST — Atlantic Films Limited, (Film projection booths and installation).

B. GENERAL DESCRIPTION OF PAVILION/STRUCTURE

1. FUNCTIONAL DESCRIPTION — The pavilion consisted of two separate buildings connected by a covered bridge. One was a circular structure which enclosed a movie amphitheatre, and staff and VIP facilities. The other, of rectangular shape, contained exhibits and public facilities. Outside was a landscaped plaza area which included lagoons and fountains. The entire complex housed a very extensive exhibition both on the exterior and interior, which told a detailed story of the products and services of the two companies concerned.
2. DIMENSIONS —



- a. Size: 100' diameter (theatre); 40' X 180' (Exhibition building).
  - b. Area: 16,700 sq. ft.
  - c. Height: 40' (theatre); 25' (exhibition building).
  - d. Stories: Two (theatre); One (exhibition building).
3. FOUNDATIONS — Reinforced concrete foundations on spread concrete footings.
  4. STRUCTURE — Structural steel.
  5. WALLS & EXTERIOR CLADDING — Baked enamel galvanized steel, sandwich panels; exposed bush hammered concrete.
  6. ROOF — Built up roofing on steel roof deck.
  7. WINDOWS & ENTRANCES — Plate glass in concrete.
  8. INTERIOR FINISHES —
    - a. Floors: Carpet, vinyl asbestos tile, exposed concrete and ceramic tile.
    - b. Walls: Carpet, vinyl wall fabric, painted plaster and dry wall, exposed concrete block, formica, wallpaper, ceramic tile, metal tiles (no one material predominant).
    - c. Ceilings: Plaster, acoustical plaster, drywall, exposed steel.
  9. MECHANICAL SYSTEMS —
    - a. Plumbing: Standard; electric hot water tank.
    - b. Heating, ventilation, air conditioning: Theatre — 2 — 25T package air handling units with separate condensing units mounted on roof; distribution ductwork supplying grilles in auditorium ceiling; 1 — 15 T dual duct high pressure system, individual space control for offices and V.I.P. lounge; 1 — 5T air cooled package unit for projection booth. Exhibition building — 1 — 60 T, dual duct high pressure system, individual space control. Heating achieved by use of electric heating coils in ductwork and electric heaters in office areas.
    - c. Kitchen: Domestic type.
    - d. Other: Tempered water system in washrooms; special separated ventilation system in smell areas (part of exhibit) for both supply and exhaust.

## 10. ELECTRICAL —

- a. Power: 12,000 V incoming service, step down to 600 V service for equipment with 600 KVA dry transformer and further step down to 120/208V service for lighting, power etc. with 3— 150 KVA dry transformers.
  - b. Lighting: Incandescent throughout with exception of fluorescent in service areas.
  - c. Audio-visual systems: Two separate systems installed.
  - d. Other: Fully programmed lighting—film system in auditorium area.
12. FIRE PROTECTION — Standpipe, extinguishers, hose cabinets; wood surfaces and carpet fire retardant treated.
  13. SAFETY FEATURES — Emergency lighting; smoke detector fire alarm system.
  14. EXTERIOR WORK (where part of the construction contract) — Landscaping, exhibition on plaza, floodlighting, fountains.
  15. OTHER ITEMS OF PARTICULAR INTEREST —
    1. Metal Title:
      - a. Brief description: — Galvanized iron, treated with various chemicals to produce colourful effects in the zinc coating.
      - b. Location: — Roofing over line-up area canopy and decorative wall panels on the interior.
      - c. Manufacturer or producer: — Cominco.
      - d. Nearest Source of more information: — Same.
    2. Zinc Hardware:
      - a. Brief description: — Cast zinc hardware (lever handle, push and pulls).
      - b. Location: — Doors.
      - c. Manufacturer or producer: — Cominco.
      - d. Nearest source of more information: — Same.
  16. COMMENTS — Well landscaped and designed, the buildings were separated into two distinct blocks. Very good use was made of well detailed, galvanized steel sandwich panels.



## CANADIAN PULP & PAPER ASSOCIATION

### A. GENERAL DATA

1. NATURE OF PAVILION/STRUCTURE — Temporary.
2. LOCATION — Expo Area: Ile Notre-Dame;  
Lot No. 4044;  
Key Plan No. 482.
3. OWNER (or contracting body) — Canadian Pulp & Paper Association, Montreal.
4. DESIGN ARCHITECT — P.M. Acres, Westmount, Quebec. Concept design by Kissiloff & Wimmershoff Limited, Montreal.
6. CONSULTING ENGINEERS —
  - a. Structural: E.A. Dahl, and T. Eldridge, Town of Mt.-Royal, Quebec.
  - b. Mechanical and electrical: T.G. Anglin Engineering Company Limited, Montreal.
9. GENERAL CONTRACTOR — Pollock-McGibbon Limited, Montreal.

### B. GENERAL DESCRIPTION OF PAVILION/STRUCTURE

1. FUNCTIONAL DESCRIPTION — Design of this one-level pavilion was based upon a 16' modular grid which extended out to the lot lines. The building consisted of 50 pyramid shaped elements, each with a rectangular base measuring 16' by 16' and a height of 20', 30', 40', or 60'. Each pyramid was supported by a central circular column to provide an overall stylized tree shape. The building complex gave, in fact, the appearance of a forest and included a perimeter band of pyramid units which provided shelter for visitors approaching the entrance. The main exhibition area was an enclosed rectangular space covering 36 modules of the grid. Within it were two auditoriums separated by a stage and utility area. Additional modules enclosed a hospitality lounge.
2. DIMENSIONS —
  - a. Size: Main Building (80' x 112'); Hospitality lounge (32' x 50').
  - b. Area: 11,000 sq. ft.
  - c. Height: 90'.
  - d. Stories: One.



3. FOUNDATIONS — Reinforced concrete spread footings supporting slab on grade and building structure. (An extensive concrete foundation system was required due both to poor sub-soil conditions and high wind loads on the irregular roof structure).
4. STRUCTURE — Although wood was considered during initial design studies, the structural requirements of the central "tree-trunk" column (used for all free standing tree units) dictated the necessity of using steel, specifically, a welded rigid column and beam frame. On top, the pyramid shape consisted of channel and tube sections with horizontal and vertical diagonal bracing designed similar to transmission towers.
5. WALLS & EXTERIOR CLADDING — 8" concrete block with stucco finish. Exhibition periphery, anodized aluminum window wall glazed with 3/8" thick clear plate glass.
6. ROOF —
  - a. Flat roof area: Standard 6" mill deck with 1" thick fiberboard insulation and asphalt and gravel roofing.
  - b. Pyramids: 2" x 4" nailing strips at 16" centres bolted to steel; 3/4" thick tongue and grooved exterior grade plywood, joints filled with epoxy and taped; acrylic coatings in five shades of green with silica sand added to provide texture to the finished surfaces.
7. WINDOWS AND ENTRANCES — Anodized aluminum store front sections glazed with 1/4" plate glass. Anodized aluminum store front type entrance and exit doors. Doors to service areas solid Kalamein.
8. INTERIOR FINISHES —
  - a. Floors: Carpet on concrete.
  - b. Walls: Concrete block, metal furring, gypsum wallboard with taped joints, painted.
  - c. Ceilings: Standard suspended metal system with perforated acoustical mineral lay-in tile forming part of air conditioning system.
9. MECHANICAL SYSTEMS —
  - a. Plumbing: Standard fixtures.
  - b. Heating, ventilation, air conditioning: Electric baseboard units in washrooms and offices. Other areas were electrically heated, to provide nominal heating in spring and fall, by means of heating coils installed in air conditioning units. The pavilion was air conditioned throughout by means of package roof type units.
10. ELECTRICAL —
  - a. Power: 12 KV sub-station.
  - b. Lighting: Part of exhibits.
  - c. Audio-visual systems: Part of exhibits.
12. FIRE PROTECTION — Fire alarm system, portable fire extinguishers.
14. EXTERIOR WORKK (where part of the construction contract) — Texture-exposed aggregate cast in place concrete plaza. Crowd control cedar and steel railings. Cedar benches. The canal embankment slope was covered with concrete and large boulders to form an irregular pattern.
16. COMMENTS — This "forest-like" pavilion presented an interesting sight with its stylized trees set at varying heights directly on the lines of the module grid.



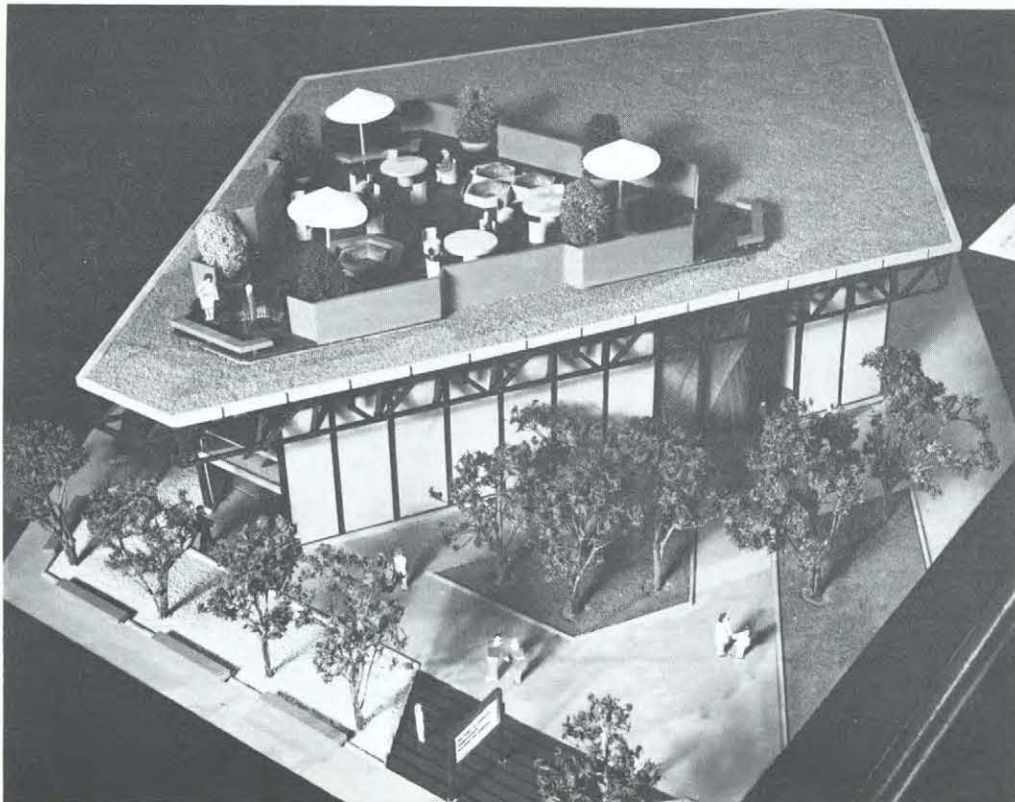
## DUPONT OF CANADA AUDITORIUM

### A. GENERAL DATA

1. NATURE OF PAVILION/STRUCTURE — Temporary.
2. LOCATION — Expo Area: Ile Sainte-Hélène;  
Lot No. 3270;  
Key Plan No. 330.
3. OWNER (or contracting body) — Canadian Corporation for the 1967 World Exhibition.
4. DESIGN ARCHITECT — Affleck, Desbarats, Dimakopoulos, Lebensold and Size, Montreal.
6. CONSULTING ENGINEERS —
  - a. Structural: R.R. Nicolet & Assoc., Montreal.
  - b. Mechanical and electrical: Cote, Leclaire, Langlois, Boisvert & Assoc., Montreal.
8. OTHER CONSULTANTS — William M.C. Lam & Assoc., Cambridge, Mass., (lighting); Bolt, Beranek and Newman Inc., Cambridge, Mass. (acoustical); Helyar, Vermeulen, Rae, Mauchan, Montreal (quantity surveyors).
9. GENERAL CONTRACTOR — J. Serrentino Company Limited, Montreal.

### B. GENERAL DESCRIPTION OF PAVILION/STRUCTURE

1. FUNCTIONAL DESCRIPTION — This building housed a 374 seat lecture auditorium equipped with motion picture and slide projectors, a full range sound-reinforcement system and a simultaneous translation system. Facilities were also provided to accommodate T.V. camera equipment. The building was part of the "Man the Explorer" theme pavilion to which it connected by a deck structure.
2. DIMENSIONS —
  - a. Size: 150' x 90'.
  - b. Area: 8,300 sq. ft.
  - c. Height: 20'.
  - d. Stories: One.
3. FOUNDATIONS — Reinforced concrete foundations on spread concrete footings.
4. STRUCTURE — Two way steel truss (spaceframe) system supported on exposed structural steel columns.



5. WALLS & EXTERIOR CLADDING — Stained vertical wood paneling, glazed clear-story around lounge.
6. ROOF — Built up roofing over lightweight concrete topping.
7. WINDOWS & ENTRANCES — Sheet and plate glass in steel sash.

#### 8. INTERIOR FINISHES —

- a. Floors: Carpet, exposed aggregate and steel trowelled exposed concrete.
- b. Walls: Exposed concrete block, stained rough sawn B.C. fir vertical wood panelling, painted drywall.
- c. Ceilings: Exposed steel structure, cement fibre board panels (laid over steel truss system).

#### 9. MECHANICAL SYSTEMS —

- a. Plumbing: Standard.
- b. Heating, ventilation, air conditioning: Auditorium and VIP lounge were air conditioned. These areas were fed by the central AC system of "Man the Explorer" complex. Electrical coils in ductwork and electrical baseboard heaters in offices were used for heating.
- c. Kitchen: Domestic type for staff and VIP lounge.

#### 10. ELECTRICAL —

- a. Power: Building was served by substation of "Man the Explorer" complex.
- b. Lighting: Incandescent, fluorescent (service areas).
- c. Audio-visual systems: Complete audio-visual and simultaneous translation system.

12. FIRE PROTECTION — Extinguishers, fire retardant coating applied to wood panelling, hose cabinet.

13. SAFETY FEATURES — Emergency lighting, smoke detection fire alarm system.

14. EXTERIOR WORK (where part of the construction contract) — Landscaping, roof deck.

15. OTHER ITEMS OF PARTICULAR INTEREST —  
Roof spaceframe structure —

- a. Brief description: Two-way interlocking steel truss system.
- b. Location: Roof structure of building.
- c. Manufacturer or producer: Leeds Bridge and Iron Works Limited, LaSalle, Quebec.
- d. Nearest source of more information: Same.

16. COMMENTS — This temporary building, which was part of the Man the Explorer complex, attained both a quiet formality and a warm inviting character by balancing the symmetric planning and the unbroken rhythm of the steel colonnade with soft-textured carpeting, patterned concrete, oxidized steel and rough sawn wood panelling. The auditorium ceiling, an intricate steel lacework, was emphasized by the suspension of lighting fixtures and acoustical "clouds" within its framework.

*Seating in auditorium*





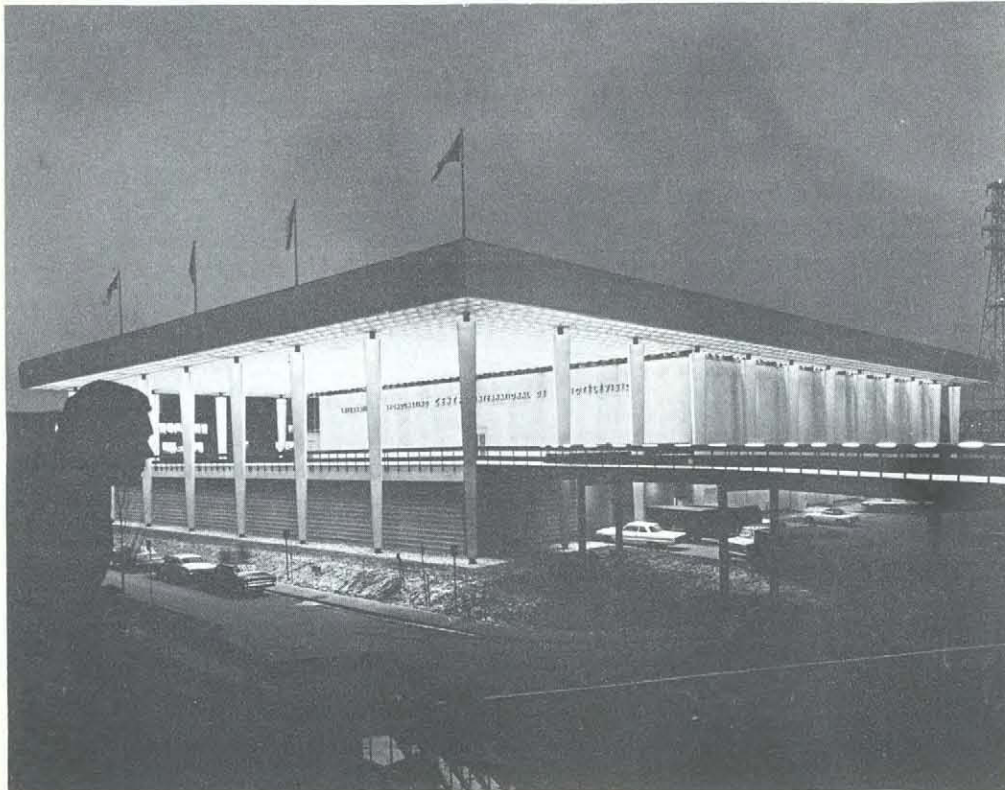
## INTERNATIONAL BROADCASTING CENTRE

### A. GENERAL DATA

1. NATURE OF PAVILION/STRUCTURE — Permanent.
2. LOCATION — Expo Area: Cité du Havre;  
Lot No. 2120;  
Key Plan No. 207
3. OWNER (or contracting body) — Federal Government of Canada, owner; Canadian Broadcasting Corporation, contracting body.
4. DESIGN ARCHITECT — Gordon D. McKinstry, Montreal.
5. LOCAL ASSOCIATE ARCHITECT — Meadowcroft & Mackay, Montreal.
6. CONSULTING ENGINEERS —
  - a. Structural: The Austin Company Limited, Montreal.
  - b. Mechanical and Electrical: Same.
9. GENERAL CONTRACTOR — The Austin Company Limited, Montreal.

### B. GENERAL DESCRIPTION OF PAVILION/STRUCTURE

1. FUNCTIONAL DESCRIPTION — A permanent structure, the building houses complete up-to-date radio and TV services which were available to all participants at Expo for special programming needs in Canada and throughout the world. In addition, the pavilion served as an exhibit for visitors, with special galleries for guided tours of the studios.
2. DIMENSIONS —
  - a. Size: 304' x 200'.
  - b. Area: 88,000 sq. ft.
  - c. Height: 60'.
  - d. Stories: Four.
3. FOUNDATIONS — Concrete piles, reinforced concrete foundations.
4. STRUCTURE — Structural steel.
5. WALLS & EXTERIOR CLADDING — Precast exposed aggregate concrete, concrete decorative screen walls.
6. ROOF — Built up roofing on metal deck.
7. WINDOWS & ENTRANCES — Sheet glass in aluminum frames (office area).
8. INTERIOR FINISHES —
  - a. Floors: Coloured concrete (TV studios), padded



- (Walkease) vinyl sheet (in other studios), vinyl asbestos floor tile, carpet.
- b. Walls: Fir plywood (up to 12' in TV studios), flyscreen with fiberglass sound absorption panels (above 12'), perforated transite panels (with fiberglass insulation behind panels, in radio studios), exposed aggregate applied with epoxy (hallways), textured vinyl, painted plastic.
  - c. Ceilings: Perforated transite (technical areas), painted aluminum decorative ceiling (Leaf-lite) (public areas such as tour galleries), exposed steel deck, painted plaster; exterior soffit, moulded fiberglass panels.
9. MECHANICAL SYSTEMS –
    - a. Plumbing: Standard.
    - b. Heating, ventilation, air conditioning: Air conditioning – Administration areas, 50T multi-zone air handling unit; remaining areas are served by 11 separate air handling units (centrifugal fan, chilled water type units) total capacity 590T; chilled water from central cooling tower (2 centrifugal chillers) pumped to main building. Heating – Electric heating coils in ductwork fed by air handling units, hot water heating coils in multi-zone ductwork, and hot water baseboard heaters in administration offices. Ventilation – Mechanical ventilation part of air conditioning system which separate exhaust fans for transformer room, washrooms and garage areas.
    - c. Kitchen: Domestic type for staff use only.
  10. ELECTRICAL –
    - a. Power: 12,000 V, 2 feeder incoming service, with automatic switch over equipment step down to 600 V service for mechanical equipment with 1500 KVA dry transformer; 120/208V service for building lighting and conveniences with 1000 KVA dry transformer and 133/229V service for CBC production equipment and studio lighting with 1000 KVA dry transformer.
    - b. Lighting: Interior predominantly fluorescent except incandescent for studio house lighting and exterior lighting.
    - d. Other: Monitoring system, closed circuit TV.
  11. SPECIAL TRAFFIC CONVEYING EQUIPMENT – Freight elevator serving all levels.
  12. FIRE PROTECTION – Hose cabinet, extinguishers, all materials (wood, cloth) treated with fire alarm system.
  13. SAFETY FEATURES – Emergency lighting, smoke detector fire alarm system, central fire alarm system.
  14. EXTERIOR WORK (where part of the construction contract) – Paving, landscaping (done with C.C.W.E.), deck.
  15. OTHER ITEMS OF PARTICULAR INTEREST – Elevated Floor System –
    - a. Brief description – Elevated floor system made up of steel T-sections on a 2' grid, steel pipe columns on 2' centers, and metal infill floor panels; flooring system allows complete flexibility for running ductwork, wiring etc. in the floor plenum.
    - b. Location: Technical area (1st floor).
    - c. Manufacturer or producer: Cameron Windows (Aluminum) Limited, Brantford, Ontario.
    - d. Nearest source of more information: Same.
  16. COMMENTS – An extremely functional building, it houses the latest facilities for TV (including coloured TV) and radio communications. The building is linked with Place d'Accueil (entrance to Expo) by a bridge leading to the observation deck and public entrance.

The most interesting architectural feature is the visitors' gallery which enables people to walk through the whole building and see the working of studios etc. without disturbing the activities within them. This is accomplished by using low level lighting and smoke-coloured glass in the gallery areas.

The building is illuminated in the evening by a luminous fiberglass soffit which extends completely around it under the main roof overhang. Unfortunately, however, the color and quality of the lighting produced clashes with other exterior lighting in the area and gives a somewhat garish color not consistent with the quality of the building.



## INTERNATIONAL NICKEL PLAZA

### A. GENERAL DATA

1. NATURE OF PAVILION/STRUCTURE — Temporary.
2. LOCATION — Expo Area: Ile Sainte-Hélène;  
Lot No. 3015;  
Key Plan No. 308.
3. OWNER (or contracting body) — Sponsored by International Nickel Company of Canada Limited, Sudbury, Ontario.
4. DESIGN ARCHITECT — Project Planning Associates Limited, J. Austin Floyd, Dunington Grubb & Stenson, Montreal.
6. CONSULTING ENGINEERS —
  - a. Structural: Surveyer Menniger & Chenevert Inc., Montreal.
8. OTHER CONSULTANTS — Hancock Little Calvert Associates (interior design).
9. GENERAL CONTRACTOR — Secant Construction Company Limited, Montreal.

### B. GENERAL DESCRIPTION OF PAVILION/STRUCTURE

1. FUNCTIONAL DESCRIPTION — Located between the Place des Nations Expo-Express station and the Scandinavian pavilion, this plaza was an open, terraced space the dominant element of which was a 48-ton stainless steel sculpture by Alexander Calder. Below the plaza was located a top-lit V.I.P. lounge for visiting members and guests of International Nickel.
2. DIMENSIONS —
  - b. Area: 50,000 sq. ft. of plaza.
  - c. Height: 10' (plaza), 67' (sculpture).
  - d. Stories: Basement.
3. FOUNDATIONS — Piles and caps (sculpture) reinforced concrete strip foundation (lounge and retaining walls).

4. STRUCTURE — Reinforced battered walls of textured concrete, reinforced concrete slab roof with earth cover.

5. WALLS & EXTERIOR CLADDING — See above.

6. ROOF — Waterproof protected membrane over lounge.

7. WINDOWS & ENTRANCES — Skylight acrylic dome over lounge, stainless steel double doors.

### 8. INTERIOR FINISHES —

- a. Floors: Carpet.
- b. Walls: Rough textured plaster on metal lath and carpet on gypsum lath.
- c. Ceilings: Suspended gypsum board and acoustic plaster and carpet on plywood.

### 5. MECHANICAL SYSTEMS —

- a. Plumbing: Standard fixtured and plumbing area drains.
- b. Heating, ventilation, air conditioning: 3 ton AC unit to distribution ducts.
- d. Other: Bar sinks.

### 10. ELECTRICAL —

- a. Power: 600V service entry step down to 120/208 V service with wall mounted 75 KVA dry type transformer.
- b. Lighting: Incandescent cove lighting, fluorescent (toilets).

13. SAFETY FEATURES — Step lights set into side of concrete steps.

14. EXTERIOR WORK (where part of the construction contract) — Extensive landscaping.

## INTERNATIONAL TRADE CENTRE

### A. GENERAL DATA

1. NATURE OF PAVILION/STRUCTURE — Permanent.
2. LOCATION — Expo Area: Cité du Havre;  
Lot No. 2270;  
Key Plan No. 223.
3. OWNER (or contracting body) — Canadian Corporation for the 1967 World Exhibition (sponsored by the Canadian Bankers' Association.)
4. DESIGN ARCHITECT — D'Astous & Pothier, Montreal.
6. CONSULTING ENGINEERS —
  - a. Structural: T.A. Eldridge, Montreal.
  - b. Mechanical and electrical: Monti, Lefevre, Lavoie & Nadon, Montreal.
8. OTHER CONSULTANTS — Harper Douglas, Montreal (landscape).
9. GENERAL CONTRACTOR — Sestock Construction Limited, Montreal North.

### B. GENERAL DESCRIPTION OF PAVILION/STRUCTURE

1. FUNCTIONAL DESCRIPTION — The Centre housed the Business Development Bureau and Expo Club plus offices for the Chartered Banks of Canada. Businessmen visiting Expo were provided with facilities here to meet and do business with their counterparts in Canada and with one another. On two levels, there were reception rooms, offices, an international trade reference library, dining room, lounge, private rooms and a terrace cafe. The private rooms were able to be converted into a conference room for 100 persons.
2. DIMENSIONS —
  - a. Size: (L-Shape) 215' x 35' and 115' x 50'.
  - b. Area: 22,000 sq. ft.
  - c. Height: 22'.
  - d. Stories: Two
3. FOUNDATIONS — Reinforced concrete, no piles.

4. STRUCTURE — Laminated wood columns and beams.
5. WALLS & EXTERIOR CLADDING — Glass, stucco on wood frame and metal lath.
6. ROOF — T & G, flat.
7. WINDOWS & ENTRANCES — Wood frames, standard windows and doors. One wall constructed with decorative elements of 11 stained-glass panels with PVC joints.
8. INTERIOR FINISHES —
  - a. Floors: Carpet on wood floors.
  - b. Walls: Standard partitions (wood frames, gypsum board, painted).
  - c. Ceilings: Exposed cedar wood decking.
9. MECHANICAL SYSTEMS —
  - a. Plumbing: Standard.
  - b. Heating, ventilation, air conditioning: Individual air conditioning units in offices; electric heating and air conditioning ceiling diffusers in second floor restaurant.
  - c. Kitchens: Main kitchen on first floor; service kitchen on second floor; gas ranges.
10. ELECTRICAL —
  - a. Power: 12,000 V transformed to 115/208 V; 3-phase, 150 KW.
  - b. Lighting: Incandescent and fluorescent fixtures (designed by Architect); exterior floodlighting.
  - c. Audio-visual systems — Projection booth for 16 mm film and slides (conference rooms), intercom (restaurant), paging.
12. FIRE PROTECTION — CO<sub>2</sub> extinguishers; all wood surfaces treated with fire retardant.
13. SAFETY FEATURES — Automatic fire alarm system throughout building with central control panel.
14. EXTERIOR WORK (where part of the construction contract) — Concrete terrace — extension of restaurant (sandblasted, with black discs placed at locations of tables and umbrellas); flowers, bushes, shrubs, trees, artistic woodwork.



15. OTHER ITEMS OF PARTICULAR INTEREST —  
Stained glass.

- a. Brief description: Artistic stained glass panels, set in between two clear glass panels and joined with vinyl gaskets (8' x 7').
- b. Location: Exterior wall of second floor corridor, facing terrace.
- c. Manufacturer or producer: Superseal Corp., Douville, Quebec.
- d. Nearest source of more information: Artist: Mme M. Ferron, Longueuil, Quebec.

16. COMMENTS — The architect of this simply designed and functional building had made ingenious use of a laminated wood column and beam structure which is well expressed both inside and out.

Infill panels of stucco on lath were very suitable for the summer of Expo but do not seem satisfactory for a permanent structure.

Designed by the architect, the interiors and most of the furniture are very pleasant and architecturally consistent with the building's design — a good example of total design by the architect. Very effective are the stained glass windows on the second floor.



## KALEIDOSCOPE

### A. GENERAL DATA

1. NATURE OF PAVILION/STRUCTURE – Temporary.
2. LOCATION – Expo Area: Ile Notre-Dame;  
Lot No. 4056 and 4055;  
Key Plan No. 474.
3. OWNER (or contracting body) – Excolor Incorporated (Canadian Industries Ltd., Chemcel (1963) Ltd., Cyanamid of Canada Ltd., Dow Chemical of Canada Ltd., Shawinigan Chemicals Ltd., and Union Carbide Canada Ltd.)
4. DESIGN ARCHITECT – Designer: Robert S. Frew, University of Waterloo; Project Designer: Morley Markson & Assoc., Toronto; Architect: Irving Grossman, Toronto.
6. CONSULTING ENGINEERS –
  - a. Structural: Dr. A.N. Sherbourne, Dr. R. Green, University of Waterloo.
  - b. Mechanical & electrical: R. Tamblyn, G. Mulvey, Toronto.

8. OTHER CONSULTANTS – Dr. H.B. Poorooshasb, University of Waterloo (soils); Dr. B.G. Hutchinson, University of Waterloo (pedestrian movement); Prof. J.S. Keeler, University of Waterloo (acoustics); Dr. V.K. Honda, University of Waterloo (management).
9. GENERAL CONTRACTOR – J.S. Hewson Construction Ltd., Montreal.
10. OTHER CONSULTANTS OF SPECIAL INTEREST – Pilkington Glass Ltd., Montreal (mirror installation).

### B. GENERAL DESCRIPTION OF PAVILION/STRUCTURE

1. FUNCTIONAL DESCRIPTION – The enclosed portion of the pavilion was a cruciform shape which was surrounded by a circular ring of vertical, colored fins. One wing of the cruciform contained both the entrance and exit halls. The other three housed exhibit areas in which were presented color, sound and motion shows.
2. DIMENSIONS –
  - a. Size: 100' diameter.





- b. Area: 5,000 sq. ft.
- c. Height: 35'.
- d. Stories: 3 plus basement.
- 3. FOUNDATIONS — Compacted soil at 150 psi 3' deep, concrete pad 18" deep.
- 4. STRUCTURE — Reinforced concrete core with cantilevered steel structure.
- 5. WALLS & EXTERIOR CLADDING — Stucco on metal lath on metal studs.
- 6. ROOF — Built-up felt on insulation on metal deck.
- 7. WINDOWS & ENTRANCES — Entrances, ramp.
- 8. INTERIOR FINISHES —
  - a. Floors: Carpet.
  - b. Walls: Painted concrete block.
  - c. Ceilings: Exposed structure painted.

9. MECHANICAL SYSTEMS —

- a. Plumbing: Standard.
- b. Heating, ventilation, air conditioning: Plenum system with electrical heat and chemical cooling.

10. ELECTRICAL —

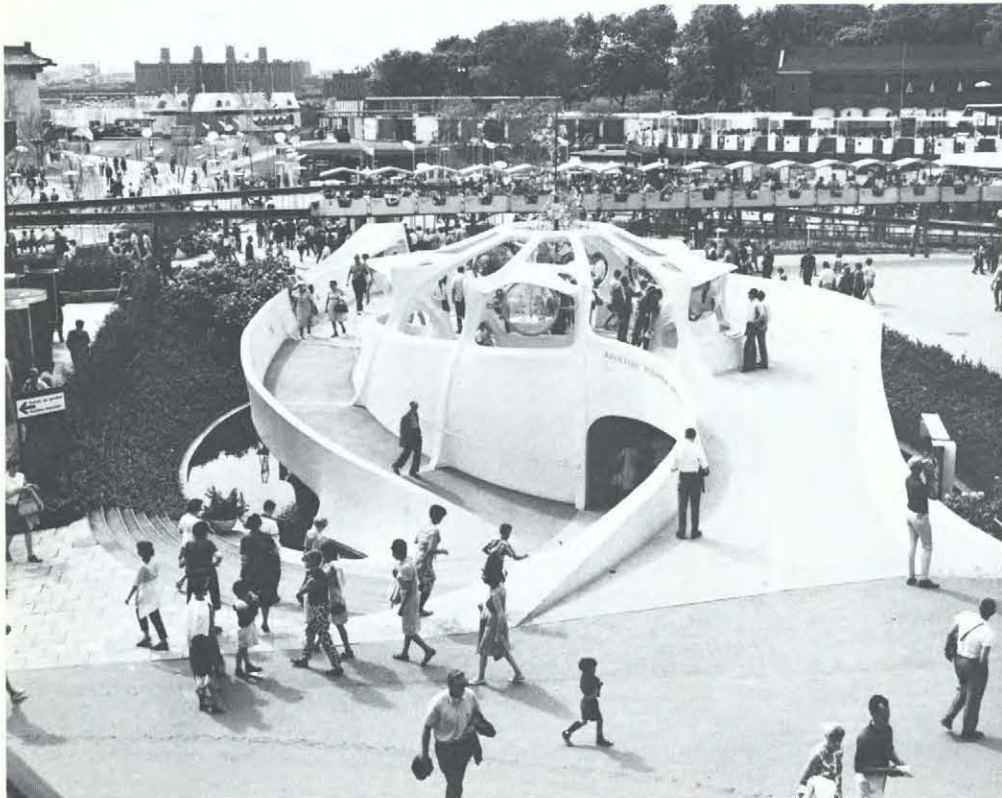
- a. Power: 3 phase 150 KV.
- b. Lighting: Individual floodlights generally and required emergency lighting for theatre building.
- c. Audio-visual systems: 35 mm. automatic start projectors.

12. FIRE PROTECTION — Normal.

13. SAFETY FEATURES — Automatic systems. Double the requirement for exit.

14. EXTERIOR WORK (where part of the construction contract) — Landscaping, information booth.

16. COMMENTS — A colorful building, this pavilion provided a sequence of interesting and colorful shows within a carefully organized interior.



*Polymer Corporation*

## POLYMER CORPORATION

### A. GENERAL DATA

1. NATURE OF PAVILION/STRUCTURE — Temporary.
2. LOCATION — Expo Area: Ile Sainte-Hélène;  
Lot No. 3175;  
Key Plan No. 331.
3. OWNER (or contracting body) — Polymer Corporation, Sarnia, Ontario,
4. DESIGN ARCHITECT — Thompson, Berwick, Pratt & R.J. Thom, Toronto.
6. CONSULTING ENGINEERS —
  - a. Structural: M.S. Yolles & Associates, Toronto.
  - b. Mechanical and electrical: R.E. Crossey & Associates, Toronto.
8. OTHER CONSULTANTS — Dudas Kuypers & Rowan Ltd., Toronto (Exhibit designers).
9. GENERAL CONTRACTOR — Douglas Bremner Contractors & Builders Ltd., Montreal.
10. OTHER CONTRACTORS OF SPECIAL INTEREST — Greaghan & Archibald Ltd., Montreal, (gas concrete application).

### B. GENERAL DESCRIPTION OF PAVILION/STRUCTURE

1. FUNCTIONAL DESCRIPTION — Devoted to the theme of curiosity, this multicurved pavilion contained a partially enclosed display space on its upper level and a small lounge, office and workshop area underneath. The structure was molded to act as bridge over a landscaped depression, between the Metro station and the "Man the Explorer" theme pavilion.
2. DIMENSIONS —
  - a. Size: 50' x 100' (Approx.)
  - b. Area: 8,000 sq. ft.
  - c. Height: 18' (from lower level).
  - d. Stories: Two.

3. FOUNDATION — Conventional spread footings.

4. STRUCTURE — Gas concrete sprayed on reinforcing steel.

5. WALLS & EXTERIOR CLADDING — Gas concrete sprayed on reinforcing steel with final silicone finish.

6. ROOF — Gas concrete with silicone finish.

7. WINDOWS & ENTRANCES — Curved acrylic sheets.

### 8. INTERIOR FINISHES —

- a. Floors: Carpet.
- b. Walls: Sprayed gas concrete.
- c. Ceilings: Sprayed gas concrete.

### 9. MECHANICAL SYSTEMS —

- a. Plumbing: Standard commercial fixtures and plumbing.
- b. Heating, ventilation, air conditioning: Electric heating units recessed in floor. Residential type air conditioning unit in services office and lounge.

### 10. ELECTRICAL —

- a. Power: Unit transformer 75 KVA, 12.5 KV, 120/240 V; 1 phase.
- b. Lighting: Incandescent.

12. FIRE PROTECTION — Portable fire extinguishers, emergency telephone.

14. EXTERIOR WORK (where part of the construction contract) — Wood risers set in concrete.

16. COMMENTS — This was a small but ingenious free form pavilion, the structure of which was the most important part (discussed in innovations section following).



C. DATA ON INNOVATION — POLYMER CORP.

1. NAME OF ITEM — Structure of Building.
2. LOCATION — Structure.
3. DESIGNER OR SELECTOR INVOLVED — Paul Merrick of the Ron J. Thom Office, Toronto, (Architect).
4. WHY WAS ITEM SELECTED? — To provide flexibility necessary for the creation of free-form structures. Its plastic qualities were also in keeping with the nature of the sponsor's products.
5. WAS ITEM PRODUCED SPECIFICALLY FOR EXPO? — No.
6. MANUFACTURER — Creaghan & Archibald Ltd., Montreal.
7. DISTRIBUTOR (nearest) — Manufacturer.
8. NEAREST SOURCE OF ADDITIONAL INFORMATION — Manufacturer.
9. INSTALLER OR SUBCONTRACTOR — Manufacturer.
10. MARKETING —
  - a. If the item is of Canadian manufacture:
    - (i) Is it now also manufactured abroad? Yes, by manufacturer.
    - (ii) Could it be manufactured abroad? Yes, no special licence required.
    - (iii) What patents are involved? None.
  - b. Is the item now commercially available? : Yes, from manufacturer.
  - c. Is further research and development required before marketing in Canada? : Research may be required depending upon nature of application.
  - d. What is the marketing feasibility and/or potential of the item? : There is considerable potential for the future use of this system for unusually shaped structures as no formwork in the conventional sense is required. Instead, a metal lath backing is used which becomes a tie for the reinforcing.

11. TECHNICAL DATA AND EVALUATION —

- a. Generic and functional description: Sprayed

lightweight concrete composed of aluminum powder (aeration agent), lime, cement, sand and a vinyl additive — (supplied by the Vinlux Corp. of Miami, Florida).

- b. Dimensions and weights (units): See drawing.
- c. Physical characteristics: Lightweight concrete.
- d. Durability and resistance to exposures (weather, chemicals, etc.): Vinyl paint was applied for exhibition purposes; the finishing coat is dense and waterproof.
- e. Standards covering item: None.
- f. Test data:
  - (i) Scope of test — Shear test of bond between layers.
  - (ii) Method of test — Destruction of 4" cubes consisting of 3 layers; forces were applied horizontally and vertically to bond faces.
  - (iii) Date of test — Oct., 1966.
  - (iv) Testing body — Warnock Hersey.
  - (v) Results of test — Excellent. Required 3000# shear; obtained 4800# to 5400#.

12. PERFORMANCE RECORD

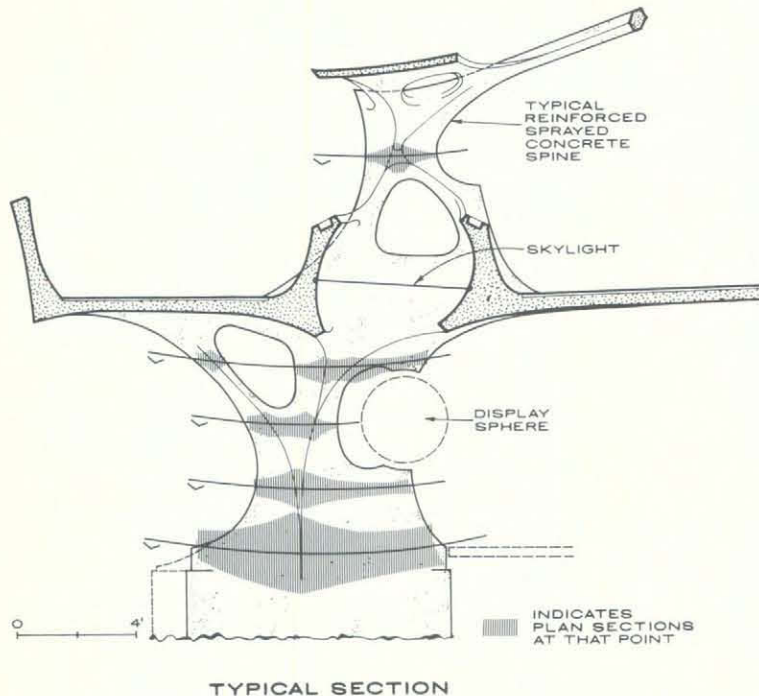
- a. When and where was item first manufactured? : Florida.
- b. When and where was item first installed? : On 75' dome of synagogue in Miami.
- c. Experience in manufacture: One year, based upon previous experience of many years in regular and sprayed concrete work.
- d. Experience in installation (at Expo or elsewhere): Gladstone fountain sculpture at entrance plaza of La Ronde (Expo '67); St. Joseph Oratory, Montreal, (dense plastering required for adhesion due to organ sound vibration).
- e. Service performance since installation: Excellent.
- f. Experience with Canadian climate: Protection needed for cellular concrete in order to prevent absorption. (Vinyl paint used at Polymer).

- h. Other suggested uses: Concrete structures of unusual shape which are impossible to achieve or prohibitive in cost using normal form work.
- i. Other comments on performance: At the time of this study, tests and research were still underway to find better additives for reducing "rebound" (i.e. waste material lost through non-adhesion, especially on soffit application). The problem has been greatly reduced with wet application and a 1-1/2" thickness may be applied at a time to soffits without breakaway (due to self weight). The vinyl additive acts as a self curing membrane after the surface is trowelled.

13. COST DATA — Available from manufacturer.

- 14. COMMENTS — Only economical on difficult shapes, the material requires skilled setters and applicators for its use. It wears well with no shrinkage problems, even in the hot Florida sun. Density and strength can be varied at will where desired during application, in contrast to conventional concrete work where normally only one or two grades are used.

Because of the structural calculation problems concerned with free forms, most such buildings are over designed. The Polymer Pavilion, for example, was over reinforced and would have been stable without the interior concrete. The manufacturer has suggested that the computer should be brought into use as it has been for space frames and geodesic domes.





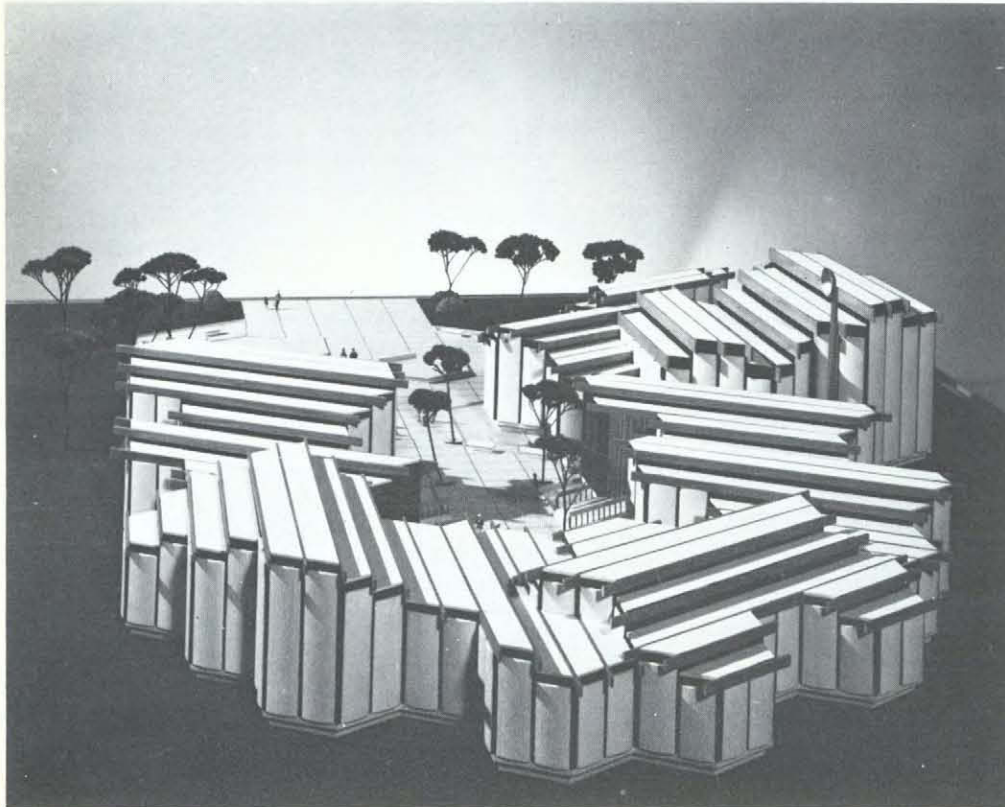
## QUEBEC INDUSTRIES

### A. GENERAL DATA

1. NATURE OF PAVILION/STRUCTURE — Temporary.
2. LOCATION — Expo Area: Cité du Havre;  
Lot No. 2300;  
Key Plan No. 225.
3. OWNER (or contracting body) — Quebec Industrial Pavilion Corporation St. Lambert, Quebec.
4. DESIGN ARCHITECT — Jean Grondin, Montreal.
5. CONSULTING ENGINEERS —
  - a. Structural: Claude Lanthier, Montreal.
  - b. Mechanical and electrical: Bussiers, Racine & Associates, Chomedey, Quebec.
6. GENERAL CONTRACTOR — Lucien Bedard & Cie. Inc., Montreal.

### B. GENERAL DESCRIPTION OF PAVILION/STRUCTURE

1. FUNCTIONAL DESCRIPTION — The pavilion consisted of 45 hexagonal cells ranging in height from 9' to 35' and clustered about an interior courtyard. Housed were exhibits, a projection room, a V.I.P. lounge and administration space. The exhibit cells were arranged as a sequence of compartments through which the visitor was led, from one to another.
2. DIMENSIONS —
  - a. Size: 240' x 176'.
  - b. Area: 16,875 sq. ft.
  - c. Height: 35' (highest cell).
  - d. Stories: One.
3. FOUNDATIONS — Concrete spread footings supported superstructure; ground floor slab on grade.
4. STRUCTURE — Laminated B.C. Fir beams supported on standard I shape steel columns.
5. WALLS & EXTERIOR CLADDING — Cast fiberglass exterior panels with sandwich-type laminated cement asbestos panels behind, insulated with 2" rigid fiberglass.



*View of model*

6. ROOF — 4" precast 'Siporex' to which was glued 95 lbs. white roofing paper.

7. WINDOWS & ENTRANCES — Painted steel framing with dark grey single pane glazing. Doors were laminated Pine in standard pressed metal frames (stained finish).

8. INTERIOR FINISHES —

- a. Floors: Epoxy paint on concrete, commercial carpet glued on concrete.
- b. Walls: 1/2" gyproc on steel studs (taped joints, painted).
- c. Ceilings: Exposed 'Siporex'.

9. MECHANICAL SYSTEMS —

- a. Plumbing: Standard public washroom fixtures.
- b. Heating, ventilation, air conditioning: No heating. Each cell separately ventilated by means of individual wall mounted ventilation units. Air conditioning units in V.I.P. area and conference room (wall mounted, portable type).

10. ELECTRICAL —

- a. Power: 450 KV.
- b. Lighting: Part of exhibits.
- c. Audio-visual systems: Projection room equipped by Hydro Quebec with a closed circuit, color T.V. system; images projected on a 40" x 35" screen.

11. FIRE PROTECTION — Five fire stations consisting of stand-pipe system; standard fire alarm system.

12. EXTERIOR WORK (where part of the construction contract) — Interior garden and terrace café.

16. COMMENTS — The need for both planning and circulation flexibility led to the adoption of the hexagon shape for the pavilion's individual building cells. The prefabricated, molded fiberglass panel system is discussed in the innovations section.

C. DATA ON INNOVATION — QUEBEC INDUSTRIES

1. NAME OF ITEM — Exterior wall panels.

2. LOCATION — Exterior walls.

3. DESIGNER OR SELECTOR INVOLVED — Jean Grondin, Montreal (Architect).

4. WHY WAS ITEM SELECTED? : To provide a light-weight wall cladding that could be easily erected and removed.

5. WAS ITEM PRODUCED SPECIFICALLY FOR EXPO? — Yes.

6. MANUFACTURER — Plastal Manufacturing, Granby, Quebec.

7. DISTRIBUTOR (nearest) — Manufacturer.

8. NEAREST SOURCE OF ADDITIONAL INFORMATION — Manufacturer.

9. INSTALLER OR SUBCONTRACTOR — Unicel incorporated, Montreal.

10. MARKETING —

- a. If the item is of Canadian Manufacture:
  - (i) Is it now also manufactured abroad? : No.
  - (ii) Could it be manufactured abroad? : Yes.
  - (iii) What patents are involved? : None.
- b. Is the item now commercially available? : Yes, from manufacturer.
- c. Is further research and development required before marketing in Canada? : No.
- d. What is the marketing feasibility and/or potential of the item? : Presently being considered for exterior wall cladding of an apartment building.

11. TECHNICAL DATA AND EVALUATION —

- a. Generic and functional description: Premolded fiberglass panel used as weatherproof, decorative wall cladding.
- b. Dimensions and weights (units): 5' wide x 9' to 35' high; weight, approximately 1 lb. per sq. ft.
- c. Physical characteristics: Non-reinforced molded fiberglass panel, receiving strength from its curved shape.



- d. Durability and resistance to exposures (weather, chemicals, etc.): Weather, hot or cold, has no effect upon the panels.
- e. Standards covering item: None.
- f. Test data: Available from Architect.

- e. Service performance since installation: No repairs or replacements made since installation.
- f. Experience with Canadian climate: Excellent, no effects due to heat or cold.
- g. Was item used for other purposes before? : No.
- h. Other suggested uses: Exterior cladding for most building types.

## 12. PERFORMANCE RECORD —

- a. When and where was item first manufactured? : Summer, 1966, Granby, Quebec.
- b. When and where was item first installed? : September, 1966, at Expo.
- c. Experience in manufacture: Two plywood molds were used during manufacture of the panels, no difficulties were encountered.
- d. Experience in installation (at Expo or elsewhere): Installed at Pavilion only.

- 13. COST DATA — Available from Plastal Incorporated, Granby, Quebec. Installed cost at Expo was \$1.65 per sq. ft.

- 14. COMMENTS — Although the panels are somewhat of an innovation as far as exterior wall cladding is concerned, the fibreglass material from which they were made has, of course, been used considerably in exterior industrial and commercial work.

Lightweight with a permanent finish, the panels are capable of being molded into almost any conceivable shape and can easily be repaired on the site in case of damage.

## STEEL INDUSTRIES

### A. GENERAL DATA

1. NATURE OF PAVILION/STRUCTURE — Temporary.
2. LOCATION — Expo Area: Ile Notre-Dame;  
Lot No. 4042;  
Key Plan No. 483.
3. OWNER (or contracting body) — The Algoma Steel Corporation Ltd., Dominion Foundries and Steel Company Ltd., Dosco Steel Ltd., The Steel Company of Canada Ltd.
4. DESIGN ARCHITECT — Mathers & Haldenby, Toronto.
6. CONSULTING ENGINEERS —
  - a. Structural: C.D. Carruthers & Wallace Consultants Ltd., Toronto
  - b. Mechanical: R.T. Tamblyn & Partners Ltd., Toronto.
  - c. Electrical: G.E. Mulvey & Co. Ltd., Toronto.

8. OTHER CONSULTANTS — Dana Designs Ltd., Toronto (Exhibition Designers)
9. GENERAL CONTRACTOR — Richard & B.A. Ryan (1958) Ltd., Montreal.
10. OTHER CONTRACTORS OF SPECIAL INTEREST — J. Arthur Rank Ltd., London England (Short Film).

### B. GENERAL DESCRIPTION OF PAVILION/STRUCTURE

1. Functional description — This was a basic A-frame structure, supported by high strength cast steel units. Three exhibits provided visitors with the feeling of actually being in an operating steel mill. They were entitled "Might of fire", "Might of Mill" and "Might of Metal" and were part of the overall theme of "Might of Man". Also housed was a 350 seat theatre.
2. DIMENSIONS —
  - a. Size: 106' x 150'
  - b. Area: 15,900 sq. ft.





- c. Height: 92' (top of roof) plus 20' high letters.
  - d. Stories: One plus mezzanine.
3. FOUNDATIONS — Steel "H" piles with reinforced concrete pile caps and grade beams.
  4. STRUCTURE — Structural steel welded "WF" sections and standard steel beams with square tubing sections.
  5. WALLS & EXTERIOR CLADDING — Prepainted steel panels, roll formed to profile (fibre glass insulated sandwich with interior steel sheet lining).
  6. ROOF: Same as wall cladding.
  7. WINDOWS & ENTRANCES — Steel sash framing with light grey solar reduction glazing. Doors: Hollow metal set in structural steel framing.
  8. INTERIOR FINISHES —
    - a. Floors: Epoxy paint on concrete slab (ground floor). Vinyl asbestos tile over steel deck (mezzanine).
    - b. Walls: Prepainted steel panels.
    - c. Ceilings: Exposed structure (ground floor). Metal acoustic perforated tiles (mezzanine)
  9. MECHANICAL SYSTEMS —
    - a. Plumbing: Standard public washroom fixtures and equipment
    - b. Heating Ventilation, Air Conditioning: Unit system capable of establishing 40° temperature differential. Trane Co. Units, capacity 80 tons.
    - c. Kitchen: Standard Kitchenette
10. ELECTRICAL —
    - a. Power: 450 KVA unit sub-station located outside of building
    - b. Lighting: Incandescent
    - c. Audio-Visual Systems: Two 35 millimeter projectors in main theatre, equipped with Monomaphic lenses for panoramic projection; one standard 35 mm projector for cartoon films.
  12. FIRE PROTECTION — Fire Alarm System with Automatic Fire detectors, stand pipe system and fire hose cabinets.
  14. EXTERIOR WORK (Where part of the construction contract) — Exterior paving, landscaping and reflecting pools.
  15. OTHER ITEMS OF PARTICULAR INTEREST — Working models
    - a. Brief Description: Working model loop films, technomated murals simulating interior workings of steel mill.
    - b. Location: Ground Floor
    - c. Manufacturer or producer: Composite Form, Toronto.
    - d. Nearest Source of More Information — Same.
  16. COMMENTS: — Appropriately, great use was made of exposed structural steel members both in the structure itself and in the exhibits. Adoption of the A-frame, however, resulted in a rather conventional looking building, unrelieved by an unfortunate color scheme.

## TELEPHONE ASSOCIATION

### GENERAL DATA

1. NATURE OF PAVILION/STRUCTURE — Temporary
2. LOCATION — Expo Area: Ile Sainte-Hélène;  
Lot No. 3160 & 3170;  
Key Plan No. 319.
3. OWNER (or contracting body) — Telephone Association of Canada.
4. DESIGN ARCHITECT — Gordon S. Adamson and Associates, Toronto.
5. LOCAL ASSOCIATE ARCHITECT — David, Barott, Boulva, Montreal
6. CONSULTING ENGINEERS —
  - a. Structural: Spector, Barbacki, Forte & Associates
  - b. Mechanical and electrical: Lalonde, Girouard, Letendre, Montreal
  - c. Other: Malkin, Hosking & Bingham, Montreal (Lighting consultants)

### 9. GENERAL CONTRACTOR —

Hewson Construction Ltd., Montreal.

### B. GENERAL DESCRIPTION OF PAVILION/STRUCTURE

1. FUNCTIONAL DESCRIPTION — This was a long rectangular building containing an exhibition hall and a circular theatre, the drum like form of which was superimposed onto the main box structure.
2. DIMENSIONS —
  - a. Size: 90' x 270'
  - b. Area: 40,542 sq. ft.
  - c. Height: 55'.
  - d. Stories: 3 levels
3. FOUNDATIONS — Concrete expanded base piles with concrete pile caps, grade beams and floor slab.
4. STRUCTURE — Demountable structural steel framework consisting of columns, beams, open web joists and steel roof deck.





5. WALLS & EXTERIOR CLADDING — Wood balloon frame, stucco and stained Spruce.
6. ROOF — Four ply tar and gravel on 2" rigid insulation.
7. WINDOWS & ENTRANCES — Extruded anodized aluminum store front type windows and doors with 1/4" thick polished plate glass.
8. INTERIOR FINISHES —
  - a. Floors: Concrete block paving in sand, carpeting on concrete, vinyl asbestos on concrete.
  - b. Walls: Stained spruce slats on wood studs and painted gyproc on wood studs.
  - c. Ceilings: Exposed steel structure painted (exhibit hall), acoustical tile on wood furring (theatre), stained wood slats (entrances and exits).
9. MECHANICAL SYSTEMS —
  - a. Plumbing: Standard fixtures
  - b. Heating, Ventilation, Air Conditioning: Hot air heating in ventilation duct system. Air conditioning in public and V.I.P. areas consisting of package type units.
  - c. Kitchen: Staff Kitchen with hot plate, refrigerator.
10. ELECTRICAL —
  - a. Power: High and low tension service, 15KV substation
  - b. Lighting: Incandescent (theatre), fluorescent (exhibition hall)
  - c. Audio-visual systems: Paging and music
12. FIRE PROTECTION — Stand pipe system, fire alarm system.
14. EXTERIOR WORK — (where part of the construction contract) — paving and telephone booths.
15. OTHER ITEMS OF PARTICULAR INTEREST — Telephone booths
  - a. Brief Description: Circular plastic booths in different colours.
  - b. Location: Exterior
  - c. Manufacturer or Producer: Art Lab, Montreal
  - d. Nearest source of more information — Same
16. COMMENTS — Noted primarily for the 360 degree film inside, the building was competently designed with a demountable steel structure in a very simple manner in order not to compete with the larger theme pavilions nearby.





**CANADIAN PAVILIONS**

**PRIVATE PAVILIONS**





A. GENERAL DATA

1. NATURE OF PAVILION/STRUCTURE — Temporary.
2. LOCATION — Expo Area: Ile Notre-Dame;  
Lot No. 4246;  
Key Plan No. 449.
3. OWNER (or contracting body) — Chatelaine Magazine.
4. DESIGN ARCHITECT — Gustavo Da Roza, Winnipeg.
6. CONSULTING ENGINEERS —
  - a. Structural: Cyr & Houle, Montreal.
  - b. Mechanical & Electrical: Pageau & Morel, Montreal.
8. OTHER CONSULTANTS —  
Interior designer: Mr. Alan Campaigne, Toronto.
9. GENERAL CONTRACTOR — Multiplex Incorporated, St. Hyacinthe, Quebec.

B. GENERAL DESCRIPTION OF PAVILION/STRUCTURE

1. FUNCTIONAL DESCRIPTION — The project consisted of a two-storey house with a basement and a separate one-storey pavilion structure, also with a basement, and an adjoining swimming pool measuring 12'-0" x 20'-0".
2. DIMENSIONS —
  - a. Size: House: 41' x 27'.  
Pavilion: 20' x 25'.
  - b. Area: House: 1,930 sq. ft.  
Pavilion: 1,000 sq. ft.
  - c. Height: House: 25'  
Pavilion: 11'.
  - d. Stories: House: Two stories plus basement.  
Pavilion: One storey plus basement.
3. FOUNDATIONS — Poured concrete walls and footings.
4. STRUCTURE — Wood, conventional studding.
5. WALLS AND EXTERIOR CLADDING — Random size vertical wood siding.



6. ROOF — Tar and gravel on 1-1/2" rigid insulation; 20 oz. copper flashings.

7. WINDOWS AND ENTRANCES — Wood frames, sealed double-glazing units, fixed and opening sashes. Entrances were wood doors with glass panels.

8. INTERIOR FINISHES —

- a. Floors: Resilient tile and quarry tile (basements); carpet (ground floors and mezzanine).
- b. Walls: Wood panelling and painted gypsum wallboard.
- c. Ceilings: 1/2" gypsum board, "texobond finish", Acoustic tile (basement).

9. MECHANICAL SYSTEMS —

- a. Plumbing: Standard house plumbing. Hot water heating by gas.

b. Heating, ventilation, air conditioning: Gas fired furnace for heating and air conditioning.

c. Kitchen: Typical domestic kitchen.

10. ELECTRICAL —

- a. Power: 120/208V, 3 phase.
- b. Lighting: Incandescent throughout house. In pavilion, incandescent with fluorescent in basement service areas.
- d. Other: Intercom system, exterior and emergency lighting.

12. FIRE PROTECTION — Manual fire extinguishers.

16. COMMENTS —,The buildings were of conventional structure and materials. The sponsors obviously placed the greatest stress upon the interiors, their decoration and furnishings, which were designed and selected by Chatelaine Magazine.



## CHRISTIAN PAVILION

### A. GENERAL DATA

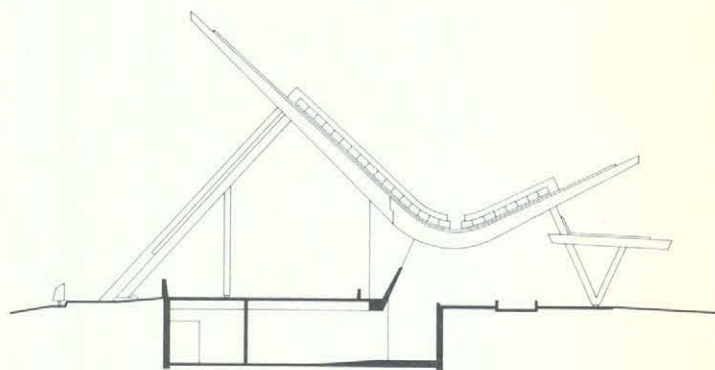
1. NATURE OF PAVILION/STRUCTURE — Temporary.
2. LOCATION — Expo Area: Ile Notre-Dame;  
Lot No. 4400;  
Key Plan No. 416.
3. OWNER (or contracting body) — Christian Pavilion Committee.
4. DESIGN ARCHITECT — D'Astous & Pothier, Montreal.
6. CONSULTING ENGINEERS —
  - a. Structural: T. A. Eldridge, Montreal.
  - b. Mechanical and electrical: Lorrain, Tourigny, Dubuc, Gérin-Lajoie, Montreal.
8. OTHER CONSULTANTS — Louis Perron, Ville St. Laurent. (Landscape Architect)
9. GENERAL CONTRACTOR — Fraser Brace Engineering Company Limited, Montreal.

### B. GENERAL DESCRIPTION OF PAVILION/STRUCTURE

1. FUNCTIONAL DESCRIPTION — The pavilion consisted of an enclosed entrance garden and a three-level one-storey building, in which exhibits in three zones related to man and his spiritual conditions.
2. DIMENSIONS —
  - a. Size: 75' x 85'.
  - b. Area: 9,500 sq. ft.
  - c. Height: 32'.
  - d. Stories: One, with basement.
3. FOUNDATIONS — Spread concrete footings.
4. STRUCTURE — Laminated B.C. fir column and arch structure with 4" thick laminated pine roof deck.
5. WALLS AND EXTERIOR CLADDING — Freestanding walls consisting of stucco on metal lath on steel wall framing.

6. ROOF — Combination of 4 ply tar and gravel roofing and asphalt shingles.
7. WINDOWS AND ENTRANCES — Windows and doors had 1/4" plate glass in painted steel frames. Roof skylights were 1/4" acrylic set in sealant on wood framing.
8. INTERIOR FINISHES —
  - a. Floors: Asphalt on crushed stone, exposed concrete, vinyl asbestos tile on concrete (administration area).
  - b. Walls: Steel studs with gyproc lath and gypsum plaster (pavilion), gyproc on wood stud partition framing (administration area).
  - c. Ceilings: Exposed wood dick finished with sealer.
9. MECHANICAL SYSTEMS —
  - a. Plumbinb: Standard fixtures.
  - b. Heating, ventilation, air conditioning: Infra red tubes and electric radiant floor heating (pavilion) to provide nominal heating; electric baseboard heating (administrative area). No ventilation or air conditioning system. Gravity ventilation only.

*Cross section*



- c. Kitchen: Small combination unit for staff.

#### 10. ELECTRICAL —

- b. Lighting: Incandescent interior lighting. Most of the lighting forms part of the exhibits except exterior building lighting, located at grade level inside stucco walls.
- a. Power: 12 KV sub-station; 3 phase, 4 wire, 120/208V wiring system.
- c. Audio-visual systems: Part of exhibits.

- 12. FIRE PROTECTION — Fire alarm system. Portable extinguishers.

- 14. EXTERIOR WORK (where part of the construction contract) — Exterior pool with seven fountains.

- 16. COMMENTS — The extremely low budget resulted in the design of a rough, simple building consisting of free standing walls and a laminated wood structure supporting the roof. The building was supposed to have been an open-air shelter with three different zones. However, this was changed considerably during construction and the result was an almost completely enclosed building. The shape of the building was dictated by the exhibit concept.





## ENGINEERS PLAZA

### A. GENERAL DATA

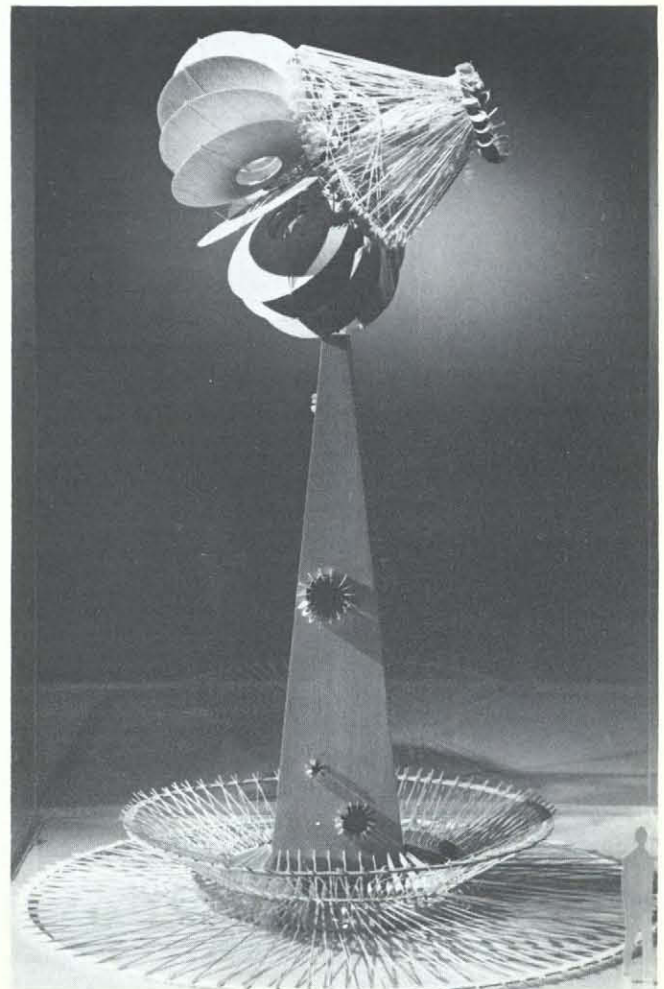
1. NATURE OF PAVILION/STRUCTURE — Temporary.
2. LOCATION — Expo Area: Ile Notre-Dame;  
Lot No. 4223;  
Key Plan No. 421.
3. OWNER (or contracting body) — Professional Engineers of Canada.
4. DESIGN ARCHITECT — Gerald Gladstone, Toronto (sculptor) and Project Planning Associates Limited, Toronto (landscape architects).
6. CONSULTING ENGINEERS —
  - a. Structural: N. Seethaler Associates, Toronto (designed frame to hold sculpture).
  - b. Mechanical and electrical: Nicholas Fodor & Associates, Montreal.
9. GENERAL CONTRACTOR,— Euclid Construction Inc., St. Lambert, Quebec.
10. OTHER CONTRACTORS OF SPECIAL INTEREST — Frontenac Floor & Tile Company, Toronto.

### B. GENERAL DESCRIPTION OF PAVILION/STRUCTURE

1. FUNCTIONAL DESCRIPTION — The plaza was located due west of the French pavilion where it was surrounded by the pavilions of Mauritius, Yugoslavia, Haiti, Monaco and Jamaica. Designed as a resting place with benches and trees laid out in two circles, it contained at the centre a 40' high luminous aluminum sculpture with a 30' double circular fountain surrounding its base.
2. DIMENSIONS —
  - a. Size: 100' x 191'.
  - b. Area: 18,814 sq. ft.
  - c. Height: 40' (top of sculpture).
3. FOUNDATIONS — Reinforced concrete spread footings.

4. STRUCTURE — Structural steel, welded and bolted connections.
5. WALLS & EXTERIOR CLADDING — Polished aluminum sheet metal welded and rivetted to structural steel frame.
9. MECHANICAL SYSTEMS —
  - a. Plumbing: Drainage and fountain sprays (operated by a pumping system).
10. ELECTRICAL —
  - a. Power: 600 V service for 220 horsepower motor and 14 KW 115/230 V lighting.
  - b. Lighting: Colored underwater lighting.

*Model of sculpture representing a planet and the shadow it casts into space.*



## INTERNATIONAL SCOUT CENTRE

### A. GENERAL DATA

1. NATURE OF PAVILION/STRUCTURE — Temporary.
2. LOCATION — Expo Area: Ile Sainte-Hélène;  
Lot No. 3260;  
Key Plan No. 335.
3. OWNER (or contracting body) — Boy Scouts of Canada.
4. DESIGN ARCHITECT — John Bland, Montreal.
6. CONSULTING ENGINEERS —
  - a. Structural: de Stein & Associates, Montreal.
  - b. Mechanical and electrical: Frost, Lindsay and Associates, Montreal.
8. OTHER CONSULTANTS — Harold Spence-Sales, Montreal (Landscape designer and planner).
9. GENERAL CONTRACTOR — J.S. Hewson Construction Limited, Montreal.

### B. GENERAL DESCRIPTION OF PAVILION/STRUCTURE

1. FUNCTIONAL DESCRIPTION — This four unit complex, consisting of three structures grouped about a central, tent-like, gathering place, functioned as an assembly and demonstration area for scouts performing services at Expo.
2. DIMENSIONS —
  - a. Size. 48' x 16', 16' x 16', 16' x 16', 45' diam.



- b. Area: 768 sq. ft., 256 sq. ft., 256 sq. ft., 1,600 sq. ft.
  - c. Height: 9', 9', 9', 32'.
  - d. Stories: One.
3. FOUNDATIONS — Reinforced concrete.
4. STRUCTURE — Wood.
5. WALLS & EXTERIOR CLADDING — Stained wood.
6. ROOF — Stained wood with a rubber-like fabric and canvas over central tent-like structure.
7. WINDOWS & ENTRANCES — Fixed georgian wired glass.
8. INTERIOR FINISHES —
  - a. Floors: Exposed concrete.
  - b. Walls: Stained wood planking.
  - c. Ceilings: Stained wood structure.
9. MECHANICAL SYSTEMS —
  - a. Plumbing: W.C. and shower, electric domestic hot water tank.
  - b. Other: Shallow pond with standard water purification.
10. ELECTRICAL —
  - a. Power: 120/208V service supplied from adjoining CCWE Operations Control Centre transformer substation.
  - b. Lighting: Incandescent.
12. FIRE PROTECTION — Extinguishers.
14. EXTERIOR WORK (where part of the construction contract) — Landscaping, wood fence enclosures, floodlighting, pool.
16. COMMENTS — This was by far the cheapest participation at Expo '67.



## "JEUNESSES MUSICALES" OF CANADA

### A. GENERAL DATA

1. NATURE OF PAVILION/STRUCTURE — Temporary.
2. LOCATION — Expo Area: Cité du Havre;  
Lot No. 2230;  
Key Plan No. 216.
3. OWNER (or contracting body) — Jeunesses Musicales du Canada, Montreal.
4. DESIGN ARCHITECT — Desgagné & Côté, Chicoutimi, Quebec.
6. CONSULTING ENGINEERS —
  - a. Structural: Ernest Dauphinais, Chicoutimi, Quebec.
  - b. Mechanical & Electrical: Same.
9. GENERAL CONTRACTOR — Terral Construction Company Limited, Montreal.
10. OTHER CONTRACTORS OF SPECIAL INTEREST — Francon Limited, Montreal (precast concrete units).

### B. GENERAL DESCRIPTION OF PAVILION/STRUCTURE

1. FUNCTIONAL DESCRIPTION — Dedicated to Man and Music, this building consisted of an audio-visual theatre linked by an entrance hall to an exhibition space and office area.
2. DIMENSIONS —
  - a. Size: average 88' x 188'.
  - b. Area: 6,655 sq. ft.
  - c. Height: 10' to 16'.
  - d. Stories: One.
3. FOUNDATIONS — 4'-6" deep strip foundation with cast in anchors for precast "T" welded connections.
4. STRUCTURE — Tapered precast concrete "T" walls roofed with precast concrete "T" sections.
5. WALLS & EXTERIOR CLADDING — See structure.



6. ROOF — See structure.
7. WINDOWS & ENTRANCES — Glass and wood.
8. INTERIOR FINISHES —
  - a. Floors: Carpet on concrete.
  - b. Walls: Paint on concrete.
  - c. Ceilings: Blown asbestos (limpet asbestos sprayed).
9. MECHANICAL SYSTEMS —
  - a. Plumbing: Fibre pipe underground; standard plumbing above ground.
  - b. Heating, ventilation, air conditioning: Electrical baseboard; ceiling diffusers (hot air); air conditioning in V.I.P. room.
10. ELECTRICAL —
  - a. Power: One transformer 72 KVA to 120/240 V.
  - b. Lighting: Fluorescent — lecture theatre. Incandescent — "spots", etc. elsewhere.
  - c. Audio-visual systems: Philips Electric Industries, Montreal.
12. FIRE PROTECTION — Fire extinguishers.
15. OTHER ITEMS OF PARTICULAR INTEREST — Strips of plexiglass separating parapet walls from roof.
16. COMMENTS — This pavilion well exemplified the beneficial results to be gained when appropriate and established structural techniques are properly adapted for a temporary exhibition building. The precast concrete tee system chosen was economical, strikingly dynamic in appearance and carefully detailed to allow both speedy erection and disassembly. Subsequent reconstruction was planned for the J.M.C. camp at Mont-Orford.

## JUDAISM PAVILION

### A. GENERAL DATA

#### 1. NATURE OF PAVILION/STRUCTURE — Temporary.

LOCATION — Expo Area: Ile Notre-Dame;  
Lot No. 4048;  
Key Plan No. 475.

#### 3. OWNER (or contracting body) — The Foundation for Judaism, Montreal.

#### 4. DESIGN ARCHITECT — Harry Stilman, Montreal.

#### 6. CONSULTING ENGINEERS —

- a. Structural: Bernard Geller, Montreal.
- b. Mechanical: Levine & Jonas, Montreal.
- c. Electrical: Mendel, Brasloff, Lassman & Sidler, Montreal.

#### 9. GENERAL CONTRACTOR — Ain & Zakuta Limited, Montreal.

### B. GENERAL DESCRIPTION OF PAVILION/STRUCTURE

1. FUNCTIONAL DESCRIPTION — This was a two level exhibition building housing a museum and chapel on the ground floor, and an auditorium and ancillary facilities in the basement. Entrance to the building was gained up a two-pronged ramp.

#### 2. DIMENSIONS —

- a. Size: 88' x 57'.
- b. Area: 8,000 sq. ft.
- c. Height: Highest 21'; Lowest 17'.
- d. Stories: Basement plus one storey.

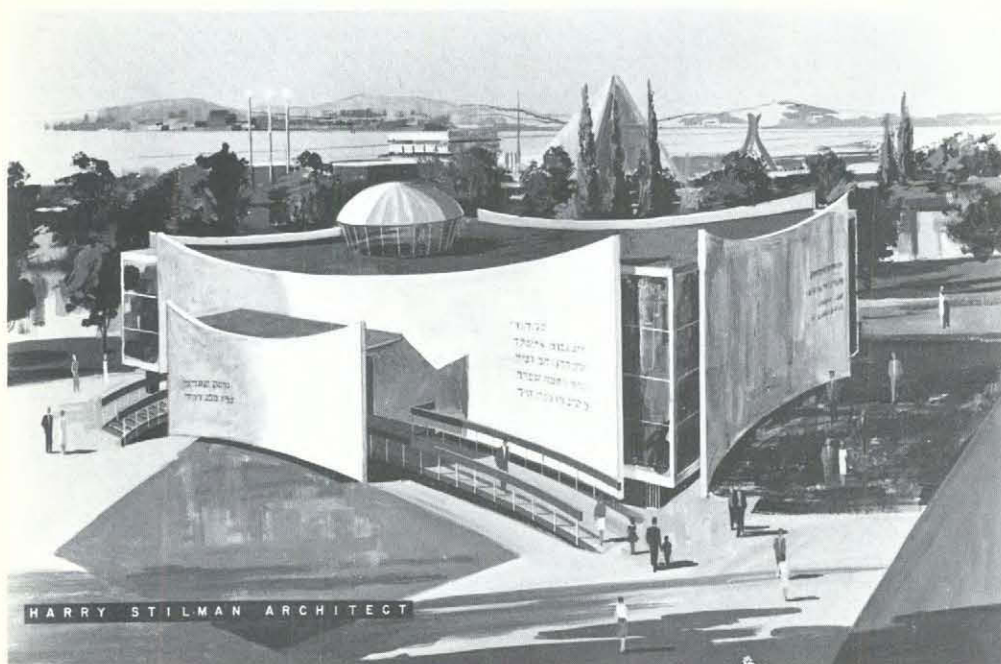
3. FOUNDATIONS — Concrete piles and reinforced concrete foundation walls.

4. STRUCTURE — Structural steel with mill deck for floor and roof.

5. WALLS AND EXTERIOR CLADDING — Stucco on metal lath.

6. ROOF — Built up roofing over wood deck; on dome, painted galvanized metal over wood deck.

7. WINDOWS AND ENTRANCES — Bronze tinted plate glass in painted steel frames; at entrance, bronze tinted plate glass in bronze anodized aluminum frames.





8. INTERIOR FINISHES –

- a. Floors: Vinyl asbestos floor tile (offices and washrooms), exposed concrete (mechanical room), carpet (public areas).
- b. Walls: Painted drywall, decorative walls of marble chips set in plaster base.
- c. Ceilings: Accoustical tile (auditorium), exposed wood deck stained.

9. MECHANICAL SYSTEMS –

- a. Plumbing: standard; electric domestic hot water system.
- b. Heating, ventilation, air conditioning: 2-15T and 1-10T condensing units at rear of building fed 3 air handling units in basement mechanical work; distribution ductwork from air handling units to wall grilles in all areas; ventilation part of A.C. system with separate exhaust of washroom areas; electric unit heaters in ceiling for heating.

10. ELECTRICAL –

- a. Power: 12,000 V, 2 feeder service, step down to 120/208 V service with 300 KVA PYROCLOR (fire proof oil) type transformer.
- b. Lighting: Incandescent house lighting; fluorescent (washrooms and offices).
- d. Other: Speaker system.

12. FIRE PROTECTION – Extinguishers, heat detector and smoke detection in return ductwork fire alarm system, fire retardant stain on wood deck.

13. SAFETY FEATURES – Battery operated emergency lighting.

14. EXTERIOR WORK (where part of the construction contract) – Landscaping, sculpture pads, quartz floodlighting.

16. COMMENTS – To convey its religious context, this four-winged building was designed in the shape of a cross and topped with an eight-rib dome. In addition, Hebrew lettering was applied to the walls.

## NATURAL GAS HOSPITALITY PAVILION

### A. GENERAL DATA

1. NATURE OF PAVILION/STRUCTURE – Temporary.
2. LOCATION – Expo Area: Cité du Havre;  
Lot No. 2260;  
Key Plan No. 217.
3. OWNER (or contracting body) – Canadian Corporation for the 1967 World Exhibition.
4. DESIGN ARCHITECT – Marshall, Merrett, Stahl, Elliott & Mill, Montreal.
6. CONSULTING ENGINEERS –
  - a. Structural: Spector, Barbacki, Forté & Associates, Montreal.
  - b. Mechanical and Electrical: Keith Associates Limited, Montreal.
8. OTHER CONSULTANTS, – Harper, Lantzius and D. W. Graham and Associates Limited, Montreal (landscape).

9. GENERAL CONTRACTOR – The Tower Company (1961) Limited, Montreal.

### B. GENERAL DESCRIPTION OF PAVILION/STRUCTURE

1. FUNCTIONAL DESCRIPTION – This pavilion served as the official Expo welcoming centre for women. It consisted of four interlocking forms which contained a multi-purpose assembly room, a spacious lobby, a lounge, reception areas, VIP rooms and service areas.
2. DIMENSIONS –
  - a. Size: 125' x 135'.
  - b. Area: 8,900 sq. ft.
  - c. Height: 34'.
  - d. Stories: One storey with two storey utility core area.
3. FOUNDATIONS – Reinforced concrete foundation walls on spread footings.





4. STRUCTURE: Structural steel.
5. WALLS & EXTERIOR CLADDING — B.C. fir rough sawn vertical slats of varying dimensions.
6. ROOF — Built up roofing over wood deck.
7. WINDOWS AND ENTRANCES — Clear plate glass in anodized black aluminum frames for entrances.
8. INTERIOR FINISHES —
  - a. Floors: Linoleum (utility areas), painted concrete (washrooms), terrazzo (lobby), carpet (remaining areas).
  - b. Walls: Painted drywall is predominant, wood slats (assembly and exhibition — lobby area) and limited amount of cork (assembly room).
  - c. Ceilings: Suspended mineral tile (administration offices), suspended triangular-shaped wood slats (all other areas).
9. MECHANICAL SYSTEMS —
  - a. Plumbing: Standard; gas fired domestic hot water system.
  - b. Heating, ventilation, air conditioning: Cooling tower; two gas fired absorption chilled and hot water units, each 25T capacity, feeding 8 fan coil units (suspended from ceiling) and 4 air handling units. Total capacity of system 50T, minimum amount of duckwork. Heating was provided by hot water heating coils in the units. Ventilation part of A.C. system.
  - c. Kitchen: Domestic type servery.
10. ELECTRICAL —
  - a. Power: 12,000 V 2-feeder service entry, step down to 120/208V service with 75 KVA dry transformer substation.
  - b. Lighting: Incandescent.
12. FIRE PROTECTION — Extinguishers, CO2 system in kitchen, fire retardant paint on all wood (both exterior and interior).
13. SAFETY FEATURES — Emergency lighting, fire alarm system both manual and heat detection.
14. EXTERIOR WORK (where part of the construction contract) — Landscaping, reflecting pools.
16. COMMENTS — The building consisted of several interlocking one storey masses and a contrasting two storey utility core. By the predominant use of wood throughout, an appropriate feeling of warmth and domestic invitation was created.

## OLYMPIC HOUSE

### A. GENERAL DATA

1. NATURE OF PAVILION/STRUCTURE — Permanent.
2. LOCATION — Expo Area: Cité du Havre,  
Lot No. 2395  
Key Plan No. 230.
3. OWNER (or contracting body) — Canadian Olympic Association.
4. DESIGN ARCHITECT — Chadwick, Pope & Edge,  
Montreal.
6. CONSULTING ENGINEERS —
  - a. Structural, mechanical and electrical: Foundation of Canada Engineering Corp. Ltd., Westmount, Quebec.
8. OTHER CONSULTANTS — Dosco Industries Ltd. (Truscon Division), Montreal (Structure)
9. GENERAL CONTRACTOR — Foundation Company of Canada Ltd., Westmount, Quebec.

### B. GENERAL DESCRIPTION OF PAVILION/STRUCTURE

1. FUNCTIONAL DESCRIPTION — The pavilion was designed as the permanent headquarters of the Canadian Olympic Association which, during Expo, displayed a brief history of both the Olympiads held to date and the accomplishments at them of Canadian participants.
2. DIMENSIONS —
  - a. Size: 92' x 92'.
  - b. Area: 8,364 sq. ft.
  - c. Height: 36'-4"
  - d. Stories: One, plus mezzanine and basement (2,000 sq. ft.)
3. FOUNDATIONS — Spread concrete footings on grade.
4. STRUCTURE — Poured in place reinforced concrete, sand blasted outside and exposed inside.
5. WALLS & EXTERIOR CLADDING — Poured in place reinforced concrete.
6. ROOF — Four-ply tar and gravel roofing on main roof. Canopy roof finished in Durorof Elastomer Roof Coating (Duron Company Ltd.)





7. WINDOWS & ENTRANCES — Plate glass in wood frames. Standard Aluminum entrance doors and side lights.
8. INTERIOR FINISHES —
  - a. Floors: Carpet (public areas), cement finish (service areas), Duroflek Polyurethane Seamless flooring (washrooms).
  - b. Walls: Exposed concrete, gyproc partitions painted, Duroflek Polyurethane multicoat application (washrooms).
  - c. Ceilings: Exposed concrete sandblasted (public areas), unfinished (service areas), suspended gypsum board Duroflek Polyurethane multicoat application (washrooms).
9. MECHANICAL SYSTEMS —
  - a. Plumbing: Standard commercial type toilet fixtures.
  - b. Heating, ventilation, air conditioning: All air heating and ventilation system provided by RECOLD unit using electric heating coil with multi-stop control and humidifier. Air distribution by overhead ducting system and ceiling diffusers. Provision was made in the RECOLD unit for incorporation at a later date of cooling coils to provide complete airconditioning when cooling plant added (at that stage, air distribution and controls would be zoned).
10. ELECTRICAL —
  - a. Power: Sub-station with dual service entrance capacity 225KVA.
  - b. Lighting: After Expo, fluorescent, During Expo, basement fluorescent tubes, V.I.P. room on mezzanine fluorescent and incandescent, Exhibition area lights were incorporated into exhibits.
  - c. Audio-visual System: Film strip and slide projector shows.
12. FIRE PROTECTION — Three nominal alarm stations (one at each exit). Fire alarm bells, Automatic heat detectors in service areas interconnected with C.C.W.E. centre via fire panel. Emergency reporting telephone.
15. OTHER ITEMS OF PARTICULAR INTEREST — Acrylic Dome Skylight — Double skin,
  - a. Brief Description: Size: 9'-6" x 9'-6" (clear inside dimensions). Acrylic skins are light gray to reduce solar rays transmission. One piece acrylic sheets had to be shaped in a specially built furnace (believed to be largest skylight built of one sheet of thermoplastic material).
  - b. Location: Roof
  - c. Manufacturer or Producer: Hickey Plastic Co. Ltd., Montreal.
  - d. Nearest Source of More Information: Same.
16. COMMENTS — A conventional structure, the pavilion was carefully planned for future permanent use. The large, acrylic skylight dome extends the use of plastics within permanent buildings. The claim, that it is "the largest skylight built of one sheet of thermoplastic material", competes rather interestingly with the "largest molded acrylic elements" used in the American geodesic dome.

## SERMONS FROM SCIENCE

### A. GENERAL DATA

1. NATURE OF PAVILION/STRUCTURE — Temporary.
2. LOCATION — Expo Area: Ile Notre-Dame;  
Lot No. 4050;  
Key Plan No. 473.
3. OWNER (or contracting body) — Sermons from Science '67 Inc.
4. DESIGN ARCHITECT — George F. Eber, Montreal.
6. CONSULTING ENGINEERS —
  - a. Structural: Blauer Horvath Assoc., Montreal.
  - b. Mechanical & Electrical: M.G. Spankie, Guelph, Ontario
8. GENERAL CONTRACTOR — Douglas Bremner Contractors & Builders Ltd., Montreal.

### B. GENERAL DESCRIPTION OF PAVILION/STRUCTURE

1. FUNCTIONAL DESCRIPTION — This was basically an auditorium building seating 300, complete with demonstration stage and projection room. At the rear of the building were also administration, public and counselling areas.

### 2. DIMENSIONS —

- a. Size: 150' x 80'.
- b. Area: 9,160 sq. ft.
- c. Height: 31'.
- d. Stories: One with mechanical room on mezzanine level.

3. FOUNDATIONS — Concrete piles and reinforced concrete foundation walls.

4. STRUCTURE — Bearing concrete block walls supported directly on grade beams and laterally by poured concrete tie beams and steel bracing to concrete shear walls; steel roof joists; reinforced concrete floor slab to mechanical room.

5. WALLS & EXTERIOR CLADDING — Stucco on concrete block, stained wood.

6. ROOF — Built up roofing over steel deck.

7. WINDOWS & ENTRANCES — Sheet glass in stained wood frames; wood doors.

### 8. INTERIOR FINISHES —

- a. Floors: Exposed concrete (service areas), carpet (auditorium aisles, administration, counselling and stage areas).
- b. Walls: Painted concrete block.





- c. Ceilings: Exposed structure (service areas), painted drywall (other areas), acoustical tile (projection room and rear two panels of auditorium).

#### 9. MECHANICAL SYSTEMS –

- a. Plumbing: Standard; gas fired domestic hot water system.
- b. Heating, ventilation, air conditioning: System consisted of air conditioning fan coil unit with direct expansion cooling coils, refrigeration compressor and air cooled condenser, and gas fired heating units; total capacity 35T, with distribution ductwork to ceiling diffusers. Ventilation was part of the A.C. system with ventilation of washrooms on separate exhaust fan system.

#### 10. ELECTRICAL –

- a. Power: 12,000V, 2 feeder entry, step down to 575V service for equipment with 75 KVA transformer and 115/230V, 1 phase service with 37.1/2KVA transformer; transformers dry type.
- b. Lighting: Incandescent (floodlighting and auditorium lighting), fluorescent (all other areas).

- c. Audio-visual systems: Installed by Owner.

- d. Other: Simultaneous translation by Owner.

12. FIRE PROTECTION – Heat detection fire alarm system with manual alarm stations, fire dampers in supply and return ductwork, extinguishers.

13. SAFETY FEATURES – Battery operated emergency lighting system.

14. EXTERIOR WORK (where part of the construction contract) – Landscaping, planter boxes, asphalt paving, display boards, wood (sign) letters, line up area canopy.

16. COMMENTS – This was an economical building, well detailed, and of functional design. Its walls were staggered in such a manner that they defined the contours of the auditorium and related facilities. The auditorium ceiling was constructed with a series of steps related to changes in wall panel elevations. Advantage was taken of the elevational difference between the front and rear roads by introducing a series of stepped terraces enclosed by planter boxes.

## SUN LIFE CENTENARY CARILLON

### A. GENERAL DATA

1. NATURE OF PAVILION STRUCTURE – Temporary.
2. LOCATION – Expo Area: Ile Sainte-Hélène (Park area);  
Lot No. 8000 and 8100;  
Key Plan No. 368.
3. OWNER (or contracting body) – Canadian Corporation for the 1967 World Exhibition.
4. DESIGN ARCHITECT – Dobush, Stewart, Bourke, Longpré, Marchand & Goudreau, Montreal.
6. CONSULTING ENGINEERS –
  - a. Structural: deStein & Associates, Montreal.
  - Mechanical and electrical: Huza-Thibault, Montreal.
9. GENERAL CONTRACTOR – J.A. Faulconbridge Ltd., Montreal.
10. OTHER CONTRACTORS OF SPECIAL INTEREST – Schulmerich Carillons Inc., Sellersville, Penn. (carillon builders and installers).

### B. GENERAL DESCRIPTION OF PAVILION/STRUCTURE

1. FUNCTIONAL DESCRIPTION – The 671 bell carillon was installed on top of the existing 96' high Levis tower which already possessed an observation platform. Beside it was constructed a new building to house the console and related components.
2. DIMENSIONS –
  - a. Size: 20' x 20' (new Console Building).
  - b. Area, 930 sq. ft. (console bldg.)
  - c. Height: 25' (console bldg.)
  - d. Stories: Two (console bldg.)
3. FOUNDATIONS – Reinforced concrete foundation walls.

4. STRUCTURE – Combination structural steel and timber.
5. WALLS & EXTERIOR CLADDING – Plate glass and cedar shingles.
6. ROOF – Cedar shingles, and built up roofing over wood deck on flat portion of roof.
7. WINDOWS & ENTRANCES – Plate glass in wood frames; steel painted door.
8. INTERIOR FINISHES –
  - a. Floors: Carpet (ground floor), vinyl asbestos floor tile (2nd floor).
  - b. Walls: Painted dry wall.
  - c. Ceilings: Painted dry wall (2nd Floor ceiling), luminous plastic ceiling (ground floor ceiling).
9. MECHANICAL SYSTEMS –
  - a. Plumbing: Standard; electric hot water tank.
  - b. Heating, ventilation, air conditioning: 1-7 1/2 ton roof-mounted package A.C. unit, supply duct work to diffusers; electric heating coils in duct work.
10. ELECTRICAL –
  - a. Power: 575V incoming service, step down to 120/208 V service with 75 KVA dry transformer.
  - b. Lighting: Incandescent (2nd floor and floodlighting), fluorescent (ground floor luminous ceiling).
  - c. Audio-visual systems: Loudspeaker system to exterior.
  - d. Other: System serving carillon itself.
12. FIRE PROTECTION – Extinguishers.
14. EXTERIOR WORK (where part of the construction contract) – Landscaping and floodlighting;
15. OTHER ITEMS OF PARTICULAR INTEREST – Carillon.
  - a. Brief description: 671 bell electronic carillon.



- b. Location: On top of existing Levis tower.
- c. Manufacturer or producer: Schulmerich Carillons Inc.
- d. Nearest source of more information: Sun Life Assurance Co. of Canada or Schulmerich Carillons Inc.

16. COMMENTS — This was a relatively simple project — a building to house the carillon's console and other related facilities, located next to the tower on which the carillon bells were placed. The building was designed to be inconspicuous in nature, blending in with the tower and park setting (wood materials used).

## UNITED NATIONS

### A. GENERAL DATA

#### 1. NATURE OF PAVILION/STRUCTURE — Temporary.

#### 2. LOCATION — Expo Area: Ile Notre-Dame; Lot No. 4410; Key Plan No. 415.

#### 3. OWNER (or contracting body) —

- a. Corporation made up of the following companies: Reader's Digest Assoc. (Canada) Ltd., International Minerals & Chemical Corp., Quebec Cartier Mining Co., Canada Iron Foundries Ltd., Hewitt Equipment Ltd., S.C. Johnson and Son Ltd., Laurentide Financial Corp. Ltd., The Montreal Star Co. Ltd., The House of Seagram Ltd., Nesbitt, Thomson & Co. Ltd., Power Corporation of Canada, Ltd., The Royal Trust Co., The Warnock Hersey Co. Ltd., The Globe and Mail Ltd. and Inspiration Ltd.

#### 4. DESIGN ARCHITECT — Eliot Noyes & Associates, New Canaan, Conn.

#### 5. LOCAL ASSOCIATE ARCHITECT — Donaldson, Drummond, Sankey, Montreal.

#### 7. LOCAL ASSOCIATE CONSULTING ENGINEERS —

- a. Structural: Dr. F.M. Kraus, Montreal
- b. Mechanical and electrical: Malkin, Hosking, Bingham, Montreal.

#### 8. OTHER CONSULTANTS — Sylvan R. Shemitz & Assoc., New Canaan, Conn. (Lighting); Will Szabo, Montreal (Theatre).

#### 9. GENERAL CONTRACTOR — Douglas Bremner Contractors & Builders Ltd., Montreal.

### B. GENERAL DESCRIPTION OF PAVILION/STRUCTURE

#### 1. FUNCTIONAL DESCRIPTION — The dominant element of this pavilion was a large plaza on which were located the flags of all member countries and circular, glazed exhibition building. Below the plaza were housed a 300 seat auditorium, a restaurant and an administration office.

#### 2. DIMENSIONS —

#### a. Size: 140' x 110' Plaza with a 48' diameter exhibit building

#### b. Area: 17,200 sq. ft. (floor area)

#### c. Height: 30'

#### d. Stories: Two

#### 3. FOUNDATIONS — Concrete piles, reinforced concrete foundation walls.

#### 4. STRUCTURE — Reinforced concrete (lower level), waffle slab construction (plaza), concrete columns and ring beams and steel bar joists (circular exhibit building on plaza.)

#### 5. WALLS & EXTERIOR CLADDING — Exposed, patterned and sand blasted concrete.

#### 6. ROOF — Built up roofing over wood deck; exposed aggregate with integral membrane (plaza).

#### 7. WINDOWS & ENTRANCES — Bronze, solar plate glass in painted aluminum frames.

#### 8. INTERIOR FINISHES —

#### a. Floors: Carpet and exposed concrete (lower level); exposed aggregate, lightly sandblasted (plaza).

#### b. Walls: Exposed or painted concrete and concrete block.

#### c. Ceilings: Exposed structure (concrete, steel and wood).

#### 9. MECHANICAL SYSTEMS —

#### a. Plumbing: Standard; electric and gas fired domestic hot water systems.

#### b. Heating, ventilation, air conditioning: Evaporative condenser water system served 3 separate package A.C. units (all in central mechanical room). Separate package A.C. unit served each of the following areas: theatre, restaurant and plaza exhibit building. Gas fired heating system for two units and electric heating coils in ductwork for plaza exhibit area; ventilation, part of A.C. system.

#### c. Kitchen: Full commercial kitchen for restaurant, with separate exhaust system.



10. ELECTRICAL —

- a. Power: 12,000 V, 2 feeder entry, manual transfer switch, 120/208V service with 500 KVA dry core transformer. Substation was shared with adjoining Indians of Canada Pavilion.
- b. Lighting: Incandescent; fluorescent (service, office and kitchen areas) quartz (50 ft. candles) for exterior floodlighting.
- c. Audio-visual systems: Part of exhibits contract (theatre).

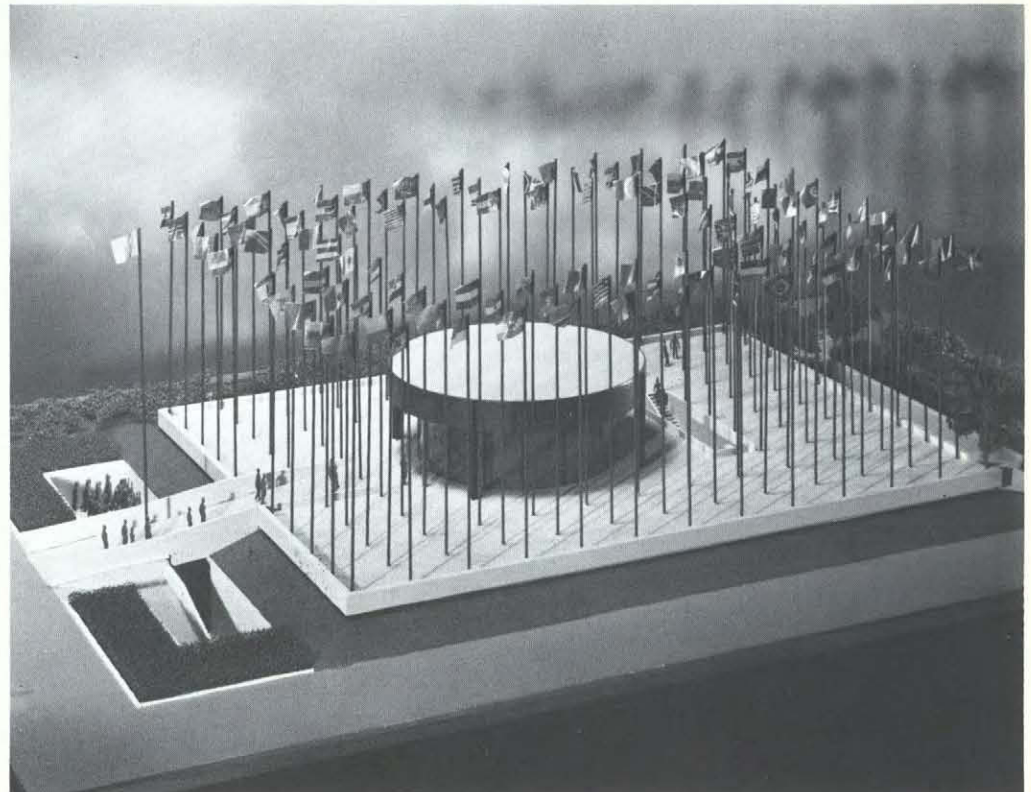
12. FIRE PROTECTION — Hose cabinets, fire ex-

tinguishers, heat detection fire alarm system.

13. SAFETY FEATURES — Battery operated emergency lighting.

14. EXTERIOR WORK — (where part of the construction contract) Flagpoles (122), exterior restaurant terrace, landscaping.

16. COMMENTS — The pavilion was jointly sponsored by a group of distinguished Canadian and American companies and designed to acquaint the general public with the varied functions of the United Nations. The restaurant below the plaza was operated by the Government of Pakistan,







## **FOREIGN PAVILIONS**

## **GOVERNMENTAL PAVILIONS**





## AFRICA PLACE

### A. GENERAL DATA

1. NATURE OF PAVILION/STRUCTURE — Temporary.
2. LOCATION — Expo Area: Ile Notre-Dame;  
Lot No. 4252, 4253, 4255, 4256, 4258;  
Key Plan No. 462, 463.
3. OWNER (or contracting body) — Canadian Corporation for the 1967 World Exhibition.
4. DESIGN ARCHITECT — John Andrews, Toronto.
6. CONSULTING ENGINEERS —
  - a. Structural: Norbert Seethaler, Toronto.
  - b. Mechanical & Electrical: Ellard Willson Associates Limited, Toronto.
10. GENERAL CONTRACTOR — Paré & Quart Limited, Montreal.

### B. GENERAL DESCRIPTION OF PAVILION/STRUCTURE

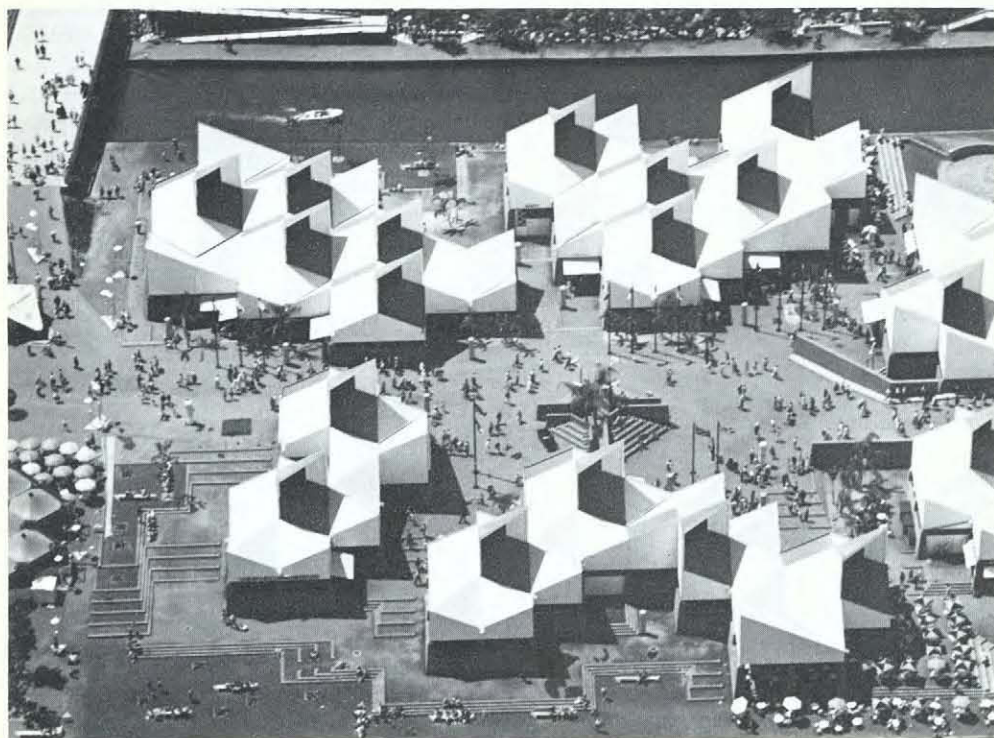
1. FUNCTIONAL DESCRIPTION — The pavilion housed exhibits from the following countries: Niger, Ivory Coast, Upper Volta, Cameroun, Chad, Dahomey, Democratic Republic of the Congo, Tanzania, Gabon, Senegal, Togo, Kenya, Madagascar and Uganda. Design was based upon a natural flow pattern which resulted in a series of interrelated and interdependent spaces arranged within a modular system. A natural ventilation system was devised based upon consistent prevailing winds on this section of the St. Lawrence River.

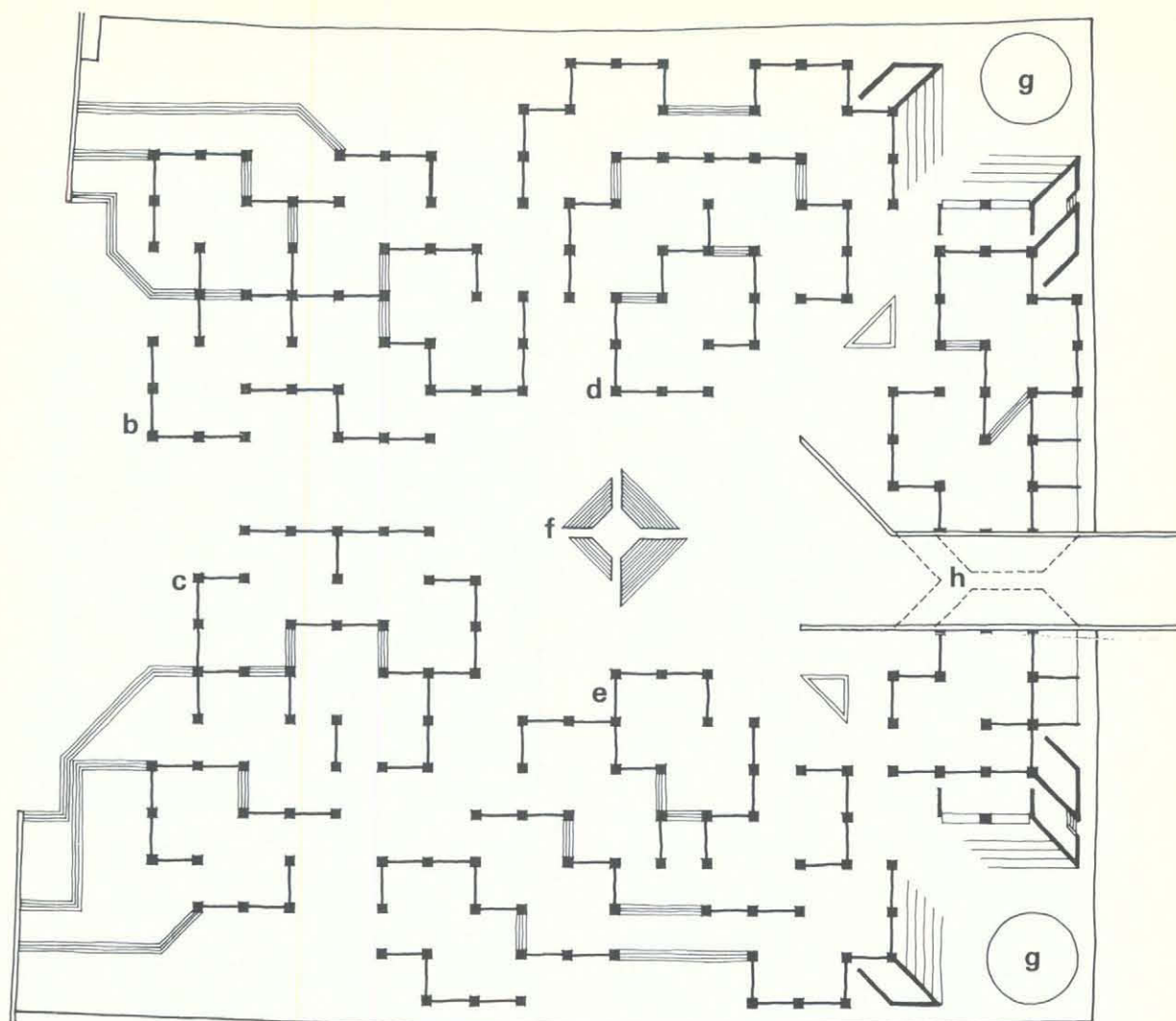
### 2. DIMENSIONS —

- a. Size: 320' x 320' (over all irregular shapes).
- b. Area: 50,000 sq. ft.
- c. Height: 40'.
- d. Stories: One.

3. FOUNDATIONS — Structural spread footings under columns; structural flat slab on grade.

4. STRUCTURE — Terracotta tile with concrete and reinforcing rods, for walls and short piers.





Plan of Africa Place key

- a. activities area
- b. Council of the Agreement
- c. Economic and Customs Union
- d. French speaking African countries
- e. English speaking African countries
- f. seating area
- g. performance area
- h. bridge (administration under)

5. WALLS & EXTERIOR CLADDING – Terracotta tile reinforced with concrete beams.
6. ROOF – 3/8" fir plywood on 4" x 4" or 2" x 4" wood framed pre-fabricated panel units assembled on the site.
7. WINDOWS & ENTRANCES – Plexiglass in wood frames.
8. INTERIOR FINISHES –
  - a. Floors: Quarry tiles.
  - b. Walls: Terracotta tiles.
  - c. Ceilings: Exposed fir plywood with clear fire retardant coating.
9. MECHANICAL SYSTEMS –
  - a. Plumbing: Standard commercial type fixtures. Provision of gas and water for snack bars.
  - b. Heating, ventilation, air conditioning: Electric heating for administration and service areas. Natural ventilation by scoops and open walls for exhibit areas. Sanitary ventilation in administration areas.
  - c. Kitchen: Provision for snack bars only.
10. ELECTRICAL –
  - a. Power: 600 KVA – 12.5 KV – 120/208 V.
  - b. Lighting: Incandescent located on continuous run of flush duct on underside of beams.
  - c. Audio-visual systems: Power provision for TV and Radio Broadcasting. Conduit provision for sound at performance areas.
12. FIRE PROTECTION – Fire retardant treatment of wood. Manual fire extinguishers.
15. OTHER ITEMS OF PARTICULAR INTEREST – ROOF PANELS –
  - a. Brief description: The panels were made of fir plywood and glue-nailed to 4" x 4" or 2" x 4" spruce member framing. There were 999 pieces in 11 basic sizes. Joints between panels were sealed with fibre glass tape. All exterior surfaces were sprayed with white synthetic roofing.
  - b. Location: Roof.
  - c. Manufacturer or producer: Desordy Lumber Limited, St. Jean, Quebec.
  - d. Nearest source of more information: Same.
16. COMMENTS – One of the largest pavilions of the geometrical cellular variety at Expo, Africa Place was basically realized in terms of the original concept. Unfortunately, however, the concept was not understood by the exhibitors who, as a result, were unable to use the complex to its full potential. The overall effect of the pavilion was interesting but not too inviting in spite of considerable attention given to the grounds and the well thought out flow pattern. In addition, the natural ventilation did not seem to work as well as was expected.



## ARAB COUNTRIES

### A. GENERAL DATA

1. NATURE OF PAVILION/STRUCTURE — Temporary.
2. LOCATION — Expo Area: Ile Notre-Dame;  
Lot No. 4260, 4261, 4263, 4265, 4266;  
Key Plan No. 469.
3. OWNER (or contracting body) — Canadian Corporation for the 1967 World Exhibition.
4. DESIGN ARCHITECT — Mr. C. R. Anderson, Quebec City.
6. CONSULTING ENGINEERS —
  - a. Structural: Piette, Beaudy, Lepinay, Bertrand & Lemieux, Quebec City.
  - b. Mechanical and Electrical: Boulay & Leclerc, Quebec City.
9. GENERAL CONTRACTOR — R. E. Stewart Construction Corporation, Montreal.

### B. GENERAL DESCRIPTION OF PAVILION/STRUCTURE

1. FUNCTIONAL DESCRIPTION — Represented within the pavilion were the countries of Algeria, the United Arab Republic and Kuwait. Displayed were their national and cultural resources by means of works of art, museum pieces and photographs. In addition to display space, a restaurant and cinema were included in the Algerian section.
2. DIMENSIONS —
  - a. Size: 100' x 120'.
  - b. Area: 12,000 sq. ft.
  - c. Height: 16'.
  - d. Stories: One.
3. FOUNDATIONS — Spread concrete footings and concrete walls.
4. STRUCTURE — Wood: Plywood frames with steel reinforcement.
5. WALLS & EXTERIOR CLADDING — Plywood panels with rough cast paint finish.
6. ROOF — Four-ply tar and gravel.
7. WINDOWS & ENTRANCES — Aluminum sash, fixed. Standard aluminum doors.



8. INTERIOR FINISHES —

- a. Floors: Ceramic tile (exhibition areas, by countries represented), vinyl asbestos tile (service areas, by general contractor).
- b. Walls: Plywood panels painted.
- c. Ceilings: Suspended exposed tees supporting 24" x 48" wood fibre tiles.

9. MECHANICAL SYSTEMS —

- a. Plumbing: Standard commercial type fixtures.
- b. Heating, ventilation, air conditioning: Seven individual Trane Company roof units, 50 ton capacity each. Units served for purposes of heating and ventilation. No air conditioning.
- c. Kitchen: Standard commercial in Algerian section.

10. ELECTRICAL —

- a. Power: 150 KVA sub-station transformed to 120/208V.
- b. Lighting: Incandescent interior lights and exterior floodlights.

12. FIRE PROTECTION — Manual 2.5 gallon water fire extinguishers. Emergency telephones direct to C.C.W.E. fire department.

16. COMMENTS — Lack of contact with the participants made programming of work extremely difficult. In addition, indecisions and late entry of participants required continuous changes. The budget was insufficient and continuously revised by the owner.

## AUSTRALIA

### A. GENERAL DATA

1. NATURE OF PAVILION/STRUCTURE — Temporary.
2. LOCATION — Expo Area: Ile Notre-Dame;  
Lot No. 4135 and 4176;  
Key Plan No. 456.
3. OWNER (or contracting body) — The Commonwealth of Australia (Department of Works).
4. DESIGN ARCHITECT — James MacCormick, Commonwealth Department of Works, Canberra.
5. LOCAL ASSOCIATE ARCHITECT — John B. and John C. Parkin, Montreal.
7. LOCAL ASSOCIATE CONSULTING ENGINEERS —
  - a. Structural, mechanical and electrical: John B. and John C. Parkin, Montreal.
8. OTHER CONSULTANTS — Professor Henderson, University of Toronto (Acoustical Consultant).
9. GENERAL CONTRACTOR — J.L.E. Price & Company Limited, Montreal.

### B. GENERAL DESCRIPTION OF PAVILION/STRUCTURE

1. FUNCTIONAL DESCRIPTION — The pavilion was a floating, square, box-like, two story building divided into four areas by fan-like wood pillars which rose

from the ground floor. Entrance to the second floor main exhibition area was by a ramp circling around an "aluminum tree" exhibit. The main exhibition area was a vast gracious room where an unusual and relaxing audio-visual exhibit, "the talking chairs", was featured. Exit from the building was by another ramp down to the rear garden exhibition area.

### 2. DIMENSIONS —

- a. Size: 136' x 136'.
- b. Area: 37,000 sq. ft.
- c. Height: 33'.
- d. Stories: Two, plus partial basement for services.

### 3. FOUNDATIONS — Concrete piles, reinforced concrete foundation walls.

### 4. STRUCTURE — Reinforced concrete for ground floor and laminated wood beam structure for upper floor.

### 5. WALLS & EXTERIOR CLADDING — Tinted (grey) glass, painted metal curtain wall and infill panels.

### 6. ROOF — Built up roofing on wood deck.

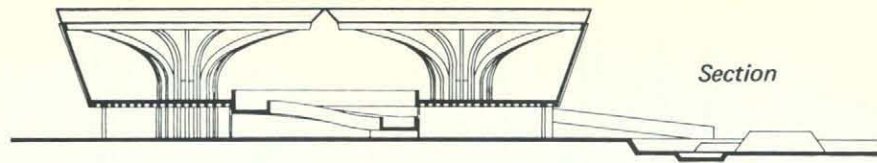
### 7. WINDOWS & ENTRANCES — Plate glass in aluminum frames.

### 8. INTERIOR FINISHES —

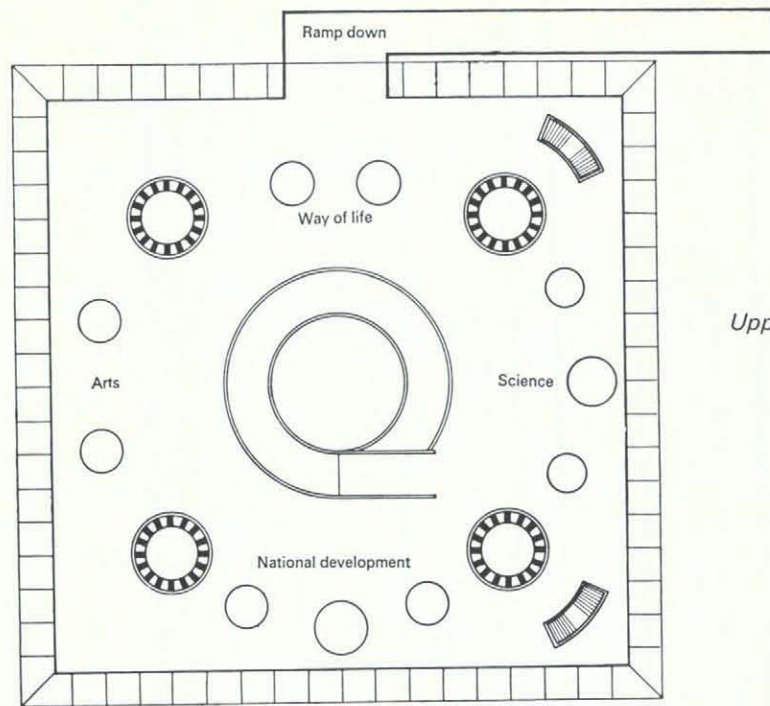
- a. Floors: Gravel, exposed concrete, terrazzo



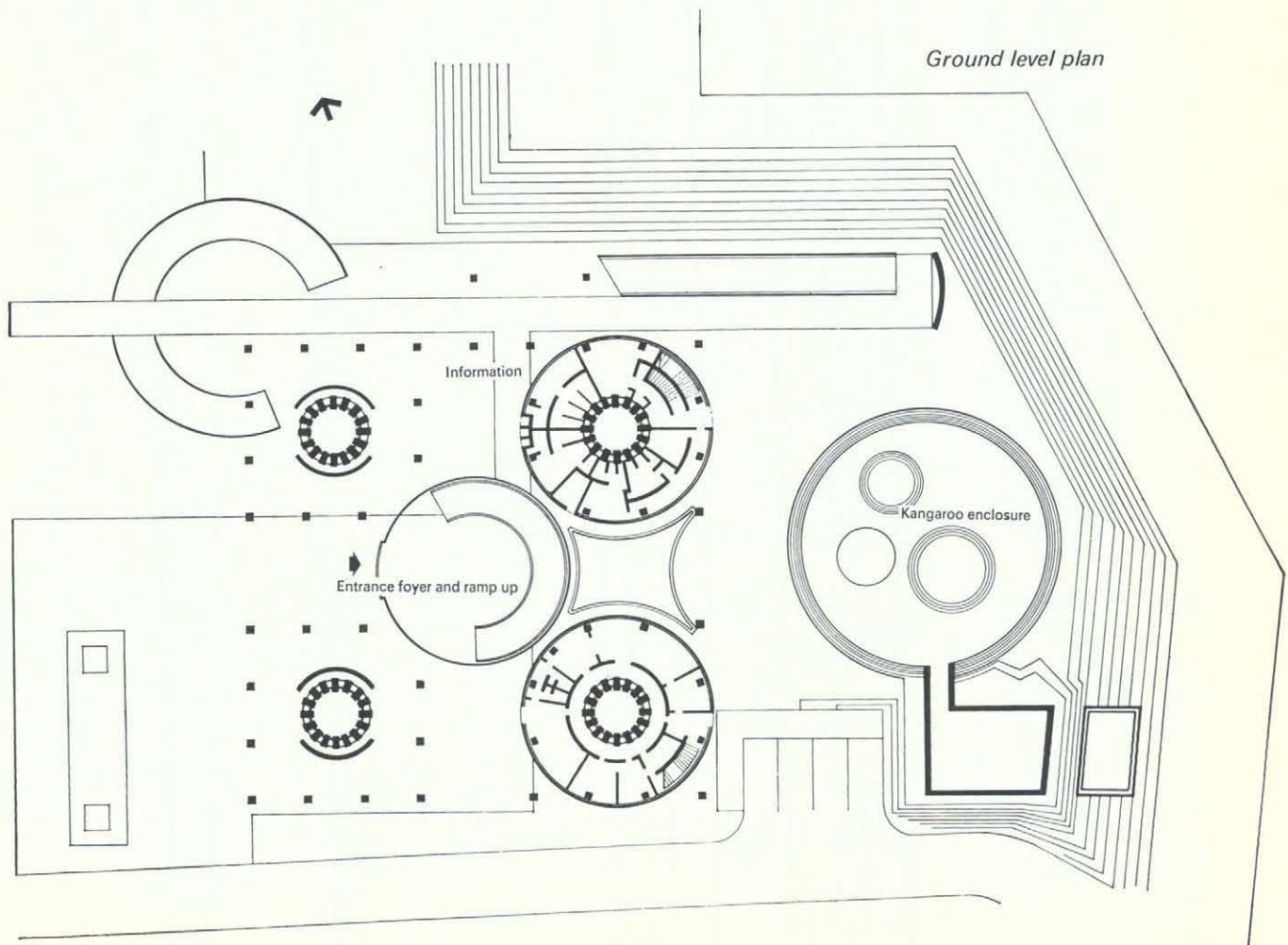




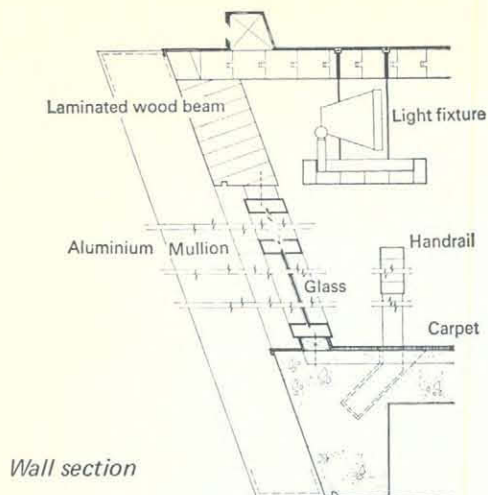
Section



Upper level plan



Ground level plan



(ground floor), vinyl asbestos floor tile, carpet from Australia (second floor exhibition area).

- b. Walls: Plaster, wood panelling (from Australia), carpet, exposed concrete, exposed concrete block.
- c. Ceilings: Drywall, limpet asbestos (second floor exhibition), exposed concrete.

#### 9. MECHANICAL SYSTEMS —

- a. Plumbing: Standard; electrical hot water tank.
- b. Heating, ventilation, air conditioning: 40T self-contained package A.C. units with water cooled condenser for each of the four quadrants. Units set at base of the pillars and air fed into the hollow wood ribs which acted as ductwork. Cooling tower fed condensers. Heating: electrical heating coils in ductwork and electric baseboard heaters in administration offices. Ventilation: mechanical.
- c. Kitchen: Domestic type for staff and V.I.P. lounge.
- d. Other: Recirculating water system for pool.

#### 10. ELECTRICAL —

- a. Power: 12,470V two feeder entry; manual transfer switch; step down to 120/208 V service

with 1,000 KVA dry transformer.

- b. Lighting: Incandescent.
- c. Audio-visual systems: Sophisticated audio-system for the second floor exhibition (sound chair) area.

- 12. FIRE PROTECTION — Fire extinguishers, hose cabinets, fire retardant to wood.
- 13. SAFETY FEATURES — Emergency lighting; automatic fire detection fire alarm system.
- 14. EXTERIOR WORK (where part of the construction contract) — Animal shelter, landscaping.
- 15. OTHER ITEMS OF PARTICULAR INTEREST — Wood ribs:

- a. Brief description: 36" x 12" box beam made up of 3/4" x 3-1/2" laminated wood sections used as structural element and service shaft.
- b. Location: Each of four quadrants.
- c. Manufacturer or producer: Timber Structures (Division of Foldaway Furniture), Peterborough, Ontario.
- d. Nearest source of more information: Same.

- 16. COMMENTS — The building was envisaged as an oasis of peaceful serenity away from the turmoil of the fair and the crowding of other pavilions. In this, it was successful with a well designed traffic flow and very comfortable interior.

The vastness of the interior, the sparsity of objects, and the fact that the main exhibition area was raised above ground were all representative of the large size and geographical remoteness of the continent of Australia. This effect was heightened by landscaping the building with typical "down under" plant materials and by exhibiting that country's most famous animal, the kangaroo.

The most interesting architectural feature was the curved, laminated wood, beam system although it did not embody any significant advance in structural design.



## AUSTRIA

### A. GENERAL DATA

1. NATURE OF PAVILION/STRUCTURE – Temporary.
2. LOCATION – Expo Area: Ile Sainte-Hélène  
Lot No. 3060;  
Ref. No. 313.
3. OWNER (or contracting body) – Austrian Federal Economic Chamber, Vienna.
4. DESIGN ARCHITECT – Prof. Dr. Karl Schwanzer, Vienna.
5. LOCAL ASSOCIATE ARCHITECT – Labelle, Labelle & Marchand, Montreal.
6. CONSULTING ENGINEERS –
  - a. Structural: Dr. Robert Krapfenbauer, Vienna.
7. LOCAL ASSOCIATE CONSULTING ENGINEERS –
  - a. Structural: Brouillet, Carmel, Boulva & Associates, Montreal.
  - b. Mechanical & Electrical: Leblanc & Montpetit, Montreal.

9. GENERAL CONTRACTOR – Foundation Company of Canada Limited, Montreal.

10. OTHER CONTRACTORS OF SPECIAL INTEREST – Aluminum Company of Canada Ltd., Montreal (aluminum building frame and insulated aluminum wall and roof panels); Oesterich Alpine Montan Gessellschaft, Vienna (part of the steel structure); Wertheim-Werke A.6, Vienna (escalator).

### B. GENERAL DESCRIPTION OF PAVILION/STRUCTURE

1. FUNCTIONAL DESCRIPTION – The pavilion consisted of a panoramic theatre, theme exhibit areas and a restaurant. All building elements were standardized into triangular shapes and assembled to produce a multi-planed structure. This highly geometric approach was employed in order to evoke associations of the molecular structure of crystals as an expression of the many facets of Austrian culture.
2. DIMENSIONS –
  - a. Size: 195' x 165' (irregularly shaped);
  - b. Area: 17,068 sq. ft.;





- c. Height: 166'6" (top of lightmast);
  - d. Stories: Two.
3. FOUNDATIONS — Franki expanded concrete pedestal piles 19' long and spread concrete footings on compacted fill. Piles and footings supported perimeter foundation walls on which rested concrete floor slabs.
  4. STRUCTURE — A rigid, structural steel welded frame for the theatre structure of the pavilion and rigid aluminum frame for the lower exhibit area with structural steel columns. The aluminum framing consisted of extruded structural shapes assembled in rigid triangular frames with bolted connections.
  5. WALLS & EXTERIOR CLADDING — 3" thick triangular, sandwich wall panels consisting of interior and exterior baked enamel on .008" sheet aluminum, 3" thick impregnated fireproofed honeycomb cardboard insulation and extruded anodized aluminum framing. Panels were laid into the structural frame, kept in place with aluminum mouldings and caulked with sealant. They were of two standardized sizes: 24' x 24' x 24', and 24' x 12' x 12'.
  6. ROOF — Aluminum panels, as described above, with wood sleepers, 3/4" plywood and 45 lbs. white pebbled tarred felt.
  7. WINDOWS AND ENTRANCES — Windows: 1/4" clear plate glass in extruded anodized aluminum framing (store front type). Entrance doors: extruded anodized aluminum (store front type).
  8. INTERIOR FINISHES —
    - a. Floors: Wall to wall nylon carpet on concrete, imported from Austria.
    - b. Walls: Exterior, aluminum sandwich panels with baked enamel finish; interior partitions of 6" concrete block and metal studding with 5/8" gyproc. Concrete block walls were painted and covered with exhibits.
    - c. Ceilings: Aluminum sandwich panels with baked enamel finish; metal suspension system with fissured mineral acoustic tile in special areas.
  9. MECHANICAL SYSTEMS —
    - a. Plumbing: Standard commercial type; vitreous china basins and water closets.
    - b. Heating, ventilation, air conditioning: Combines heating and air conditioning system with electric coils in air conditioning units. Theatre and restaurant were air conditioned; remainder of building, ventilated by forced air.
    - c. Kitchen: Equipment imported from Germany (part of exhibit contract).
  10. ELECTRICAL —
    - a. Power: 400 KW power; 500 KW lighting.
    - b. Lighting: Part of exhibit contract.
    - c. Audio-visual systems: Part of exhibit contract.
  12. FIRE PROTECTION — Fire extinguisher, fire alarm system.
  14. EXTERIOR WORK (where part of the construction contract) — Landscaping consisting of small Norwegian pines from 12" to 15" high; concrete pebble finish paving with scored joints, on crushed stone fill.
  16. COMMENTS — The use of prefabricated aluminum frames and insulated aluminum wall and roof panels, in an interesting geometric arrangement, made this one of the most forward looking of the smaller pavilions. Unfortunately, the jointing between panels was not properly solved. This is, of course, the greatest problem with prefabricated building elements, which usually fail at the joints, unless one of the several, complicated and supposedly foolproof, formula sealants available is properly and very carefully applied. Inside, the building space was cramped and badly organized from the point of view of traffic flow.
- C. DATA ON INNOVATION — AUSTRIA
    1. NAME OF ITEM — Structural System.
    2. LOCATION — Aluminum Structure.
    3. DESIGNER OR SELECTOR INVOLVED — Prof. Dr. Karl Schwanzer, Vienna (architect).
    4. WHY WAS ITEM SELECTED? — For simplicity of conception and erection.
    5. WAS ITEM PRODUCED SPECIFICALLY FOR EXPO? — Yes.

6. MANUFACTURER — Aluminum Company of Canada Limited, Montreal.
7. DISTRIBUTOR (nearest) — Manufacturer.
8. NEAREST SOURCE OF ADDITIONAL INFORMATION — Manufacturer.
9. INSTALLER OR SUBCONTRACTOR — Mojan Steel Erectors, Montreal; Panelex Limited, Ville D'Anjou, Quebec.
10. MARKETING —

a. If the item is of Canadian Manufacturer:

(i) is it now also manufactured abroad? : No.

(ii) Could it be manufactured abroad? : Yes, with licence from designer.

(iii) Patents involved? : Possibly patents granted to Prof. Schwanzer.

b. Is the item now commercially available? : No.

c. Is further research and development required before marketing in Canada? : Yes.

d. What is the marketing feasibility and/or potential of the item? : If cost could be reduced, the system could be used for demountable structures and could be particularly suitable for use in the far North due to its extreme lightweight nature. Could be easily transported by airplane.

11. TECHNICAL DATA AND EVALUATION —

a. Generic and functional description: The structural system consisted of two types of aluminum triangular framings filled with lightweight aluminum sandwich panels which gave rigidity to the structure.

b. Dimensions and weights (units): Panels consisted of:

(i) Isocetes triangles 24' x 24' x 24'.

(ii) Right angle triangles 12' x 12' x 24'.

(iii) Weight 250 lbs.  $\pm$  per unit.

The weight of the aluminum structural elements depended on their shape.

c. Physical characteristics: Extruded, structural

shape, aluminum frame which consisted of angles, tees, channels, assembled with gusset plates and bolted together with cadmium plated steel bolts. The triangles were assembled in a jig. The sandwich panels consisted of 3" honeycomb cardboard insulation, baked enamel finish, .008" sheet aluminum interior and exterior skin and extruded aluminum framing. The panels were inserted in the frame structure, covered over with aluminum mouldings and caulked.

d. Durability and resistance to exposures (weather, chemicals, etc.): Stood up very well under Canadian climatic conditions. If to be used farther north, the insulation of the sandwich panels would have to be of higher resistance.

e. Standards covering item: None.

f. Test data: Not tested.

g. Alternate method of evaluation, used in lieu of applicable standard: The cost of fabricating this construction system in steel was more than twice the cost of the system in aluminum. The system was evaluated on the basis of engineering calculations.

12. PERFORMANCE RECORD —

a. When and where was item first manufactured? : 1966 in Montreal.

b. When and where was item first installed? : 1966 at Expo (Austrian Pavilion).

c. Experience in manufacture: Since this was a standard product but used in a special system, experience was gained during the manufacturing process.

d. Experience in installation (at Expo or elsewhere): Similar to above.

e. Service performance since installation: Due to the system being entirely new, certain problems were met during erection which were rectified as the work progressed. No modifications were made after installation.

f. Experience with Canadian climate: Some condensation occurred which can be eliminated by modifications in certain members.

g. Was item used for other purposes before? No.

h. Other suggested uses: For structures in the far north where weight, transportation and erection are of great importance.



- i. Other comments on performance: None, too short a period since completion.
13. COST DATA — Available from the Aluminum Company of Canada Limited, Montreal.

14. COMMENTS — With some modifications, the system could be used where exceedingly light weight structures are important due to aerial transportation. A certain amount of floor area is made unavailable because of sloping walls.



*Barbados and Guyana*



## BARBADOS & GUYANA

### A. GENERAL DATA

1. NATURE OF PAVILION/STRUCTURE — Temporary.
2. LOCATION — Expo Area: Ile Notre-Dame;  
Lot No. 4100;  
Key Plan No. 458.
3. OWNER (or contracting body) — The Governments of Barbados and Guyana.
4. DESIGN ARCHITECT — George F. Eber, Montreal.
7. CONSULTING ENGINEERS —
  - a. Structural: Blauer Horvath Associates, Montreal.
  - b. Mechanical & Electrical: Keith Associates Limited, Montreal.
8. OTHER CONSULTANTS — Bryan Elliott Limited, Montreal (interior and exhibition design).
9. GENERAL CONTRACTOR — Bryan Elliott Limited, Montreal.

### B. GENERAL DESCRIPTION OF PAVILION/STRUCTURE

1. FUNCTIONAL DESCRIPTION — For economic reasons, two newly independent countries equally shared the facilities of the one pavilion. It consisted of a series of interconnected hexagon cubes, with pitched roofs, arranged symmetrically. On one side of the pavilion were the exhibits of Barbados, on the other Guyana. A common element was the sunken atrium containing a pool and garden which was covered with the highest roof of the complex. Common bar facilities and an exterior terrace served as relaxation areas.
2. DIMENSIONS —
  - a. Size: 54' x 100' (irregular).
  - b. Area: 4,452 sq. ft.
  - c. Height: 32'.
  - d. Stories: One, plus partial basement.
3. FOUNDATIONS — Spread footings under concrete walls and concrete piers.

4. STRUCTURE — Standard steel framing (columns & beams), wood joist framing (floors & roof).
5. WALLS & EXTERIOR CLADDING — 2" x 4" @ 16" c/c studs, plywood on exterior, painted with Durotex Epoxy finish.
6. ROOF — Four-ply tar & gravel on flat roofs, cedar shingles on pitched roofs and fibre glass on summits of pitched roofs.
7. WINDOWS & ENTRANCES — Fixed glass in wood frames. Aluminum entrances anodized black.
8. INTERIOR FINISHES —
  - a. Floors: Wood strip flooring, maple and oak (exhibition areas), carpet (bar and sitting area).
  - b. Walls: Gypsum board painted.
  - c. Ceilings: Gypsum board painted (flat ceilings), T & G Boarding (pitched ceilings), exposed translucent fibre glass (summits of pitched roofs).
9. MECHANICAL SYSTEMS —
  - a. Plumbing: Standard commercial type fixtures.
  - b. Heating, ventilation, air conditioning: 2 Carrier 48 DA 012 cooling & heating units; total heating capacity of each unit, 225,000 BTU/HR.
  - d. Other: Standard bar equipment.
10. ELECTRICAL —
  - a. Power: 12 KV unit substation.
  - b. Lighting: Interior: incandescent incorporated into exhibits.

Exterior floodlighting: incandescent.

12. FIRE PROTECTION — Smoke detection and fire alarm manual stations.
16. COMMENTS — The basic problem was to develop an architectural expression suitable to both countries which are located in similar climates but on separate continents. The resulting solution was successful, in spite of a low budget and the use of inexpensive materials, particularly in the treatment of the exposed wood, interior roof structure and the central skylights enclosed in steel.

## BELGIUM

### A. GENERAL DATA

1. NATURE OF PAVILION/STRUCTURE — Temporary.
2. LOCATION — Expo Area: Ile Sainte Hélène;  
Lot No. 3080;  
Key Plan No. 311.
3. OWNER (or contracting body) — Government of Belgium.
4. DESIGN ARCHITECT — René Stapels, Brussels.
5. LOCAL ASSOCIATE ARCHITECT — George F. Eber, Montreal.
6. CONSULTING ENGINEERS —
  - a. Structural: Verdeyen & Moenaert, Brussels.
7. LOCAL ASSOCIATE CONSULTING ENGINEERS —
  - a. Structural: C.B.A. Engineering Ltd., Vancouver.
  - b. Mechanical and electrical: Ellard — Willson & Assoc. Ltd., Toronto.
9. GENERAL CONTRACTOR — Entreprises Blaton — Aubert Société anonyme associée avec Argo Construction Ltd., Montreal.

### B. GENERAL DESCRIPTION OF PAVILION/STRUCTURE

1. FUNCTIONAL DESCRIPTION — Two stories high, this building was devoted almost entirely to exhibition space with also an interior sculpture patio, restaurant and administration area. The plan was free in form, based upon a modular parallelogram grid pattern which was carried throughout the building from floor slabs and planter boxes to exhibition showcases.
2. DIMENSIONS —
  - a. Size: 220' x 135' (overall)
  - b. Area: 34,500 sq. ft.
  - c. Height: 33' — 6''.
  - d. Stories: 2, with partial basement.
3. FOUNDATIONS — Concrete piles, reinforced concrete foundation walls and grade beams.
4. STRUCTURE — Reinforced concrete basement and ground floor, structural steel superstructure above grade, concrete filled steel deck floor.
5. WALLS & EXTERIOR CLADDING — Belgian hand made brick.





6. ROOF — Built up roofing over steel deck.

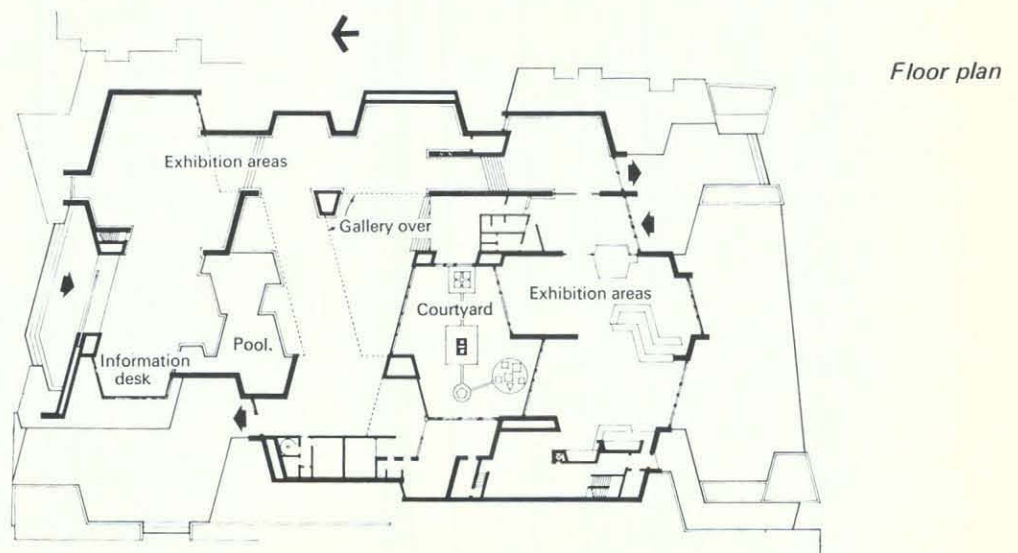
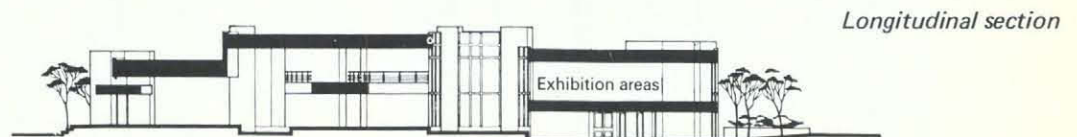
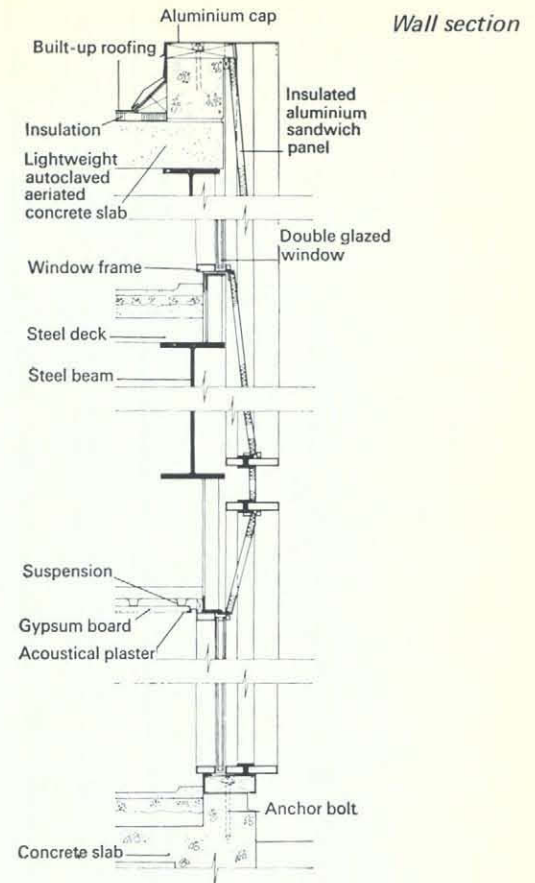
7. WINDOWS & ENTRANCES — Double glazed sealed solar reflecting units ("STOPRAY"), imported from Belgium, in painted aluminum frames.

8. INTERIOR FINISHES —

- a. Floors: Exposed concrete (mechanical room and kitchen areas), glazed tile (public and private washrooms), vinyl asbestos floor tile (staff areas), Belgian carpet (administration offices and restaurant), petit granit from Belgium (exhibition areas).
- b. Walls: Belgian hand made brick, painted dry-wall (staff, kitchen, washroom and basement areas), glazed tile (public and private washrooms),
- c. Ceilings: Painted drywall (staff, kitchen, washroom and basement areas), painted acoustic plaster elsewhere.

9. MECHANICAL SYSTEMS —

- a. Plumbing: Standard gas fired domestic hot water system.





- b. Heating, ventilation, air conditioning: Air conditioning was accommodated by two conventional, low pressure, package air handling units in the central mechanical room, with distribution ductwork. Refrigeration equipment consisted of reciprocating compressor and water cooled condenser utilizing water from the lake (156 T capacity). Electric heating coils in ductwork and electric baseboard heaters in administration offices. Ventilation incorporated as part of A.C. system with separate exhaust fans for kitchen and washroom areas.
- c. Other: Air door installation at the main entrance and plumbing to interior and exterior patio pools.

#### 10. ELECTRICAL —

- a. Power: 12,000 V, 2 feeder service entrance, manual transfer step down at 120/208 V service with 600 KVA dry type transformer.
- b. Lighting: Incandescent, fluorescent (kitchen, washrooms, service areas), quartz floodlighting (exterior).
- c. Audio-visual systems: Exhibition contract.

#### 11. SPECIAL TRAFFIC CONVEYING EQUIPMENT — Dumbwaiter between basement and ground floor kitchens.

#### 12. FIRE PROTECTION — Extinguishers, CO2 system in hoods of restaurant and kitchen; manual fire alarm system; automatic heat detectors and fire dampers in ductwork.

#### 13. SAFETY FEATURES — Battery operated emergency lighting.

#### 14. EXTERIOR WORK (where part of the construction contract) — Landscaping, flagpole, planter boxes, asphalt paving, floodlighting and petit granit paving.

#### 15. OTHER ITEMS OF PARTICULAR INTEREST —

- a. Brief description: Specially formed painted aluminum curtainwall framing with painted aluminum insulated infill panels and double glazed sealed window units.
- b. Location: Exterior wall.
- c. Manufacturer or producer: Montreal Iron Works Corp., Montreal.

- d. Nearest source of more information: Same.

#### 16. COMMENTS —

- a. General: The pavilion was conceived as a "jewel box" by its Belgian architect and was meticulously executed by all concerned. It constituted a "custom job" for which all prominent elements such as the brick, petit granit paving, curtain wall and solar reflecting glazing were specially made. The sum total effect of the materials and detailing gave this building a richness, quality and feeling of permanence quite different from any other pavilion on the site. In addition, some very interesting interior spaces were created by the play of different floor, wall and ceiling planes. Approximate square foot cost was \$43.00.
- b. Petit granit: Pre-cut paving panels, imported from Belgium, of 3/4 inch thick charcoal-grey granite. The material was very uniform in color and of high quality. Approximate cost, cut and finished, was \$2.50 per sq. ft. No problems were encountered in installation.
- c. Brick: Specially hand made and very handsome in appearance but too porous for Montreal's climate (made in Belgium). Size — 3 1/2" x 3 1/2" x 11 1/2". Approximate cost was \$400.00 per thousand.
- d. Glazing: Windows consisted of insulating, double glazed, sealed units (trade name — "Stopray"). The outside sheet had a solar reflecting coating on its inside face which gave a gold mirror-like appearance. Similar units had been used previously but never in such large sizes. Special equipment had to be obtained by the Belgian manufacturer (Belcana Glass) in order to make the larger units which measured up to 9' x 11'. Local manufacture of this product was to be undertaken by Superseal Inc. of St. Hyacinthe, Quebec. Approximate cost was \$5.00 per sq. ft. To match the sealed units in appearance, specially laminated (to minimize the thickness) glass units were manufactured for all doors.
- e. Curtain wall: Custom built to the architect's design, the curtain wall system consisted of extruded aluminum frames, parallelogram in section and finished in acrylic "Alanco-Durspandrel panels. Approximate cost, excluding glazing, was \$20.00 per sq. ft. Fabrication was conducted by Montreal Iron Works Corp.

## BRITAIN

### A. GENERAL DATA

1. NATURE OF PAVILION/STRUCTURE — Temporary.
2. LOCATION — Expo Area: Ile Notre-Dame;  
Lot No. 4200;  
Key Plan No. 435.
3. OWNER (or contracting body) — Government of Great Britain.
4. DESIGN ARCHITECT — Sir Basil Spence, Bonnington & Collins, London.
5. LOCAL ASSOCIATE ARCHITECT — Bland, Lemoyne, Edwards, Shine, Montreal.
6. CONSULTING ENGINEERS —
  - a. Structural: Sir Alexander Gibb & Partners, London, England.
  - b. Mechanical and Electrical: Ministry of Public Building & Works, England.
7. LOCAL ASSOCIATE CONSULTING ENGINEERS —

- a. Structural: Gibb, Underwood & McLellan, Toronto.

- b. Mechanical and Electrical: Lefrancois, Laflamme, Gauthier, Montreal.

9. GENERAL CONTRACTOR — Robert McAlpine Limited, Montreal.

### B. GENERAL DESCRIPTION OF PAVILION/STRUCTURE

1. FUNCTIONAL DESCRIPTION — The complex consisted of four separate building volumes, housing five main exhibition sections, with a 200' tower as the prominent feature. The building volumes included the tower (with two exhibition areas), two exhibition units and the administration-theatre unit, all inter-linked. Visitors approaching from the main avenue passed first over a shallow moat and then under a covered entrance to the broad concourse which featured a sculptured fountain and associated pools.

#### 2. DIMENSIONS —

- a. Size: Tower — 100' diameter at base; remaining units 180' x 120', 80' x 140', 288' x 100'.





- b. Area: 65,600 sq. ft.
- c. Height: Tower 200'; Highest building 75'.
- d. Stories: Tower — 2 stories; remaining units were one storey with floors at various levels.

3. FOUNDATIONS — Concrete piles or spread reinforced concrete footings at bearing points.

4. STRUCTURE — Structural steel imported from the United Kingdom.

5. WALLS AND EXTERIOR CLADDING — Asbestos-cement wallboard painted, rough textured sprayed vermiculite plaster to batter walls.

6. ROOF — Built up roofing over steel deck.

7. WINDOWS AND ENTRANCES — Plate glass in wood frames for windows in administration unit; plate glass in aluminum frames for entrances.

8. INTERIOR FINISHES —

- a. Floors: Carpet (administration and certain exhibit areas), vinyl floor tile (service areas), rubber tile, cork tile and brick paving (exhibit areas).
- b. Walls: Painted concrete block, plaster or drywall (administration areas), plaster painted, acoustical plaster, cement-asbestos painted (exhibit areas).

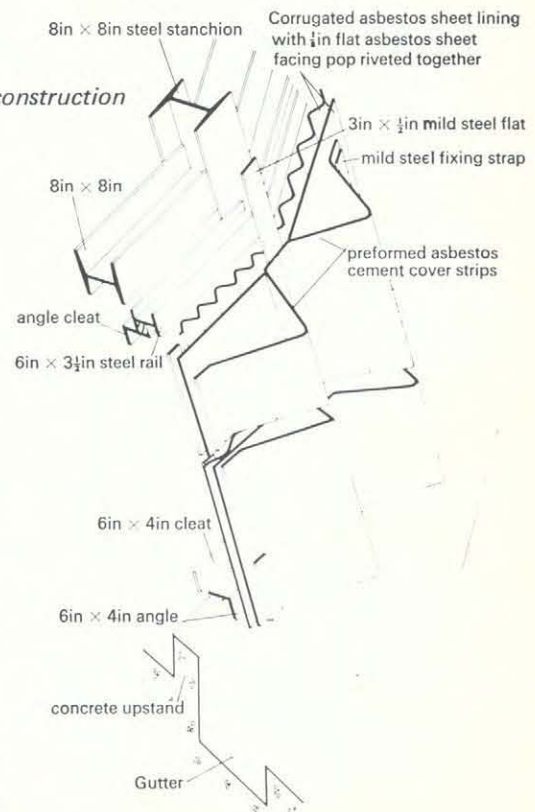
- c. Ceilings: Limpet asbestos (administration), acoustical plaster and suspended sections (rings) of fiberglass pipes.

## 9. MECHANICAL SYSTEMS —

- a. Plumbing: Standard; Electric domestic hot water system.
- b. Heating, ventilation, air conditioning: The heat source was a 250 B.H.P. gas fired hot water boiler. For air conditioning, a 326 ton centrifugal compressor, using Freon 11, cooled the system water which, as in the case of heating, was circulated through 29 air handling units for main areas and to force flow convectors for the administration building and V.I.P. lounge. Air was conveyed from the air handling units to each area by means of sheet metal ducts, well insulated, to which were attached air diffusers in different rooms. Ventilation was part of A.C. system with separate exhaust fans for washrooms and transformer room. Electric controls were used. Submersible pump in the lagoon was used to cool centrifugal compressor condenser.
- c. Kitchen: Domestic type bar-servery in V.I.P. area.
- d. Other: Air-door curtain at entrance to tower and plumbing to pools and fountain.



*Detail of wall construction*





## 10. ELECTRICAL —

- a. Power: 12,500 V, 2 feeder service entrance, automatic transfer switch, step down to 600 V service for mechanical equipment with 1250 KVA transformer and 120/208 V service for lighting and conveniences with 1250 KVA transformer. Both transformers were TYRONOL models.
- b. Lighting: Predominantly incandescent, fluorescent in administration and service areas.
- c. Audio-visual systems: Part of exhibition.

## 11. SPECIAL TRAFFIC CONVEYING EQUIPMENT — Four escalators, average rise 20', maximum rise 33'; one dumbwaiter in literature area.

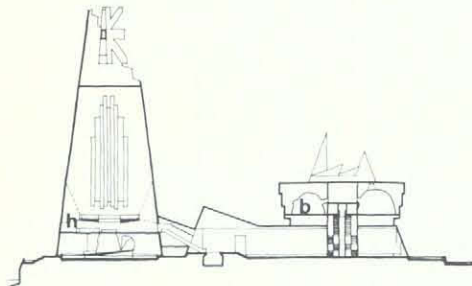
## 12. FIRE PROTECTION — Hose cabinets, extinguishers, fireproofing of steel structure, smoke and heat detection fire alarm system with manual alarm stations.

## 13. SAFETY FEATURES — Emergency lighting, battery operated.

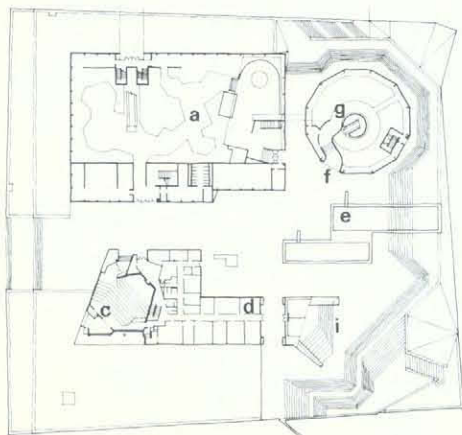
## 14. EXTERIOR WORK (where part of the construction contract) — Plaza (concrete and exposed aggregate), pools, fountain, flagpoles.

## 16. COMMENTS — The complex was robust in conception making use of large forms with an industrial bias. The dominating tower was left incomplete to symbolize that Britain's contribution to world progress was far from finished. In addition, to remind visitors that the British are an island race, the walls of the building rose directly from the shallow moat at its base.

The entire complex was envisaged as a giant stage set within which the site was exploited to the utmost advantage, including the lake at the rear. Special mention should be made of the many sculptural exhibits inside, which were among the best at Expo.



section through British pavilion



ground floor plan key

- a, Britain today
- b, industrial Britain
- c, cinema (Britain the world over)
- d, administration
- e, fountain and water sculpture
- f, entrance
- g, shaping the nation
- h, genius of Britain
- i, exit

## CEYLON

### A. GENERAL DATA

1. NATURE OF PAVILION/STRUCTURE — Temporary.
2. LOCATION — Expo Area: Ile Notre-Dame;  
Lot No. 4080.  
Key Plan No. 453.
3. OWNER (or contracting body) — Government of Ceylon; Colombo, Ceylon.
4. DESIGN ARCHITECT — V. Kamdavel, Colombo, Ceylon.
5. LOCAL ASSOCIATE ARCHITECT — C.R.M. Wood, Ottawa, and Archibald, Illsley & Templeton, Montreal.
7. LOCAL ASSOCIATE CONSULTING ENGINEERS —
  - a. Structural: R.J. Kane & Associates, Montreal.
  - b. Mechanical and electrical: Jas. A. Kearns & Associates, Montreal.
9. GENERAL CONTRACTOR — J.E. Brazeau Limited, Montreal.

### B. GENERAL DESCRIPTION OF PAVILION/STRUCTURE

1. FUNCTIONAL DESCRIPTION — The pavilion consisted of two levels with exhibits on both of them. The lower level also contained a restaurant.
2. DIMENSIONS —
  - a. Size: 55' x 82'.
  - b. Area: 4,510 sq. ft.
  - c. Height: 45'.
  - d. Stories: One.
3. FOUNDATIONS — Spread concrete footings with concrete slab on grade.
4. STRUCTURE — Standard structural steel sections, columns and beams with wood floor and roof structure.
5. WALLS AND EXTERIOR CLADDING — Wood studs finished with teak panels and precast concrete slabs. Rock wool insulation 2" thick. Gyproc interior lining.



6. ROOF — Four ply tar and gravel on flat roof area. Asphalt shingles on wood deck for pitched roof.
7. WINDOWS AND ENTRANCES — 1/4" polished plate glass, fixed in extruded anodized aluminum. Black anodized extruded aluminum entrance doors with 1/4" plate glass.
8. INTERIOR FINISHES —
  - a. Floors: Vinyl asbestos tile on mill floor.
  - b. Walls: Wood studs with painted gypsum board.
  - c. Ceilings: Mineral acoustical tile on metal suspension system.
9. MECHANICAL SYSTEMS —
  - a. Plumbing: Standard.
  - b. Heating, ventilation, air conditioning: Electric baseboard heaters. Six separate air conditioning

package type units, total capacity 30 tons.

- c. Kitchen: Refrigerator. Ice cube machine. Cold pan display on counter. Hot plate.

#### 10. ELECTRICAL —

- a. Power: 225 K.V.A. Substation, 120/208 V, 3 phase.
- b. Lighting: incandescent with some fluorescent in basement. Interior floodlighting on tracks.

#### 12. FIRE PROTECTION — Portable extinguishers.

14. EXTERIOR WORK (where part of the construction contract) — Precast concrete flagstones forming a terrace around building. Marble chip gravel walk. Shrubs.

16. COMMENTS — Of standard construction, this very effective building was both well detailed and economically built.



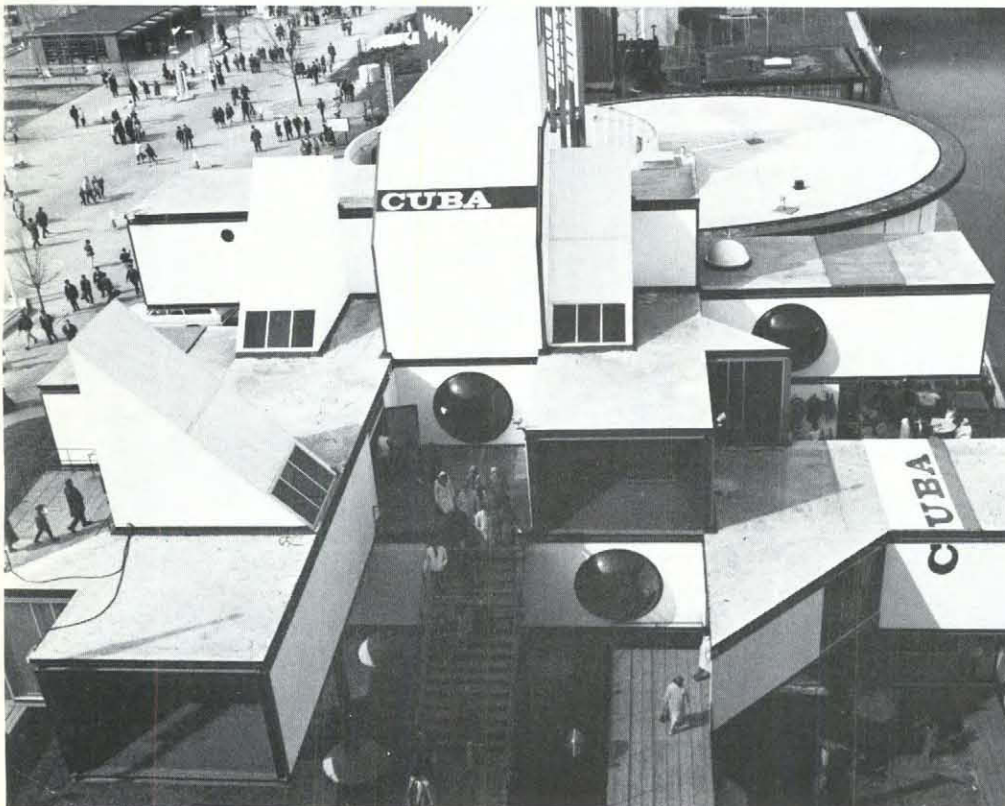
## CUBA

### A. GENERAL DATA

1. NATURE OF PAVILION/STRUCTURE — Temporary.
2. LOCATION — Expo Area: Ile Notre-Dame;  
Lot No. 4240;  
Key Plan No. 417.
3. OWNER (or contracting body) — EXPOSICUBA
4. DESIGN ARCHITECT — G. Baroni & Vittorio Gorati  
and Hugo d'Acosta, Havana, Cuba.
5. LOCAL ASSOCIATE ARCHITECT — Gagnon &  
Rousseau, Ville Jacques Cartier, Quebec.
6. CONSULTING ENGINEERS —
  - a. Structural: Jose E. Hernandez, Alfredo Quintero,  
Hugo Wainstok.
  - b. Mechanical and electrical: René Rey, Evaristo  
Fiallo, Edelmiro Sisto.
9. GENERAL CONTRACTOR — Jab Construction Inc.,  
Longueuil, Quebec.

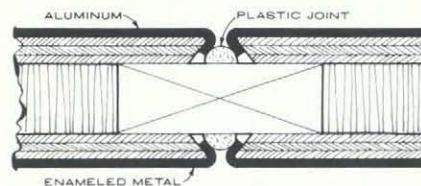
### B. GENERAL DESCRIPTION OF PAVILION/STRUCTURE

1. FUNCTIONAL DESCRIPTION — Three stories high, the pavilion consisted of a series of white interlocking square forms (vinyl on aluminum) arranged on a 15' module within an exposed steel frame. In addition to exhibition space, it included a 200 seat restaurant situated on a nearby canal as part of the general structure but isolated in function and circulation from the exhibit areas.
2. DIMENSIONS —
  - a. Size: 105' x 75'.
  - b. Area: 9,000 sq. ft.
  - c. Height: 50'.
  - d. Stories: Three, plus basement.
3. FOUNDATIONS — Reinforced concrete.
4. STRUCTURE — Prefabricated steel boxes on a 15'-0" module, precast concrete floor.

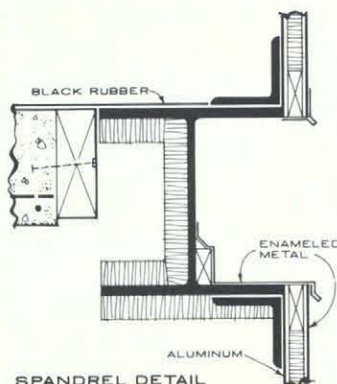


5. WALLS & EXTERIOR CLADDING — Insulated steel sandwich panels consisting of Stelvitite 22 ga. pin head Morocco finish applied to 1/4" plywood, styro-foam insulation, .032 anodized aluminum applied to 1/4" plywood.
6. ROOF — Precast concrete slabs, 1-1/2" insulation, asphalt and gravel.
7. WINDOWS AND ENTRANCES — Standard section aluminum doors; coloured acrylic domes as windows.
8. INTERIOR FINISHES —
  - a. Floors: Carpet, marble (restaurant).
  - b. Walls: Prefabricated panels.
  - c. Ceilings: Painted concrete, exposed structure.
9. MECHANICAL SYSTEMS —
  - a. Plumbing: Standard fixtures and plumbing.
  - b. Heating, ventilation, air conditioning: Exhaust and supply fan system direct into areas ventilated.
  - c. Kitchen: Capacity of 100 meals per hour. Equipment electrical.
  - d. Other: Bar sinks.
10. ELECTRICAL —
  - a. Power: 600 V, 3 transformers of 150 KVA to 120/208 V.
  - b. Lighting: 120/208 V incandescent.
  - c. Audio-visual systems: Slide projectors.
  - d. Other: P.A. system.
11. SPECIAL TRAFFIC CONVEYING EQUIPMENT — Dumb waiter.
12. FIRE PROTECTION — Fire hose cabinets and extinguishers, standard CCWE fire alarm system.
15. OTHER ITEMS OF PARTICULAR INTEREST — Demountable prefabrication system and the Stelvitite finish on the exterior panels (PVC baked on steel) (actually an innovation).
16. COMMENTS — The result of a national competition, this pavilion was one of the most interesting buildings at Expo — a dynamic piece of push and pull pop art. Structurally, it was very simple, straight-forward, and certainly the most successful of the small national pavilions, for which demountable frame and panel systems were adopted. In comparison with the Austrian pavilion, for example, it not only cost considerably less but also showed much greater daring and virtuosity. In addition, there seemed to be less of a jointing problem.

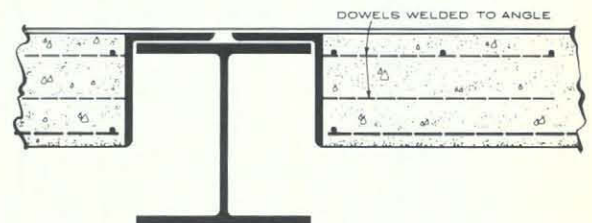
Beyond exhibition purposes, there has also been mention of this system being suitable for low cost housing (cheaper than the Habitat process).



PANEL JOINT DETAIL



SPANDREL DETAIL



FLOOR DETAIL



## CZECHOSLOVAKIA

### A. GENERAL DATA

1. NATURE OF PAVILION/STRUCTURE – Temporary.
2. LOCATION – Expo Area: Ile Notre-Dame;  
Lot No. 4310;  
Key Plan No. 443.
3. OWNER (or contracting body) – Czechoslovakian Government.
4. DESIGN ARCHITECT – Miroslav Repa & S. Pylka, Montreal.
5. LOCAL ASSOCIATE ARCHITECT – Jean A. Gelinas, Montreal.
6. CONSULTING ENGINEERS –
  - a. Structural: Lalonde Valois Lamarre Valois Assoc., Montreal.
  - b. Mechanical and electrical: Pierre de Guise & Assoc., Montreal.
9. GENERAL CONTRACTOR – Janin Construction Ltd., Montreal.

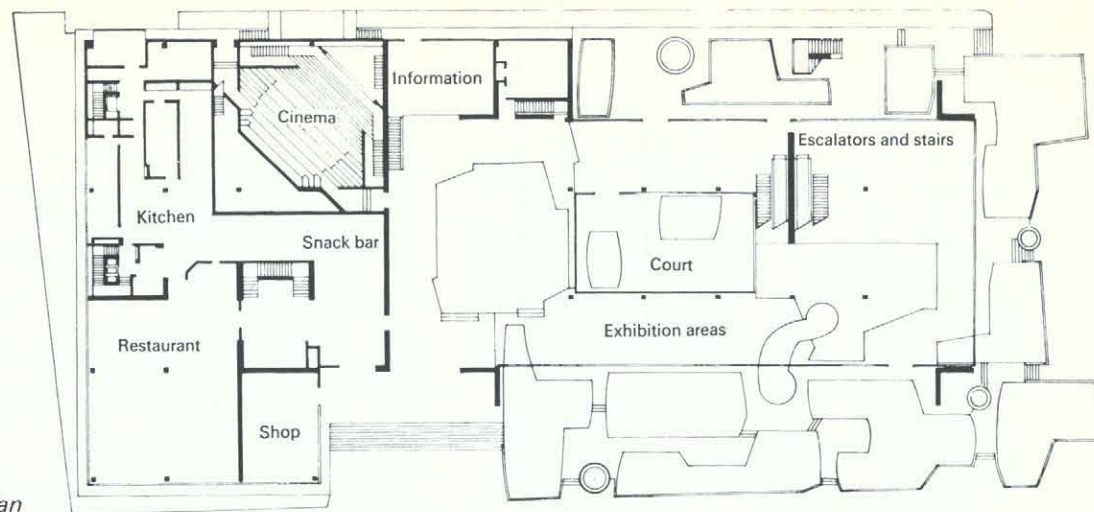
### B. GENERAL DESCRIPTION OF PAVILION/STRUCTURE

1. FUNCTIONAL DESCRIPTION – The pavilion consisted of two sections linked by an entrance hall. One contained exhibition areas on two levels arranged about a central courtyard. The other housed four restaurants on two floors, administration offices, a gift shop and a theatre.
2. DIMENSIONS –
  - a. Size: 293'-4" x 146'-0".
  - c. Height: 42'-6".
  - d. Stories: Two plus basement.
3. FOUNDATIONS – Reinforced concrete foundation walls, concrete piles.
4. STRUCTURE – Vierendeel truss on four point support, light steel trusses (steel framework prefabricated in Czechoslovakia).
5. WALLS AND EXTERIOR CLADDING – Glass with and without mullions; hand glazed terracotta 5'-0" x 8" x 4" deep (from Czechoslovakia).
6. ROOF – Alumbit roofing.

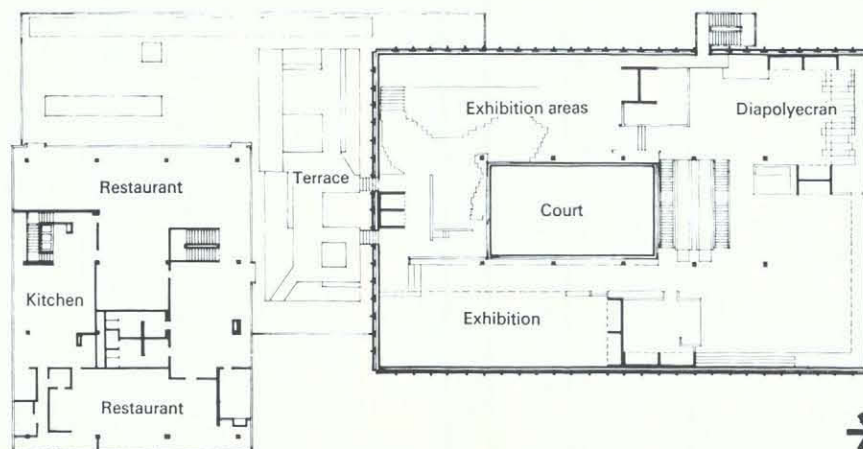




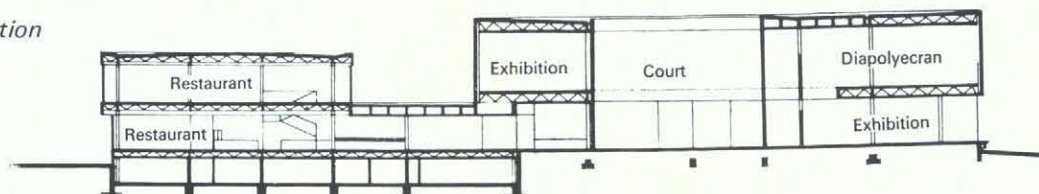
Ground floor plan



Upper floor plan



Section



7. WINDOWS AND ENTRANCES – The windows were originally designed to be mullionless for lengths of 70' x 16' but this proved to be too unstable and inside steel supports were added. Doors were tempered glass with glass bracket stiffeners. Basement windows, horizontal sliding aluminum clad wood frame.

8. INTERIOR FINISHES –

- a. Floors: Terrazzo, exposed aggregate, stone, carpeting.
- b. Walls: Slate, gypsum board.
- c. Ceilings: Acoustic tile and gypsum board.

9. MECHANICAL SYSTEMS –

- a. Plumbing: Standard fixtures and plumbing.
- b. Heating, ventilation, air conditioning: Gas fired hot water tanks. Roof hung A/C units and 2nd floor perimeter A/C units in plenum, totaling 375 tons. River water used as coolant, 2-D.M.S. Lennox units used for the first time in Canada for multi-zone control of Restaurant.
- c. Kitchen: Gas fixtures.

10. ELECTRICAL –

- a. Power: 3 transformers total 1000 KVA to 380/220 V, 3 dry core transformers wall hung, 25 KVA at 120 V to 115/230 V.
- b. Lighting: 220 V fluorescent and incandescent.
- c. Audio-visual systems: Polyvision, Diapolyekran, Kinoautomat.

11. SPECIAL TRAFFIC CONVEYING EQUIPMENT – 2 escalators, one freight elevator, 3 dumbwaiters.

12. FIRE PROTECTION – Fire hose cabinets, extinguishers, standard CCWE alarm system.

14. EXTERIOR WORK (where part of the construction contract) – Landscaping, plaza sculpture bases, roof terrace.

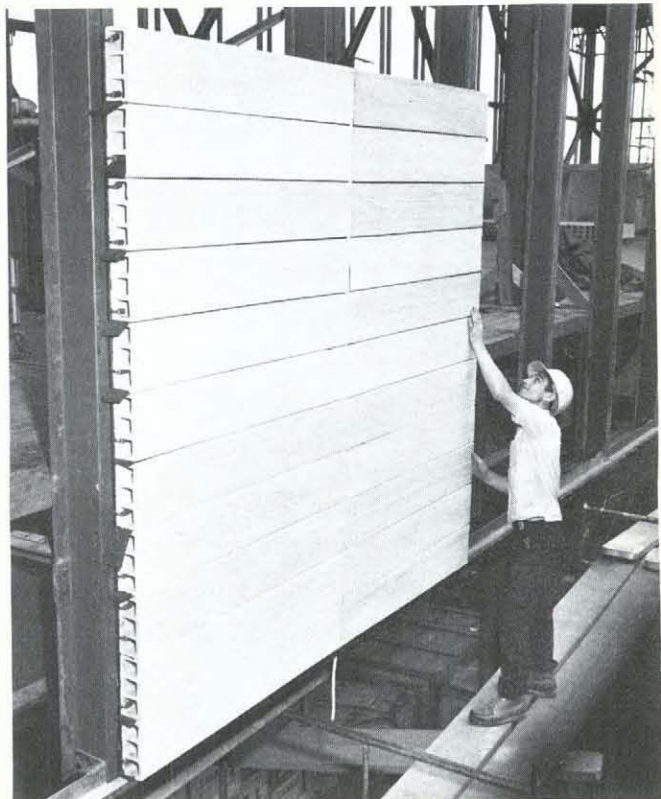
15. OTHER ITEMS OF PARTICULAR INTEREST – GLAZING –

- a. Brief description: Large sheets designed with steel interior mullions.
- b. Location: Ground floor perimeter of exhibition block.

c. Manufacturer or producer: Czechoslovakian glass industry.

16. COMMENTS – A fine building, constructed of well selected materials, the pavilion was nevertheless noted more for its exhibits and movies than its architecture. They attracted some of the largest crowds of the fair for which the interior spaces were not nearly adequate. Two innovations are worthy of mention: the acoustic floor isolation material, which was made from scrap tires, and the "Alumbit" roofing reflective finish. Unfortunately, no detailed information about these materials was available for this report.

*Erecting wall panels*





## ETHIOPIA

### A. GENERAL DATA

1. NATURE OF PAVILION/STRUCTURE — Temporary
2. LOCATION — Expo Area: Ile Notre-Dame;  
Lot Number: 4275;  
Key Plan No. 866
3. OWNER (or contracting body) — Government of Ethiopia.
4. DESIGN ARCHITECT — Jacques Benoit Barnet, Addis Ababa, Ethiopia.
5. LOCAL ASSOCIATE ARCHITECT — Jules Dupuis, Montreal.
7. LOCAL ASSOCIATE CONSULTING ENGINEERS —
  - a. Structural, mechanical and electrical — Jean F. Gagnon & Associates, Montreal.
9. GENERAL CONTRACTOR — Mount Royal Construction Company, Montreal.

### B. GENERAL DESCRIPTION OF PAVILION/STRUCTURE

1. FUNCTIONAL DESCRIPTION — Covered by a red vinyl tent, the pavilion contained an exhibition area and 40 seat cinema on the ground floor and a coffee bar on a mezzanine level. Visitors entered by a stair first to the mezzanine and then down to the exhibits and cinema.
2. DIMENSIONS —
  - a. Size: 66' diameter
  - b. Area: 4,500 sq. ft.
  - c. Height: 100'.
  - d. Stories: Two.
3. FOUNDATIONS — Concrete spread footings.
4. STRUCTURE — Bolted rigid structural steel frame, demountable, of standard circular columns and H beams.
5. WALLS & EXTERIOR CLADDING — Double balloon frame of Spruce; clad inside and out with bamboo tubes approximately 2 in. diameter. Walls were not insulated.

6. ROOF: Tent-type coloured roof: 'Climatite' vinyl coating consisting of two coats of Shawinigan 'Climatite' with fiberglass reinforcing in between. Carried by terylene cables which in turn were supported by the steel building structure.
7. WINDOWS & ENTRANCES — Pine framed, 32 oz. clear glazed windows, fixed glazing; in tent, clear mylar glazing. Entrance doors were covered with Ethiopian paintings.
8. INTERIOR FINISHES —
  - a. Floors: Colored concrete (ground floor); mill type, pine floor on steel framing (mezzanine).
  - b. Walls: None.
  - c. Ceilings: Exposed underside of tent roof.
9. MECHANICAL SYSTEMS —
  - a. Plumbing: Standard commercial fixtures.
  - b. Heating, ventilation, air conditioning: No heating



or air conditioning. Staff washroom ventilated by fan type exhaust unit.

#### 10. ELECTRICAL —

- a. Power: Power supply provided by C.C.W.E. from Morocco Pavilion, 54 KVA.
- b. Lighting: Incandescent (pavilion), fluorescent (exhibits); Exterior quartz-type fixtures to light top of tent and four obelisks.
- c. Audio-visual systems: Part of exhibits.

#### 12. FIRE PROTECTION — Portable fire extinguishers.

#### 14. EXTERIOR WORK (where part of the construction contract) — Four obelisks, built of structural steel, covered with plywood and styrofoam, finished with cement paint.

#### 16. COMMENTS — Possessing a colorful, interesting shape, the pavilion was a copy, built with modern materials and techniques, of an Ethiopian building constructed some 100 years before.

### C. DATA ON INNOVATION — ETHIOPIA

1. NAME OF ITEM — Tent roof.
2. LOCATION — Roof.
3. DESIGNER OR SELECTOR INVOLVED — Jean F. Gagnon & Associates, Montreal. (consulting Engineers.)
4. WHY WAS ITEM SELECTED? — To suit Architect's design in an economical manner.
5. WAS ITEM PRODUCED SPECIFICALLY FOR EXPO? — Yes.
6. MANUFACTURER — Shawinigan Chemicals Limited, Montreal (Climatite vinyl); A.L. Industries Co. Ltd., Montreal, Terylene ropes.
7. DISTRIBUTOR (nearest) — Manufacturer.
8. NEAREST SOURCE OF ADDITIONAL INFORMATION — Jean F. Gagnon & Associates, Montreal.
9. INSTALLER OR SUBCONTRACTOR — General Canvas Goods Manufacturing Co. Ltd., Montreal.

#### 10. MARKETING —

- a. If the item is of Canadian manufacture:
  - (i) Is it now also manufactured abroad? : No.
  - (ii) Could it be manufactured abroad? Unknown.
  - (iii) What patents are involved? : Unknown.
- b. Is the item now commercially available? : Yes, from manufacturer.
- c. Is further research and development required before marketing in Canada? No.
- d. What is the marketing feasibility and/or potential of the item? : Commercial type tents.

#### 11. TECHNICAL DATA AND EVALUATION —

- a. Generic and function description: Colored vinyl roofing membrane.
- b. Dimensions and weights (units): See manufacturer's product literature.
- c. Physical characteristics: Fiberglass membrane covered on both sides with colored vinyl.
- d. Durability and resistance to exposures (weather, chemicals, etc). Bright colors cannot be guaranteed by manufacturer due to ultra-violet sun ray damage. Stands up very well under Canadian climate.
- e. Standards covering item: See manufacturer's product literature.
- f. Test data: See manufacturer's product literature.
- g. Alternate method of evaluation used in lieu of applicable standard: None.

#### 12. PERFORMANCE RECORD —

- a. When and where was item first manufactured? : 1965, Ste. Therese, Quebec.
- b. When and where was item first installed? : 1965, Ottawa, by National Research Council.
- c. Experience in manufacture: Unknown.
- d. Experience in installation (at Expo or elsewhere): Excellent.
- e. Service performance since installation: Small



holes were successfully patched with same material and specially glued without any loss of skin resistance.

- f. Experience with Canadian climate: Quite good.
- g. Was item used for other purposes before? : Unknown.
- h. Other suggested uses: The material is very translucent and could be used to cover many kinds of

exhibit areas where daylight is required.

- i. Other comments on performance: The material diffuses and spreads daylight very well.

13. COST DATA — Available from Shawinigan Chemicals Ltd., Montreal.

14. COMMENTS — 'Climatite' is definitely a temporary material due to the effect of the sun upon it. It is, however, easy to shape, glue and sew.

## FRANCE

### A. GENERAL DATA

1. NATURE OF PAVILION/STRUCTURE — Temporary.
2. LOCATION — Expo Area: Ile Notre-Dame;  
Lot No. 4210;  
Key Plan No. 425.
3. OWNER (or contracting body) — French Government.
4. DESIGN ARCHITECT — Jean Faugeron, Paris, France.
5. LOCAL ASSOCIATE ARCHITECT — Andre Blouin, Montreal.
6. CONSULTING ENGINEERS —
  - a. Structural, mechanical and electrical: O.T.H., Paris.
7. LOCAL ASSOCIATE CONSULTING ENGINEERS —
  - a. Structural: Bourgeois, Martineau, Samson, Montreal.
  - b. Mechanical and electrical: Pageau Morel, Montreal.

9. GENERAL CONTRACTOR — Dimas Canada Limited, Montreal.

10. OTHER CONTRACTORS OF SPECIAL INTEREST — Dominion Bridge, Lachine, Quebec (structural steel frame erectors).

### B. GENERAL DESCRIPTION OF PAVILION/STRUCTURE

1. FUNCTIONAL DESCRIPTION — The building consisted of seven circular stories arranged about a giant central space. Located on the first floor were a 150 seat restaurant, a 150 seat cinema, conference rooms and administrative offices. Above, on the remaining levels were an art gallery and exhibit areas devoted to science, industry and technology.
2. DIMENSIONS —
  - a. Size: 270' x 270' (circular).
  - b. Area: 250,000 sq. ft.
  - c. Height: 106'.
  - d. Stories: Seven stories plus roof terrace.





*key*

*a. mechanical services*

*b. brasserie*

*c. Kitchen*

*d. bar*

*e. restaurant*

*f. pool*

*g. cinema*

*h. conference*

*i. administration*

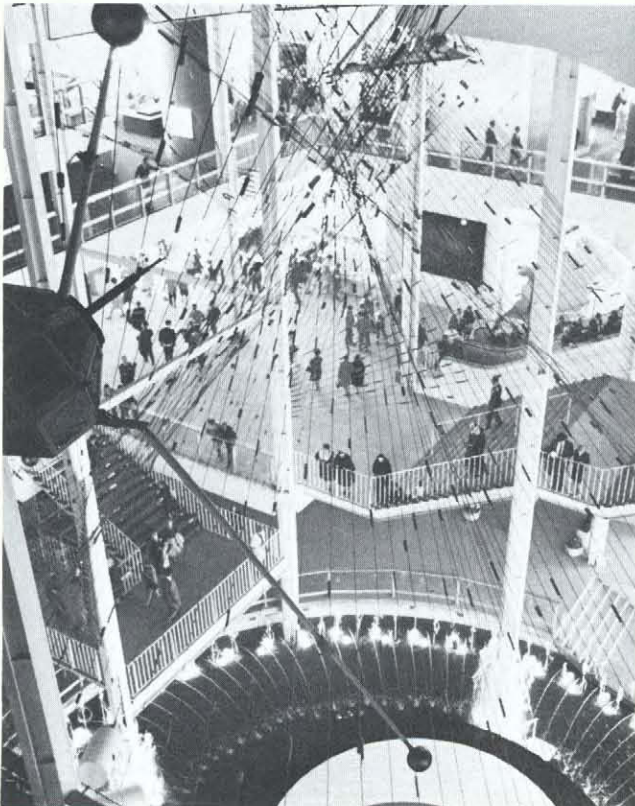
*j. external staircase and terrace*

*k. exhibition area*

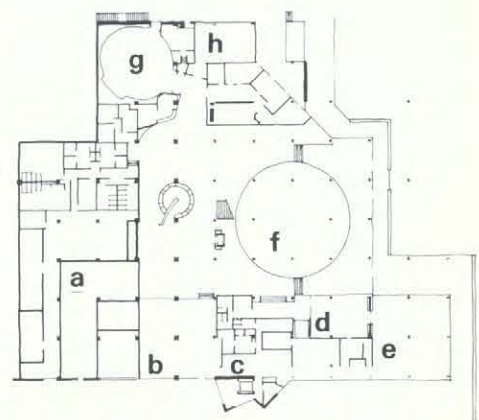
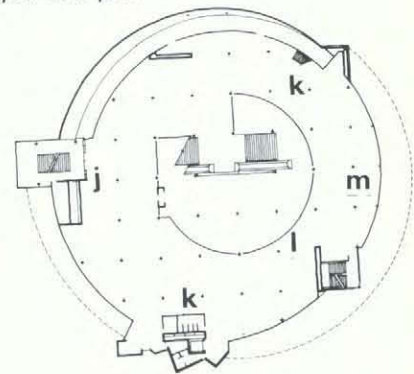
*l. open core*

*m. escalator*

*Interior well*



*Upper level plan*



*ground floor plan,*

3. FOUNDATIONS — Expanded base concrete piles with pile caps and reinforced concrete grade beams.
4. STRUCTURE — Structural steel frame consisting of columns and beams with concrete slab on metal floor deck.
5. WALLS & EXTERIOR CLADDING — Glazed extruded anodized aluminum framing with extruded anodized aluminum sun louvres.
6. ROOF — four ply tar and gravel.
7. WINDOWS & ENTRANCES — Extruded anodized aluminum. Store front type entrances.
8. INTERIOR FINISHES —
  - a. Floors: Carpet on concrete, washed stone aggregate on cast-in-place concrete.
  - b. Walls: Gypsum wallboard on metal studs.
  - c. Ceilings: Suspended canvas on metal frames.
9. MECHANICAL SYSTEMS —
  - a. Plumbing: Standard fixtures.
  - b. Heating, ventilation, air conditioning: Hot water boiler, gas fired with heating coils placed in central ventilating dual duct system. Centrifugal chiller with chilled water coil in cold dual duct system.
  - c. Kitchen: One kitchen served restaurant and bar and consisted of walk-in refrigerator, free standing refrigerators, gas fired stoves, dishwashers, hot plates and heating and serving equipment.
  - d. Other: Large interior pool with fountains.
10. ELECTRICAL —
  - a. Power: 1000 KW (lighting); 1500 KW (power).
  - b. Lighting: Incandescent throughout.
  - c. Audio-visual systems: Part of exhibits.
  - d. Other: T.V. studio equipment.
12. FIRE PROTECTION — Stand pipe system, fire alarm system.
14. EXTERIOR WORK (where part of the construction contract) — Landscaping and paving.
15. OTHER ITEMS OF PARTICULAR INTEREST —
  - a. Sun Louvres:
    - (i) Brief description:— Extruded anodized aluminum sun louvres especially extruded by Alcan, attached to the building structure by means of three dimensional anchors.
    - (ii) Location:—Exterior Facade of building.
    - (iii) Manufacturer or producer:—Raymond Manufacturing Co., Lachine, Quebec.
    - (iiii) Nearest source of more information—Same.
  - b. Canvas Ceiling:
    - (i) Brief Description:— Standard modules of steel tube frames assembled with plastic connectors. Standard awning canvas stretched and rivetted to frames with a 2" space between panels for ventilation and lighting suspension.
    - (ii) Location:—Throughout building.
    - (iii) Manufacturer or producer:—Alouette Awning & Tent Co., Montreal.
    - (iiii) Nearest source of more information:—Same.
16. COMMENTS — Although built with a conventional steel frame structure, the building was quite sculptural in appearance due to the aluminum sunscreen louvres on the exterior. The largest single building at Expo, it was organized inside about a central well from which all levels could be seen. Surprisingly, however, in spite of its size and seeming ingenuity, it was actually devoid of any truly unique or original ideas.



## GERMAN FEDERAL REPUBLIC

### A. GENERAL DATA

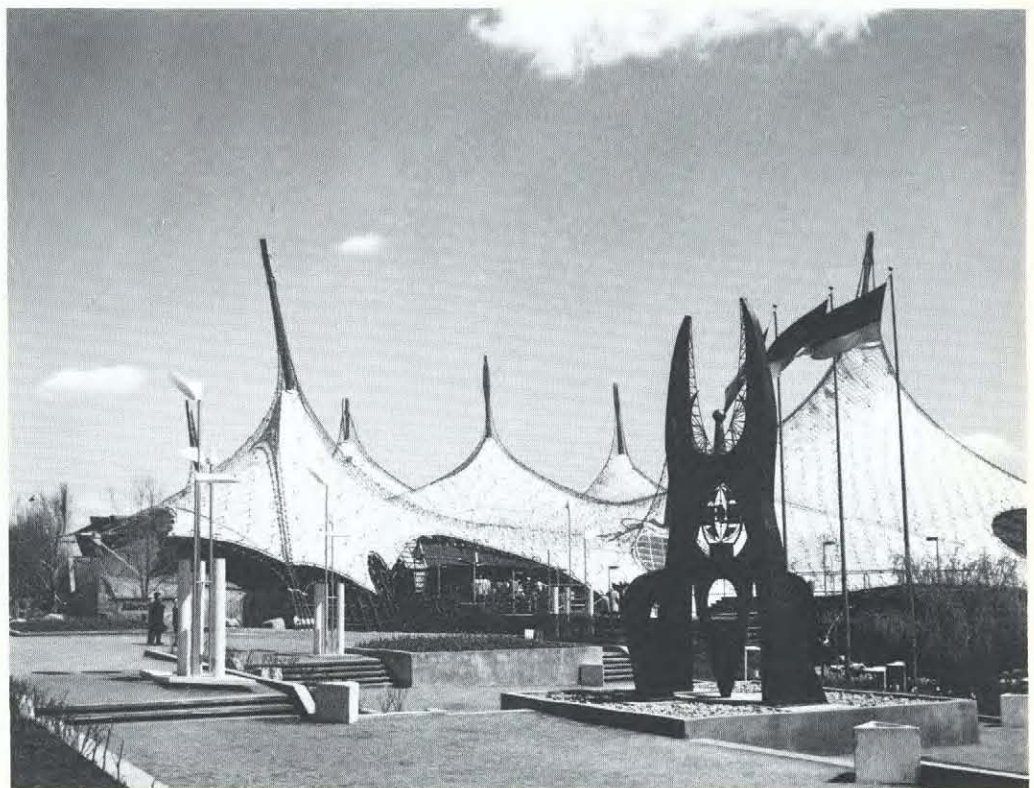
1. NATURE OF PAVILION/STRUCTURE — Temporary
2. LOCATION — Expo Area: Ile Notre-Dame;  
Lot No. 4190;  
Key Plan No. 454.
3. OWNER (or contracting body) Federal Republic of Germany.
4. DESIGN ARCHITECT — Prof. R. Gutbrod and Prof. F. Otto, Berlin.
5. LOCAL ASSOCIATE ARCHITECT — O. Tarnowski and George F. Eber, Montreal.
6. CONSULTING ENGINEERS —
  - a. Structural: Prof. Dr. F. Leonhardt, Stuttgart-Nord.
7. LOCAL ASSOCIATE CONSULTING ENGINEERS —
  - a. Structural' C.B.A. Engineering Ltd., Vancouver.

- b. Mechanical and Electrical: Pageau & Morel, Montreal.

9. GENERAL CONTRACTOR — Ross & Anglin Ltd., Westmount, Que.
10. OTHER CONTRACTORS OF SPECIAL INTEREST — Dominion Bridge Co. Ltd., Lachine, Quebec; L. Stromeyer & Co. Ltd.; Steffens & Noelle, Tempelhof, Berlin.

### B. GENERAL DESCRIPTION OF PAVILION/STRUCTURE

1. FUNCTIONAL DESCRIPTION — This was a two level exhibition building covered by a free flowing tent structure. Contained, in addition to exhibit areas, were a basement kitchen, a restaurant, administration offices, an auditorium, service areas and multi-level, elevated viewing promenades.
2. DIMENSIONS —
  - a. Size: 300' x 340'.



b. Area: 136,000 sq. ft.

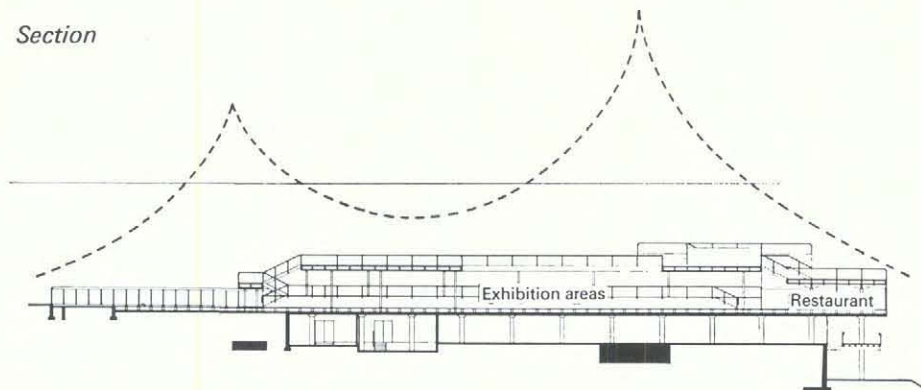
c. Height: 120' (top of highest mast).

d. Stories: Basement, terraced ground floor and multi-level promenades.

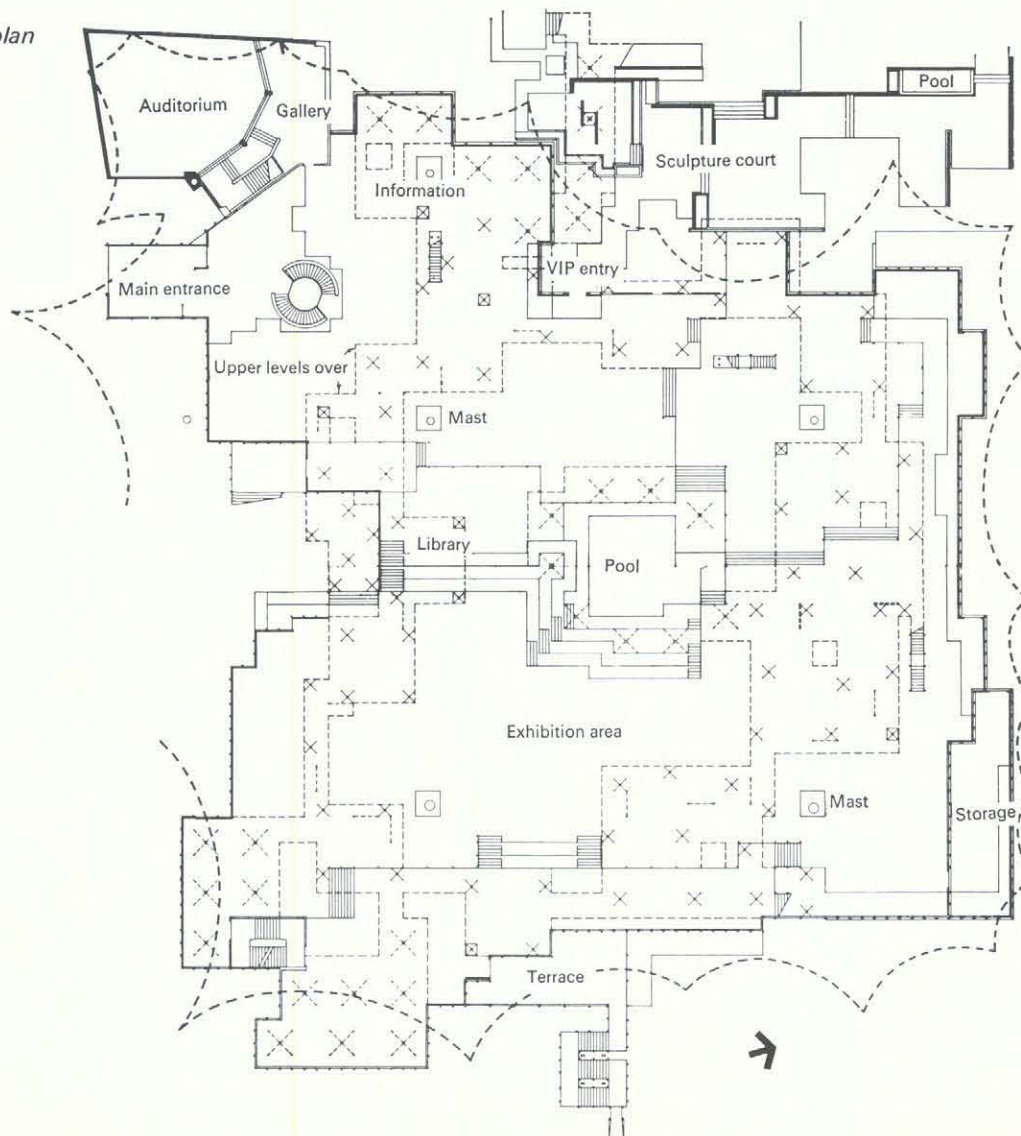
### 3. FOUNDATIONS —

Reinforced concrete foundation walls and columns on spread footings; rock anchors and post tensioned reinforced concrete anchorages for tent tie-downs.

*Section*



*Floor plan*

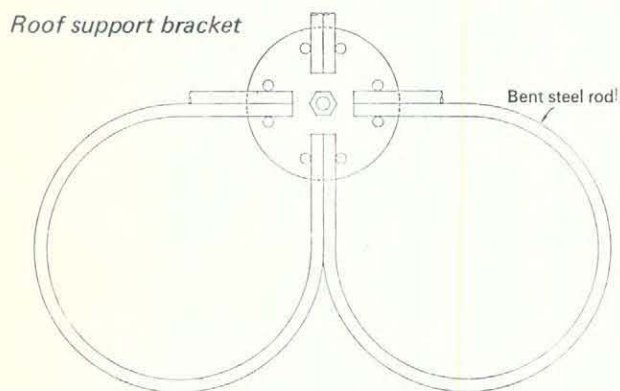




4. STRUCTURE — Tapered, tubular steel masts supporting steel roof net; modular steel promenade structure; reinforced concrete ground floor slabs and basement; timber and steel exterior terraces and bridges.
5. WALLS & EXTERIOR CLADDING — Glazed free standing windscreens and walls in wood framing; exposed concrete; built up wood.
6. ROOF — Translucent polyester membrane suspended from tent structure; built up roofing over roof areas beyond line of tent coverage.
7. WINDOWS & ENTRANCES — Sheet glass in wood frames.
8. INTERIOR FINISHES —
  - a. Floors: Carpet, limestone, birch stem floor, vinyl asbestos floor tile, painted concrete, wood decking and planking.
  - b. Walls: Glazed block, stained wood (plywood or planking), concrete block, exposed concrete, cork tile (auditorium).
  - c. Ceilings: Suspended acoustical tile, exposed concrete, wood slats, plastic (tent), wood fibre acoustical panels (auditorium).
9. MECHANICAL SYSTEMS —
  - a. Plumbing: Standard; gas fired domestic hot water system.
  - b. Heating, Ventilation, Air Conditioning: Heating conducted by hot water system with package fan coil units in basement and exhibition areas and infra-red units in open exhibition areas (auxiliary). Air conditioning handled by low velocity, chilled water, package fan coil units in zoned exhibition areas, restaurant, auditorium and administration offices. Ventilation and supply air system in kitchen.
10. ELECTRICAL —
  - a. Power: 1-400 KVA, 575 V power transformer, 60 cycle; 2-500 KVA, 231 V lighting transformer, 60 cycle power requirements to suit German equipment.
  - b. Lighting: Fluorescent, incandescent, Xenon.
  - c. Audio-visual systems: Auditorium projection system; remaining, part of exhibits.
  - d. Other: All electrical equipment, wiring, fixtures, etc. were made in Germany and supplied by Siemens Canada Ltd.
12. FIRE PROTECTION — Exterior fire hydrant; standard fire extinguishers; CO<sub>2</sub> system in kitchen; fire retardant paint to auditorium cupolas; tent membrane of self extinguishing polyester fabric.
13. SAFETY FEATURES — Automatic and manual fire alarm system; Emergency lighting system.
14. EXTERIOR WORK — (where part of the construction contract) — Landscaping including landscaped island, sculpture garden, asphalt paving, bridges, lighting, light and water special display column, and water wheels.
15. OTHER ITEMS OF PARTICULAR INTEREST —
  1. Electrical installation
    - a. Brief description: Very neat and compact electrical system with all basic components such as junction boxes, switch and convenience boxes made of plastic; wiring attached to walls and ceiling with plastic clips.
    - b. Location: Throughout building.
    - c. Manufacturer or Producer: Siemens Canada Ltd., Montreal.
    - d. Nearest source of more information: Same.
  2. Plastic tent membrane.
    - a. Brief description: Polyester fibre weave, sandwiched between plasticized polyvinyl-chloride (pvc) sheets (film), suspended by means of clover leaf hangers attached to the net.
    - b. Location: Roof membrane of tent.
    - c. Manufacturer or Producer: L. Stromeyer Co. Ltd., Germany.
    - d. Nearest source of more information: Same.
16. COMMENTS —
  - a. General: From the points of view of architectural expression, structural engineering and electrical installation, this was one of the most outstanding and revealing exhibition buildings at Expo. Its several ingenious construction systems warrant study by all professionals connected with the building industry.

- b. Electrical Installations: All electrical fixtures, wiring, junction boxes, switches, convenience outlets, equipment, etc., were manufactured in Germany by Siemens. The equipment was all very designed of the highest quality. One of the more interesting features was the wiring: exposed plastic-covered cable fastened to plastic clips which were glued or screwed to ceiling and wall surfaces. The junction boxes, switches and convenience outlets were all made of plastic. Installation was very neat and presentable.
- c. Tent Membrane: Made in Germany, it consisted, as described above, of a polyester fibre weave sandwiched between PVC. The fabric was very strong and self extinguishing. Little difficulty was encountered in working with it. The membrane arrived on the job in large sections (each a series of smaller sheets joined together) ready for erection.

See innovations section for comments on the tent roof structure, the modular steel floor structure and the wood lattice cupola.



#### C1. DATA ON INNOVATION – GERMANY

1. NAME OF ITEM – TENT SHAPED ROOF STRUCTURE
2. LOCATION – Tent shaped structure covering the entire building.
3. DESIGNER OR SELECTOR INVOLVED – Prof. F. Otto, Berlin (Architect)
4. WHY WAS ITEM SELECTED? – For flexibility of design within, its attractive free flowing shape and demountability.
5. WAS ITEM PRODUCED SPECIFICALLY FOR EXPO? – Yes.

6. MANUFACTURER – L. Stromeier & Co. Ltd., Konstanz (Net); Steffens & Noelle, Berlin (Mast).
7. DISTRIBUTOR (nearest) – Manufacturer.
8. NEAREST SOURCE OF ADDITIONAL INFORMATION – Prof. F. Otto or L. Stromeier & Co. Ltd.,
9. INSTALLER OR SUBCONTRACTOR – Dominion Bridge Co. Ltd., Lachine, Que.
10. MARKETING –

- a. If the item is of foreign manufacture:
  - (i) Is it now also manufactured in Canada? : No.
  - (ii) Could it be manufactured in Canada? : Yes, as a franchise by a company having suitable facilities for the light manufacturing of structural steel or miscellaneous metals systems.
  - (iii) What patents are involved? : Foreign patents on entire system (see designer or manufacturer).
- b. Is the item now commercially available? : No.
- c. Is further research and development required before marketing in Canada? : Yes, marketing analysis, substantial technical research into climatic influences and further design of connectors.
- d. What is the marketing feasibility and/or potential of the item? : The potential is good providing that the architectural expression inherent in the system is acceptable.

#### 11. TECHNICAL DATA AND EVALUATION –

- a. Generic and functional description: The tent was basically a tensile net membrane made up of wire cables set to a 1' – 8" grid, with overlapping wires connected by 2-way clamp connectors. The net was supported by woven cables suspended from 8 tapered steel masts and 35 concrete anchorage points. It was in tension between supporting cables which transmitted the forces to masts and tie downs.
- b. Dimensions and weights (units):
  - (i) Masts – highest, 120'; lowest 65'; diameter, 1/40 ratio (i.e. 3' for highest mast, 1'-8" for lowest).
  - (ii) Net – 2" diameter, woven supporting cables and 12 mm. net wires, weighed approximately 3 pounds per square foot (not including masts or membrane.).



- c. Physical characteristics: Galvanized steel.
- d. Durability and resistance to exposures (weather, chemicals, etc.): Excellent.
- e. Standards covering item (if applicable): Not available.
- f. Test Data: Not available, although a detailed study was conducted by Prof. F. Otto on a scale test model in order to analyse stresses.
- g. Alternate method of evaluation, used in lieu of applicable standard: Standard engineering cable theory principles and criteria can be used.

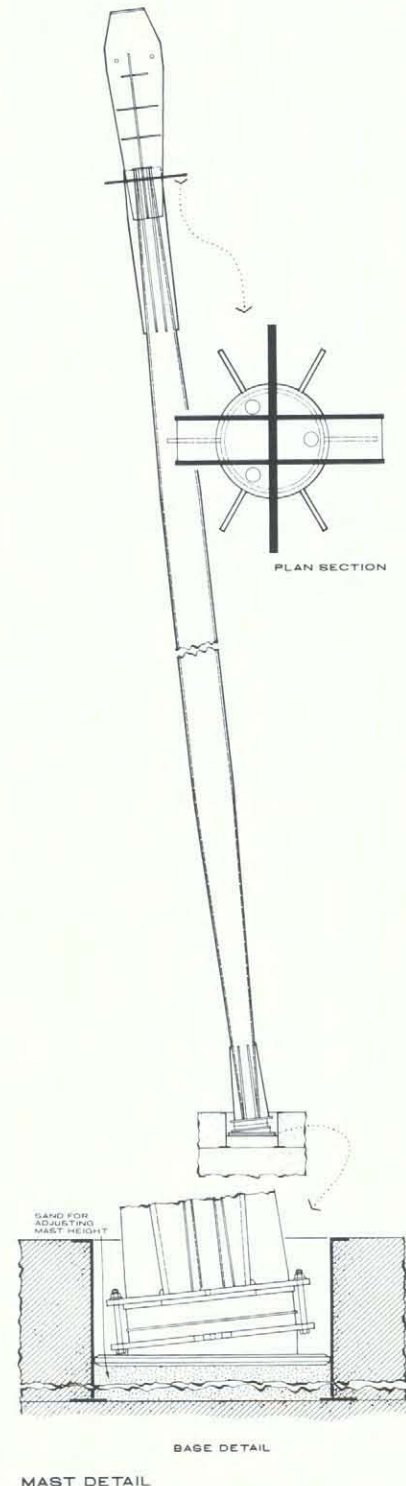
## 12. PERFORMANCE RECORD –

- a. When and where was item first manufactured? 1966, in Germany.
- b. When and where was item first installed? a Mock-up was first installed in 1966 in Germany; work on the site started in July, 1966.
- c. Experience in manufacture: Manufacturer had had previous experience with cables, connectors and clamps. No major problems were encountered during manufacturing.
- d. Experience in installation (at Expo or elsewhere): The mock-up was erected in Germany to establish procedures for the actual installation. No major problems were encountered during site erection.
- e. Service performance since installation: No problems.
- f. Experience with Canadian climate: The structure stood up very well over the one Canadian winter for which it stood prior to the opening of Expo.
- g. Was item used for other purposes before? : Structures embodying similar principles (as developed by Prof. F. Otto) had been used in Europe for several years before Expo. The German Pavilion, however, represented the largest such installation up until that time.
- h. Other suggested uses: Unlimited (theoretically) possibilities as a shelter.

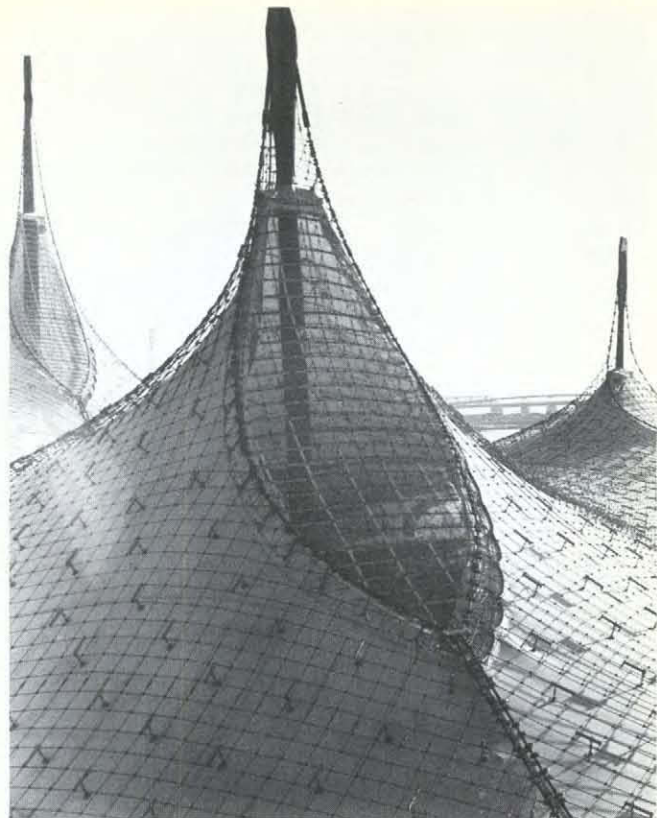
13. COST DATA – Available from L. Stromeyer & Co. Ltd. and Prof. F. Otto.

14. COMMENTS – Primary advantages of this structural system are lightness, adaptability to a variety of conditions and the ability to cover large areas with

free flowing shapes. (Spans of up to 440' were feasible at the time of the German Pavilion's construction although greater spans were considered possible upon improvements in cable manufacture.) In addition, of course, the system is capable of dismantling and re-erection. Intensity of light transmitted can be controlled through use of different membranes. The basic components were manufactured in Germany including the nets which were assembled in large sections ready for erection on the



site. Great care had to be taken in the design and construction of the main structural foundation system consisting of tie-downs and mast posts which received the net structure. The nets were erected with few problems using standard structural steel erection methods, and a regular labor force. Considerable time was spent in the stressing of the cables and net to the proper configuration. The procedure was very complicated and had to be computerized. Because of this custom tailoring, the system was very costly. The basic approach however, if applied to simply shaped roofs (not free forms as in this pavilion), could prove to be very economical.



*Erecting the tent roof*





## C2. DATA ON INNOVATION – GERMANY

1. NAME OF ITEM – MODULAR STEEL FLOOR STRUCTURE.
2. LOCATION – Promenades in ground floor exhibition area.
3. DESIGNER OR SELECTOR INVOLVED – Prof. F. Otto, Berlin (architect).
4. WHY WAS ITEM SELECTED? : Easily adjustable to suit varying exhibition layouts.
5. WAS ITEM PRODUCED SPECIFICALLY FOR EXPO? : Yes.
6. MANUFACTURER – Steffens & Noelle, Berlin.
7. DISTRIBUTOR (nearest) – Manufacturer.
8. NEAREST SOURCE OF ADDITIONAL INFORMATION – Prof. F. Otto or manufacturer.
9. INSTALLER OR SUBCONTRACTOR – Dominion Bridge Co. Ltd.
10. MARKETING –

a. If the item is of foreign manufacture:

(i) Is it now also manufactured in Canada? : No.

(ii) Could it be manufactured in Canada? : Yes, with licence by a company having suitable facilities for structural steel or miscellaneous metals work.

(iii) What patents are involved: Unknown.

b. Is the item now commercially available? : No.

c. Is further research and development required before marketing in Canada? : Yes, market analysis and simplification of component parts.

d. What is the marketing feasibility and/or potential of the item? : Questionable under present design.

## 11. TECHNICAL DATA AND EVALUATION –

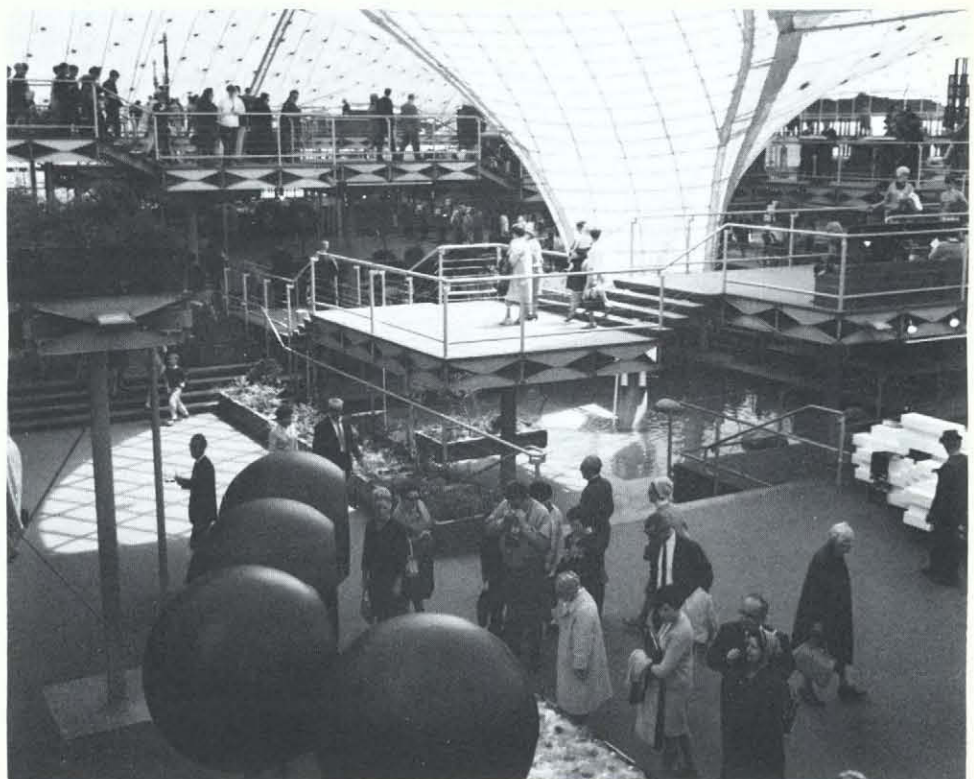
a. Generic and functional description: Extremely flexible, light-weight steel structure made up of beam sections (lower and upper chords bolted together) bolted to connectors.

b. Dimensions and weights (units):

(i) Beams – 1'-6" deep x 3'-10" long.

(ii) Columns – steel pipe, avg. 6" diam. (free standing columns) and 11" diam. (fixed end columns).

*Modular framing of mezzanines*



(iii) Connectors — 1'-6" deep with 4" x 4" top sections

(iv) Weight — 11 lbs. per sq. ft. (approx.)

c. Physical Characteristics: Hot dipped galvanized steel.

d. Durability and resistance to exposures (weather, chemicals, etc.): excellent.

e. Standards covering item: Normal structural steel standards.

f. Test data: Not available.

g. Alternate method of evaluation, used in lieu of applicable standard: Normal structural steel design and testing criteria can be used.

## 12. PERFORMANCE RECORD —

a. When and where was item first manufactured: 1966, Germany.

b. When and where was item first installed? : September, 1966, German pavilion at Expo.

c. Experience in manufacture: Manufacturer has considerable experience in this field; no major problems were encountered in manufacture.

d. Experience in installation (at Expo or elsewhere): No major problems encountered during installation.

e. Service performance since installation: No problems.

f. Experience with Canadian climate: Not applicable; normal steel behaviour would apply.

g. Was item used for other purposes before? : No.

h. Other suggested uses: There are many structural uses for this system because of its modular and flexible nature.

13. COST DATA — Available from Steffens & Noelle and Prof. F. Otto.

14. COMMENTS — Use of this modular system produced a rather interesting space composition consisting of a series of decks at various levels. Major advantages are flexibility and ease of dismantling at this time, the major disadvantage is its high cost due to the complicated and precise nature of its component parts. The system is far too expensive for standard application.

## C3. DATA ON INNOVATION — GERMANY

1. NAME OF ITEM — WOOD LATTICE CUPOLA.

2. LOCATION — Auditorium roof.

3. DESIGNER OR SELECTOR INVOLVED — Prof. F. Otto, Berlin, (architect).

4. WHY WAS ITEM SELECTED? : To demonstrate that an economical, light-weight shell structure, using wood lattice framing, could be used to cover large open areas.

5. WAS ITEM PRODUCED SPECIFICALLY FOR EXPO? — Yes.

6. MANUFACTURER — Wolff & Mueller, Stuttgart.

7. DISTRIBUTOR (nearest) — Manufacturer.

8. NEAREST SOURCE OF ADDITIONAL INFORMATION — Prof. F. Otto, or manufacturer.

9. INSTALLER OR SUBCONTRACTOR — Ross & Anglin Ltd.,

## 10. MARKETING —

a. If the item is of foreign manufacture:

(i) Is it now also manufactured in Canada? : No.

(ii) Could it be manufactured in Canada? : Yes, as a franchise by any millwork shop.

(iii) What patents are involved? : None.

b. Is the item commercially available? : No.

c. Is further research and development required before marketing in Canada? : Yes, marketing analysis.

d. What is the marketing feasibility and/or potential of the item? : Good.

## 11. TECHNICAL DATA AND EVALUATION —

a. Generic and functional description: Wood lattice grid system in which all joints are fully in compression. Cupolas covered auditorium area measuring 75' x 75'. The lattice requires a stiffening membrane over same (plywood used at German Pavilion to produce a shell effect).

b. Dimensions and weights (units): Lattice constructed of 2" x 1" nominal wood strips, bolted



at intersections to a 1'-8" grid. Weight was approximately 3 lbs per sq. ft. including plywood and insulation covering.

- c. Physical characteristics: Wood lattice of eastern spruce (Canadian lumber).
- d. Durability and resistance to exposures (weather, chemicals, etc.) Not exposed to the elements in this installation, an interior covered system.
- e. Standards covering item: None.
- f. Test Data: Not available.
- g. Alternate method of evaluation, used in lieu of applicable standard: Standard engineering design and testing criteria.

## 12. PERFORMANCE RECORD —

- a. When and where was item first manufactured? : 1966, in Germany although similar type of installation had been previously constructed also in Germany.
- b. When and where was item first installed: August, 1966, German Pavilion,
- c. Experience in manufacture: No problems.
- d. Experience in installation (at Expo or elsewhere): No problems
- e. Service performance since installation: No problems.
- f. Experience with Canadian climate: As an interior application it was not subject to climatic conditions but could be used externally.
- g. Was item used for other purposes before? : No.
- h. Other suggested uses: Can be used in reverse (in tension) to produce a bowl effect.

## 13. COST DATA — Available from Prof. F. Otto and Wolff & Mueller.

14. COMMENTS — This basically economical and light-weight system is very flexible and an easy way to cover large spaces with a dome shape. Its use at Expo, however, was very expensive due to the irregular form of the roof. Both the establishment of the points of connection for the wood lattice strips and the application of the built-up roofing (insulating, layers of thin plywood and then plastic) were far too complicated. The basic system possesses considerable merit and deserves further study by the plywood and lumber industry.

*Greece*



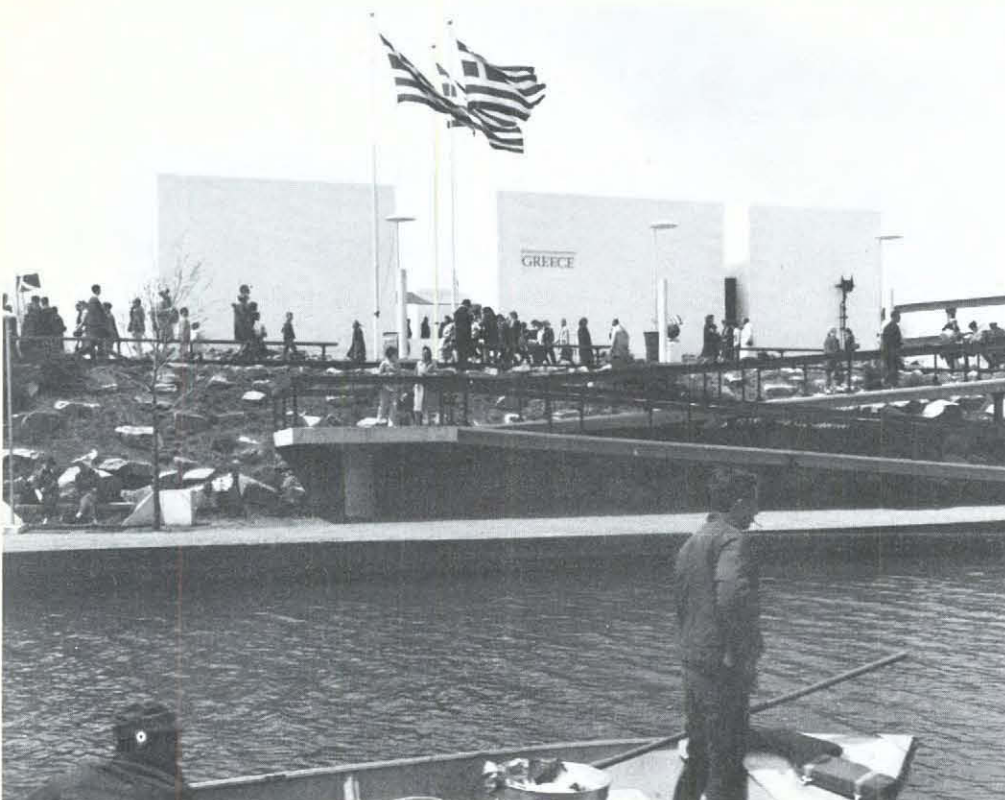
## GREECE

### A. GENERAL DATA

1. NATURE OF PAVILION/STRUCTURE — Temporary.
2. LOCATION — Expo Area: Ile Notre-Dame;  
Lot No. 4390;  
Key Plan No. 417.
3. OWNER (or contracting body) — Government of Greece.
4. DESIGN ARCHITECT — Nicholas C. Chryssopoulos, Montreal.
5. LOCAL ASSOCIATE ARCHITECT — Ian Martin, Montreal.
7. LOCAL ASSOCIATE CONSULTING ENGINEERS —
  - a. Structural: R.R. Nicolet & Assoc., Montreal.
  - b. Mechanical & electrical: Keith Assoc. Ltd., Montreal.
9. GENERAL CONTRACTOR — Secant Construction Co., Montreal.

### B. GENERAL DESCRIPTION OF PAVILION/STRUCTURE

1. FUNCTIONAL DESCRIPTION — This pavilion was a complex of nine separated blocks, linked by glazed corridors, which were arranged around a central courtyard containing a garden and amphitheatre. Housed were exhibition areas, a cinema and information and administration areas.
2. DIMENSIONS —
  - a. Size: 126' x 104'.
  - b. Area: 13,104 sq. ft. (building), 5,749 sq. ft. (courtyard).
  - c. Height: 20'.
  - d. Stories: One.
3. FOUNDATIONS — Reinforced concrete foundation walls on spread footings.
4. STRUCTURE — Bearing 12" concrete block walls (reinforced) spanned by open web lightweight steel joists.





5. WALLS & EXTERIOR CLADDING – Painted concrete block.

6. ROOF – Built up roofing over 2" wood deck.

7. WINDOWS & ENTRANCES – Links: Clear sheet glass in wood frames. Entrances: Glazed wood doors.

8. INTERIOR FINISHES –

a. Floors: Coloured concrete.

b. Walls: Painted concrete block.

c. Ceilings: Exposed steel structure and wood deck.

9. MECHANICAL SYSTEMS –

a. Plumbing: Standard; electric domestic hot water tank.

b. Heating, ventilation, air conditioning: Heating and cooling provided by 6 Westinghouse packaged central heat pump, air-cooled units located within exterior enclosures over corridor links, feeding air to wall grilles of exhibition halls; total capacity 30T. Electric baseboard heaters used in administration offices. Ventilation part of A.C. system.

10. ELECTRICAL –

a. Power: 12,000 V incoming service, step down to 120/208 V service with 150 KVA dry transformer.

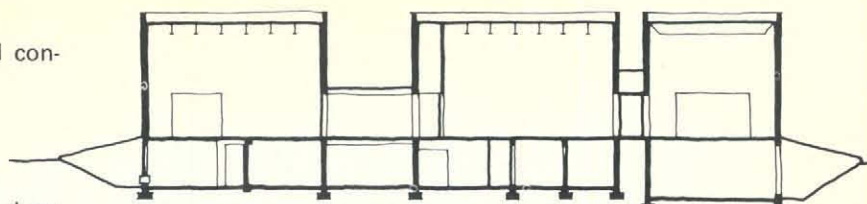
b. Lighting: Incandescent lighting for service and administration areas and exterior lighting. Remaining lighting was part of exhibits contract.

12. FIRE PROTECTION – Extinguishers, fire retardant stain to wood.

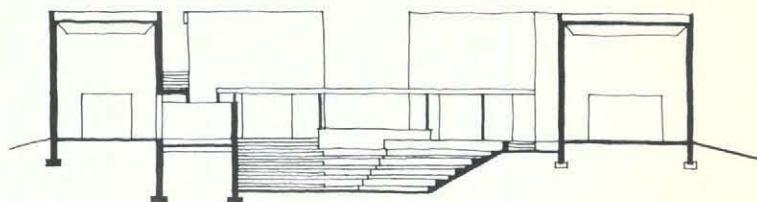
13. SAFETY FEATURES – Emergency lighting, automatic heat detection fire alarm system.

14. EXTERIOR WORK (where part of the construction contract) – Landscaping, courtyard.

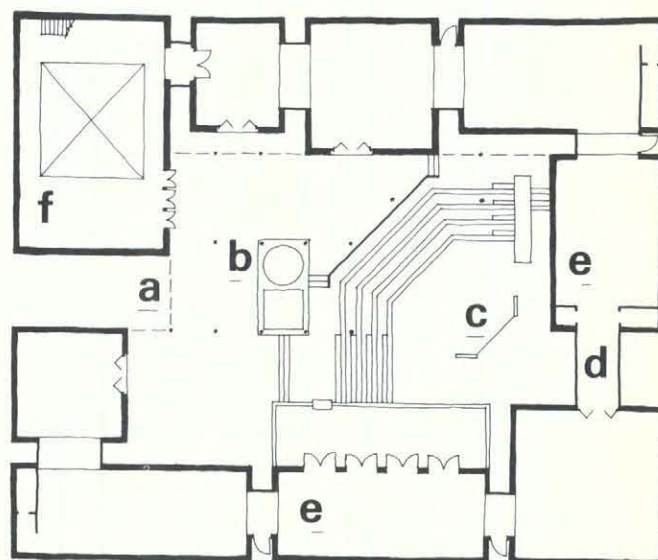
16. COMMENTS – More a monument than an exhibition building in character, the pavilion was a relatively simple statement of classic planning and design, built of plain materials. The building elements were, in fact, considered as mere shells to house exhibits. The courtyard-amphitheatre was intended as a peaceful enclosure away from the hectic pace of the fair without.



Sections



Floor plan



key

a. entrance

b. pool

c. amphitheatre

d. bridge

e. exhibition area

f. theatre

## HAITI

### A. GENERAL DATA

1. NATURE OF PAVILION/STRUCTURE — Temporary.

2. LOCATION — Expo Area: Ile Notre-Dame;  
Lot No. 4222;  
Key Plan No. 423.

3. OWNER (or contracting body) — Government of Haiti.

4. DESIGN ARCHITECT — Jodin, Lamarre, Pratte, & Carrière, Montreal (resigned, however, during course of commission).

#### 6. CONSULTING ENGINEERS —

a. Structural: Claude Lanthier and Associates, Montreal.

b. Mechanical and electrical: Gilles Dufresne and Associates, Montreal.

Note: All consultants have resigned.

#### 7. LOCAL ASSOCIATE CONSULTING ENGINEERS —

a. Structural, mechanical and electrical: Gendron Lefebvre and Associates, Laval, Quebec.

Note: All consultants have resigned.

8. OTHER CONSULTANTS — Desrochers & Dumont, Architects, Laval, Quebec.

9. GENERAL CONTRACTOR — Transit Construction Ltd., Laval, Quebec.

### B. GENERAL DESCRIPTION OF PAVILION/STRUCTURE

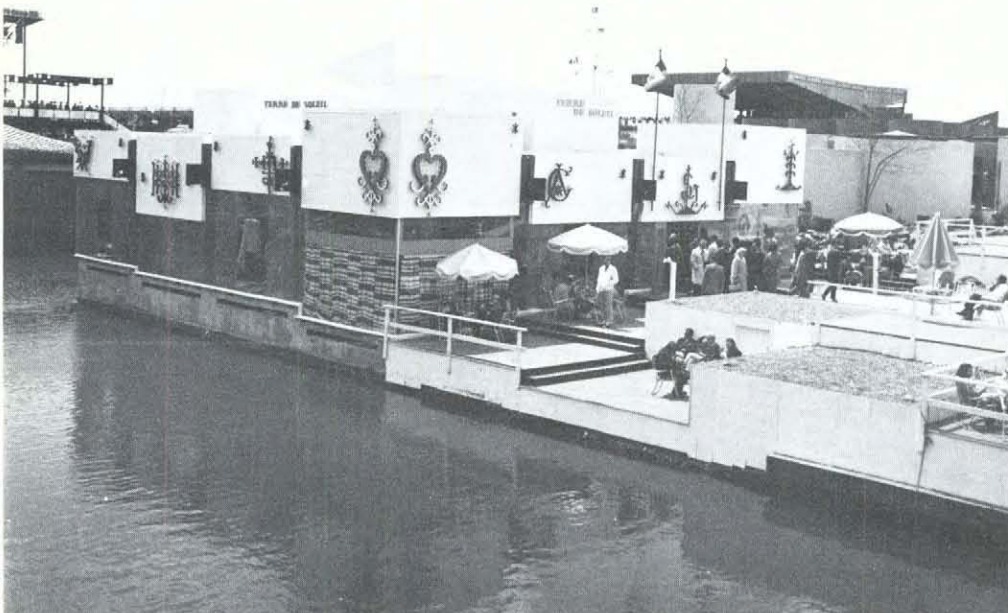
1. FUNCTIONAL DESCRIPTION — The pavilion consisted of 16 cubes supported on four columns with glazed walls at the ground level periphery. Displays were mounted on free standing panels.

#### 2. DIMENSIONS —

a. Size: 60' x 60'.

b. Area: 3,600 sq. ft.

c. Height: 16'.





- d. Stories: One.
- 3. FOUNDATIONS – Spread concrete footings.
- 4. STRUCTURE – Structural steel columns and beams supporting plywood roof cubes.
- 5. WALLS & EXTERIOR CLADDING – 5/16" polished glass set directly in structure and sealed with silicone around lower part of building; painted 3/4" marine grade plywood on 2" x 4" framing around upper part of pavilion.
- 6. ROOF – Tar and gravel on solid cubes; georgian wired glass 1/4" thick on translucent cubes.
- 7. WINDOWS & ENTRANCES – No windows; glazed solid core wood doors in pine frames.
- 8. INTERIOR FINISHES –
  - a. Floors: Carpet on concrete and wood parquette on concrete.
  - b. Walls: 2" x 4" studs with gyproc finish.
  - c. Ceilings: Exposed inside of cube which is painted gyproc.
- 9. MECHANICAL SYSTEMS –
  - a. Plumbing: Standard washroom fixtures.
  - b. Heating, ventilation, air conditioning: No heating was provided. Ventilation consisted only of electrically operated roof vents in the toilets. The building was air conditioned with window type units installed in the roof cubes.
  - d. Other: Diswasher, refrigerator and ice machine in bar.
- 10. ELECTRICAL –
  - a. Power: 110/220 V and 550 V, 3 phase.
  - b. Lighting: Incandescent recessed spotlights in walls and roof cubes.
- 12. FIRE PROTECTION – Fire alarm system, portable fire extinguishers.
- 14. EXTERIOR WORK (where part of the construction contract) – Modular Spruce planking on 2" x 4" framing which formed staggered levels, supported on Spruce posts. (some squares were filled with crushed stone and painting). Wood flagpole.
- 16. COMMENTS – One of the least significant of the national pavilions.

## INDIA

### A. GENERAL DATA

1. NATURE OF PAVILION/STRUCTURE – Temporary.
2. LOCATION – Expo Area: Ile Notre-Dame;  
Lot No. 4070 and 4075;  
Key Plan No. 464.
3. OWNER (or contracting body) – Government of India.
4. DESIGN ARCHITECT – M.M. Rona, DI, New Delhi, India.
5. LOCAL ASSOCIATE ARCHITECT – Marshall, Merrett, Stahl, Elliott & Mill, Montreal.
7. LOCAL ASSOCIATE CONSULTING ENGINEERS –
  - a. Structural: Spector, Barbacki, Forté & Assoc., Montreal.
  - b. Mechanical and electrical: Brais, Frigon, Hanley, Montreal.
9. GENERAL CONTRACTOR – Cook & Leitch Ltd., and E.G.M. Cape (1956) Limited, (Joint Venture), Montreal.

### B. GENERAL DESCRIPTION OF PAVILION/STRUCTURE

1. FUNCTIONAL DESCRIPTION – The pavilion consisted of four units: a tall triangular tower (a replica of a giant sun-dial) at the entrance, a two-storey exhibition block, a restaurant and an exhibition display link which joined the exhibition and restaurant areas together. The exhibition block was entered by means of a decoratively paved ramp, on either side of which were located reflecting pools.
2. DIMENSIONS –
  - a. Size: Overall size, 114' x 305', main block, 194' x 114'.
  - b. Area: 40,000 sq. ft.
  - c. Height: 50' (exhibition block), 72' (tower).
  - d. Stories: One with partial basement and 2-storey exhibition block.
3. FOUNDATIONS – Reinforced concrete foundation walls and spread footings.
4. STRUCTURE – Reinforced concrete (basement and ground floor), structural steel (above grade).





5. WALLS & EXTERIOR CLADDING — Painted concrete block, sandstone (from India), aluminum curtain wall.
6. ROOF — Built up roofing over steel deck.
7. WINDOWS & ENTRANCES — Tempered glass or plexiglass in painted aluminum frames.
8. INTERIOR FINISHES —
  - a. Floors: Generally carpet (from India), sandstone (2nd floor of exhibition block), mosaic tile, teak and rosewood blocks, vinyl asbestos floor tile (service areas).
  - b. Walls: Painted and stuccoed concrete block, texture painted plywood, painted drywall.
  - c. Ceilings: Acoustical tile, plaster, silk, wood lattice slats.
9. MECHANICAL SYSTEMS —
  - a. Plumbing: Standard; gas fired domestic hot water system.
  - b. Heating, ventilation, air conditioning: Interior cooling tower connected by ductwork to exterior, gas fired boiler and chiller unit fed 16 air handling units, 135T total capacity, ductwork distribution; fresh air taken from exterior; ceiling served as a return plenum; hot water heating coils in air handling units. Ventilation was part of the A.C. system with separate exhausting of washrooms, transformer room and kitchen.
  - c. Kitchen: Full kitchen (basement) and servery (restaurant level) to serve restaurant; CO<sub>2</sub> system in exhaust hoods.
10. ELECTRICAL —
  - a. Power: 12,000V, 2 feeder service entrance, manual transfer switch, step down to 600V service for mechanical equipment with 600 KVA transformer, 400V service for miscellaneous Indian equipment with 30 KVA transformer, 120/208V service with 225 KVA transformer; all transformers were dry core.
  - b. Lighting: Incandescent, fluorescent (service areas).
  - c. Audio-visual systems: Part of exhibits contract.
11. SPECIAL TRAFFIC CONVEYING EQUIPMENT — Escalator rising 23' (glass balustrades); dumbwaiter between basement kitchen and restaurant pantry.
12. FIRE PROTECTION — Hose cabinets, extinguishers, smoke and heat detection fire alarm system; all wood materials fire retardant treated.
13. SAFETY FEATURES — Emergency lighting battery operated.
14. EXTERIOR WORK (where part of the construction contract) — Reflecting pools, exposed aggregate paving, asphalt paving, dining terrace, landscaping, flagpoles.
16. COMMENTS — The exterior of the complex was kept intentionally simple in its treatment to contrast with the highly decorated interior. Special features were the sun-dial tower and the stepped buttresses. The latter were partially constructed with glass, through which interior displays were visible. Extensive use was made of Indian materials such as marble, sandstone, teak, rosewood and carpet. In addition, native handicrafts, were prominently displayed — the ornate hand carved main entrance doors and carved marble screens.

## IRAN

### A. GENERAL DATA

1. NATURE OF PAVILION/STRUCTURE — Temporary.
2. LOCATION — Ile Sainte Hélène;  
Lot No. 3155;  
Key Plan No. 318.
3. OWNER (or contracting body) — The Imperial Government of Iran.
4. DESIGN ARCHITECT — A. A. Farman Farmaian & P. Maayed-Ahd, Teheran, Iran.
5. LOCAL ASSOCIATE ARCHITECT — George F. Eber, Montreal.
7. LOCAL ASSOCIATE CONSULTING ENGINEERS —
  - a. Structural: Blauer Horvath Associates, Montreal.
  - b. Mechanical and Electrical: Keith Associates Limited, Montreal.
9. GENERAL CONTRACTOR — Argo Construction Limited, Montreal.

### B. GENERAL DESCRIPTION OF PAVILION/STRUCTURE

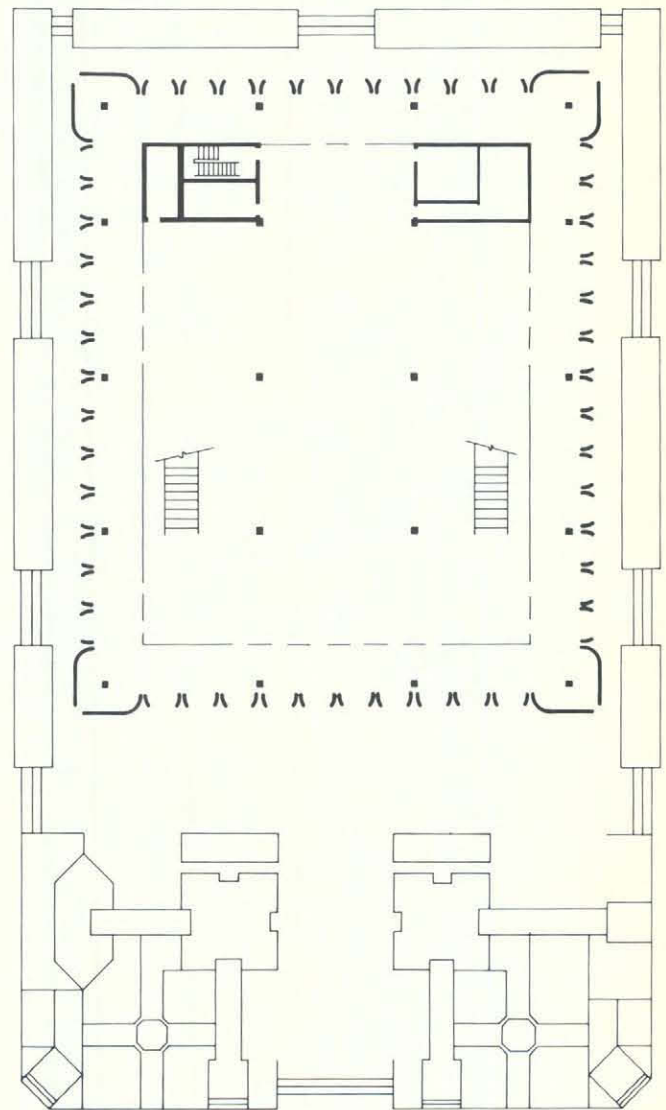
1. FUNCTIONAL DESCRIPTION — Designed in a formal and traditional style, the pavilion was a two storey building with exhibits located on both levels. Inside, there was an atrium or inner court with two main staircases leading from the ground to the first floor. The roof over this central space was accentuated by both a change in level and an open light well. The entire building, both interior and exterior was highly representative of Iranian handicrafts.
2. DIMENSIONS —
  - a. Size: 143' x 117' (building); 250' x 140' (plaza).
  - b. Area: 31,500 sq. ft.
  - c. Height: 49'-2" main building and 57'-0" roof over interior court.
  - d. Stories: Two.
3. FOUNDATIONS — Concrete piles and reinforced concrete foundations.
4. STRUCTURE — Reinforced concrete ground floor, structural steel superstructure above grade with reinforced concrete 2nd floor slab.
5. WALLS & EXTERIOR CLADDING — Cement plaster painted and hand made painted Iranian glazed tiles to drums.





6. ROOF — Built up roofing over steel roof deck.
7. WINDOWS & ENTRANCES — Plate glass in stained wood frames (arcade) or painted metal frames (strip and upper arch windows).
8. INTERIOR FINISHES —
  - a. Floors: Vinyl asbestos floor tile (staff and kitchen areas), painted concrete (storage areas), glazed tile (public washrooms), carpet (exhibition areas).
  - b. Walls: Painted plaster (exhibition areas), painted concrete block (staff, service and storage areas), glazed tiles (washrooms).
  - c. Ceilings: Drywall (staff areas and washrooms), exposed concrete (service areas), carpet (ground floor exhibition area), lay-in acoustical panels (2nd floor exhibition area).
9. MECHANICAL SYSTEMS —
  - a. Plumbing: Standard; electric domestic hot water system.
  - b. Heating, ventilation, air conditioning: 8 roof mounted self contained package units complete with air cooled condenser, direct expansion cooling coils and gas fired heaters. Each 10T capacity serving 8 separate zones. Each unit individually controlled by room thermostat. Three units with distribution ductwork to linear diffusers serve ground floor exhibition area. Remaining 5 fed directly to 2nd floor ceiling combination supply and return diffusers. Ventilation part of A.C. system with separate exhaust system (roof fans and ductwork) to washrooms and kitchen.
  - c. Kitchen: Domestic type.
  - d. Other: Plumbing to pools and water fountains.
10. ELECTRICAL
  - a. Power 12,000V, 2 feeder service entry, manual transfer switch, step down to 120/208V service with 450 KVA dry type transformer.
  - b. Lighting: Incandescent in arcades, exhibition and storage areas, fluorescent in staff areas and washrooms, incandescent and quartz floodlighting.
  - c. Audio-visual systems: Part of exhibits contract.

*Plan*



12. FIRE PROTECTION — CO<sub>2</sub> fire extinguishers, standpipe and fire hose cabinets, closed circuit electric annunciator type fire alarm system with automatic smoke detectors and manual alarm stations.

13. SAFETY FEATURES — Battery operated emergency lighting.

14. EXTERIOR WORK (where part of the construction contract) — Flagpoles, terrazzo to arcade floor, exposed aggregate plaza paving, concrete planter boxes and pools, landscaping, floodlighting.

16. COMMENTS —

- a. General: Specially interesting and richly coloured, this very elegant and successful building turned out to be one of the "sleepers" at Expo. Though neither truly contemporary nor traditionally Iranian in design, it still conveyed

much of the vast architectural heritage of that country. Classical in nature, it was sited on a raised plaza and surrounded by landscaped planter boxes and fountain pools. Especially striking were the semi-circular drums faced with blue ceramic tiles, which helped form the arcade surrounding the ground floor's perimeter. Approximate cost was \$26 per sq. ft.

- b. Ceramic tiles: The hand-painted exterior tiles, which provided the building with most of its colour, were made in Iran and installed by Iranian tile setters. Size — 4-1/2" x 4-1/2" x 3/8" to 1/2" in thickness. The quality of the clay on which the ceramic was glazed, however, was extremely poor. The entire building, as a result, had to be enclosed within polyethylene for the winter months prior to the fair's opening.





## ISRAEL

### A. GENERAL DATA

1. NATURE OF PAVILION/STRUCTURE — Temporary.
  2. LOCATION — Expo Area: Ile Notre-Dame;  
Lot No. 4340;  
Key Plan No. 430.
  3. OWNER (or contracting body) — Government of Israel.
  4. DESIGN ARCHITECT — A. Sharon, O. Reznik and E. Sharon, Tel Aviv.
  5. LOCAL ASSOCIATE ARCHITECT — Rosen, Caruso & Vecsei, Montreal.
  7. LOCAL ASSOCIATE CONSULTING ENGINEERS —
    - a. Structural: Spector, Barbacki, Forté & Assoc., Montreal.
    - b. Mechanical: Bernstein & Slone, Montreal.
    - c. Electrical: Leo Loebenberg, Montreal.
  9. GENERAL CONTRACTOR — Ron Engineering Construction (Quebec) Ltd., Montreal.
  10. OTHER CONTRACTORS OF SPECIAL INTEREST — Customold Fiberglass Ltd., Montreal (fiberglass wall panels).
3. FOUNDATIONS — Concrete piles, reinforced concrete foundation walls.
  4. STRUCTURE — Structural steel, mill deck floor and roof.
  5. WALLS & EXTERIOR CLADDING — Prefabricated fibreglass panels, cement plaster to concrete foundation walls.
  6. ROOF — Nyoprene-hypalon roofing over mill deck.
  7. WINDOWS & ENTRANCES — Plate glass in painted aluminum frames (doors and sidelights), sheet glass (skylights).
  8. INTERIOR FINISHES —
    - a. Floors: Sisal carpet (public and restaurant areas), vinyl asbestos floor tile (kitchen), exposed aggregate (entrance hall), exposed concrete (public washrooms and basement).
    - b. Walls: Drywall.
    - c. Ceilings: Cement plaster, exposed structure (basement), stained wood mill deck (2nd floor).
  9. MECHANICAL SYSTEMS —
    - a. Plumbing: Standard; electrical domestic hot water system.
    - b. Heating, ventilation, air conditioning: A.C. accomplished by 3 low velocity all air A.C. units; separate temperature control and unit for each of the following areas: theatre, ground floor and upper floor. Refrigeration was handled by air cooled condenser units. Heating was supplied by electric coils in the supply ductwork. Ventilation, part of A.C. system with separate exhaust of washrooms, transformer room and kitchen.
    - c. Kitchen: Commercial type for restaurant which was equipped by concessionaire.
    - d. Other: Gas service to kitchen.

### B. GENERAL DESCRIPTION OF PAVILION/STRUCTURE

1. FUNCTIONAL DESCRIPTION — Designed upon an equal sided, parallelogram grid, the pavilion contained a 250 seat auditorium and a 100 seat restaurant on a split level ground floor, and an exhibition area on the second floor. It was clad with three dimensional, translucent, fibreglass wall panels attached to a steel frame.
  2. DIMENSIONS —
    - a. Size: 152' x 130' (main block), 92' x 26' (restaurant — kitchen extension).
    - b. Area: 27,620 sq. ft.
    - c. Height: 51'-6" (main block) 14' (extension).
    - d. Stories: Two plus partial basement.
10. ELECTRICAL —
    - a. Power: 12,000 V, 2 feeder service entry, step down to 120/208 V service with 750 KVA dry type transformer.

- b. Lighting: Incandescent house lighting with minimum fluorescent and quartz floodlighting.
- c. Audio-visual systems: Part of exhibits contract.

12. FIRE PROTECTION – Hose cabinets and extinguishers, fire retardant stain to wood, heat detection and manual station fire alarm system.

13. SAFETY FEATURES – Battery operated emergency lighting.

14. EXTERIOR WORK (where part of the construction contract) – Flagpoles, concrete plaza, landscaping, quartz floodlighting.

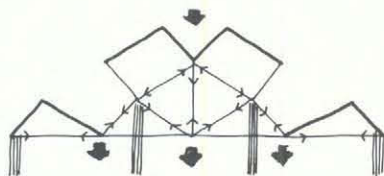
15. OTHER ITEMS OF PARTICULAR INTEREST – Fibreglass walls –

- a. Brief description: 3/8" thick translucent mould-

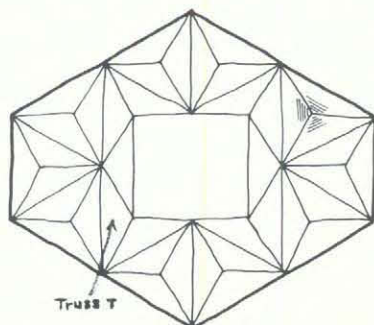
key

- |                          |                                       |
|--------------------------|---------------------------------------|
| a. entrance              | i. administration                     |
| b. the Negev             | j. diaspora                           |
| c. new towns             | k. early settlements                  |
| d. fashion and jewellery | l. the holocaust                      |
| e. stamps                | m. state and ingathering              |
| f. EL AL                 | n. new Israel                         |
| g. restaurant            | o. language and culture               |
| h. cinema                | p. kibbutz and co-operation           |
|                          | q. assistance to developing countries |

Truss diagram



Roof framing plan



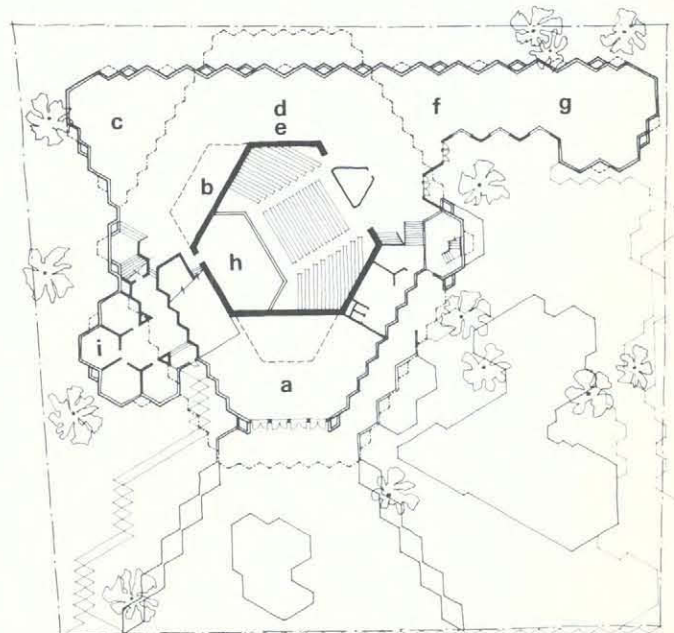
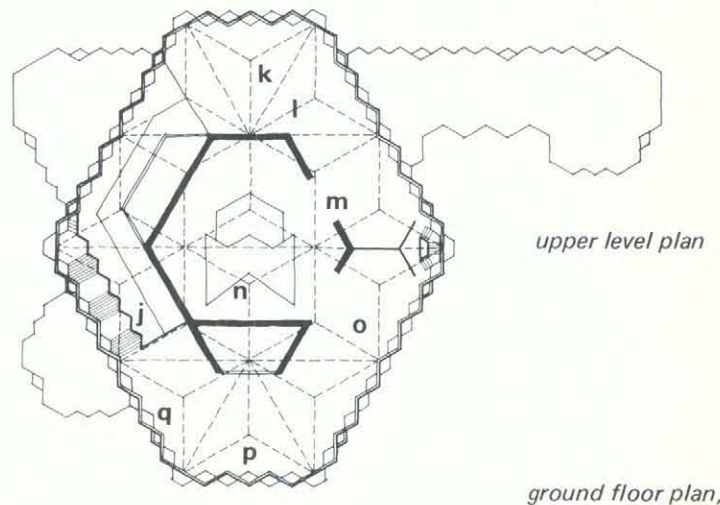
ed fibreglass panels of two basic shapes, approximately 6'-3" high x 8'-0" wide, bolted together and to steel angle framing.

- b. Location: Exterior wall.

c. Manufacturer or producer: Customold Fiberglass Ltd., Montreal.

- d. Nearest source of more information: Same.

16. COMMENTS – Design and detailing of the building were conducted to accommodate future dismantling and erection in Israel. The Parallelogram grid was adopted both inside and out in order to achieve a "cubist" effect, but no strongly distinctive pattern resulted. Perhaps this is due to the fact that the architects had to deviate from their original concept for what were understood to be economic reasons. Inside, the overall atmosphere was pleasant and traffic flow through the exhibits was well organized.





## ITALY

### A. GENERAL DATA

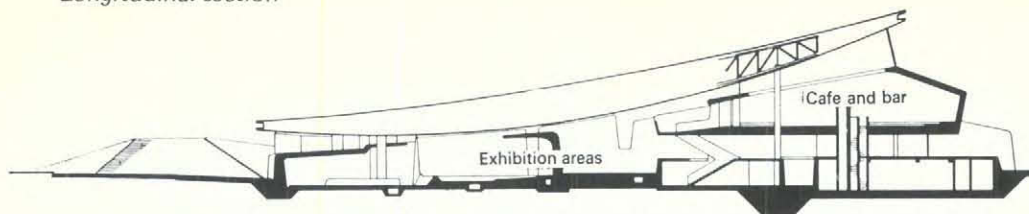
1. NATURE OF PAVILION/STRUCTURE — Temporary.
2. LOCATION — Expo Area: Ile Notre-Dame;  
Lot No. 4330;  
Key Plan No. 442.
3. OWNER (or contracting body) — Italian Government.
4. DESIGN ARCHITECT — F. Piro, A. Antonelli, Mr. Greco, Mrs. S. Rossi, Rome.
5. LOCAL ASSOCIATE ARCHITECT — Papineau, Gerin-Lajoie, Leblanc, Montreal.
7. LOCAL ASSOCIATE CONSULTING ENGINEERS —
  - a. Structural: Cartier, Coté, Piette, Boulva, Wermeling & Associates, Montreal.
  - b. Mechanical & electrical: Monti, Lavoie, Nadon & Associates, Montreal.
9. GENERAL CONTRACTOR — R.E. Stewart Const. Corp., Montreal.

### B. GENERAL DESCRIPTION OF PAVILION/STRUCTURE

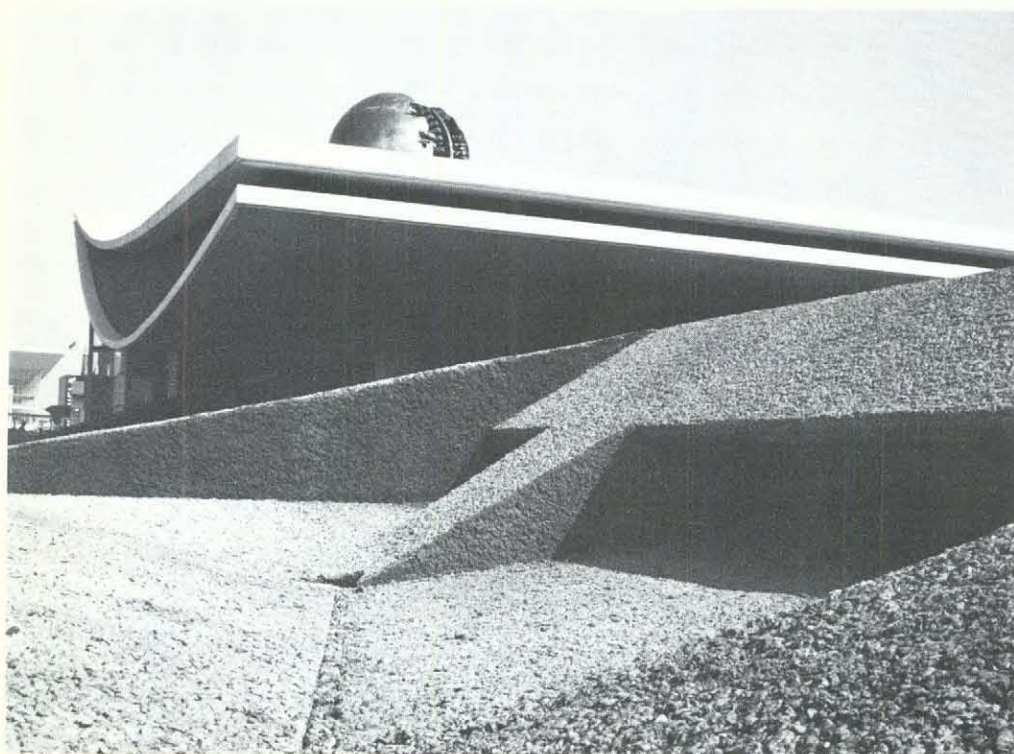
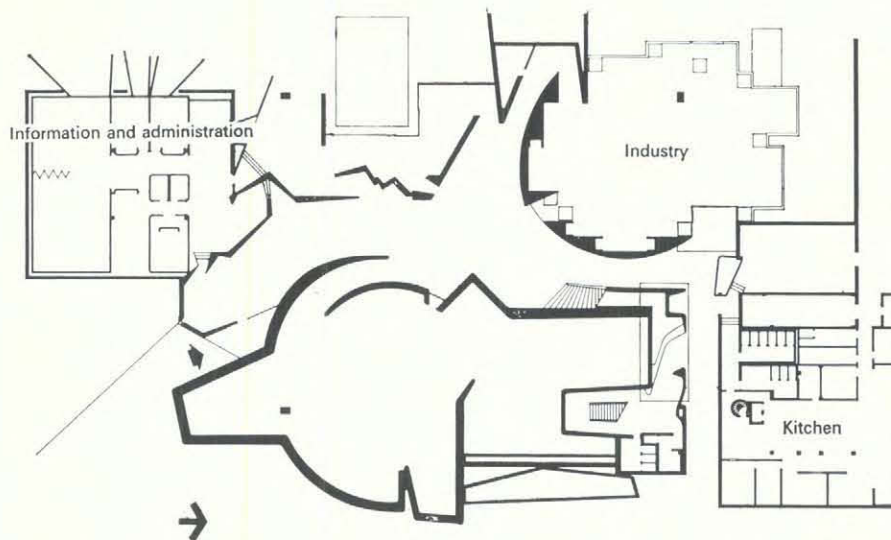
1. FUNCTIONAL DESCRIPTION — In addition to equipment rooms, a kitchen and administration offices, the pavilion contained four public sections housing exhibits and a 150 seat restaurant. All elements were covered by a continuously curving, rectangular roof supported by four columns (one at each corner).
2. DIMENSIONS —
  - a. Size: 288' x 156'.
  - b. Area: 32, 320 sq. ft.
  - c. Height: 50'.
  - d. Stories: One, with several levels.
3. FOUNDATIONS — Approximately 25' Franki expanded concrete base piles supporting building columns. Spread concrete footings supporting walls. Slabs at ground floor level were partly on grade, partly suspended.
4. STRUCTURE — Four structural steel columns sup-



*Longitudinal section*



*Plan*





ported the roof structure, which was framed with structural steel trusses.

5. WALLS & EXTERIOR CLADDING — The exterior walls were tapered and faced with a mixture of cement, marble chips and stone, applied to a metal lath, with a cement scratch coat for a base. The lath was supported by a B.C. Fir frame structure especially designed to carry the finish. Walls were uninsulated. (The wall framing system quickly proved to be inadequate and several leaks occurred soon after completion of the building.)

6. ROOF — Neoprene-hypalon roof on fiberboard insulated steel deck.

7. WINDOWS & ENTRANCES — Glass sheets, grey coloured, varying in thickness from 1/4" to 1/2" without mullions or framing. Sheets overlapped and were caulked with silicone sealant. Doors: top and bottom extruded aluminum frame members with 1/2" tempered glass, clear or grey coloured.

8. INTERIOR FINISHES —

- a. Floors: Same as exterior walls, though more smoothly finished, carpet (restaurant and administration).
- b. Walls: Same as exterior walls. 35% of the walls were sand finish plaster on metal lath on B.C. Fir trusses.
- c. Ceilings: Sand finish plaster on metal lath on roof structure, finished with neoprene-hypalon for exterior and hypalon paint on the interior.

9. MECHANICAL SYSTEMS —

- a. Plumbing: Standard commercial type fixtures of local manufacture.

- b. Heating, ventilation, air conditioning: Natural gas systems centrally located with distribution systems of hot air. Small area electrically heated. Direct fired systems without chimney. Gases were disposed of through roof cornices. Ventilation — free standing type air conditioning units in restaurant and administration, centrally located ventilation systems in exhibit areas.

- c. Kitchen: Gas and electrically heated standard stainless steel equipment.

- d. Other: Dumbwaiters bringing all food from kitchen to restaurant.

10. ELECTRICAL —

- a. Power: 75 H.P., 12 K.V.A. substation.

- b. Lighting: Incandescent and fluorescent.

12. FIRE PROTECTION — Standpipe system and fire alarm system; CO2 in kitchen.

14. EXTERIOR WORK (where part of the construction contract) — Paving similar to wall and floor finish on concrete slab on crushed stone fill.

16. COMMENTS — The pavilion had to be prepared in an extremely short time due to the fact that the Italian Government did not decide until very late to participate in Expo. As a result, it was constructed with only readily available materials which were not entirely suitable (leaking within wall structure). Nevertheless, the building was still of considerable interest, especially the stucco-like walls, both inside and out, which were very sculptural in their effect, although the solidity suggested was misleading.

## JAMAICA

### A. GENERAL DATA

1. NATURE OF PAVILION/STRUCTURE — Temporary.
2. LOCATION — Expo Area: Ile Notre-Dame;  
Lot No. 4100;  
Key Plan No. 418.
3. OWNER (or contracting body) — The Government of Jamaica.
4. DESIGN ARCHITECT — Bryan Elliott Limited, Montreal.
5. LOCAL ASSOCIATE ARCHITECT — George F. Eber, Montreal.
6. CONSULTING ENGINEERS —
  - a. Structural: G. Horvath & Associates, Montreal.
  - b. Mechanical & Electrical: Keith Associates Ltd., Westmount, Quebec.
8. OTHER CONSULTANTS — Bryan Elliott Ltd., Montreal (exhibition designers).
9. GENERAL CONTRACTOR — Bryan Elliott Ltd., Montreal.

### B. GENERAL DESCRIPTION OF PAVILION/STRUCTURE

1. FUNCTIONAL DESCRIPTION — Designed about the theme, "Tradition Inspires Tomorrow", the pavilion was a classic example of the Jamaican Inn of the late 18th and 19th centuries. It was divided into three main sections: an exhibit area, an outdoor patio and a refreshment area. At the perimeter of a courtyard were also located small thatched huts, reminiscent of the type found on old sugar plantations, which contained additional exhibits.
2. DIMENSIONS —
  - a. Size: 76' x 36' + string of huts.
  - b. Area: 4,452 sq. ft.
  - c. Heights: 26' + varying heights of huts.
  - d. Stories: Two (first floor built for appearance only, access to balcony for public not provided).
3. FOUNDATIONS — Spread concrete footing for concrete block foundation walls enclosing crawl space.
4. STRUCTURE — Wood columns and beams supported on foundation walls and piers for main Pavilion and





huts. Ground floor: wood joists and plywood sub-floor.

5. WALLS & EXTERIOR CLADDING – Plywood panels, Durotex Epoxy Finish, rough multi-coat application and concrete block, artificial coral finish.
6. ROOF – Cedar shingles on pitched roofs, standard 4-ply tar and gravel on flat roof.
7. WINDOWS & ENTRANCES – 1/4" polished plate glass fixed in wood frames; aluminum entrances.
8. INTERIOR FINISHES –
  - a. Floors: Vinyl asbestos tile.
  - b. Walls: Plywood panels, sand paint finish (exhibition and bar areas), gyproc painted, (toilets and kitchen areas).
  - c. Ceilings: Gypsum board, sand paint finish in exhibition areas.
9. MECHANICAL SYSTEMS –
  - a. Plumbing: Standard commercial type fixtures.

- b. Heating, ventilation, air conditioning: Two 10-ton capacity CHRYSLER air conditioning units equipped with condenser water to outside cooling tower located on the ground. Each unit equipped with TRANE gas fired duct heater 200,000 BTU/HR.

- c. Kitchen: Standard domestic type equipment.

- d. Other: Standard bar equipment.

#### 10. ELECTRICAL –

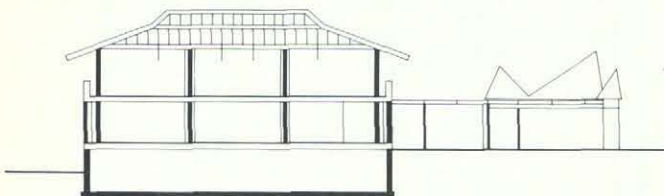
- a. Power: 12 KV sub-station located on the outside of pavilion.

- b. Lighting: Incandescent (exhibition areas and bar), fluorescent (toilets, kitchen and service areas).

#### 12. FIRE PROTECTION – Fire alarms, manual stations.

16. COMMENTS – In spite of there being no national architect for the pavilion, the project proceeded very well. Both design and construction were efficiently handled by Bryan Elliott Ltd. of New York.

*Section*



## JAPAN

### A. GENERAL DATA

1. NATURE OF PAVILION/STRUCTURE – Temporary.
2. LOCATION – Expo Area: Ile Sainte-Hélène;  
Lot No. 3100;  
Key Plan No. 325.
3. OWNER (or contracting body) – Government of Japan.
4. DESIGN ARCHITECT – Yashinobu Ashihara, Tokyo.
5. LOCAL ASSOCIATE ARCHITECT – Affleck, Desbarats, Dimokopoulos, Lebensold & Sise, Montreal.
6. CONSULTING ENGINEERS –
  - a. Structural: Takumi Orimoto, Tokyo.
  - b. Mechanical & Electrical: Keizo Inuzuka, Tokyo.
7. LOCAL ASSOCIATE CONSULTING ENGINEERS –
  - a. Structural: R.R. Nicolet & Associates, Montreal.

- b. Mechanical & Electrical: Cote, LeClair, Langlois, Boisvert and Associates, Montreal.

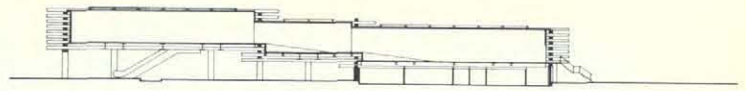
8. OTHER CONSULTANTS – Ken Nakajima, Landscape Architect, Tokyo. Helyar, Vermeulen, Rae & Mauchan, Quantity Surveyors, Montreal.
9. GENERAL CONTRACTOR – Taisei Construction Co. Ltd., Tokyo and Janin Construction Ltd., Montreal.
10. OTHER CONTRACTORS OF SPECIAL INTEREST – Frank & Norman Reg'd, Ville St. Laurent, Quebec.

### B. GENERAL DESCRIPTION OF PAVILION/STRUCTURE

1. FUNCTIONAL DESCRIPTION – The main pavilion building consisted of three exhibition halls, set at varying heights above an open ground level, within which traffic flow was carefully co-ordinated. Visitors were first taken to the highest level by escalator from which they then descended through the three exhibition areas, dedicated to "Life in Japan", "Art in Japan", and "Industry in Japan". Upon leaving the







*section through exhibition halls*

*key*

*a. activities area*

*b. sculpture*

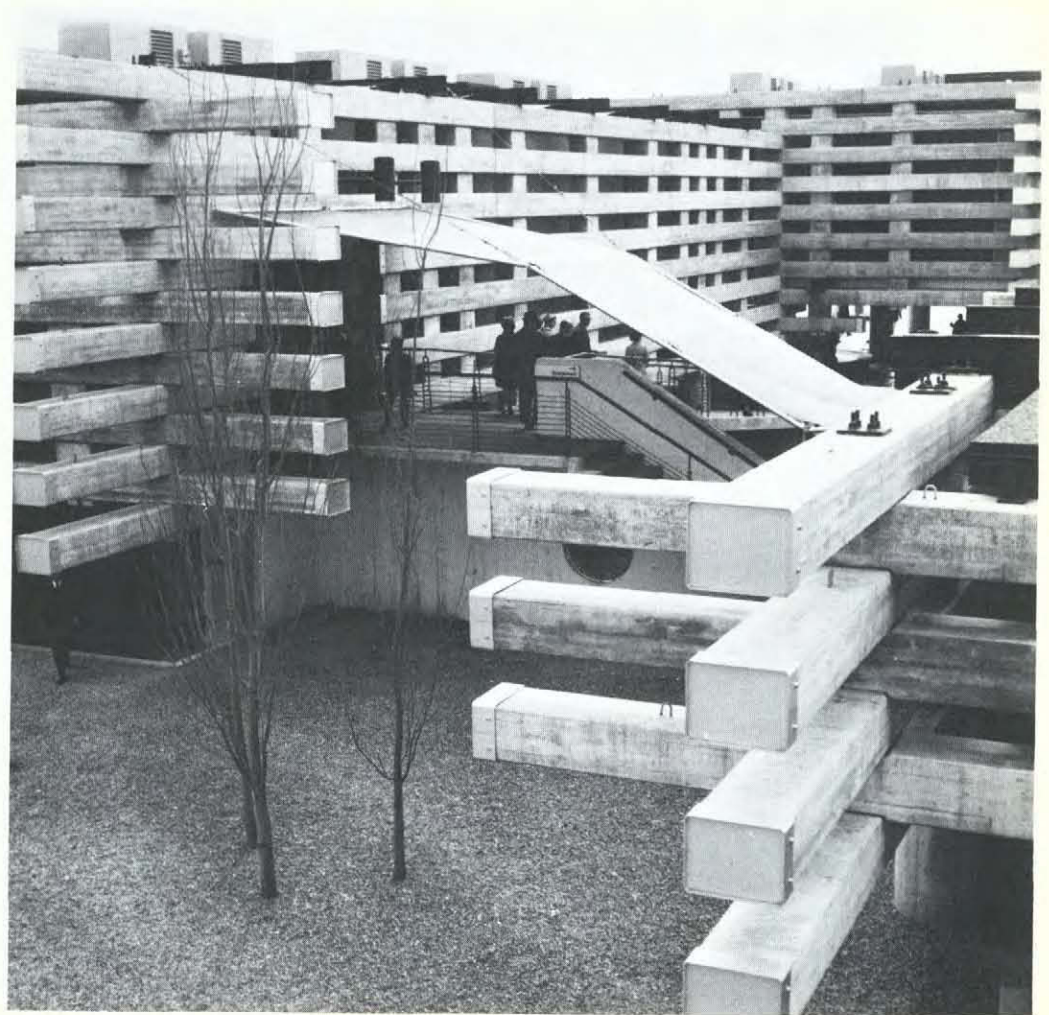
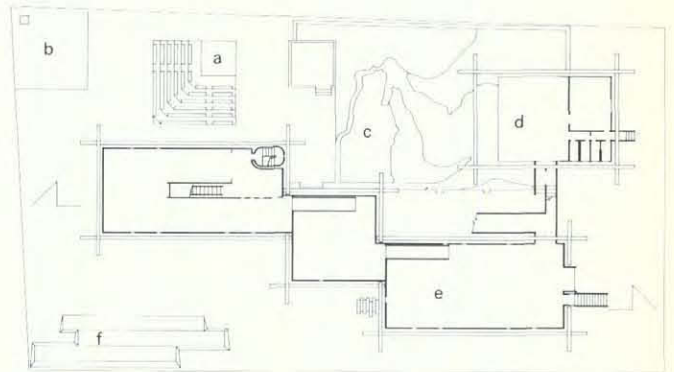
*c. garden*

*d. restaurant*

*e. administration*

*f. auto display*

*ground floor plan*



exhibition halls, visitors were able to visit a Japanese garden or a restaurant serving Japanese cuisine. Elevation of the main structure allowed full advantage to be taken of the panoramic view of the St. Lawrence River and the Montreal skyline.

## 2. DIMENSIONS —

- a. Size: 264' x 132'.
- b. Area: 27,000 sq. ft.
- c. Height: 35'-5".
- d. Stories: Two.

## 3. FOUNDATIONS — Reinforced concrete on expanded-bottom concrete piles.

## 4. STRUCTURE — Columns: cast-in-situ, reinforced concrete. Side-Walls: prefabricated, pre-stressed concrete girders (beams). Floor and roof: Steel beams, steel joists.

## 5. WALLS & EXTERIOR CLADDING — Exposed concrete girders (beams); secondary wall behind main structure: gypsum boards, supported by 2" x 4" wooden posts.

## 6. ROOF — Insulated wooden roof, supported by I-beams, consisting of 12' x 6" x 3" cedar panels and 1/2" plywood. Dupont Tedlar film roofing membrane waterproofing.

## 7. WINDOWS & ENTRANCES — Aluminum sash windows, pivoting around vertical axis. All windows can be opened. Aluminum frames and smoke-colored tempered glass.

## 8. INTERIOR FINISHES —

- a. Floors: Linoleum tile (exhibit areas and offices), rubber tile (restaurant).
- b. Walls: Stained, western, red-cedar, vertical boarding, exposed concrete block behind structural wall.
- c. Ceilings: Stained, western, red-cedar roof-deck exposed to interior; some areas painted black; perforated aluminum ceiling at ground floor level.

## 9. MECHANICAL SYSTEMS —

- a. Plumbing: Standard copper plumbing for wash-rooms, restaurant and kitchen.

- b. Heating, ventilation, air conditioning: Fan ventilated exhibit areas; intake from roof units: 1850 cfm — 24 units. Restaurant air conditioned: Cooling capacity 160,000 Btu/hr., heating capacity 204,000 Btu/hr., air quantity 4,500 cfm.

- c. Kitchen: 2 gas ranges, one electric range (ultra-microwave), one gas rice boiler, 4 sinks and dishwasher, 2 refrigerators.

## 10. ELECTRICAL —

- a. Power: 350 KVA.
- c. Audio-visual systems: Telephone.

## 11. SPECIAL TRAFFIC CONVEYING EQUIPMENT — One escalator at main entrance from ground floor to second floor.

## 12. FIRE PROTECTION — Wall wood-boarding treated with fire-retardant.

## 13. SAFETY FEATURES — Fire-alarm system, emergency telephones to Expo Fire Marshall, police alarm.

## 14. EXTERIOR WORK (where part of the construction contract) — Landscaped Japanese Garden in front of main exit door.

## 15. OTHER ITEMS OF PARTICULAR INTEREST — Concrete wall girders —

- a. Brief description: Precast, prestressed, post-tensioned (Leoba method), concrete girders (beams) shipped from Japan (largest was 40' x 1'6" x 1'4"). Entire structure of each wall acted as one beam.
- b. Location: Exterior walls.
- c. Manufacturer or Producer: Taisei Construction Co. Ltd., Tokyo.
- d. Nearest source of more information: Takumi Orimoto, Consulting Engineer, Tokyo.

## 16. COMMENTS — The overall form of this completely demountable building was derived from the ancient wood constructions of northern Japan. Of particular interest were the prefabricated, concrete wall girders which were shipped, individually wrapped, from Tokyo. The carefully planned garden reflected typical Japanese landscaping ingenuity. Its openness, however, was in contrast to the generally limited and tightly enclosed spaces which have come to be associated with that country's landscape architecture.



## KINDERGARTEN OF THE CITY OF VIENNA

### A. GENERAL DATA

1. NATURE OF PAVILION/STRUCTURE — Temporary.
2. LOCATION — Expo Area: Ile Sainte-Hélène;  
Key Plan No. 338.
3. OWNER (or contracting body) — City of Vienna.
4. DESIGN ARCHITECT — Dr. Karl Schwanzer,  
Vienna.
5. LOCAL ASSOCIATE ARCHITECT — Victor Prus,  
Montreal.
6. CONSULTING ENGINEERS — Unknown.
7. LOCAL ASSOCIATE CONSULTING ENGINEERS —  
c. Electrical: Pageau & Morel, Montreal.
9. GENERAL CONTRACTOR — The Tower Company  
(1961) Limited, Montreal.

### B. GENERAL DESCRIPTION OF PAVILION/STRUCTURE

1. FUNCTIONAL DESCRIPTION — Consisting of simple cube and cylinder (e.e. column) shapes, this complex functioned as an activity area (for both play and rest) geared to pre-school and "kindergarten" age children. Provided were play areas, a visitors' room, a nursery, a children's wardrobe, offices and storage space.

### 2. DIMENSIONS —

- a. Size: 97' x 42'.
- b. Area: 2,400 sq. ft. on existing wading pool.
- c. Height: 18' max.
- d. Stories: One.

3. FOUNDATIONS — Wood post on concrete fill slabs in an existing wading pool.

4. STRUCTURE — Wood: Structural grade B.C. Fir beams and plywood stressed panels.

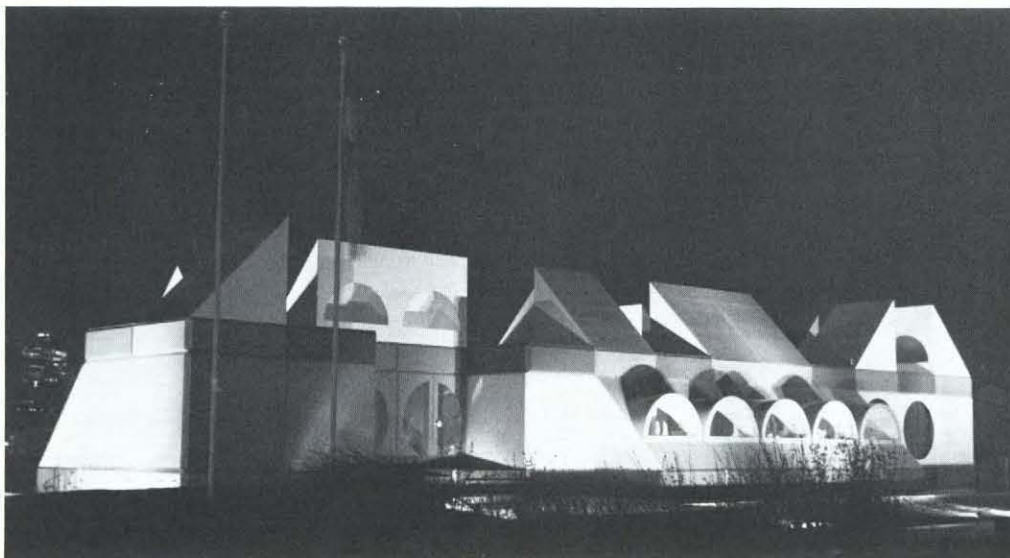
5. WALLS & EXTERIOR CLADDING — Painted plywood.

6. ROOF — Stressed panels of B.C. Fir plywood nailed to spruce studs with vapour barrier (neoprene-hypalon).

7. WINDOWS & ENTRANCES — Prefabricated plywood window panels for circular windows (with plexiglass acrylic sheet panes). Doors: Birch veneer, natural finish.

### 8. INTERIOR FINISHES —

- a. Floors: Vinyl asbestos floor tile, felt backed sheet vinyl.
- b. Walls: Painted plywood.



c. Ceilings: Exposed T. & G. planking.

9. MECHANICAL SYSTEMS —

a. Plumbing: Standard.

b. Heating, ventilation, air conditioning: Air-temp packaged heat pump, air-cooled type. Cooling capacity of 55,300 BTU per hour with air entering at 63°F WB, outside air 90°F DB; Heating capacity of 47,000 BTU, outside air, 30°F DB.

c. Kitchen: Domestic type.

10. ELECTRICAL —

a. Power: 115/230 volt underground electric entrance.

b. Lighting: 115/230 volt, single phase, 3 wire.

13. SAFETY FEATURES — Panic bolts on exterior doors.

14. EXTERIOR WORK (where part of the construction contract) — Landscaping; grass; shrubs; extensive children's games (i.e. tubes, slides, climbing apparatus, swings and see-saws, etc.).

16. COMMENTS — Special emphasis was placed on the modular appearance of the building. All elements were smoothly finished and painted in bright primary colors in order to resemble children's construction blocks.



*Korea*



## KOREA

### A. GENERAL DATA

1. NATURE OF PAVILION/STRUCTURE — Temporary.
2. LOCATION — Expo Area: Ile Sainte-Hélène;  
Lot No. 3220;  
Key Plan No. 347.
3. OWNER (or contracting body) — Korea Trade Promotion Corporation, Montreal.
4. DESIGN ARCHITECT — Mr. Kim Swoo Geun,  
Seoul, Korea.
5. LOCAL ASSOCIATE ARCHITECT — Blais et Belanger,  
Montreal.
6. CONSULTING ENGINEERS —
  - a. Structural: Belanger, Wolfe & Associates,  
Montreal.
  - b. Mechanical & Electrical: Monarque, Morelli,  
Gaudette & Laporte, Montreal.
9. GENERAL CONTRACTOR — T.G.A. Construction,  
Montreal.

### B. GENERAL DESCRIPTION OF PAVILION/STRUCTURE

1. FUNCTIONAL DESCRIPTION — Built entirely of wood, the pavilion consisted of two elements, a rectangular building and an entrance tower. Inside the former one main exhibition hall contained national art treasures and other exhibits.
2. DIMENSIONS —
  - a. Size: 68' x 68'.
  - b. Area: 4,624 sq. ft.
  - c. Height: 20' (building), 40' (tower).
  - d. Stories: One.
3. FOUNDATIONS — Concrete reinforced spread footings.
4. STRUCTURE — Laminated wood except for structural steel columns.
5. WALLS & EXTERIOR CLADDING — Wood and Plywood.

6. ROOF — 4 ply tar and gravel on plywood.
7. WINDOWS & ENTRANCES — Glass set directly into walls. Aluminum, standard black anodized entrances.
8. INTERIOR FINISHES —
  - a. Floors: vinyl tile and cork tile.
  - b. Walls: Silk fabric over gyproc.
  - c. Ceilings: Fabric over gyproc (upper); latticed bush clover sheets over plywood (bamboo) (lower).
9. MECHANICAL SYSTEMS —
  - a. Plumbing: Standard commercial type.
  - b. Heating, ventilation, air conditioning: Heating, gas fired hot air system and roof ventilation exhausts.
10. ELECTRICAL —
  - a. Power: 70 K.V. 90% of which was for lighting.
  - b. Lighting: Fluorescent, incandescent and emergency lighting.
12. FIRE PROTECTION — Stand pipe, one cabinet.
15. OTHER ITEMS OF PARTICULAR INTEREST — Round beams.
  - a. Brief description: Made of laminated wood.
  - b. Location: Exterior walls.
  - c. Manufacturer or producer: Standard Laminated Structures, Penticton, B.C.
  - d. Nearest source of more information: Same.
16. COMMENTS — Well situated on the site, this ingenious little pagoda type pavilion was simply designed within Korean architectural traditions. It was completely constructed of clearly defined, laminated wood members. (of which there were perhaps an over abundance) except for the eight, supporting structural steel columns which were wrapped in sono-tubes and covered with plywood. Occasional difficulties were experienced in finding manufacturers for some of the building's non-standard components.

## (STATE OF) MAINE

### A. GENERAL DATA

1. NATURE OF PAVILION/STRUCTURE — Temporary.
2. LOCATION — Expo Area: Ile Sainte-Hélène;  
Lot No. 3240;  
Key Plan No. 333.
3. OWNER (or contracting body) — State of Maine, Department of Economic Development.
4. DESIGN ARCHITECT — William O. and Robert E. Armitage, Portland, Maine.
5. LOCAL ASSOCIATE ARCHITECT — Rosen, Caruso & Vecsei, Montreal.
6. CONSULTING ENGINEERS — All consulting work was conducted by the architects.
9. GENERAL CONTRACTOR — Hegemann Harris Company of Canada Ltd., Montreal.
10. OTHER CONTRACTORS OF SPECIAL INTEREST — Francon (1966) Ltd., Montreal (precast concrete).

### B. GENERAL DESCRIPTION OF PAVILION/STRUCTURE

1. FUNCTIONAL DESCRIPTION — The pavilion was a loft-type, single story exhibition building designed in Colonial style, with a balcony office and VIP lounge area.
2. DIMENSIONS —
  - a. Size: 90' x 80'-6".
  - b. Area: 8,500 sq. ft.

c. Height: 33'.

d. Stories: One.

3. FOUNDATIONS — Reinforced concrete foundation walls on spread footings, concrete slab on grade.
4. STRUCTURE — Walls and roof of giant, pre-stressed concrete T-sections.
5. WALLS & EXTERIOR CLADDING — Exposed concrete painted.
6. ROOF — Built up roofing over concrete deck.
7. WINDOWS & ENTRANCES — Sheet glass in wood window frames; wood entrance doors.
8. INTERIOR FINISHES —
  - a. Floors: Carpet.
  - b. Walls: Vinyl covered drywall.
  - c. Ceilings: Suspended decorative acrylic plastic.

### 9. MECHANICAL SYSTEMS —

- a. Plumbing: Standard; electric domestic hot water tank.
- b. Heating, ventilation, air conditioning: Two domestic thru-wall A.C. units in offices; 3 package A.C. units @ 4,000 cfm for exhibition area with distribution ductwork to ceiling linear diffusers; electric heating coils in A.C. units; roof fan ventilation.

### 10. ELECTRICAL —

- a. Power: 12,000 V, 2 feeder service entry, step down to 120/208V service with 2-12.5 KVA transformers.
- b. Lighting: Fluorescent
12. FIRE PROTECTION — Heat detection and manual station fire alarm system; extinguishers.
13. SAFETY FEATURES — Battery operated emergency lighting.
14. EXTERIOR WORK (where part of the construction contract) — Landscaping, picket fence, incandescent floodlighting, model railroad track.





## MAURITIUS

### A. GENERAL DATA

1. NATURE OF PAVILION/STRUCTURE — Temporary.
2. LOCATION — Expo Area: Ile Notre-Dame;  
Lot No. 4428;  
Key Plan No. 419.
3. OWNER (or contracting body) — Canadian Corporation for the 1967 World Exhibition.
4. DESIGN ARCHITECT — J.F. DuVernet & F.A. Dawson, Montreal.
6. CONSULTING ENGINEERS —
  - a. Structural: E.V. Leon, Montreal.
  - b. Mechanical & electrical: C.D. Howe Co. Ltd., Montreal.
9. GENERAL CONTRACTOR — Pare & Quart Ltd., Montreal.

### B. GENERAL DESCRIPTION OF PAVILION/STRUCTURE

1. FUNCTIONAL DESCRIPTION — A circular, tent-like structure, this pavilion housed a simple one-room exhibition area.
2. DIMENSIONS —
  - a. Size: 30'-6" radius.
  - b. Area: 1,600 sq. ft.
  - c. Height: 55' to top of mast.
  - d. Stories: One.
3. FOUNDATIONS — Concrete deadmen for cable anchorage.
4. STRUCTURE — Central steel mast and columns with galvanized steel roof supporting cables to tension ring to foundations
5. WALLS & EXTERIOR CLADDING — Wood studs, plywood two sides, painted.
6. ROOF — Translucent "Facilon" (vinyl coated nylon), distributed by LaSalle Canvas & Rope Reg'd, Montreal, Quebec.



7. WINDOWS & ENTRANCES — No windows. Two wood framed doors, glazed.

8. INTERIOR FINISHES —

a. Floors: Concrete painted.

b. Walls: Plywood painted.

9. MECHANICAL SYSTEMS —

a. Plumbing: No washrooms but drinking fountain and drain were installed.

b. Heating, ventilation, air conditioning: No heating, ventilation or air conditioning.

10. ELECTRICAL —

a. Power: 30 KVA transformer, 3 phase, 4 wire 110/208 Volt.

b. Lighting: Incandescent.

12. FIRE PROTECTION — Portable extinguishers.

13. EXTERIOR WORK (where part of the construction contract) — Concrete sidewalks and steps.

14. OTHER ITEMS OF PARTICULAR INTEREST —

a. Brief description: Steel cable structure.

b. Location: Pavilion roof.

c. Manufacturer or producer: Pare & Quart Ltd., Montreal.

d. Nearest source of more information: Same.

16. COMMENTS — A simple and economical, but attractive exhibition structure.

*Mexico*





## MEXICO

### A. GENERAL DATA

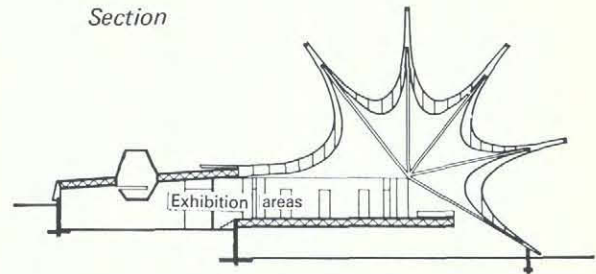
1. NATURE OF PAVILION/STRUCTURE – Temporary.
2. LOCATION – Expo Area: Ile Notre-Dame;  
Lot No. 4063;  
Key Plan No. 465
3. OWNER (or contracting body) – The Ministry of Industry & Commerce, Mexico.
4. DESIGN ARCHITECT – Antonio Garcia-Corona, Leonardo Favela Rey and Federico Muggenburg, Mexico City.
5. LOCAL ASSOCIATE ARCHITECT – André Brouillet and Henri Brillon, Montreal.
6. CONSULTING ENGINEERS –
  - a. Structural: Francisco Castono & Douglas Wright, Mexico City.
7. LOCAL ASSOCIATE CONSULTING ENGINEERS –
  - a. Structural: Douglas Wright, Mexico City.
  - b. Mechanical & electrical: Larocque, Sanon, Geurette & Brillon, Montreal.
9. GENERAL CONTRACTOR – Constructora d'ARQ-SA', Mexico City.
10. OTHER CONTRACTORS OF SPECIAL INTEREST – Secant Construction Co., Ville d'Anjou, Quebec

(foundations) and Nantais Construction Ltée., Repentigny, Quebec (structural wood).

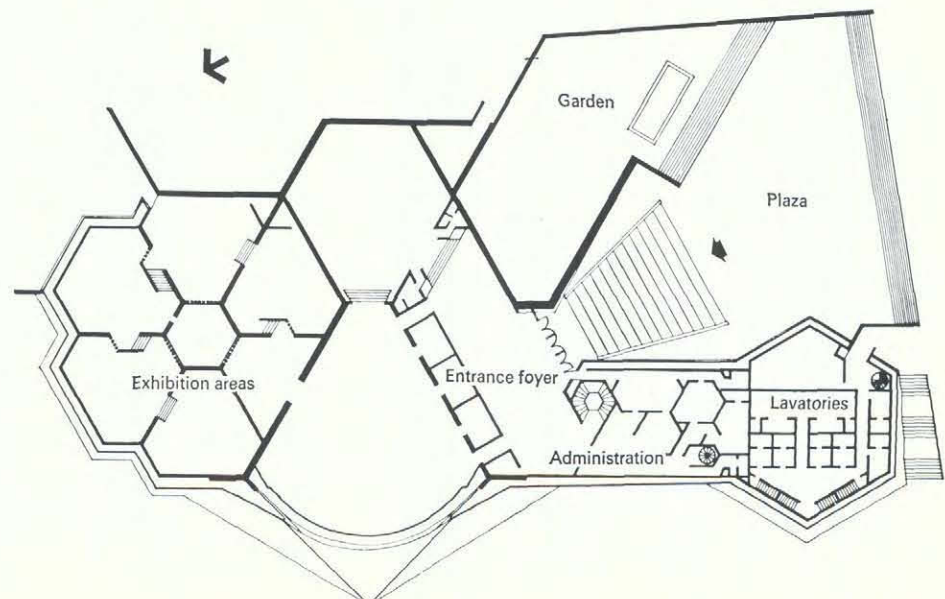
### B. GENERAL DESCRIPTION OF PAVILION/STRUCTURE

1. FUNCTIONAL DESCRIPTION – The pavilion consisted of two main parts. The first was an enclosed exhibition area surmounted by a giant multiwinged, soaring shell; the second, an open area designed in the form of an Aztec amphitheatre. On the right of the plaza-like entrance to the covered exhibition halls was a replica in stone of the Eastern Facade of the "Nuns Court" at Uxmal, Yucatan. This was in the form of an arch and led into a sculpture garden where monoliths of Mexican antiquity were exhibited. Opposite the arch and in front of the facade of the main building were a contemporary sculpture in metal and two, large baroque stone archangels, playing musical instruments, copies of two sculptures which decorate the dome of the 18th century church of San Augustin, Mexico.

*Section*



*Floor plan*



2. DIMENSIONS —

- a. Size: 100' x 200'.
- b. Area: 20,000 sq. ft.
- c. Height: 70' (shell).
- d. Stories: Two.

3. FOUNDATIONS — Reinforced concrete spread footings, two reinforced concrete piles supported the parabolic — hyperbolic structure.

4. STRUCTURE — Tubular aluminum Triodetic Structure of Mexico under patent of Canadian Company in Ottawa (Triodetic Structures).

5. WALLS & EXTERIOR CLADDING — Plywood panels painted white acrylic paint.

6. ROOF — Plywood panel painted white acrylic paint.

7. WINDOWS & ENTRANCES — No windows; standard herculite 1/2" thick main entrance doors. Standard anodized aluminum entrances to the restaurant.

8. INTERIOR FINISHES —

- a. Floors: Ozite carpeting, painted monolithic concrete floors (basement).

b. Walls: Gyproc painted.

c. Ceilings: Exposed structure & plywood panels painted black.

9. MECHANICAL SYSTEMS —

- a. Plumbing: Standard Commercial type fixtures.
- b. Heating, ventilation, air conditioning: Hot air for restaurant and bar section. Exhaust system elsewhere.
- c. Kitchen: Standard commercial equipment.

10. ELECTRICAL —

- a. Power: 12 KV sub-station unit.
- b. Lighting: Incandescent, fluorescent (administration and services areas).

12. FIRE PROTECTION — Manual fire stations and three fire hose cabinets, stand pipe system. Interior wood painted with fire retardant paint.

16. COMMENTS — This parabolic-hyperbolic structure appeared most successful when viewed from the back. Inside, however, the unsuitability of the triodetic system for this form could not be disguised, even with the interior surfaces painted black.

Monaco





## MONACO

### A. GENERAL DATA

1. NATURE OF PAVILION/STRUCTURE – Temporary
2. LOCATION – Expo Area: Ile Notre-Dame;  
Lot No.: 4224;  
Key Plan No.: 422.
3. OWNER (or contracting body) – Government of Monaco.
4. DESIGN ARCHITECT – Papineau, Gérin-Lajoie, Leblanc, Montreal.
6. CONSULTING ENGINEERS –
  - a. Structural, mechanical and electrical: Di Zazzo Martinoli Vigneault, Montreal.
9. GENERAL CONTRACTOR – Duroc Construction, Montreal.

### B. GENERAL DESCRIPTION OF PAVILION/STRUCTURE

1. FUNCTIONAL DESCRIPTION – This pavilion, open on the sides, consisted of several interlocking towers surrounding a garden-cinema, which was covered by canvas parasols. The only completely enclosed areas were V.I.P. rooms and service facilities.
2. DIMENSIONS –
  - a. Size: Construction area, 110' x 60'.
  - b. Area: 6,600 sq. ft.
  - c. Height: 27' - 6".
  - d. Stories: two levels.
3. FOUNDATIONS – Concrete spread footings on grade with concrete block foundation walls where required.
4. STRUCTURE – Concrete block bearing walls, interior and exterior.
5. WALLS & EXTERIOR CLADDING – Stucco on concrete block walls, interior and exterior.
6. ROOF – Steel deck on open web steel joists over V.I.P. rooms with tar and gravel roofing. 3/4" plywood on Spruce joists, with tar and gravel roofing, over service areas. In Cinema area, structural steel parasols with canvas inserts.
7. WINDOWS & ENTRANCES – 1/4" clear plate glass set in steel angles and masonry. Wood frames and plastic laminate clad, solid core doors.
8. INTERIOR FINISHES –
  - a. Floors: Carpet (V.I.P. area), exposed concrete (service areas).
  - b. Walls: Stucco on concrete block.
  - c. Ceilings: Metal suspension system with gypsum plaster on metal lath.
9. MECHANICAL SYSTEMS –
  - a. Plumbing: Standard fixtures in two washrooms for staff and V.I.P.
  - b. Heating, ventilation, air conditioning: Baseboard type electric heating; gas fired, roof top, air conditioning unit (V.I.P. areas); roof mounted air handling units.
  - c. Kitchen: Small kitchenette with refrigerator, hot plate and sink in V.I.P. area.
10. ELECTRICAL –
  - a. Power: 600 Volt entrance from Expo general power supply.
  - b. Lighting: Exterior and interior Incandescent.
  - c. Audio-visual systems: Part of exhibits.
12. FIRE PROTECTION – Portable fire extinguishers.
14. EXTERIOR WORK (where part of the construction contract) – Preparation of open areas for landscaping, concrete walks and local vegetation.
16. COMMENTS – A limited budget eliminated the possibility of a completely enclosed building. As a result, a covered garden of considerable interest was provided with only service areas enclosed.

## MOROCCO

### A. GENERAL DATA

1. NATURE OF PAVILION/STRUCTURE — Temporary.
2. LOCATION — Expo Area: Ile Notre-Dame;  
Lot No.: 4274;  
Key Plan No.: 467.
3. OWNER (or contracting body) — Canadian Corporation for the 1967 World Exhibition.
4. DESIGN ARCHITECT — Mourad Ben Barek, Rabat, Morocco.
5. LOCAL ASSOCIATE ARCHITECT — C.R. Anderson, Quebec City.
6. CONSULTING ENGINEERS —
  - a. Structural: Piette, Beaudy, Lepinay, Bertrand & Lemieux, Quebec City.
  - b. Mechanical and Electrical: Boulay & Leclerc, Quebec City.
9. GENERAL CONTRACTOR — R.E. Stewart Construction Corporation, Montreal.

### B. GENERAL DESCRIPTION OF PAVILION/STRUCTURE

1. FUNCTIONAL DESCRIPTION — Designed within the Arab tradition, the pavilion consisted of a square exhibition building (with adjoining service and administration wings) and a minaret.
2. DIMENSIONS —
  - a. Size: 73'-6" square exhibition building with two 19' square wings (service and administration) and a 13'-6" square minaret.
  - c. Height: 18'-6" building, 55'-0" plus minaret.
  - d. Stories: One.

3. FOUNDATIONS — Spread concrete footings and concrete walls.
4. STRUCTURE — Wood: Plywood frames with steel reinforcement.
5. WALLS & EXTERIOR CLADDING — Plywood panels with rough cast paint finish.
6. ROOF — 4 ply tar and gravel.
7. WINDOWS & ENTRANCES — Aluminum fixed sash, standard aluminum entrance doors.
8. INTERIOR FINISHES —
  - a. Floors: Parquette.
  - b. Walls: 1" gypsum board laminated.
  - c. Ceilings: 1" gypsum board laminated.
9. MECHANICAL SYSTEMS —
  - a. Plumbing: Standard fixtures and plumbing, electrical hot water tank.
  - b. Heating, ventilation, air conditioning: 4 trane A/C units on wing roofs, 60,600 BTU each capacity with electrical heating coils 5 KW 208 V; 3 exhaust fans.
10. ELECTRICAL —
  - a. Power 12000 V to transformer 150 KVA to 120/208 V.
  - b. Lighting: Incandescent.
12. FIRE PROTECTION — Fire extinguishers, Standard CCWE fire alarm system.
16. COMMENTS — This was the best pavilion of the Arab nations' group. Fairly conventional internally, it possessed, like the others, a somewhat cardboardy exterior.



## NETHERLANDS

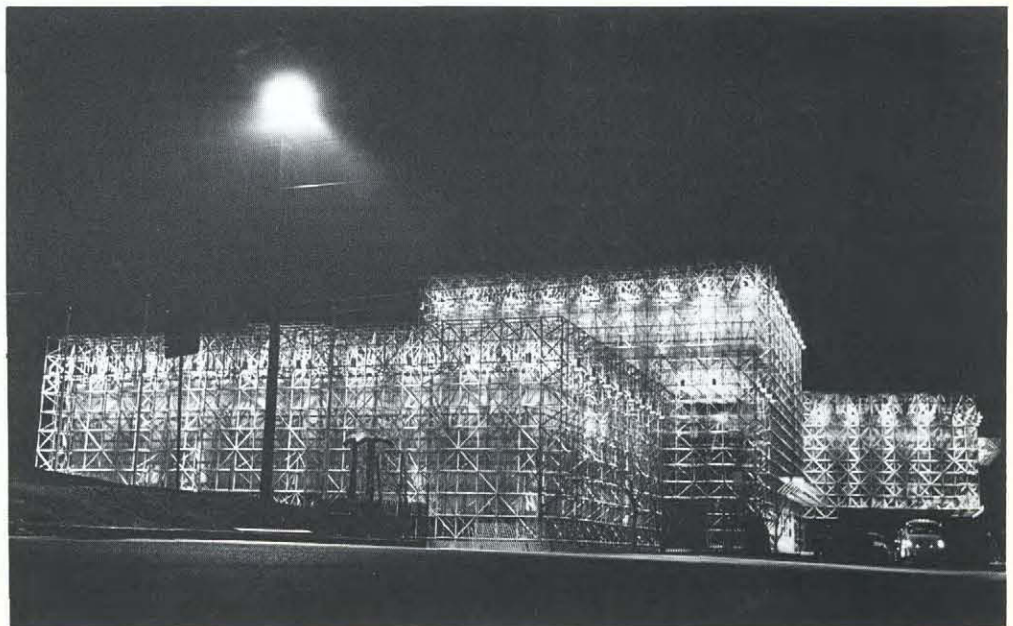
### A. GENERAL DATA

1. NATURE OF PAVILION/STRUCTURE — Temporary.
2. LOCATION — Expo Area: Ile Sainte Hélène;  
Lot No. 3090;  
Key Plan No. 310.
3. OWNER (or contracting body) — Government of Netherlands (The Netherlands Foundation for the Montreal 1967 World Exhibition).
4. DESIGN ARCHITECT — W. Eijkelenboom & A. Middelhoek, Rotterdam.
5. LOCAL ASSOCIATE ARCHITECT — George F. Eber, Montreal.
7. LOCAL ASSOCIATE CONSULTING ENGINEERS —
  - a. Structural: C.B.A. Engineering Limited, Vancouver.
  - b. Mechanical & Electrical: Ellard-Willson & Associates Limited, Toronto.
8. OTHER CONSULTANTS — Dr. D. T. Wright, University of Waterloo (special structural consultant to C.B.A. Engineering Limited).
9. GENERAL CONTRACTOR — Argo Construction Limited, Montreal.

10. OTHER CONTRACTORS OF SPECIAL INTEREST — F. Fentiman and Sons Limited, Ottawa (spaceframe manufacturers); Canadian Iron and Foundries Limited, Ottawa (spaceframe erectors).

### B. GENERAL DESCRIPTION OF PAVILION/STRUCTURE

1. FUNCTIONAL DESCRIPTION — The building consisted of three main exhibition hall volumes located at different levels and fully expressed on the exterior. In addition, there were several exterior exhibit areas including a wave pool and market place. Main building elements were enclosed within a cocoon-like structure of aluminum tubing.
2. DIMENSIONS —
  - a. Size: 243' x 153' (overall dimensions); volumes measure 133' x 228', 209' x 152' and 171' x 171'.
  - b. Area: 27,000 sq. ft.
  - c. Height: 62'.
  - d. Stories: Partial basement plus 2 stories (at different floor levels).
3. FOUNDATIONS — Concrete piles and reinforced concrete foundations.



4. STRUCTURE — Reinforced concrete basement and ground floor with *limited* amount of structural steel; combination aluminum spaceframe and structural steel superstructure above grade; precast lightweight concrete floor slabs.
5. WALLS & EXTERIOR CLADDING — Cement-asbestos board panels (walls are sandwich type consisting of cement-asbestos on exterior and gypsum board inside with 2" of batt insulation attached to wood framing); Dutch brick to base walls.
6. ROOF — Cold process (Flintkote) built up roofing (no gravel) over steel roof deck.
7. WINDOWS & ENTRANCES — Plate glass in painted wood frames (windows), tempered glass in aluminum frames (entrances).
8. INTERIOR FINISHES —
  - a. Floors: Vinyl asbestos floor tile (staff areas, public washrooms, pantry), exposed concrete (mechanical room), brick (cultural area), carpet (from Holland) (administration and exhibition areas).
  - b. Walls: Painted drywall throughout with the exception of basement exposed concrete foundation walls and concrete block in mechanical room.
  - c. Ceilings: Painted drywall throughout with the exception of basement exposed concrete in mechanical room; plastic luminous ceiling in reception area.
9. MECHANICAL SYSTEMS —
  - a. Plumbing: Standard; electric hot water system.
  - b. Heating, ventilation, air conditioning: Conventional low pressure package air-handling equipment and distribution ductwork A.C. system from central mechanical room in basement. Refrigeration equipment included a reciprocating compressor and water-cooled condenser utilizing water from the lake (total capacity; 108T). Heating was provided by electric heating coils in ductwork and auxiliary electric baseboard heaters in administration offices. Ventilation was part of A.C. system with separate exhaust fans for washrooms and kitchenette.
  - c. Kitchen: Domestic type for staff only.
  - d. Other: Plumbing to wave pool.
10. ELECTRICAL —
  - a. Power: 12,000V, 2 feeder service entrance, manual transfer switch, step down to 120/208V service with a 600 KVA dry core transformer.
  - b. Lighting: Incandescent for general illumination and exterior floodlighting, fluorescent for service areas, washrooms and reception area luminous ceiling.
  - c. Audio-visual systems: Part of exhibits contract.
  - d. Other: Wiring to carillon and exterior free standing pylon sign.
11. SPECIAL TRAFFIC CONVEYING EQUIPMENT — Two separate escalators; one rising 15', the other 16'-6".
12. FIRE PROTECTION — Extinguishers and smoke detector in mechanical room.
13. SAFETY FEATURES — Battery operated emergency lighting system.
14. EXTERIOR WORKS (where part of the construction contract) — Brick (from Holland) paving to terraces and base; flagpoles; wave pool including installation of wave making machine; pylon sign; landscaping.
15. OTHER ITEMS OF PARTICULAR INTEREST — ALUMINUM SPACEFRAME —
  - a. Brief description: Aluminum tubes joined by the "Triodetic" system. The connection consisted of extruded aluminum slotted hubs into which the quoined ends of the tubes were inserted.
  - b. Location: The entire exterior of the building.
  - c. Manufacturer or producer: F. Fentiman & Sons Limited, Ottawa.
  - d. Nearest source of more information: Same.
16. COMMENTS —
  - a. General: Although totally demountable, this pavilion happily combined permanence of structure with light exhibition type design. In many ways, from general conception to the incorporation of small courtyards, it was typically Dutch in character.

Emphasizing Holland's relationship to water, the pavilion faced onto an artificial lake. In addition, it contained a long rectangular wave pool in which waves were created and directed against a



*key*

*a. entrance*

*b. wave pool*

*c. historical*

*d. traditional Holland*

*e. land reclamation*

*g. Bird's Eye View (film)*

*f. escalator*

*h. gateway to Europe*

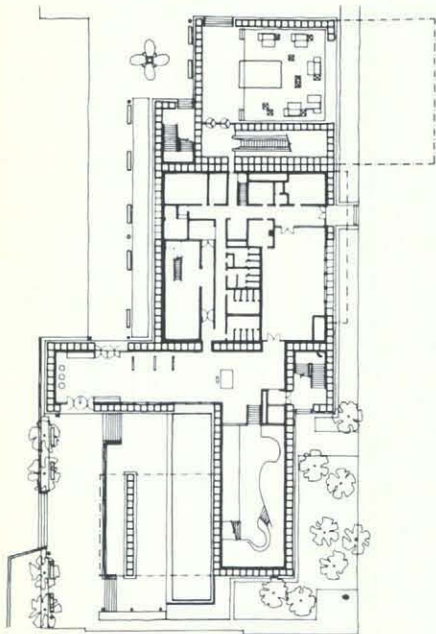
*i. Ducth Industry (film)*

*j. industrial and social*

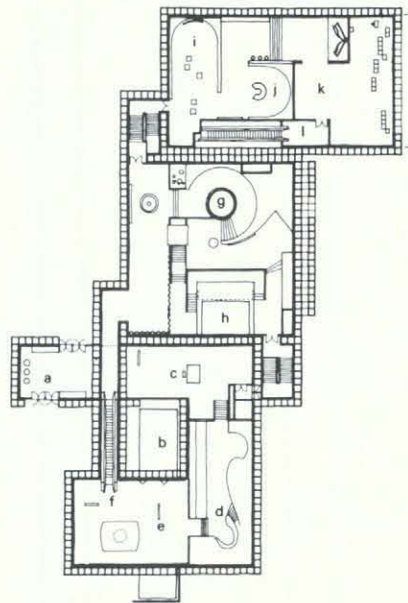
*k. House of Orange-Nassau*

*l. exit*

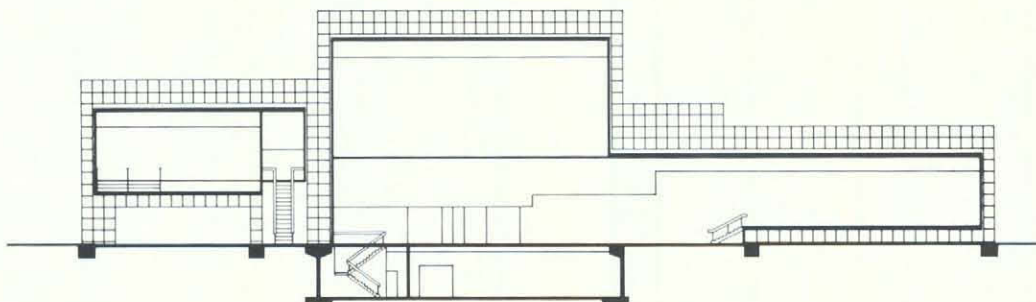
*ground floor plan*



*upper level plan*



*Section*



simulated dike for special sound effect purposes. Approximate cost was \$39. per sq. ft.

- b. Aluminum spaceframe: The aluminum spaceframe structure was both structurally and aesthetically important. This was readily evident upon inspection of the manner in which its walls, floor, and roofs completely enclosed the building volumes within a decorative, lattice-patterned framework. In the process, the actual exterior walls inside the frame were literally negated aesthetically and, in that regard, served only to emphasize the depth of the structural system. The boldest aspect of the structure was the 45' cantilevered section overlooking the St. Lawrence River. Exterior detailing was meticulous.

The system is very easy to erect requiring no special tools or labour. If properly co-ordinated during the manufacturing and erection stages, construction can be quickly accomplished.

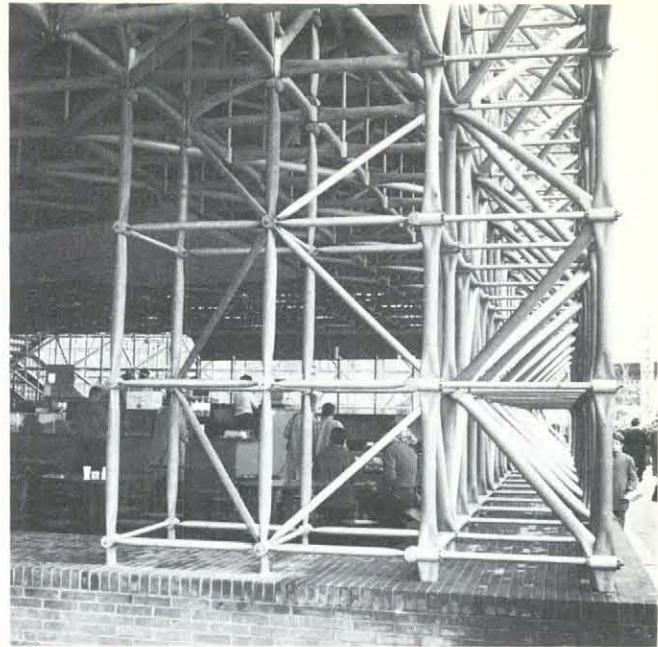
Prime reasons for use of the spaceframe system were the flexibilities inherent within it and the possibility of later dismantling for re-erection in Holland. (The simplicity of the connectors makes such a move feasible).

Unfortunately, the cost of dismantling is very high due to a complicated procedure by which the building must be carefully taken apart from the interior (reverse construction process) so as not to damage the spaceframe.

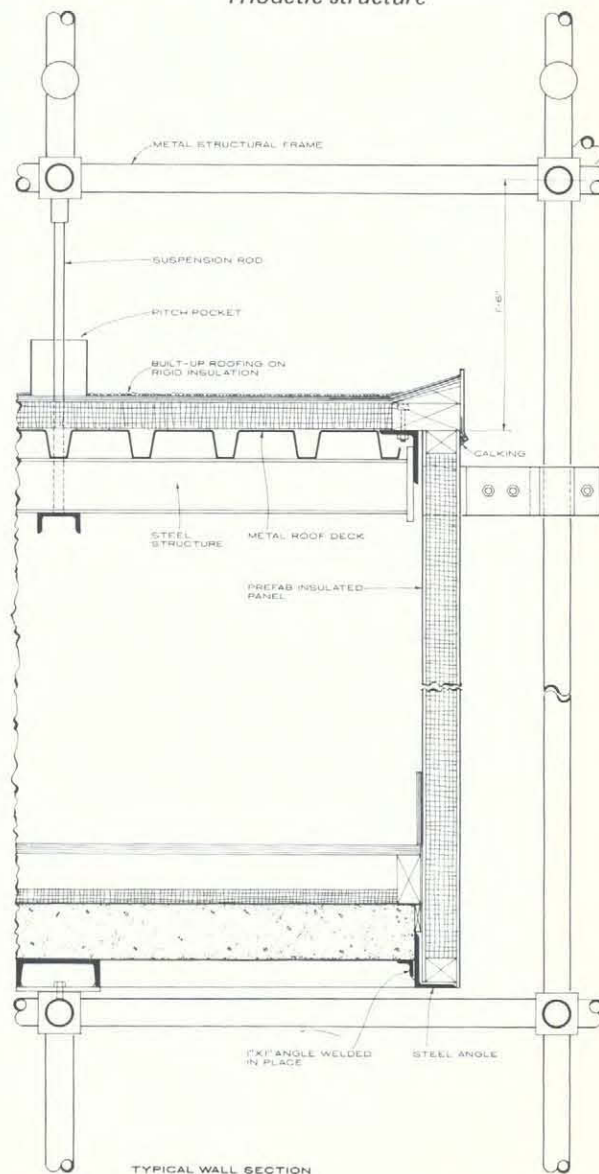
Many of the effects achieved with this spaceframe were made possible by the use in a novel way of the existing "Triodetic" connection system patented by F. Fentiman & Sons Limited, Ottawa. This building represented the first complete (walls, floors, roofs) installation of that system on a large scale.

Cost of the spaceframe for this project was rather expensive, approximately \$6.50 per sq. ft., or 38% of the total building construction cost.

- c. Wave making machine: The equipment and mechanism were basic consisting of rubber paddles driven by an electric motor (brought from Holland and erected by local labour).
- d. Bricks: Dark, chocolate brown, measuring 4" x 2" x 8", they were imported from Holland and used for paving and along the base of the building. Although of very high quality, they are too expensive to be competitive with local brick of the same type.



*Triodetic structure*





## NEW YORK STATE

### A. GENERAL DATA

1. NATURE OF PAVILION/STRUCTURE — Temporary.
2. LOCATION — Expo Area: Ile Sainte-Hélène;  
Lot No. 3230;  
Key Plan No. 346.
3. OWNER (or contracting body) — State of New York,  
Department of Commerce.
4. DESIGN ARCHITECT — Felix Stephen Gula As-  
sociates, New York City.
5. LOCAL ASSOCIATE ARCHITECT — Donaldson,  
Drummond, Sankey, Montreal.
6. CONSULTING ENGINEERS —
  - a. Structural: P.E. Gorlin, New York.
  - b. Mechanil & electrical: Joseph Bressman, New  
York.
9. GENERAL CONTRACTOR — Pavilions Interna-  
tional, New York.

10. OTHER CONTRACTORS OF SPECIAL INTEREST  
— Leasehold Construction Corp., Montreal, (acted in  
capacity of contractor).

### B. GENERAL DESCRIPTION OF PAVILION/STRUC- TURE

1. FUNCTIONAL DESCRIPTION — The pavilion con-  
sisted of a revolving, canvas-covered, exhibit carousel  
and six 40' high towers (also canvas covered). Four of  
the towers contained movie theatres; the other two  
were two-storey structures housing administration  
and staff areas.
2. DIMENSIONS —
  - a. Size: Carousel, 80' diameter; towers, 30' dia-  
meter.
  - b. Area: 12,000 sq. ft.
  - c. Height: Carousel, 16'; towers, 40'.
  - d. Stories: One, except for two two-storey towers.
3. FOUNDATIONS — Reinforced concrete floating slab  
and grade beams.



4. STRUCTURE — Structural steel.
5. WALLS & EXTERIOR CLADDING — Canvas.
6. ROOF — Canvas.
7. WINDOWS & ENTRANCES — Sliding glass window-door in administration area only.
8. INTERIOR FINISHES —
  - a. Floors: Carpet (administration offices and carousel deck), painted concrete (all other areas).
  - b. Walls: Canvas; painted drywall (administration, staff and washroom areas).
  - c. Ceilings: Canvas; painted drywall (administration, staff and washroom areas).
9. MECHANICAL SYSTEMS —
  - a. Plumbing: Standard; electric domestic hot water system.
  - b. Heating, ventilation, air conditioning: 6-32,000 BTU A.C. units in towers and 3-16,000 BTU A.C. units in administration lounge area. A.C. units were domestic type (thru-wall). No heating was provided; portable electric heaters were used. Ventilation, part of A.C. system.
  - d. Other: Plumbing to pools.
10. ELECTRICAL —
  - a. Power: 12,000V, 2 feeder service entry, step down to 120/208V service with 225 KVA oil type transformers shared with adjoining Korean pavilion.
  - b. Lighting: Incandescent house lighting.
  - c. Audio-visual systems: Part of exhibits.
11. SPECIAL TRAFFIC CONVEYING EQUIPMENT — None (revolving turntable carousel deck provided).
12. FIRE PROTECTION — Fire Extinguishers.
13. SAFETY FEATURES — Battery operated emergency lighting.
14. EXTERIOR WORK (where part of the construction contract) — Landscaping, quartz floodlighting, pools, flagpoles.
16. COMMENTS — A pleasant, light-hearted spirit was conveyed by this pavilion with its revolving carousel and canvas tent-like structural system (devised because of limited budget). Of interest, is the fact that it was a "package deal" project. The owner-designer contract covered design, construction, management and eventual demolition.



## REPUBLIC OF CHINA (TAIWAN)

### A. GENERAL DATA

1. NATURE OF PAVILION/STRUCTURE — Temporary.
2. LOCATION — Expo Area: Ile Sainte-Hélène;  
Lot No. 3130;  
Key Plan No. 328.
3. OWNER (or contracting body) — The Republic of China (Taiwan).
4. DESIGN ARCHITECT — C.C. Yang, Taipei, Taiwan.
5. LOCAL ASSOCIATE ARCHITECT — Ian Martin, Montreal.
7. LOCAL ASSOCIATE CONSULTING ENGINEERS —
  - a. Structural: Blauer Horvath Associates, Montreal.
  - b. Mechanical and Electrical: Keith Associates Limited, Montreal.
9. GENERAL CONTRACTOR — Hegeman-Harris Company of Canada, Montreal.

### B. GENERAL DESCRIPTION OF PAVILION/STRUCTURE

1. FUNCTIONAL DESCRIPTION — This was a two-storey exhibition building with a dining-kitchen extension, all designed in a distinctly oriental character.
2. DIMENSIONS —
  - a. Size: 121' x 71' main building; 84' x 33' restaurant-kitchen extension.
  - b. Area: 11,000 sq. ft.
  - c. Height: 40' (exhibition block); 17' (restaurant-kitchen).
  - d. Stories: Two storey exhibition block; one storey restaurant-kitchen.
3. FOUNDATIONS — Reinforced concrete foundations on spread footings.
4. STRUCTURE — Reinforced concrete.
5. WALLS AND EXTERIOR CLADDING — Stucco and clay tiles (from Taiwan) on overhang.
6. ROOF — Built up roofing over concrete deck.
7. WINDOWS AND ENTRANCES — No windows; glazed decorative wood main entrance door from Taiwan.



8. INTERIOR FINISHES —

- a. Floors: Vinyl asbestos floor tile.
- b. Walls: Painted plaster and wallpaper.
- c. Ceilings: Formed plastic, plastic with plywood pendants, decorative tentest, plaster on plywood (these ceiling materials hand made in Taiwan), suspended painted drywall.

9. MECHANICAL SYSTEMS —

- a. Plumbing: Standard; electric and gas domestic hot water system.
- b. Heating, ventilation, air conditioning: Two roof mounted, direct expansion cooling coils and gas fired heaters, total capacity 54T, with distribution ductwork to ceiling diffusers; ventilation part of A.C. system with separate exhaust of washrooms and kitchen.
- c. Kitchen: Full kitchen complete with CO2 system in hoods.
- d. Other: Gas service to package units, hot water heater and restaurant.

10. ELECTRICAL —

- a. Power: 12,000 V, 2 feeder service entry, step down to 120/208 V service with 300 KVA transformer.
- b. Lighting: Fluorescent, quartz floodlighting.

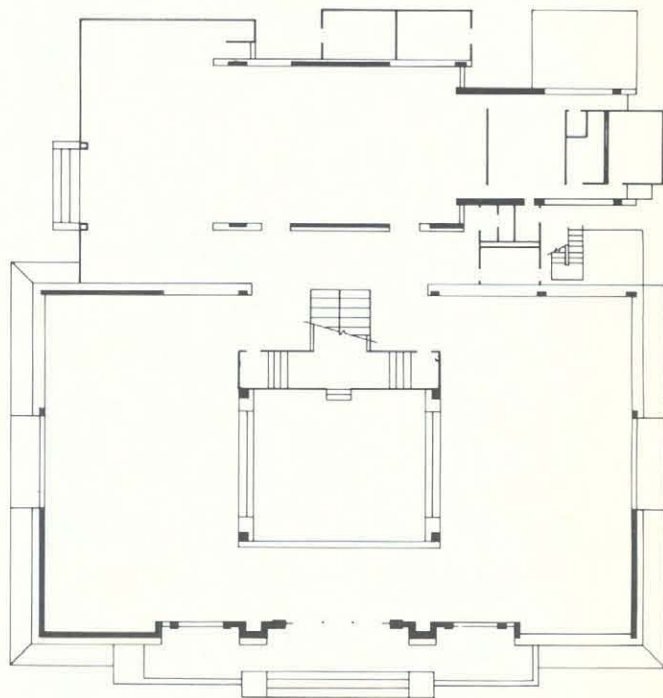
12. FIRE PROTECTION — Extinguishers, heat detection and manual station fire alarm system.

13. SAFETY FEATURES — Battery operated emergency lighting system.

14. EXTERIOR WORK (where part of the construction contract) — Flag-poles, dining room terrace.

16. COMMENTS — The building was designed in the classical vernacular of Chinese architecture. Numerous handicrafts from Taiwan, such as decorative ceilings, main entrance doors and clay tiles were used throughout the building to complete an oriental touch.

*Floor plan*





## SCANDINAVIA

### A. GENERAL DATA

1. NATURE OF PAVILION/STRUCTURE — Temporary.
2. LOCATION — Expo Area: Ile Sainte-Hélène;  
Lot No. 3320;  
Key Plan No. 316.
3. OWNER (or contracting body) — Denmark, Finland, Iceland, Norway and Sweden (represented by Svenska Industri Byggen A. B. Stockholm, Sweden).
4. DESIGN ARCHITECT —  
  
Denmark: Professor Erik Herlow, Copenhagen.  
  
Finland: Jackko Paatela, Westend, Finland.  
  
Iceland: Skarphedin Johansson, Reykjavik.  
  
Norway: Otto Torgersen, Oslo.  
  
Sweden: Gustaf Letterstrom, Stockholm.
5. LOCAL ASSOCIATE ARCHITECT — Chadwick & Pope, Montreal.

### 6. CONSULTING ENGINEERS —

- a. Structural: C. Ostenfeld & W. Jensen, Copenhagen.

### 7. LOCAL ASSOCIATE CONSULTING ENGINEERS —

- a. Structural and mechanical: Per Hall, Couture, Van Walsum & Assoc., Montreal.
- c. Electrical: George F. Bassett & Assoc., Montreal.

8. OTHER CONSULTANTS — S. F. Products Canada Limited (manufacturers, installers and designers of A.C. system in pavilion).

9. GENERAL CONTRACTOR — The Tower Co. (1961) Ltd., Montreal.

### B. GENERAL DESCRIPTION OF PAVILION/STRUCTURE

1. FUNCTIONAL DESCRIPTION — This was a three storey building, the ground floor of which was treated as an open exhibition court. The upper two floors were reached by moving sidewalks set into an open well. The first level housed administration



offices, a restaurant, cafeteria and kitchen and public washrooms. The second contained five exhibit areas, one for each country, and a theatre.

## 2. DIMENSIONS –

- a. Size: 165' x 165'.
- b. Area: 55,500 sq. ft.
- c. Height: 52'.
- d. Stories: Three plus partial service basement.

## 3. FOUNDATIONS – Reinforced concrete spread footings and grade beams.

## 4. STRUCTURE – Structural steel (prefabricated in Sweden), precast lightweight concrete floor and roof deck with cement topping on 1st and 2nd floors.

## 5. WALLS & EXTERIOR CLADDING – Stained wood clapboard, painted asbestos board, painted concrete block to service core.

## 6. ROOF – Built up roofing over concrete deck, plexi-glass cylindrical sky lights (from Sweden), painted wood louvres.

## 7. WINDOWS & ENTRANCES – Plate or sheet glass in wood or steel sash; 1/2" thick glass doors.

## 8. INTERIOR FINISHES –

- a. Floors: Carpet (public areas), Norwegian slate and asphalt (grade), ceramic tile (public washrooms), concrete (service areas), vinyl sheet (cafeteria and kitchen).
- b. Walls: Painted drywall, painted cement asbestos, stained vertical wood planking.
- c. Ceilings: Suspended wood slats or rough boards, painted gypsum (washrooms and kitchen), exposed structure (service areas).

## 9. MECHANICAL SYSTEMS –

- a. Plumbing; Standard; gas fired domestic hot water system.
- b. Heating, ventilation, air conditioning: A.C. in administration and restaurant areas only with two package units, water cooled chiller, 30 T capacity; distribution ductwork to ceiling grilles. Exhibition areas, washrooms and kitchen ventilated by roof exhaust fans; electric baseboard convector heating in service and administration

areas, infra-red ceiling mounted heating units in outdoor cafeteria dining area.

- c. Kitchen: Full restaurant kitchen equipped by concessionaire; CO2 system in hoods.

## 10; ELECTRICAL –

- a. Power: 12,000 V, 2 feeder service entrance, step down to 600 V service for equipment with 1,000 KVA transformer and 120/208 V service with 3-150 KVA transformers. All transformers were dry type.

- b. Lighting: Incandescent, fluorescent (service and kitchen areas).

- c. Audio-visual systems: Part of exhibits contract.

## 11. SPECIAL TRAFFIC CONVEYING EQUIPMENT – Moving sidewalks serving all levels manufactured by Sandvik of Sweden; service-passenger elevator in service core serving 3 levels.

## 12. FIRE PROTECTION – Extinguishers, fire alarm system.

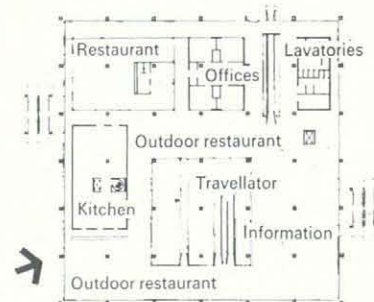
## 13. SAFETY FEATURES – Battery operated emergency lighting, exterior fire escape stairs.

## 14. EXTERIOR WORK (where part of the construction contract) – Norwegian slate to ground level court, sculpture garden, benches, flagpoles, incandescent floodlighting.

*Section*



*ground floor plan (exhibition level)*





16. COMMENTS – The pavilion conveyed very well the sense of a temporary building. It was also an honest expression of the functional and structural elements of which it had been constructed (columns, beams, plumbing pipes and ducts, for example, were all visible).

The interior spaces were not completely resolved, both from the point of view of continuity between entrance and mezzanine and because of the low

ceiling of the ground floor, which resulted in an awkward exhibit area at that location.

Although the building's design represented the purist approach usually associated with Scandinavian architecture, it was considered possible that it would have been better had it been the work of one or two men, rather than the compromise solution of designers from five different countries.

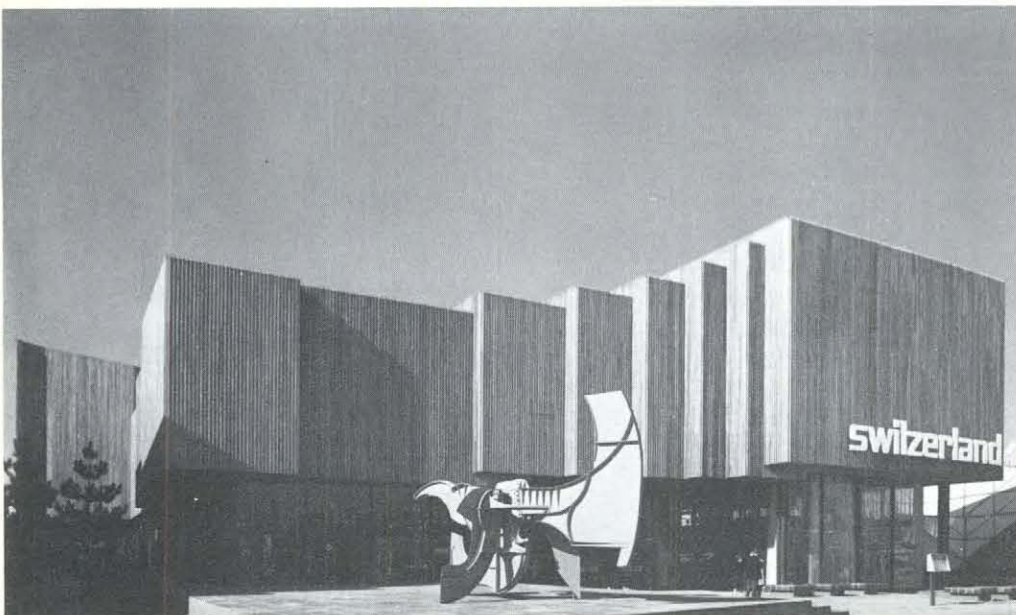
## SWITZERLAND

### A. GENERAL DATA

1. NATURE OF PAVILION/STRUCTURE — Temporary.
2. LOCATION — Ile Sainte Hélène;  
Lot No. 3080;  
Key Plan No. 312.
3. OWNER (or contracting body) — Government of Switzerland (Swiss Office for the Development of Trade).
4. DESIGN ARCHITECT — Werner Gantenbein, Zurich, Switzerland.
5. LOCAL ASSOCIATE ARCHITECT —  
George F. Eber, Montreal;  
George Banz, Toronto.
7. LOCAL ASSOCIATE CONSULTING ENGINEERS —
  - a. Structural: R. R. Nicolet & Associates, Montreal.
  - b. Mechanical & Electrical: Ellard Willson & Associates Limited, Toronto.
9. GENERAL CONTRACTOR — Argo Construction Limited, Montreal.

### B. GENERAL DESCRIPTION OF PAVILION/STRUCTURE

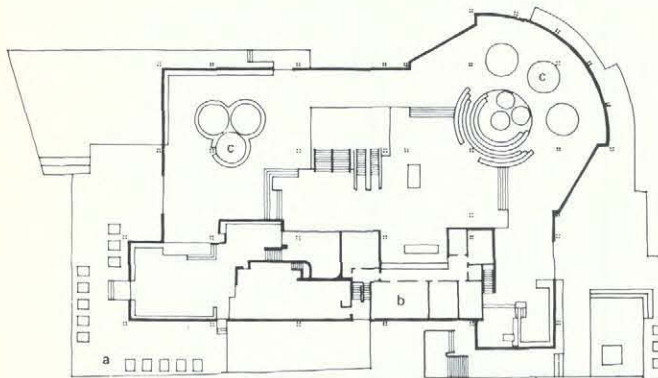
1. FUNCTIONAL DESCRIPTION — The pavilion was a two storied exhibition building complete with a 500 seat auditorium, a three level restaurant and an exterior dining area. The ground floor was devoted primarily to works of art; the main exhibit area was on the 2nd floor.
2. DIMENSIONS —
  - a. Size: 210' x 140' (overall).
  - b. Area: 49,000 sq. ft.
  - c. Height: 60'.
  - d. Stories: Partial basement plus 2 stories and mezzanine restaurant and office areas.
3. FOUNDATIONS — Reinforced concrete foundation walls and spread concrete footings.
4. STRUCTURE — Reinforced concrete basement and ground floor, structural steel superstructure above grade and wood floor decks.
5. WALLS & EXTERIOR CLADDING — Oiled cedar slats on cedar planks, limited amount of cement finished concrete.
6. ROOF — Built up roofing over wood deck.
7. WINDOWS & ENTRANCES — Plate glass in painted steel frames; tempered glass doors.



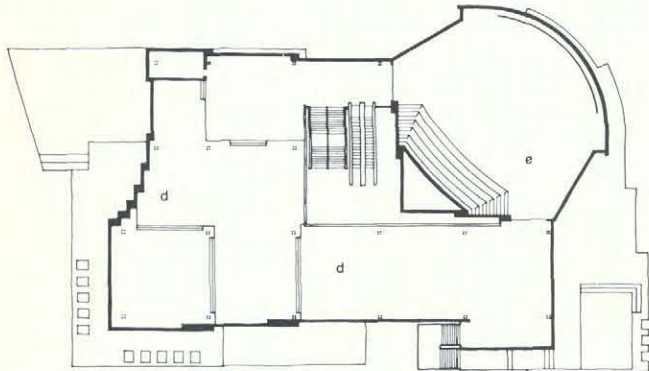


## 8. INTERIOR FINISHES —

- a. Floors: Vinyl asbestos tiles (basement and kitchen), quarry tile (from Switzerland) (ground floor and restaurant), carpet (from Switzerland) (administration offices, 2nd floor exhibition and mezzanine restaurant).
- b. Walls: Rough textured stucco (basement public corridor areas and ground floor), painted drywall (administration offices), painted concrete block (basement), burlap (2nd floor exhibition), cedar slats over chipboard (auditorium).
- c. Ceilings: Acoustical plaster (basement public washrooms), painted exposed concrete (basement), lay in acoustical tile (kitchen and administration offices), cedar slats (ground floor), burlap (2nd floor exhibition area and auditorium).



*ground floor plan*



*first floor plan*

*key a. restaurant*

*b. administration*

*c. rotovision*

*d. exhibition area*

*e. cinema*

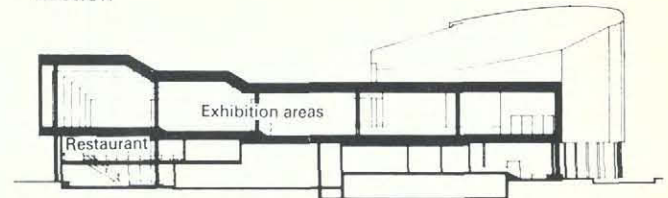
## 9. MECHANICAL SYSTEMS —

- a. Plumbing: Standard plumbing; gas fired domestic hot water system.
- b. Heating, ventilation, air conditioning: The exhibition areas were heated and cooled by 10-5T and 7-8T small packaged A.C. units set in ceiling spaces; mezzanine by 2-5T; auditorium by 3-8T; administration by 1-8T. Another two vertical standing package A.C. units, 1-15T and 1-5T, were used in the ground and basement restaurant areas. Each of the units had direct expansion cooling and electric heating coils. A 40T low pressure air handling unit in the basement mechanical room served the auditorium. Distribution ductwork from units. Refrigeration equipment consisted of reciprocating compressor and water cooled condenser operating with Refrigerant 22, and utilizing water from the adjoining lake (total cooling capacity 200T). Electric heating coils in units and electric basement heaters in offices and basement perimeter areas provided heating. Ventilation was part of A.C. system with separate exhaust of kitchen, transformer room and washrooms.
- c. Kitchen: Full kitchen to serve restaurant (on two levels).

## 10. ELECTRICAL —

- a. Power: 12,000V, 2 feeder incoming service, manual transfer switch, step down to 120/208V service with 750 KVA dry transformer.
- b. Lighting: Incandescent with fluorescent in basement and administration areas.
- c. Audio-visual systems: Part of exhibition contract.

*Section*



- d. Other: Incoming service for the Expo official time center (part of the watch exhibit). Flood-lighting using metallic vapour type fixtures.

11. SPECIAL TRAFFIC CONVEYING EQUIPMENT – Two escalators, each rising 13', one dumb-waiter serving two levels of kitchen.

12. FIRE PROTECTION – All wood surfaces treated with fire retardant coating; automatic heat detectors and manual fire alarm system; fire dampers in duct-work; CO2 system in hoods of kitchen; hose cabinets and extinguishers.

13. SAFETY FEATURES – Battery operated emergency lighting.

14. EXTERIOR WORK (where part of the construction contract) – Quarry tiled terraces and benches; landscaping; asphalt paving; floodlighting; wood (sign) letters to building; free standing screen (stucco on concrete block) wall.

#### 16. COMMENTS

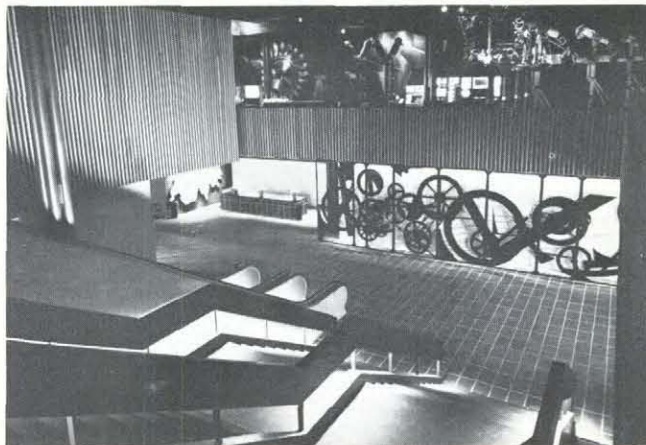
- a. General: Although typically Swiss in concept, detailing and materials, the pavilion did not fully display the great art of Swiss exhibition building design. This was primarily due to the fact that the building was not impersonal enough; its design too often intruded itself upon the exhibits. Noteworthy, however, was the choice and handling of various materials in dark brown tones by which a strong feeling of warmth was achieved: wood (extensively used both outside

and in), quarry tile, carpet, oak and burlap. In addition, the interior plasterwork, though executed by Canadians, had a richly textured surface of typical Dutch quality – a pleasant relief from the usual flat application of this material.

The ground floor was glazed from floor to ceiling in order to create an impression of open space beneath the solid wood block of the upper exhibition area. The shape of the latter was a basic reflection of the interior spaces contained expressing both the stepped walls and ceiling of the exhibition area and the sloping roof and curved wall of the auditorium. Also, in contrast to the light coloured spaces of the lower floor, the upper exhibit areas possessed very sombre backgrounds against which the exhibits stood out in sharp relief. Approximate cost was \$30 per sq. ft.

- b. Quarry tile: Imported from Switzerland in varying tones of dark brown, the tile measured 19-3/4" x 11-1/4". Because of this large size, warping occurred in the baking process and the floor was somewhat uneven in places as a result. Cost of the material was high, but it was used extensively for both interior and exterior paving. No major problems were encountered during installation.
- c. Carpet: Also imported from Switzerland (trade name SEVONYL), the carpet was 3/16" thick and dark brown in color. Possessing a composition somewhat similar to Ozite, it was applied with adhesive to a plywood sub-floor and proved to be a very durable, good wearing floor covering.

*Interior view*





## THAILAND

### A. GENERAL DATA

1. NATURE OF PAVILION/STRUCTURE — Temporary.
2. LOCATION — Expo Area: Ile Notre-Dame;  
Lot No.: 4052;  
Key Plan: 470.
3. OWNER (or contracting body) — Kingdom of Thailand, Ministry of Economic Affairs.
4. DESIGN ARCHITECT — Chamlong Yordying, Bangkok, Thailand.
5. LOCAL ASSOCIATE ARCHITECT — Affleck, Desbarats, Dimakopoulos, Lebensold, Sise, Montreal.
6. CONSULTING ENGINEERS —
  - a. Structural: Sawet Yasaravani, Bangkok, Thailand.
7. LOCAL ASSOCIATE — Consulting Engineers —
  - a. Structural, mechanical and electrical: Sverdrup & Parcel of Canada Ltd., Toronto.

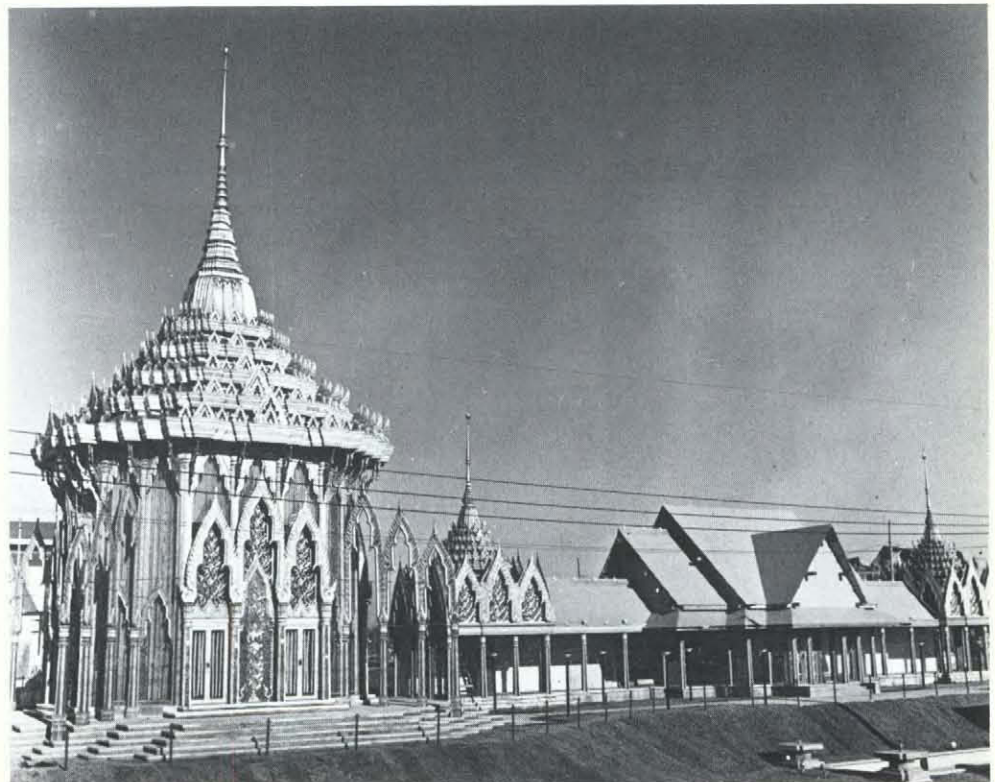
9. GENERAL CONTRACTOR — E.R. Casey Construction Co. Ltd., Montreal

### B. GENERAL DESCRIPTION OF PAVILION/STRUCTURE

1. FUNCTIONAL DESCRIPTION — The pavilion consisted of two separate buildings: a replica of an 18th century Buddhist Shrine (built in Thailand and shipped to Montreal piece by piece for re-erection) and an Exhibit Hall (with a small pagoda at each end) containing a "Royal Barge" set in a reflecting pool.  
Contents included antiques of Thai cultural accomplishments and modern examples of Thai silver, gold and wood carvings, plus silk garments.

#### 2. DIMENSIONS — Main Pavilion (Shrine)

- a. Size: 25' x 100'
- b. Area: 550 sq. ft.
- c. Height: 90'
- d. Stories: One



— Exhibit Hall

- a. Size: 50' x 50'
- b. Area: 2500 sq. ft.
- c. Height: 50'
- d. Stories: One

3. FOUNDATIONS — Reinforced Concrete

4. STRUCTURE — Structural steel frame for pagodas and wood for remaining.

5. WALLS & EXTERIOR CLADDING — Gold leaf painted wood cladding of exotic Thai carving and pieces of mirror set into wood.

6. ROOF — Same as wall description.

7. WINDOWS & ENTRANCES — Cast aluminum fenestration and sheet glass in exhibit hall. Cast aluminum main entrances and exits.

8. INTERIOR FINISHES —

- a. Floors: Reinforced concrete slab with vinyl tile cover.

b. Walls: Plaster

c. Ceilings: Suspended lay-in tile.

9. MECHANICAL SYSTEMS —

- a. Plumbing: Domestic toilets;
- b. Heating, Ventilation, Air Conditioning: None

10. ELECTRICAL —

- a. Power: 12,000 V, 2 feeder service entry step-down to 120/208V Service with 750 KVA substation shared with Burma and Kaleidoscope exhibits.
- b. Lighting: Fluorescent interior lighting and exterior incandescent spot and floodlighting.

12. FIRE PROTECTION — As required by C.C.W. E.

13. SAFETY FEATURES — As required by C.C.W.E.

14. EXTERIOR WORK (where part of the construction contract) — Landscaping and floodlighting.

16. COMMENTS — Not really a building in the Western sense, this pavilion was a good example of the delicate and ornate architecture usually associated with the Orient.

*Trinidad Tobago and  
Grenada*





## TRINIDAD, TOBAGO & GRENADA

### A. GENERAL DATA

1. NATURE OF PAVILION/STRUCTURE — Permanent
2. LOCATION — Expo Area: Ile Notre-Dame;  
Lot No. 4231;  
Key Plan No. 431.
3. OWNER (or contracting body) — Government of Trinidad and Tobago.
4. DESIGN ARCHITECT — F.A. Dawson, Montreal
6. CONSULTING ENGINEERS —
  - a. Structural, mechanical and electrical: C.D. Howe Co. Ltd., Montreal.
  - d. Other: Mr. L.L. Doelle, Montreal, (Acoustical Consultant) and Mr. B.M. Krumreich, Montreal (Theatrical Lighting Consultant)
8. OTHER CONSULTANTS — Mr. Peter Bynoe, Government of Trinidad and Tobago, Port of Spain, Trinidad.
9. GENERAL CONTRACTOR — Leasehold Construction Corp., Montreal.

### B. GENERAL DESCRIPTION OF PAVILION/STRUCTURE

1. FUNCTIONAL DESCRIPTION — On the lower level, the building contained exhibit space for artifacts and a refreshment and lounge area. The upper floor housed a thrust stage for live entertainment.
2. DIMENSIONS —
  - a. Size: 80' x 90'
  - b. Area: 14,023 sq. ft.
  - c. Height: 28'.
  - d. Stories: Two.
3. FOUNDATIONS — Spread concrete footings with slab on grade.
4. STRUCTURE — Rigid structural steel frame with second floor slab in concrete on sand on steel deck. Roof structure consisted of four hyperbolic paraboloids constructed from steel plates and pipes. The

entire structural frame was reclaimable.

5. WALLS & EXTERIOR CLADDING — Steel stud framing with drywall on two sides. Fir plywood and battens on exterior, except for auditorium where battens were replaced with a continuous mural constructed of baked-on-aluminum panels.
6. ROOF — Neoprene-hypalon on plywood on steel deck over structural framing.
7. WINDOWS & ENTRANCES — No windows; the pavilion was open at the lower floor. Solid wood doors covered with mural leading to auditorium.
8. INTERIOR FINISHES —
  - a. Floors: Painted concrete, carpet on concrete.
  - b. Walls: Steel stud framing with a variety of finishes such as drywall, painted or fabric covered.
  - c. Ceilings: Painted exposed structure (lower floor). Painted drywall (upper floor)
9. MECHANICAL SYSTEMS —
  - a. Plumbing: Standard washroom fixtures.
  - b. Heating, ventilation, air conditioning: Electrical baseboard heating (performers' changing rooms, lounge and offices); exhaust ventilation (auditorium only); no air conditioning.
10. ELECTRICAL —
  - a. Power: 12.5 KV supply, 3 Phase 4 wire, 110/208 Volt
  - b. Lighting: Mainly incandescent; fluorescent (service areas)
  - c. Audio-visual systems: Part of exhibits.
12. FIRE PROTECTION — Fire alarm system, stand pipe system and portable extinguishers.
14. EXTERIOR WORK (where part of the construction contract) — All landscaping other than sodding and planting; exterior steel and concrete ramp leading to auditorium.
16. COMMENTS — Planned very simply and functionally, this beautifully situated and lively, colorful building was one of the best of the small island country pavilions.

## TUNISIA

### A. GENERAL DATA

1. NATURE OF PAVILION/STRUCTURE – Temporary.
2. LOCATION – Expo Area: Ile Notre-Dame;  
Lot No. 4272;  
Key Plan No. 468.
3. OWNER (or contracting body) – Commissariat  
General de la Tunisie, Tunis.
4. DESIGN ARCHITECT – J. Mariney T. Haddad,  
Tunis.
5. LOCAL ASSOCIATE ARCHITECT – Andre Blouin,  
Montreal.
6. CONSULTING ENGINEERS –
  - a. Structural: Bourgeois Martineau Samson,  
Montreal.
  - Mechanical and electrical: Pageau & Morel,  
Montreal.
9. GENERAL CONTRACTOR – Dumez Canada Ltd.,  
Montreal.

### B. GENERAL DESCRIPTION OF PAVILION/STRUCTURE

1. FUNCTIONAL DESCRIPTION – The pavilion consisted primarily of an exhibition area and restaurant arranged around a central patio.
2. DIMENSIONS –
  - a. Size: 81' x 129'.
  - b. Area: 14,700 sq. ft.
  - c. Height: 17'.
  - d. Stories: One.
3. FOUNDATIONS – Spread footings and reinforced concrete expanded base piles; pile caps and concrete grade beams.
4. STRUCTURE – Combination of structural steel framing with precast concrete slabs.
5. WALLS & EXTERIOR CLADDING – Wood stud framing, metal lath, stucco.
6. ROOF – Four ply tar and gravel.
7. WINDOWS & ENTRANCES – Pine, single glazed and polished plate glass.
8. INTERIOR FINISHES –





- a. Floors: Marble on concrete.
  - b. Walls: Stucco on metal lath on wood studs.
  - c. Ceilings: Stucco on metal lath.
9. MECHANICAL SYSTEMS —
- a. Plumbing: Standard fixtures.
  - b. Heating, ventilation, air conditioning: Hot air heating; air conditioning in restaurant and administration areas only.
  - c. Kitchen: Standard restaurant type, stainless steel.
  - d. Other: Water jets forming part of landscaping.
10. ELECTRICAL —
- a. Power: 200 KW for lighting and 90 HP for power.
  - b. Lighting: Incandescent.
  - c. Audio-visual systems: AM-FM tuner, record player, tape recorder, intercommunication system.
12. FIRE PROTECTION — Portable extinguishers.
14. EXTERIOR WORK (where part of the construction contract) — Landscaping, paving, lighting.
15. OTHER ITEMS OF PARTICULAR INTEREST — Skydome.
- a. Brief Description: 24' square x 1/4" thick fibre-glass skydome.
  - b. Location: Patio.
  - c. Manufacturer or Producer: Customold Fibreglass Ltd., Montreal.
  - d. Nearest source of more information — Same.

## UNION OF BURMA

### A. GENERAL DATA

1. NATURE OF PAVILION/STRUCTURE — Temporary.
2. LOCATION — Expo Area: Ile Notre-Dame;  
Lot No. 4058;  
Key Plan No. 471.
3. OWNER (or contracting body) — Government of the Union of Burma.
4. DESIGN ARCHITECT — Harry Aung & Kyi Sein,  
Ministry of Trade, Rangoon.
5. LOCAL ASSOCIATE ARCHITECT — Goodfellow,  
Hughes & Bucholtz, Montreal.
7. LOCAL ASSOCIATE CONSULTING ENGINEERS —
  - a. Structural: Sachs & Mackeen, Montreal.
  - b. Mechanical & Electrical: Holden & Muir,  
Montreal.
9. GENERAL CONTRACTOR — Eastern Townships  
Construction Company Limited, Cowansville, Quebec.

### B. GENERAL DESCRIPTION OF PAVILION/STRUCTURE

1. FUNCTIONAL DESCRIPTION — The pavilion consisted of two structures, an enclosed exhibition building and an open 60 seat restaurant. The structure of the pavilion was conventional, decorated with elaborate wood carvings and lacquered panels imported from Burma. The pavilion's theme was "Man and Friendship". The visitor was taken through the enclosed building, where treasures of Burma were on display, past an open air stage performance of Burmese dancing to the restaurant where Burmese dishes were served.
2. DIMENSIONS —
  - a. Size: 51' x 61' and 20' x 54'.
  - b. Area: 5,488 sq. ft.
  - c. Height: 38'.
  - d. Stories: One.
3. FOUNDATIONS — Expanded base concrete piles with concrete foundation walls.
4. STRUCTURE — Structural steel arch framing. Wood floor and roof joist framing. Suspended concrete slab (restaurant).
5. WALLS & EXTERIOR CLADDING — Stucco on metal lath on wood studs.
6. ROOF — Exposed pine planking with lacquer finish on wood joists. Standard rolled roofing felt in between planking and joists.
7. WINDOWS AND ENTRANCES — Clear glazing in fixed wood frames (all windows), wood framed doors with lacquered panels (entrance), flush wood doors (exits). The windows were decorated with lacquered wood panels and lattice work.
8. INTERIOR FINISHES —
  - a. Floors: Teak parquet on wood subfloor (exhibit areas), Burma marble (entrance and restaurant).
  - b. Walls: Gyproc on wood stud partitions.
  - c. Ceilings: Gyproc on wood furring.





9. MECHANICAL SYSTEMS –

- a. Plumbing: Two washrooms with standard fixtures.
- b. Heating, ventilation, air conditioning: Nominal coil type heating in air conditioning system. Air conditioning unit in roof structure feeding exhibition area by means of duct system.
- c. Kitchen: Gas and electrical cooking equipment. Dumbwaiter service. Refrigerator and freezer. Dishwashing machine.

10. ELECTRICAL –

- a. Power: Sharing transformer substation with Thailand and Keleidoscope, drawing up to 90 KVA 208V, 3 phase power for projection equipment.

- b. Lighting: Parlamp floodlighting for roof. Ground cable for strip lighting, illuminating concrete fence. Interior incandescent and fluorescent lighting.
- c. Audio-visual systems: Taped music system with P.A. combination and projector sound.

12. FIRE PROTECTION – Fire alarm system. Portable fire extinguishers. Combustible materials were coated with fire retardant paint.

14. EXTERIOR WORK (where part of the construction contract) – Concrete paving on crushed stone. Sodding and shrubs. Concrete fence.

16. COMMENTS – The pavilion was basically a pagoda-type building, conventionally constructed and framed, and dressed-up with Burmese, handmade gold-painted zinc trimming, lacquered wood, and wood carvings.

## UNION OF SOVIET SOCIALIST REPUBLICS

### A. GENERAL DATA

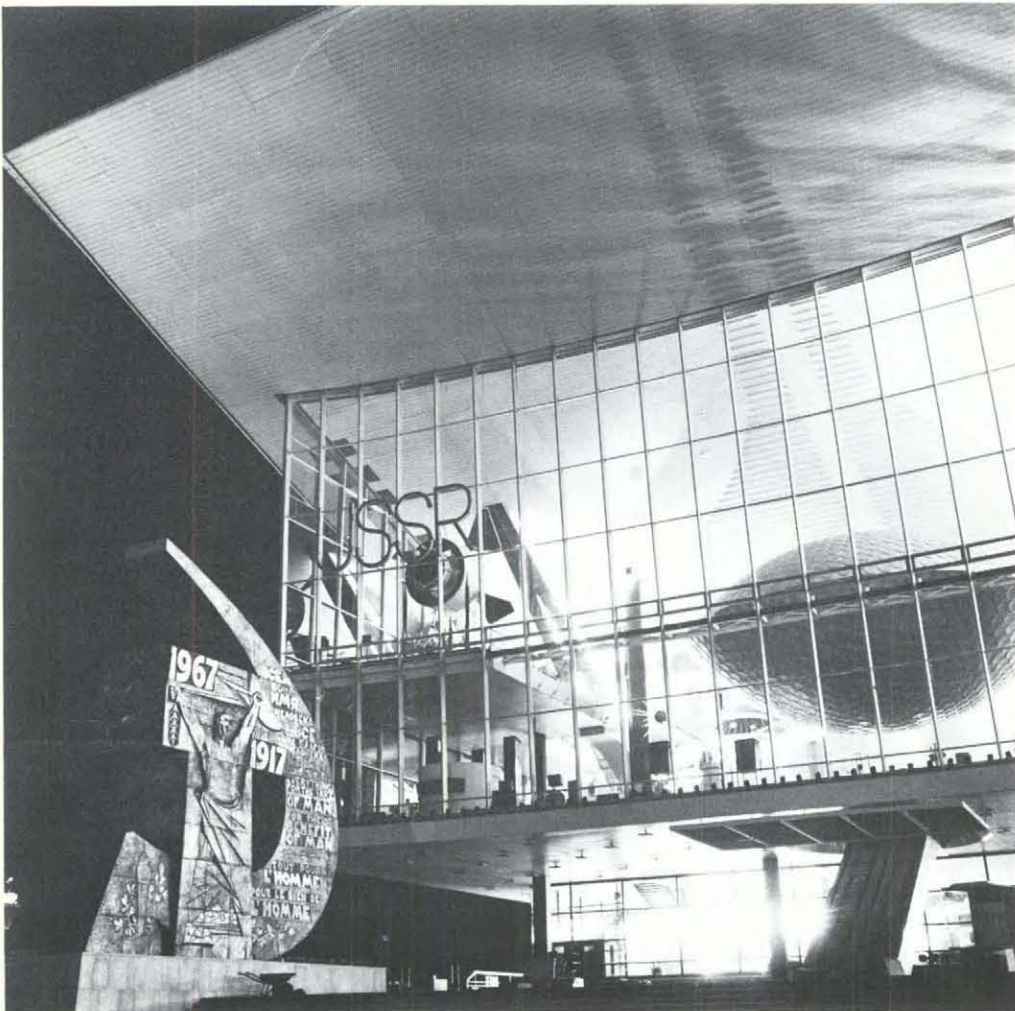
1. NATURE OF PAVILION/STRUCTURE — Temporary.
2. LOCATION — Expo Area: Ile Notre-Dame;  
Lot No. 4000;  
Key Plan No. 479.
3. OWNER (or contracting body) — The U.S.S.R.  
Chamber of Commerce, Moscow.
4. DESIGN ARCHITECT — M.V. Posokhin, A.A.  
Mndoyants, A.N. Kondretiev, Moscow.
6. CONSULTING ENGINEERS —
  - a. Structural: A.A. Mndoyants, Moscow.
  - b. Mechanical & Electrical: A.N. Dondretiev,  
Moscow.

7. LOCAL ASSOCIATE CONSULTING ENGINEERS  
— Beauchemin, Beaton, Lapointe, Montreal.

9. GENERAL CONTRACTOR — Feal, Milan, Italy.  
Canadian Address: c/o Beauchemin, Beaton,  
Lapointe, Montreal.

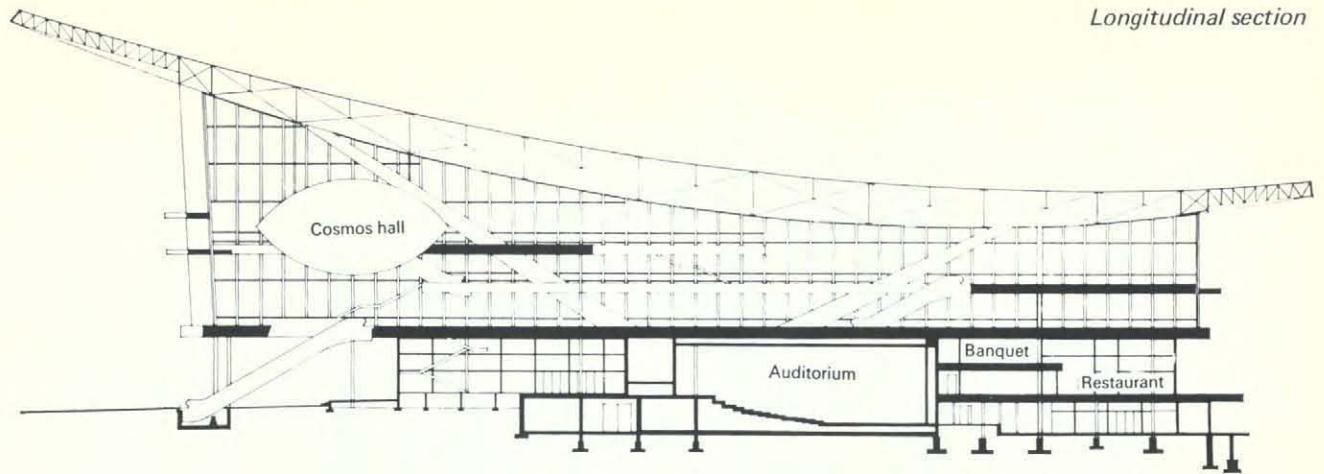
### B. GENERAL DESCRIPTION OF PAVILION/STRUCTURE

1. FUNCTIONAL DESCRIPTION — Basically a two storey building, the pavilion was dominated by a steeply rising roof, supported by two V-shaped frames which acted as columns. The first floor, although located at ground level, consisted of several terraces at the north end. Primary building elements were the exhibit hall, a 600 seat movie theatre and a 1100 seat restaurant. Floors and terraces were connected with escalators and stairs.

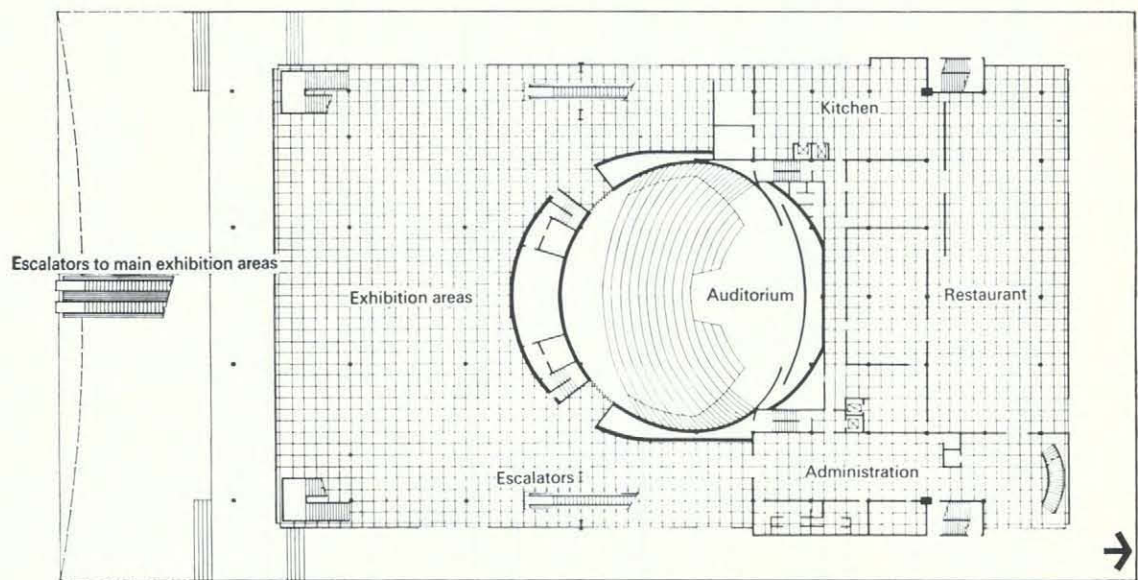




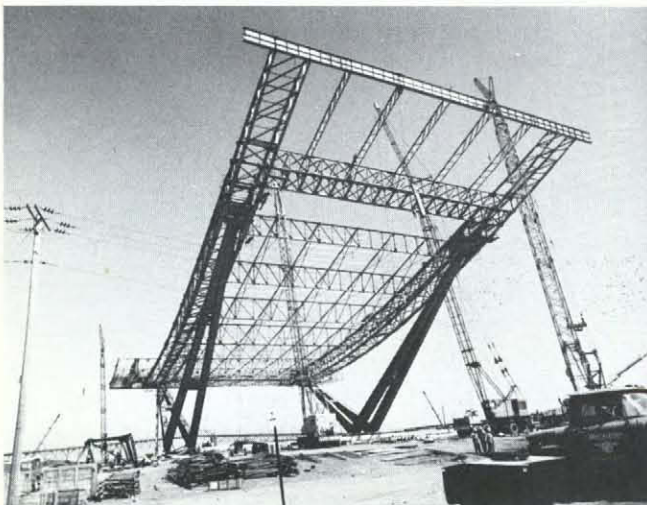
*Longitudinal section*



*Ground floor plan*



*Erecting the framing*



## 2. DIMENSIONS —

- a. Size: 189' x 343'.
- b. Area: 140,000 sq. ft.
- c. Height: 189'-4".
- d. Stories: Six levels.

3. FOUNDATIONS — Concrete caissons to rock approximately 26' below grade below each structural steel frame leg. All other areas were supported on spread concrete footings.

4. STRUCTURE — The roof structure consisted of two longitudinal edgegirders supporting cross beams. These were, in turn, supported by the two immense V-shaped frames. All members were of prefabricated structural steel. Floors were supported by steel post and beam systems and consisted of concrete poured into aluminum pans. The outside bays of the floor slabs were suspended from the roof structure by structural hangers which also functioned as framing members within the curtain wall system.

5. WALLS & EXTERIOR CLADDING — Extruded aluminum glazed curtain wall.

6. ROOF — Extruded aluminum sections anchored to steel roof structure, clamped together and caulked.

7. WINDOWS & ENTRANCES — All exterior glass was incorporated within the curtain wall. Main entrances had no doors; secondary ones contained frameless glass doors.

## 8. INTERIOR FINISHES —

- a. Floors: Imported carpet laid on concrete, vinyl asbestos tile (service areas).
- b. Walls: 2-1/4" thick sandwich panels of laminated plastic and finished pressboard.
- c. Ceilings: 18' long aluminum pans (prefinished with what appeared to be acrylic) were suspended by galvanized steel hangers

## 9. MECHANICAL SYSTEMS —

- a. Plumbing: All fixtures imported from Italy.
- b. Heating, ventilation, air conditioning: Low pressure hot water boiler fired by natural gas. Hot water heating system with radiators at base of curtain wall. Ventilation — Kitchen air withdrawn through exhaust hoods. Main part of

building exhausted by means of self-contained units located in roof structure. The restaurant, the cinema and Cosmos Hall were air conditioned by means of packaged units and a duct system.

- c. Kitchen: Combination of Russian, Italian and Canadian equipment. All equipment was electrical except gas operated dishwashers.

## 10. ELECTRICAL —

- a. Power: Russian sub-station with Italian wiring.
- b. Lighting: The ceiling was illuminated by means of incandescent fixtures located in the building structure. The restaurant and the service areas contained fluorescent lighting fixtures. All light fixtures and bulbs were of European manufacture.
- c. Audio-visual systems: Formed part of the exhibits.

11. SPECIAL TRAFFIC CONVEYING EQUIPMENT — Escalators going up.

12. FIRE PROTECTION — Italian fire alarm system. Standpipe and fire hose systems.

14. EXTERIOR WORK (where part of the construction contract) — Sodding, concrete curbs, asphalt paving, some shrubs and flowers.

## 15. OTHER ITEMS OF PARTICULAR INTEREST —

- a. Brief description: Hydraulically operated seats giving the illusion of moving through space.
- b. Location: Cosmos hall.
- c. Manufacturer or producer: Feal, Mr. G. Russo, c/o Beauchemin, Beaton, Lapointe, Montreal.
- d. Nearest source of more information: Same.

16. COMMENTS — The four-point supported roof structure was the largest of its kind ever constructed. The monumental space contained, however, though it may have impressed many a layman, was of no architectural significance. The whole structure, was, in fact, conceived within purely civil engineering terms.

Some aspects of design and construction were not fully solved. Continuous vibrations, for example, could be felt in the pavilion due to improper isolation of disturbing frequencies created by moving crowds.



## UNITED STATES OF AMERICA

### A. GENERAL DATA

1. NATURE OF PAVILION/STRUCTURE — Temporary.
2. LOCATION — Expo Area: Ile Sainte-Hélène;  
Lot No. 3190;  
Key Plan No. 358.
3. OWNER (or contracting body) — United States Information Agency, Washington, D.C.
4. DESIGN ARCHITECT — R. Buckminster Fuller, Fuller & Sadao Inc., and Geometrics Inc., Cambridge, Massachusetts (Dome); Cambridge Seven Associates Inc., Cambridge, Massachusetts (Interior).
5. LOCAL ASSOCIATE ARCHITECT — George F. Eber, Montreal.
6. CONSULTING ENGINEERS —
  - a. Structural: Simpson, Gumpertz & Heger Inc., Cambridge, Massachusetts.
  - b. Mechanical and electrical: P. Londe & Associates, St. Louis, Missouri.

d. Other: U.S.I.A. Engineering Department, Washington, D.C.

### 7. LOCAL ASSOCIATE CONSULTING ENGINEERS —

a. Structural: Blauer Horvath Associates, Montreal.

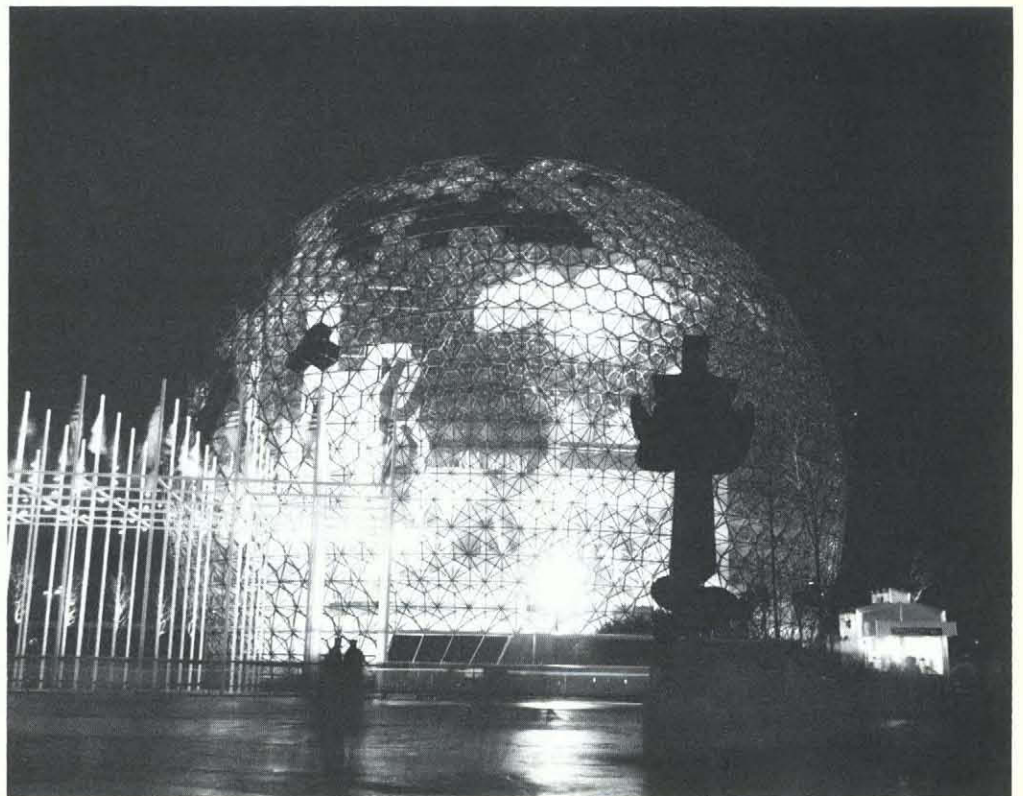
8. OTHER CONSULTANTS — Hansen Acoustical Engineering, Long Island, New York (sound proofing); Edison Price Inc., Long Island, New York (lighting).

9. GENERAL CONTRACTOR — George A Fuller Co. Inc., Boston, Mass.

10. OTHER CONTRACTORS OF SPECIAL INTEREST — Loyal Erectors, Inc., South Portland, Maine (Dome and Acrylic); Fishback & Moore of Quebec Limited, Montreal (electric); Burden Brothers Inc., Dallas, Texas (mechanical).

### B. GENERAL DESCRIPTION OF PAVILION/STRUCTURE

1. FUNCTIONAL DESCRIPTION — The pavilion's structure was a three-quarter space frame sphere enclosed with transparent acrylic. Contained were



four multi-level exhibit platforms and concourses, the highest one of which was reached by the longest escalator every constructed up until that time. At the base of the dome were a 300 seat theatre, offices and service areas.

## 2. DIMENSIONS —

- a. Size: 250' Diameter.
- b. Area: Volume, 6.7 million cu. ft.
- c. Height: 206'.
- d. Stories: 6 main levels and a basement.

## 3. FOUNDATIONS — Reinforced concrete wall anchored to rock.

## 4. STRUCTURE — The dome structure was a 40" deep space frame of 3 1/2" diameter tubes which had progressively thinner walls towards the crown and solid bars about openings. These were welded to cast steel hubs. Platforms of rolled steel sections and concrete over decking on 30" diameter tubular steel columns braced by the stair towers.

### Key to Plans

- |                   |                                    |                                  |
|-------------------|------------------------------------|----------------------------------|
| a — Main entrance | d — Line of minirail over          | g — 125' long escalator          |
| b — Theatre       | e — The American Spirit exhibition | h — Destination Moon exhibits    |
| c — Exit          | f — American Painting Now          | i — Emergency stair and elevator |

## 5. WALLS & EXTERIOR CLADDING — Acrylic domes, 1/4" thick. All were hexagon-shaped (approximately 10' to a side) except for six domes which were pentagonal.

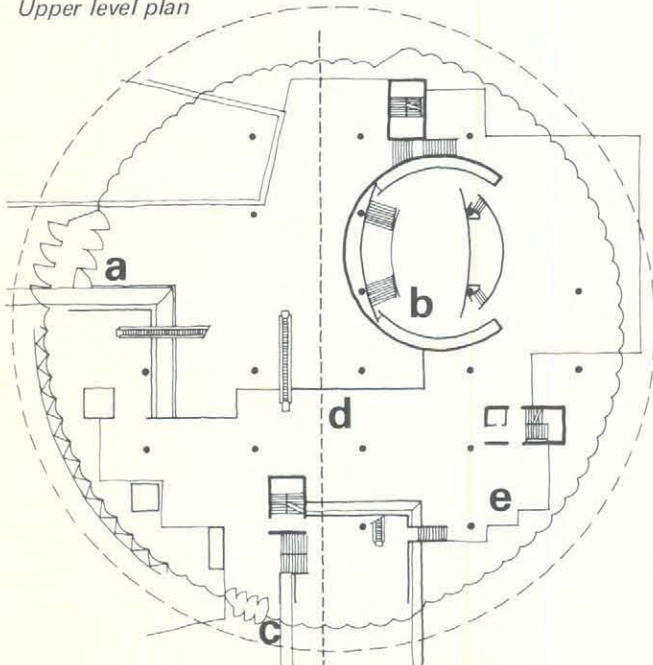
## 6. ROOF — See 5.

## 7. WINDOWS & ENTRANCES — No windows. Entrances: Air curtain behind corner pivoted trapezoidal doors.

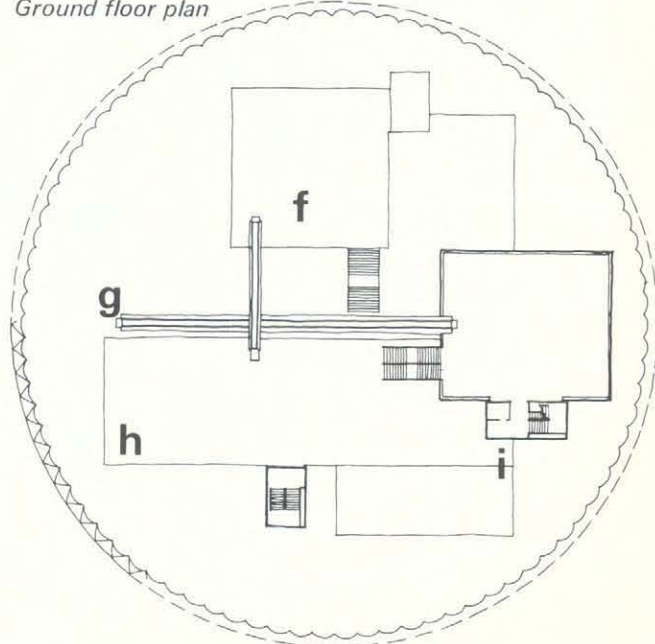
## 8. INTERIOR FINISHES —

- a. Floors: Carpet (platforms and offices), exposed aggregate (concourses), hardened concrete (service areas).
- b. Walls: Gypsum dry walls generally, Birch vertical boarding (office area), cement plaster on exposed concrete and battered walls.
- c. Ceilings: Acoustic plaster (platform soffits), gypsum board and acoustic tile (service areas and offices).

Upper level plan



Ground floor plan





## 9. MECHANICAL SYSTEMS —

- a. Plumbing: Standard
- b. Heating, ventilation, air conditioning: Air conditioning — 750 tons of refrigerant through a compressor, and 2 cooling towers. Chilled water supplied to coils in 2 fan rooms totalling 11 fans of 50,000 cfm each. Individual A/C units in basement office area fed through ductwork, 1 A/C unit for theatre, all totalling 24 units, 6 electrical coil unit heaters, and cable floor heaters.
- d. Other: Air curtain at main entrance.

## 10. ELECTRICAL —

- a. Power: 12.5 KV, stepped through 1500 KVA, 3 phase, 3 wire, 480 V transformer and a 1500 KVA, 3 phase, 4 wire, 120/208 V transformer.
- b. Lighting: Mainly incandescent; fluorescent (office areas).

- c. Audio-visual systems: Theatre and TV outlets for live shows.
- d. Other: Electrical coil heating, hot water tanks and motors.

## 11. SPECIAL TRAFFIC CONVEYING EQUIPMENT — Main escalator, 68'-0" vertical travel, 135'-0" long, 5,000 persons per hour; freight elevator.

## 12. FIRE PROTECTION — Fire hose cabinets, extinguishers, fire alarm system.

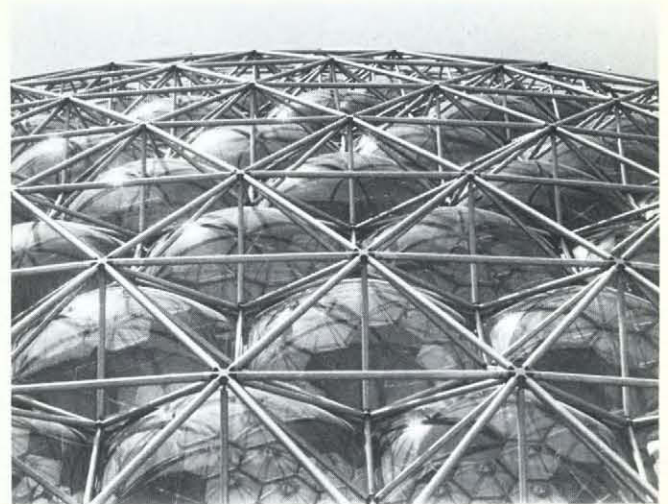
## 13. SAFETY FEATURES — Emergency lighting.

## 14. EXTERIOR WORK (where part of the construction contract) — Flagpole area, reflecting pool, landscaping.

## 15. OTHER ITEMS OF PARTICULAR INTEREST

1. Acrylic domes.

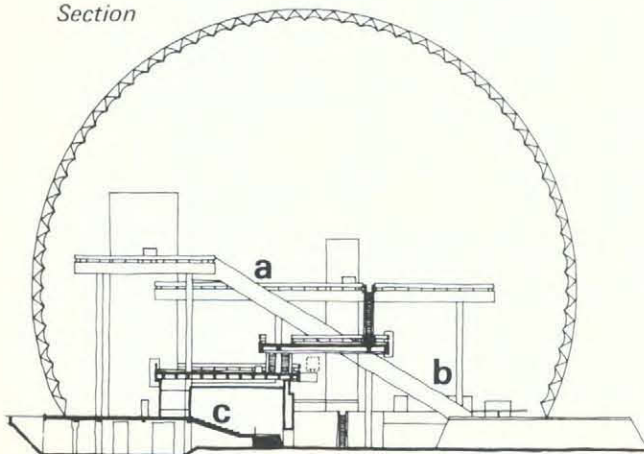
*closeup of framing*



*erecting framing*



*Section*



- a. Brief description: Large acrylic, 1/4" thick, hexagonal and pentagonal domes approx. 10' on a side.
  - b. Location: Exterior of building (i.e. part of dome).
  - c. Manufacturer or producer: Rohm & Haas Co., Philadelphia, Pa.
  - d. Nearest source of more information: Same.
2. Decorative wall finish:
- a. Brief description: A wall decoration, the dominant element of which was an American eagle made up multiple concave brass mirrors of approximately 1/2" diameter that dangled and shimmered with air movements.
  - b. Location: Exterior wall of theatre.
  - c. Manufacturer or producer: Displayers Incorporated, New York city.
  - d. Nearest source of more information: Same.

## 16. COMMENTS —

- a. General: This intriguing structure constituted one of the outstanding contributions to Expo, both

*American eagle (see item 15.2 above)*



because of its geodesic dome and the controversial approach taken towards exhibit design. Most certainly, it will go down in history as an important step in the ongoing work to solve the problems of environmental control. Future use of this type of structure in a country like Canada, however does not appear feasible at the present time. The reasons are two fold: The problem of winter heating, and the large variations of seasonal temperatures which will make the extra large acrylic domes of this particular structure, for example, undergo considerable expansion and contraction, thus causing leakage at the joints.

- b. Structural details: A more universal and flexible joining system of a dome's members would be of considerable advantage. The welded joints used in this instance do not allow for easy disassembly. The jointing details of the acrylic members of the "skin" were thoughtfully designed but defects showed during execution, possibly due to the fact that installation had to take place under very adverse winter weather conditions.

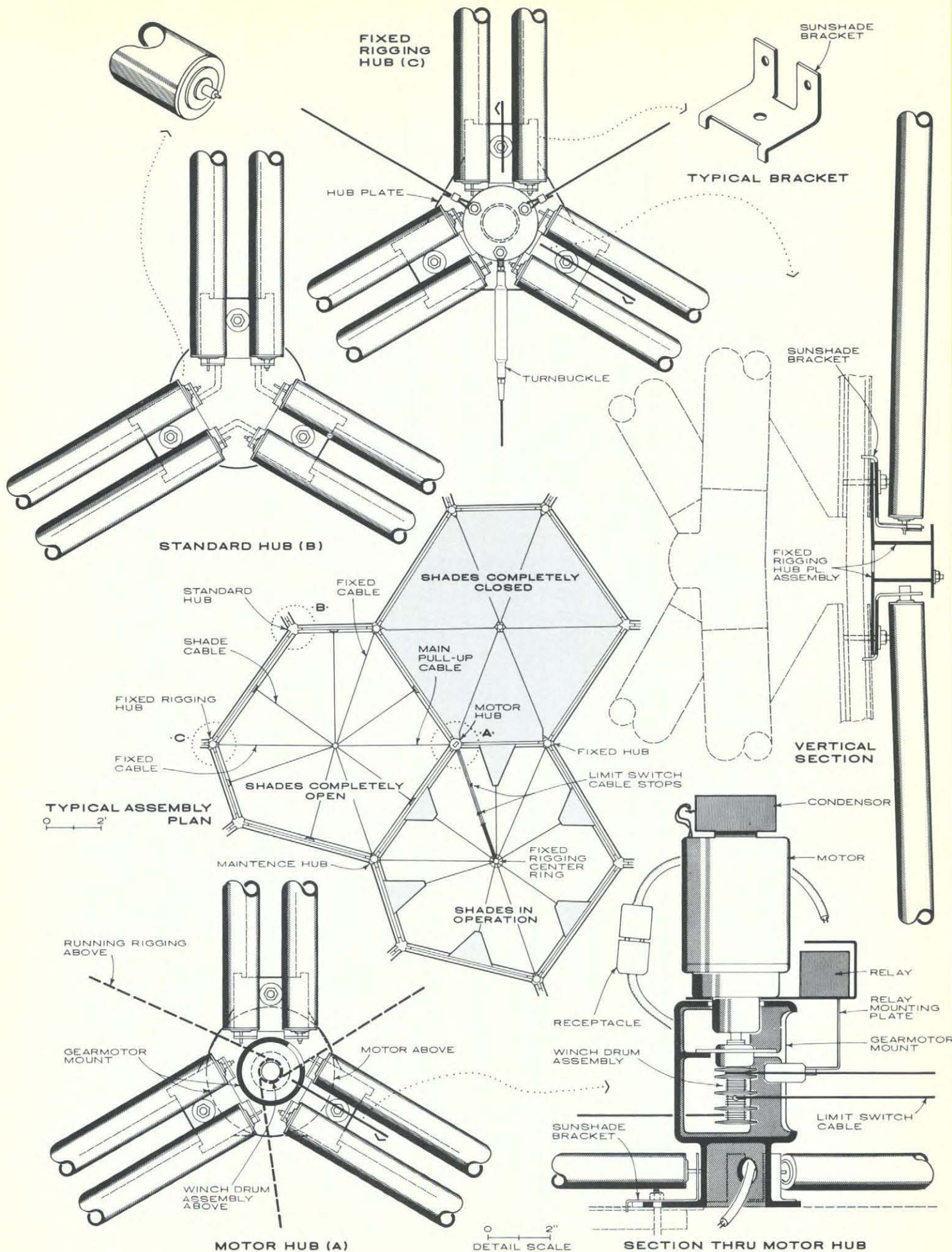
## 12. PERFORMANCE RECORD —

- a. When and where was item first manufactured? : Prototype, approximately April, 1966.

## C. DATA ON INNOVATION — UNITES STATES OF AMERICA

1. NAME OF ITEM — Sunshades.
2. LOCATION — Interior of dome opposing the sun.
3. DESIGNER OR SELECTOR INVOLVED — Buckminster Fuller.
4. WHY WAS ITEM SELECTED? — As a radiant sun heat control.
5. WAS ITEM PRODUCED SPECIFICALLY FOR EXPO? — Yes.
6. MANUFACTURER — Piccard Draperies Ltd., Montreal.
7. DISTRIBUTOR (nearest) — None.
8. NEAREST SOURCE OF ADDITIONAL INFORMATION — Manufacturer.
9. INSTALLER OR SUBCONTRACTOR — Manufacturer.





SHADES AND OPERATIONAL DETAILS

## 10. MARKETING —

- a. If the item is of Canadian manufacture:
  - (i) Is it now also manufactured abroad? : No.
  - (ii) Could it be manufactured abroad? : Yes, under agreement with Buckminster Fuller.
  - (iii) What patents are involved? : U.S. patent held by Buckminster Fuller.
- b. Is the item now commercially available? : No.
- c. Is further research and development required before marketing in Canada? : Yes, but there is little likelihood of the system becoming commercially available.
- d. What is the marketing feasibility and/or potential of the item? : Very little, as it was a special solution to a special problem which is not likely to occur frequently enough to warrant production.

## 11. TECHNICAL DATA AND EVALUATION —

- a. Generic and functional description: The system consists of mechanically actuated, triangular sun shades controlled by 600 odd motors (one mounted over the centre hub of each group of three interior hexagonal frames). Each of the motors is activated by the sun's rays striking it at a predetermined angle. When the motor goes into action, it starts to pull at three sets of cables (six cables per set). These cables, in turn, are wrapped around window-shade-type rollers overlaid on the interior hexagons.
- b. Dimensions and weights (units): The triangular shades are approximately 10'-0" along each side.
- c. Physical characteristics: Roller shade of aluminized fabric.
- d. Durability and resistance to exposures (weather, chemicals, etc.): High reflectivity; non fade. Wearability in this condition not known.

- e. Standards covering item: None.
- f. Test data: A special mock-up was tested prior to actual installation but the results were not available.

## 12. PERFORMANCE RECORD —

- a. When and where was item first manufactured? Prototype, approximately April, 1966.
- b. When and where was item first installed? : On mock up model of dome section.
- c. Experience in manufacture: Contact manufacturer.
- e. Service performance since installation: Maintenance hampered by difficult accessibility. Chances of failure high due to multiplicity of parts.
- d. Experience in installation (at Expo or elsewhere): Contact manufacturer.
- f. Experience with Canadian climate: No information available at time of study.
- g. Was item used for other purposes before? : No.
- h. Other suggested uses: None.

## 13. COST DATA — Available from manufacturer.

- 14. COMMENTS — The idea of the system is an ingenious one for the shading of a hexagonal structure without detracting from its geometry and constitutes an important step towards the environmental control of lighting and inside temperature. In this application, however, the system never functioned properly because of budget restrictions which did not permit its full development.

Located on the interior, the shades did not completely solve the heat dissipation problem as they would have on the exterior, although the aluminized fabric did reflect a portion of the heat back through the acrylic skin. The system in itself has no wide application worth further study, but the basic idea of using automatic controls for environment sun control may have future use, within modified methods of shading.



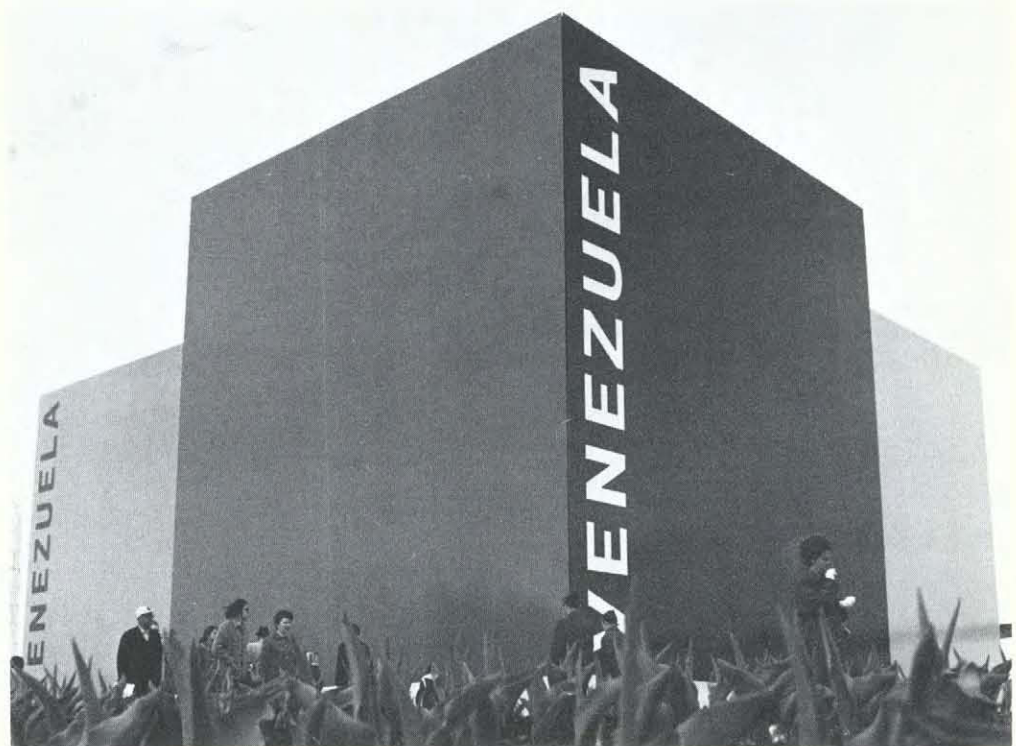
## VENEZUELA

### A. GENERAL DATA

1. NATURE OF PAVILION/STRUCTURE — Temporary.
2. LOCATION — Expo Area: Ile Notre-Dame;  
Lot No. 4300;  
Key Plan No. 460.
3. OWNER (or contracting body) — Government of Venezuela.
4. DESIGN ARCHITECT — Dr. Carlos Raoul Villanueva and Dr. Eduardo Trujillo, Caracas, Venezuela.
5. LOCAL ASSOCIATE ARCHITECT — Erickson and Massey, Montreal.
7. LOCAL ASSOCIATE CONSULTING ENGINEERS —
  - a. Structural: Baracs & Gunther, Montreal.
  - b. Mechanical & electrical: Brais, Ouellette, Frigon, Brett, Hanley, Berthiaume, Montreal.
9. GENERAL CONTRACTOR — Allan Construction Ltd., Trois-Rivieres, Quebec.
10. OTHER CONTRACTORS OF SPECIAL INTEREST — Canarch (Division of Canadair Limited), St. Laurent, Quebec. (Aluminum curtain wall).

### B. GENERAL DESCRIPTION OF PAVILION/STRUCTURE

1. FUNCTIONAL DESCRIPTION — The pavilion consisted of three equal sized cubes (42' to a side), linked by a common entrance lobby which was approached by three separate ramps. Painted in bright contrasting colors, the cubes contained a bar and restaurant, a theatre, a tropical garden, and administration and service areas.
2. DIMENSIONS —
  - a. Size: 42' x 42' (each cube).
  - b. Area: 10,300 sq. ft.
  - c. Height: 42'.
  - d. Stories: One (two cubes); three (third cube).
3. FOUNDATIONS — Concrete piles, reinforced concrete foundations.
4. STRUCTURE — Structural steel with expanded steel roof trusses.
5. WALLS & EXTERIOR CLADDING — Painted aluminum sheet curtain wall.
6. ROOF — Built up roofing over wood deck.



7. WINDOWS & ENTRANCES — No windows; plastic sky dome over corridor lobby; tempered glass folding door (main entrance).

8. INTERIOR FINISHES —

- a. Floors: Exposed aggregate, carpet.
- b. Walls: Drywall, plaster, "stramit" (pressed straw composition panel) with painted vinyl facing, bush hammered concrete, painted aluminum.
- c. Ceilings: Exposed painted structural steel and wood decking, drywall, carpet (corridor areas).

9. MECHANICAL SYSTEMS —

- a. Plumbing: Standard; electric hot water tanks.
- b. Heating, ventilation, air conditioning: A.C. made up of two separate systems. System one served two cubes, consisted of roof mounted cold generator with air cooled condenser, package A.C. supply unit serving audio cube and 3 multi-zone units for 3 zones (corridor, restaurant and administration); total capacity 15T. Heating by hot water or electrical heating coils in ductwork. All areas were fully mechanically ventilated.
- c. Kitchen: Domestic type for limited restaurant.

10. ELECTRICAL —

- a. Power: 12,000 V, incoming service step down to 480 V service for power and equipment with 600 KVA dry transformer. (It was intended to take equipment to Venezuela after exhibition).
- b. Lighting: Primarily incandescent; fluorescent (service areas); quartz (both for interior indirect lighting and exterior floodlighting).
- c. Audio-visual system: Part of exhibits contract.

11. SPECIAL TRAFFIC CONVEYING EQUIPMENT — Dumbwaiter between storage area and kitchen.

12. FIRE PROTECTION — Extinguishers; fire retardant stain to exposed wood roof deck; hose cabinet; carpet (from Venezuela) fire retardant treated.

13. SAFETY FEATURES — Emergency lighting, thermal detection fire alarm system.

14. EXTERIOR WORK (where part of the construction contract) — Sand blasted concrete banks, exposed

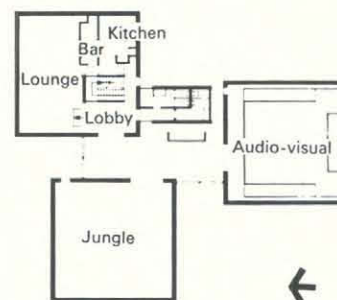
aggregate exterior ramps, floodlighting around building perimeter.

15. OTHER ITEMS OF PARTICULAR INTEREST — Curtain wall

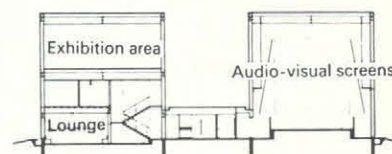
- a. Brief description: Painted sheet aluminum in 6' x 42' sections made of 1/4" thick mill finish aluminum (painted with lacquer type paint) hung from top supporting beam. Joints were butted and filled with joint sealant.
- b. Location: Exterior wall.
- c. Manufacturer or producer: Canarch (Division of Canadair Ltd.), St. Laurent, Quebec.
- d. Nearest source of more information: Same

16. COMMENTS — Classical in approach, the three, brightly painted and ingeniously arranged, "op-art" cubes constituted one of the simplest, yet most noticeable pavilions at Expo. Their only drawback, perhaps was the visible waviness of the sheet aluminum curtain wall panels with which they were clad.

*Plan*



*Section*





## VERMONT

### A. GENERAL DATA

1. NATURE OF PAVILION/STRUCTURE — Temporary.
2. LOCATION — Expo Area: Ile Sainte-Hélène;  
Lot No. 3110;  
Key Plan No. 326.
3. OWNER (or contracting body) — Development Department, State of Vermont.
4. DESIGN ARCHITECT — Mr. Peter Acres, Montreal (architect); Kissiloff & Wimmershoff Ltd., Montreal (exhibit & concept design).
6. CONSULTING ENGINEERS —
  - a. Structural: E.A. Dahl, Montreal.
  - b. Mechanical & electrical: T. G. Anglin Engineering Company, Montreal.
9. GENERAL CONTRACTOR — Pollock McGibbon, Montreal.

### B. GENERAL DESCRIPTION OF PAVILION/STRUCTURE



1. FUNCTIONAL DESCRIPTION — Built of materials native to the state of Vermont, the pavilion was entered by a ramp which led to a second floor exhibit area. From here, visitors moved down a staircase to a ground floor exhibit area then into a theatre. Located at the exit was a tourist information office.
2. DIMENSIONS —
  - a. Size: 85' x 92'.
  - b. Area: 6,770 sq. ft.
  - c. Height: 68'.
  - d. Stories: Two.
3. FOUNDATIONS — Poured concrete spread footings supporting structure.
4. STRUCTURE — Laminated B.C. fir demountable framing with bolted connections. Ground floor structure was concrete on grade. Second floor structure consisted of mill deck panels of Spruce bolted to laminated B.C. Fir beams. Panels were prefabricated (20' x 4'.)
5. WALLS & EXTERIOR CLADDING — Wall and roof panels (20' x 4' prefabricated mill deck) bolted to laminated wood structure. Exterior cladding consisted of vertical Vermont Pine barn boarding nailed to mill deck except panels for the tourist office where Vermont slate veneer was used.
6. ROOF — Sloping roofs: 45 lbs. roofing felt, with Cedar hand-split shakes over, treated with fire retardant stain. Flat roof area: 4 ply asphalt and gravel roofing.
7. WINDOWS & ENTRANCES — Pine window frames with 1/4" fixed polished plate glass. Pine doors, solid core, some with 1/4" plate glass glazing.
8. INTERIOR FINISHES —
  - a. Floors: Exposed concrete (theatre), carpet.
  - b. Walls: Mill deck panels, some painted; painted 1/2" gyproc.
  - c. Ceilings: Painted mill deck panels.
9. MECHANICAL SYSTEMS —
  - a. Plumbing: Standard commercial type fixtures.
  - b. Heating, ventilation, air conditioning: Nominal

electric baseboard and duct heating. In wash-rooms and theatre projection room standard roof top exhausts.

- d. Other: Circulation and filtering system for outside pool and waterfall.

#### 10. ELECTRICAL —

- a. Power: 12-1/2 KV outside transformer sub-station.
- b. Lighting: General incandescent illumination; other lighting formed part of exhibits.

12. FIRE PROTECTION — Fire alarm system and portable fire extinguishers.

14. EXTERIOR WORK (where part of the construction contract) — Concrete paving on crushed stone, sodding, two maple trees, reflecting pool and waterfall.

16. COMMENTS — Reflecting the ruggedness and rural character of New England the pavilion was a demountable structure (bolted frame and prefabricated wall panels), intended for demolition and reconstruction back in Vermont.



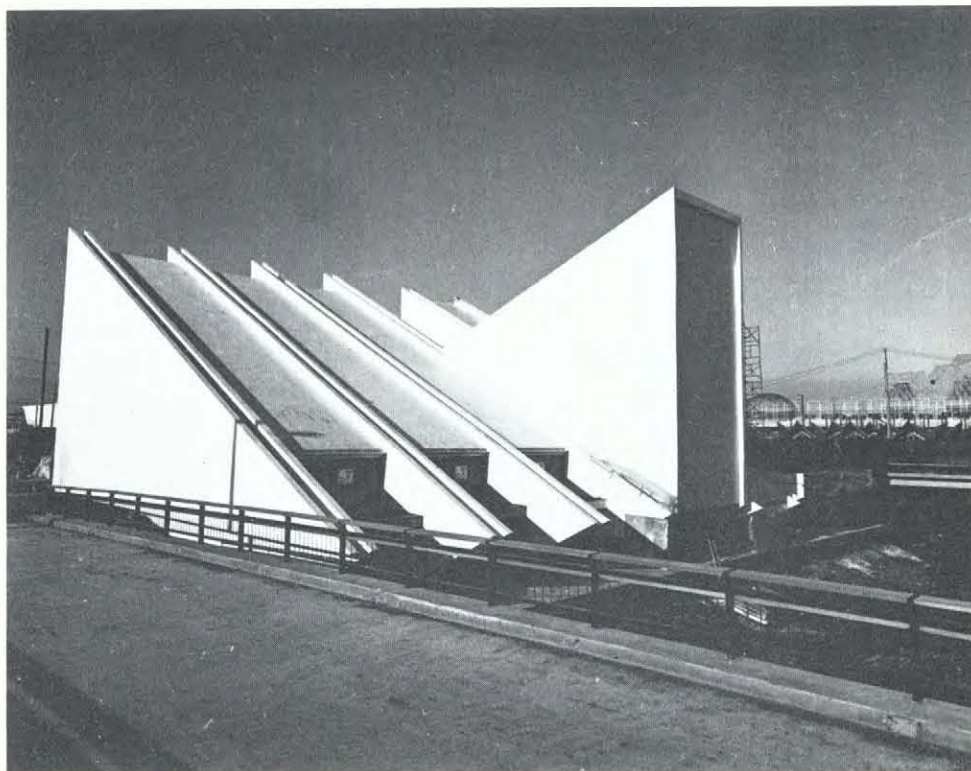
## YUGOSLAVIA

### A. GENERAL DATA

1. NATURE OF PAVILION/STRUCTURE – Temporary.
2. LOCATION – Expo Area: Ile Notre-Dame;  
Lot No. 4220;  
Key Plan No. 424.
3. OWNER (or contracting body) – Yugoslav Generalni Komesarijat.
4. DESIGN ARCHITECT – Miroslav Pesic, Belgrade, Yugoslavia.
5. LOCAL ASSOCIATE ARCHITECT – M. N. Kopsa, Toronto.
6. CONSULTING ENGINEERS –
  - a. Structural: Oskar Hraborski, Yugoslavia.
7. LOCAL ASSOCIATE CONSULTING ENGINEERS—
  - a. Structural: C.E. Welsh, Toronto.
  - b. Mechanical and electrical: R. E. Crossey & Associates Limited, Toronto.
9. GENERAL CONTRACTOR – Secant Construction Company Limited, Ville d'Anjou, (Montreal), Quebec.

### B. GENERAL DESCRIPTION OF PAVILION/STRUCTURE

1. FUNCTIONAL DESCRIPTION – Containing exhibits which illustrated both the past and contemporary life of Yugoslavia, the pavilion was composed of vertical, triangular elements, separated by glazed strips and arranged to give a one way steeply sloped profile alternating in direction. Contained were a reception area, exhibition space, a theatre and offices.
2. DIMENSIONS –
  - a. Size: 152' x 127'-6".
  - b. Area: 13,892 sq. ft.
  - c. Height: 62'.
  - d. Stories: One plus basement.
3. FOUNDATIONS – Franki piles capped and 12" reinforced concrete walls to grade.
4. STRUCTURE – Steel portal frames in a shed roof shape (one way steep slope); beams and channels spanned between frames to carry wood joists wedged between.



5. WALLS & EXTERIOR CLADDING – Cocoon vinyl coating on 3/8" plywood.
6. ROOF – Cocoon vinyl coating on 3/8" plywood.
7. WINDOWS & ENTRANCES – Pressed metal, glazed doors; boxed, channel section window frame; pressed metal window sections (basement).
8. INTERIOR FINISHES –
  - a. Floors: 1" marble on 1" sand bed; carpet (theatre).
  - b. Walls: Cocoon vinyl coating on 3/8" plywood, gypsum board on metal stud, painted concrete block.
  - c. Ceilings: Gypsum board, acoustic plaster, cork facing (theatre).
9. MECHANICAL SYSTEMS –
  - a. Plumbing: Standard fixtures and plumbing; electric hot water tank.
  - b. Heating, ventilation, air conditioning: 6 A/C units, connected to distribution ducts.
10. ELECTRICAL –
  - a. Power: 12.5 KV primary service entry, step down with 300 KVA dry core type transformer to 120/208 V, 3 phase.
  - b. Lighting: 120/208 V, fluorescent and incandescent.
  - c. Audio-visual systems: Theatre screen, back projection type.
  - d. Other: P.A. system.
12. FIRE PROTECTION – Fire extinguishers.
14. EXTERIOR WORK (where part of the construction contract) – Marble plaza.



**FOREIGN PAVILIONS**

**PRIVATE PAVILIONS**





## ECONOMIC PROGRESS

### A. GENERAL DATA

1. NATURE OF PAVILION/STRUCTURE — Temporary.
2. LOCATION — Expo Area: Ile Notre-Dame;  
Lot No. 4241;  
Key Plan No. 448.
3. OWNER (or contracting body) — Harkavy Associates Inc., New Rochelle, New York.
4. DESIGN ARCHITECT — Pisani & Falco Associates, New York.
5. LOCAL ASSOCIATE ARCHITECT — Menkes & Webb Architects, Montreal.
6. CONSULTING ENGINEERS —
  - a. Structural: Paul P. Valerio Associates, Brooklyn, New York.
  - b. Mechanical and electrical: Henry J. Campbell & Associates, New York.
9. GENERAL CONTRACTOR — Argo Construction Company Limited, Montreal.

### B. GENERAL DESCRIPTION OF PAVILION/STRUCTURE

1. FUNCTIONAL DESCRIPTION — A one storey building with basement, this pavilion depicted the history of Canadian economic development. The ground floor contained a display area and a revolving

theatre in which the pavilion's theme was presented by means of a musical puppet show. The basement housed a VIP lounge and broadcasting studio.

### 2. DIMENSIONS —

- a. Size: 84' x 110'.
- b. Area: 6,590 sq. ft.
- c. Height: 19'.
- d. Stories: One.

### 3. FOUNDATIONS — Concrete spread footings.

4. STRUCTURE — Combination of concrete walls and steel columns supported ground floor concrete slab and structural steel superstructure with open web steel roof joists.

### 5. WALLS & EXTERIOR CLADDING — Concrete block unfinished.

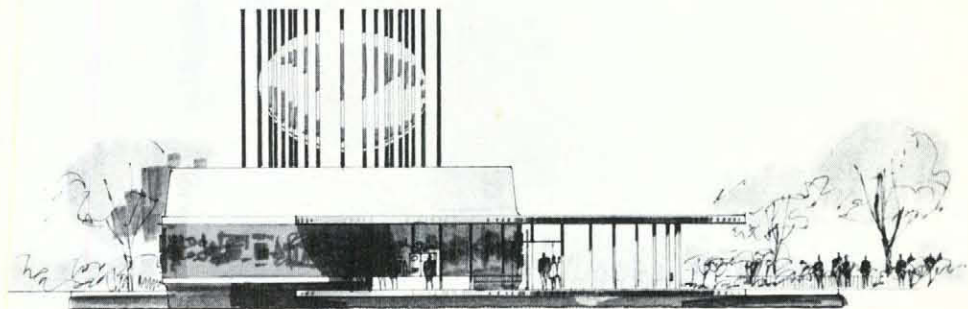
### 6. ROOF — Tar and gravel on metal roof deck.

7. WINDOWS & ENTRANCES — Fixed glass and hopper type windows in basement; wood frames, wood sash, single glazing. At ground floor level, full height solid core Birch doors in Oak frames.

### 8. INTERIOR FINISHES —

- a. Floors: Vinyl tile (exhibit and service areas), carpet (theatre).
- b. Walls: Painted concrete block and painted drywall partitions (2" x 4" stud framing).

*Artists conception*



- c. Ceilings: Sprayed accoustic plaster on metal lath on metal suspension system in display areas. No ceiling in theatre. Fiberboard accoustical tile on tee bar system in basement areas.

9. MECHANICAL SYSTEMS —

- a. Plumbing: Standard toilet fixtures.
- b. Heating, ventilation, air conditioning: No heating. Two package roof type air conditioning units with duct system for ground floor area. One package unit located outside basement wall serving basement areas.

10. ELECTRICAL —

- a. Power: Transformer shared with Cuban pavilion (180 KW).
- b. Lighting: Fluorescent (general building lighting); remainder was incorporated with exhibits.

12. FIRE PROTECTION — Fire alarm system, portable fire extinguishers.

14. EXTERIOR WORK (where part of the construction contract) — Concrete paving on crushed stone, sodding, hedges & trees in pots.

16. COMMENTS — This was a conventional structure of which the most interesting part was a huge 160' round rotating fiberglass storeywall.





## EUROPEAN COMMUNITIES

### A. GENERAL DATA

1. NATURE OF PAVILION/STRUCTURE — Temporary.
2. LOCATION — Expo Area: Ile Notre-Dame;  
Lot No. 4120;  
Key Plan No. 451.
3. OWNER (or contracting body) — European Economic Community.
4. DESIGN ARCHITECT — Andre Crivelli (Paris, France), H. Bowenter (Kettwig, Germany), Mrs. A.D. Serafini-Possi (Rome, Italy).
5. LOCAL ASSOCIATE ARCHITECT — Beaulieu, Lambert, Tremblay, Montreal.
6. CONSULTING ENGINEERS —
  - a. Structural: Beaulieu, Trudeau & Associates, Montreal.
  - b. Mechanical and electrical: Leblanc, Montpetit & Lagacé, Montreal.
9. GENERAL CONTRACTOR — B.G.L. Engineers & Contractors, Montreal.

### B. GENERAL DESCRIPTION OF PAVILION/STRUCTURE

1. FUNCTIONAL DESCRIPTION — The building was an elongated hexagonal structural with a diamond form roof. Exhibits located on three different levels, depicted the interrelated economies of the six members of the European Common Market. The lowest level also included a food tasting bar.
2. DIMENSIONS —
  - a. Size: 82' x 124'.
  - b. Area: 23,000 sq. ft.
  - c. Height: 47'-7".
  - d. Stories: Three levels.
3. FOUNDATIONS — Expanded base concrete piles with pile caps and grade beams.

4. STRUCTURE — Structural steel fabricated by Krupp in Hanover, Germany and erected by Krupp. Standard DIN sections.
5. WALLS & EXTERIOR CLADDING — Anodized extruded aluminum curtain wall with 1/4" thick, solar grey, polished plate glass.
6. ROOF — 4" mill deck on steel structure with sandwich roof panels on top. Sandwich panel consisted of plywood core with stainless steel on exterior and sheet steel on interior. Panels were connected with extruded aluminum trim caulked with Tremco "Mono Lasto-Meric".
7. WINDOWS & ENTRANCES — Extruded, anodized aluminum curtain wall (see 5 above). Store front type, extruded, anodized aluminum doors with 1/4" grey, polished plate glass.
8. INTERIOR FINISHES —
  - a. Floors: Carpet on wood subfloor.
  - b. Walls: Metal stud partitions with felt covered gyproc.
  - c. Ceilings: Lower floor, metal suspension with felt covered gyproc. Ground floor, metal suspension with mineral acoustical tile. Upper floors, mill deck exposed.
9. MECHANICAL SYSTEMS —
  - a. Plumbing: Two staff washrooms with standard fixtures. No public washrooms.
  - b. Heating, ventilation, air conditioning: Electric coils in air conditioning system. Central, package type, refrigeration units with metal duct distribution system.
  - c. Kitchen: Pantry with warm table, residential type stove, refrigerator and dishwasher.
10. ELECTRICAL —
  - a. Power: 12,000 Volt entry, 112.5 KVA transformers, 600-120/208 Volts, 3 phase, 4 wire.
  - b. Lighting: Incandescent and fluorescent, direct and indirect.

c. Audio-visual systems: Part of exhibits.

11. SPECIAL TRAFFIC CONVEYING EQUIPMENT — Two Otis German escalators of standard lengths.

12. FIRE PROTECTION — Fire alarm system. Standpipe system and portable fire extinguishers.

14. EXTERIOR WORK (where part of the construction

contract) — Exterior concrete terraces. Six, spun aluminum flagpoles, 55' tall.

16. COMMENTS — In spite of expensive materials (a roof of stainless steel, for example), this was a bulky unimpressive building. Its most interesting aspect was the precision with which the steel structural system was manufactured and assembled (in Germany).



## ORGANIZATION FOR ECONOMIC COOPERATION AND DEVELOPMENT

### A. GENERAL DATA

1. NATURE OF PAVILION/STRUCTURE — Temporary.
2. LOCATION — Expo Area: Ile Notre-Dame;  
Lot No. 4228;  
Key Plan No. 420.
3. OWNER (or contracting body) — Organization for Economic Cooperation and Development, Paris, France.
4. DESIGN ARCHITECT — Haruden & Bombelli, Barcelona, Spain.
6. CONSULTING ENGINEERS — No information available.
9. GENERAL CONTRACTOR — Anglo-Iberia de Construcciones, Barcelona, Spain.

### B. GENERAL DESCRIPTION OF PAVILION/STRUCTURE

1. FUNCTIONAL DESCRIPTION — The pavilion contained a library-type exhibit space and a conference room. A rectangular structure, it was pre-fabricated in Barcelona, Spain.
2. DIMENSIONS —
  - a. Size: 67' x 60'.
  - b. Area: 4020 sq. ft.
  - c. Height: 10'.
  - d. Stories: One.
3. FOUNDATIONS — Individual spread concrete footings, steel framed floor with wood panels.
4. STRUCTURE — Prefabricated, demountable tubular steel with open web steel joists and wood decking.
5. WALLS & EXTERIOR CLADDING — 1/4" clear plate glass in steel framing and plywood insulated sandwich panels.
6. ROOF — Four-ply tar and gravel on rigid insulation.

7. WINDOWS & ENTRANCES — For windows see exterior wall cladding. Steel framed entrance doors with 1/4" clear plate glass.

### 8. INTERIOR FINISHES—

- a. Floors: Carpet on wood.
- b. Walls: Plywood sandwich panels, painted.
- c. Ceilings: Exposed open web steel joists and wood deck.

### 9. MECHANICAL SYSTEMS —

- a. Plumbing: No washrooms.
- b. Heating, ventilation, air conditioning: Package type hot air. Air conditioning unit, 8 ton air conditioning load.

### 10. ELECTRICAL —

- a. Power: 40 KW entrance, 110/220 V.
- b. Lighting: Part of exhibits.

### 12. FIRE PROTECTION — Portable fire extinguishers.







## **LA RONDE AND MISCELLANEOUS**

## **EXPO BUILDINGS**





## THE BATHHOUSE

### A. GENERAL DATA

1. NATURE OF PAVILION/STRUCTURE — Temporary.
2. LOCATION — Expo Area: Ile Sainte-Hélène;  
Lot No. Existing Building on Saint  
Hélène Park;  
Key Plan No. 353.
3. OWNER (or contracting body) — Ville de Montréal.
4. DESIGN ARCHITECT — L.V. Shultz, Montreal.
6. CONSULTING ENGINEERS —
  - b. Mechanical and Electrical: Brais, Ouellette,  
Frigon, Brett, Hanley, Berthiaume.
9. GENERAL CONTRACTOR — A.C. Construction.

### B. GENERAL DESCRIPTION OF PAVILION/STRUCTURE

1. FUNCTIONAL DESCRIPTION — This building formerly housed the changing rooms and services for the island's public swimming pools. Modified with the minimum of alteration to accommodate changing facilities for Expo hostesses, it was to be reconverted at the end of Expo.
2. DIMENSIONS — Existing building.
3. FOUNDATIONS — Existing building.
4. STRUCTURE — Existing building.

5. WALLS & EXTERIOR CLADDING — Existing building.

6. ROOF — Existing building.

7. WINDOWS & ENTRANCES — Existing building.

8. INTERIOR FINISHES —

- a. Floors: Existing.
- b. Walls: New gypsum board partitions and glazed partitions.
- c. Ceilings: Existing.

9. MECHANICAL SYSTEMS —

- a. Plumbing: New fixtures connected to existing plumbing where required.
- b. Heating, ventilation, air conditioning: Suspended unit fan coil units in changing and shower rooms for winterization.

10. ELECTRICAL —

- a. Power: 500 V main for laundry.
- b. Lighting: Additional fluorescent and incandescent fixtures, and new outlets in partitions connected to existing circuits.

12. FIRE PROTECTION — Fire extinguishers.

## CARREFOUR INTERNATIONAL

### A. GENERAL DATA

1. NATURE OF PAVILION/STRUCTURE — Temporary.
2. LOCATION — Expo Area: La Ronde;  
Lot No. 5200;  
Key Plan No. 551.
3. OWNER (or contracting body) — Canadian Corporation for the 1967 World Exhibition.
4. DESIGN ARCHITECT — Martin, Rosen, Caruso, Vecsei, Montreal.
6. CONSULTING ENGINEERS —
  - a. Structural: Sكتور, Barbacki, Forté & Associates, Montreal.
  - b. Mechanical and electrical: Levine & Jonas, Montreal.
8. OTHER CONSULTANTS — Landscape: Sasaki, Strong and Associates Limited, Toronto.
9. GENERAL CONTRACTOR — Paré & Quart Limited, Montreal.

### B. GENERAL DESCRIPTION OF PAVILION/STRUCTURE

1. FUNCTIONAL DESCRIPTION — This was a bazaar like complex of international restaurants, small shops, courtyards, malls and plazas, all set to a triangular grid and covered by a structural translucent roof.
2. DIMENSIONS —
  - a. Size: 540' x 260' (irregular).
  - b. Area: 47,000 sq. ft.
  - c. Height: 17'-6" to 24'-6".
  - d. Stories: One and two mixture.
3. FOUNDATIONS — Concrete piles, concrete grade beams set to triangular grid.
4. STRUCTURE — Heavy timber.
5. WALLS AND EXTERIOR CLADDING — Asbestos cement painted.
6. ROOF — Neoprene-hypalon over plywood; polyvinylchloride (pvc) stretched over canopy framing; cedar shingles on two restaurants.





7. WINDOWS AND ENTRANCES — Sheet glass in wood frames.

8. INTERIOR FINISHES —

- a. Floors: Exposed concrete (finishes applied by concessionaires).
- b. Walls: Drywall (finishes applied by concessionaires).
- c. Ceilings: Exposed timber structure.

9. MECHANICAL SYSTEMS —

- a. Plumbing: Standard; electric domestic hot water system.
- b. Heating, ventilation, air conditioning: Mechanical ventilation of public washrooms was provided. All remaining mechanical work such as air conditioning was handled by the concessionaires.
- c. Kitchen: Part of restaurants and handled by concessionaires.

10. ELECTRICAL —

- a. Power: 120/208 V service entrance brought to

each building; electrical substation not part of this Contract.

- b. Lighting: General incandescent site lighting (approx. 3 ft. candles) and floodlighting provided; remaining done by concessionaires.

- c. Audio-visual system: Zoned speaker system part of overall C.C.W.E. system.

12. FIRE PROTECTION — Exterior hydrants, fire retardant to wood surfaces. Materials used were non-combustible; other protective devices were provided by concessionaires.

13. SAFETY FEATURES — Emergency lighting.

14. EXTERIOR WORK (where part of the construction contract) — Landscaping, paving, seating.

16. COMMENTS — Because of changes in the C.C.W.E. program which allowed design of the restaurants to be done by outside architects, and decreased control over graphics, the overall effect of the complex as originally envisaged was diluted. However, despite this, the strong visual features of the triangulated roofs, building units, planters, etc. unified the entire complex. The buildings themselves were designed as a basic framework within which the concessionaires could work and add their own qualities to the environment.

## CHILDREN'S WORLD

### A. GENERAL DATA

1. NATURE OF PAVILION/STRUCTURE — Permanent.
2. LOCATION — Expo Area: La Ronde;  
Lot No. 5420;  
Key Plan No. 528.
3. OWNER (or contracting body) — Canadian Corporation for the 1967 World Exhibition.
4. DESIGN ARCHITECT — John Schreiber and Radoslav Zuk, Montreal.
6. CONSULTING ENGINEERS —
  - a. Structural, mechanical and electrical: McMillan and Martynowicz, Montreal.
8. OTHER CONSULTANTS — Galemino & Goldstein, Montreal (Illumination) and Dr. F.M. Kraus, Montreal (Engineering — Rides).
9. GENERAL CONTRACTOR — Douglas Bremmer Contractors and Builders Limited, Montreal.

### B. GENERAL DESCRIPTION OF PAVILION/STRUCTURE

1. FUNCTIONAL DESCRIPTION — The complex was a children's amusement and play area. It consisted of five major rides, puppet theatre, restaurant, dairy bar and toy shop with ancillary facilities, baby care centre, changing rooms and offices.
2. DIMENSIONS —
  - a. Size: 380' x 190'.
  - b. Area: 70,000 sq. ft. total (5,800 sq. ft. enclosed).
  - c. Height: Restaurant 30', theatre 20'.
  - d. Stories: Two storey restaurant, remaining, one storey.
3. FOUNDATIONS — Spread reinforced concrete footings.
4. STRUCTURE — Structural steel for restaurant and theatre; reinforced concrete for remaining buildings.
5. WALLS AND EXTERIOR CLADDING — Sheet glass

and asbestos panels in painted steel sash for restaurant; canvas on steel frame for theatre; exposed concrete for remaining buildings.

6. ROOF — Canvas for theatre; fiberglass pyramid shaped units over restaurant; asphalt coating over concrete for all other buildings.
7. WINDOWS AND ENTRANCES — Sheet glass in painted steel sash for restaurant and service areas.

### 8. INTERIOR FINISHES —

- a. Floors: Exposed concrete, coloured asphalt (exterior areas), epoxy paint on concrete (washrooms).
- b. Walls: Canvas (theatre), exposed concrete, painted concrete block (ancillary areas), sheet glass and asbestos (restaurant).
- c. Ceilings: Exposed concrete; fiberglass; canvas.

### 9. MECHANICAL SYSTEMS —

- a. Plumbing: Standard; electric domestic hot water system.
- b. Heating, ventilation, air conditioning: No air conditioning provided under this contract; exhaust fan ventilation system (kitchen, washroom and theatre), overhead electric heating (ancillary areas).
- c. Kitchen: Commercial kitchen (restaurant) installed by concessionaire.

### 10. ELECTRICAL —

- a. Power: 600 V incoming, 2 feeder service entry, step down 120/208 V service with 30 KVA dry type transformer (theatre), 45 KVA (CCWE services), 75 KVA (dairy bar and toy shop), 112 KVA (restaurant), 600 V service brought to distribution panels at each ride.
- b. Lighting: Incandescent, fluorescent (washrooms and offices).

### 13. SAFETY FEATURES — Battery operated emergency lighting.

### 14. EXTERIOR WORK (where part of the construction contract) — Landscaping (planting, rock and sand areas, land forms); floodlighting.



15. OTHER ITEMS OF PARTICULAR INTEREST – FIBERGLASS SKYLIGHTS –

- a. Brief description: 9' square by 12' high pyramid shaped fiberglass skylight-roof units.
- b. Location: Over restaurant.
- c. Manufacturer or producer: Tanzer Industries Limited, Dorion, Quebec.

d. Nearest source of more information: Same.

16. COMMENTS: The name of the project was inaccurate; it was not a children's world. It was too stereo-typed a complex with few elements of surprise and revelation for the child. The manner in which the project was handled (a split of responsibility and authority), made it difficult if not impossible to control the final outcome of the complex.

## EXPO BANKING SERVICE (C.P.D.)

### A. GENERAL DATA

#### 1. NATURE OF PAVILION/STRUCTURE — Temporary.

#### 2. LOCATION — Bank No. 1 (Caisse Populaire).

Expo Area: Ile Notre-Dame;  
Lot No. 4248;  
Key plan No. 450.

Bank No. 2 (Canadian Imperial Bank  
of Commerce).

Expo Area: Ile Sainte-Hélène;  
Lot No. 3200;  
Key Plan No. 349.

#### 3. OWNER (or contracting body) — Canadian Corporation for the 1967 World Exhibition.

#### 4. DESIGN ARCHITECT — Marshall, Merrett, Stahl, Elliott & Mill, Montreal.

#### 6. CONSULTING ENGINEERS —

- a. Structural: Spector, Barbacki, Forte & Associates, Montreal.
- b. Mechanical and Electrical: Keith Associates Limited, Montreal.

#### 9. GENERAL CONTRACTOR — Rack Construction Limited, Montreal.

### B. GENERAL DESCRIPTION OF PAVILION/STRUCTURE

#### 1. FUNCTIONAL DESCRIPTION — Identical in design and construction, the two buildings provided banking facilities for concessionaires, exhibitors and the public (bulk money and day to day banking services).

#### 2. DIMENSIONS —

- a. Size: 68' across (12 sided polygon).
- b. Area: 4,950 sq. ft.
- c. Height: 14'.
- d. Stories: Partial basement plus one storey.

#### 3. FOUNDATIONS — Reinforced concrete foundations on spread footings.

#### 4. STRUCTURE — Reinforced concrete for basement and ground floor, structural steel above grade.

#### 5. WALLS & EXTERIOR CLADDING — Painted concrete block, exposed concrete with stucco texture, painted plywood.

#### 6. ROOF — Built up roofing over wood deck.

#### 7. WINDOWS & ENTRANCES — Sheet glass in painted wood frames.

#### 8. INTERIOR FINISHES —

- a. Floors: Vinyl asbestos floor tile.
- b. Walls: Concrete block, painted.
- c. Ceilings: Exposed concrete (basement), exposed mill deck stained, texture painted drywall to radial beam enclosures.

#### 9. MECHANICAL SYSTEMS —

- a. Plumbing: Standard, electric domestic hot water system.
- b. Heating, ventilation, air conditioning: Air conditioning fan coil unit with ductwork, air cooled condenser compressor on exterior, 12T capacity; electric baseboard heaters; ventilation (exhaust fan) of washrooms only.
- c. Kitchen: Domestic type in the basement.

#### 10. ELECTRICAL —

- a. Power: Bank No. 1 — 120/208V service entry provided by C.C.W.E.

Bank No. 2 — 12,000V, two feeder service entry, manual transfer switch, step down to 120/208V service with 112 KVA drycore transformer.

- b. Lighting: Fluorescent for general illumination, with incandescent for decorative purposes.
- d. Other: Telex, hold up alarm system.

#### 12. FIRE PROTECTION — Steel fire protected, fire retardant stain to wood.

#### 13. SAFETY FEATURES — Emergency lighting (battery operated), heat detection and manual fire alarm system.



14. EXTERIOR WORK (where part of the construction contract) — Landscaping, sign.

16. COMMENTS: The building program called for an

economical approach. This required materials that would be esthetically pleasing and structural at the same time. Concrete block walls were staggered to achieve an interesting pattern effect.

## EXPO POST OFFICE

### A. GENERAL DATA

1. NATURE OF PAVILION/STRUCTURE — Temporary.
2. LOCATION — Expo Area: Ile Sainte-Hélène;  
Lot No. 3179;  
Key Plan No. 340.
3. OWNER (or contracting body) — Canadian Corporation for the 1967 World Exhibition.
4. DESIGN ARCHITECT — Jean Michaud, Montreal.
6. CONSULTING ENGINEERS —
  - a. Structural: Labrecque, Vezina & Associates, Montreal.
  - b. Mechanical and electrical: Scharry & Ouimet, Montreal.
11. GENERAL CONTRACTOR — Solid Construction Cie. Ltee., Montreal.

### B. GENERAL DESCRIPTION OF PAVILION/STRUCTURE

1. FUNCTIONAL DESCRIPTION — This simple structure housed the typical facilities of a public post office.
2. DIMENSIONS —
  - a. Size: 33' x 33', with 6' roof overhang.
  - b. Area: 1,080 sq. ft.
  - c. Height: 11'.
  - d. Stories: One.
3. FOUNDATIONS — Reinforced concrete floating slab.
4. STRUCTURE — Combination structural steel and timber.

5. WALLS & EXTERIOR CLADDING — Stained spruce wood T & G planking.

6. ROOF — Built up roofing over wood decking.

7. WINDOWS & ENTRANCES — Plate glass in anodized aluminum frames.

### 8. INTERIOR FINISHES —

- a. Floors: Vinyl asbestos floor tile (behind counter), exposed concrete aggregate (public areas).
- b. Walls: Stained T & G wood planking.
- c. Ceilings: Stained T & G wood planking, exposed structure.

### 9. MECHANICAL SYSTEMS —

- a. Plumbing: Standard (sink and electric hot water tank only).
- b. Heating, ventilation, air conditioning: None (natural ventilation).

### 10. ELECTRICAL —

- a. Power: 120/208 V service entry provided by C.C.W.E. to distribution panel.
- b. Lighting: Incandescent.

### 12. FIRE PROTECTION — Extinguishers.

13. SAFETY FEATURES — Wood surfaces stained with fire retardant stain.

16. COMMENTS — Budget requirements and a very functional program necessitated the straightforward solution of simple expression that resulted: a neat classical box-like building.

## EXPO SERVICE AREAS A, B, C & E

### A. GENERAL DATA

1. NATURE OF PAVILION/STRUCTURE — Temporary.
2. LOCATION — Expo Area: Ile Notre-Dame — Ile Sainte Hélène;  
Lot No. 4206-4226, 4076-4250, 4270, 3114, 427-17, 477-21, 317-10, 457-19;  
Key Plan No. 427, 457, 477, 317.
3. OWNER (or contracting body) — Canadian Corporation for the 1967 World Exhibition.
4. DESIGN ARCHITECT — Thompson, Berwick, Pratt, R.J. Thom, Toronto.
6. CONSULTING ENGINEERS —
  - a. Structural: Norbert Seethaler, Toronto.
  - b. Mechanical & electrical: R.E. Crossey, Toronto.
9. GENERAL CONTRACTOR — Ron Engineering & Construction (Quebec) Ltd., Montreal.

### B. GENERAL DESCRIPTION OF PAVILION/STRUCTURE

1. FUNCTIONAL DESCRIPTION — Expo Services Areas A, B and C on Ile Notre-Dame consisted of groups of separate buildings. In Area A, there were two restaurants and 53 boutiques and snack bars; in Area B, three restaurants and 47 boutiques and snack bars; in Area C, three restaurants and 70 boutiques and snack bars. The facilities of Area C were built around a lagoon on sloping ground. Some of the buildings were two stories high, with entry both from the higher level at the back and at lagoon level in front. Area E contained two restaurants and 60 snack bars and boutiques, linked by shielded walkways on two levels.

### 2. DIMENSIONS —

- b. Area: A-125,500 sq. ft; B-136,300 sq. ft; C-160,300 sq. ft; E-90,900 sq. ft.
- c. Height: varied from 10' to 40'.
- d. Stories: One, occasionally two.

### 3. FOUNDATIONS — Concrete spread footings.

4. STRUCTURE — Plywood web beams, glue laminated beams, wood posts, plywood box panels, concrete block walls.

*Expo Services Area, A.*



*Service area B bandshell*





5. WALLS & EXTERIOR CLADDING — Plywood, stained (fire retardant varnish); concrete block, painted.
6. ROOF — Pre-cast concrete decks; wood decks and plywood. Waterproofing finish:
  1. prime coat of static asphalt emulsion mineral colloid type;
  2. heavy coat of above at 3 gal/100 sq. ft. of roof;
  3. layer of 20/10 weave fibreglass membrane;
  4. seal coat of static emulsion as above at 3 gal/100 sq. ft.
7. WINDOWS & ENTRANCES — Wood window frames with fixed glass; wood glazed doors in wood frames.
8. INTERIOR FINISHES —
  - a. Floors: Concrete, wood sub-floor (finish by concessionaire), asphalt.
  - b. Walls: Plywood (stained with fire retardant varnish), painted concrete block, painted dry-wall.
  - c. Ceilings: Exposed structure, painted drywall.
9. MECHANICAL SYSTEMS —
  - a. Plumbing: Commercial type fixtures.
  - b. Heating, ventilation, air conditioning: Forced exhaust fan ventilation for washrooms only.
  - c. Kitchen: Equipment supplied and installed by concessionaires; water supply and drainage by CCWE.
  - d. Other: Area Drains.
10. ELECTRICAL —
  - a. Power: 15KV type sub-station, 120/208 V, 3/4 wire. Emergency power: 6 volts. Electrical service brought to each building and shop on separate meters.
  - b. Lighting: Incandescent and fluorescent, commercial 20-60 foot-candles. Exterior illumination for wall washing.
  - c. Audio-visual systems: Conduits provided for audio speaker system.
- 12.- FIRE PROTECTION — Fire extinguishers and standard CCWE fire alarm system.
14. EXTERIOR WORK (where part of the construction contract) — Site furniture, asphalt paving, landscaping by CCWE.

## EXPO SERVICES AREA D

### A. GENERAL DATA

1. NATURE OF PAVILION/STRUCTURE — Temporary.
2. LOCATION — Expo Area: Ile Sainte-Hélène;  
Lot No. 3196;  
Key Plan No. 357.
3. OWNER (or contracting body) — Canadian Corporation for the 1967 World Exhibition.
4. DESIGN ARCHITECT — Jerome Markson, Toronto.
6. CONSULTING ENGINEERS —
  - a. Structural: Norbert Seethaler, Toronto.
  - b. Mechanical & electrical: R.E. Crossey & Associates, Toronto.
9. GENERAL CONTRACTOR — Ron Engineering & Construction (Quebec) Ltd., Montreal.

### B. GENERAL DESCRIPTION OF PAVILION/STRUCTURE

1. FUNCTIONAL DESCRIPTION — This activity area on Ile Sainte-Hélène, adjacent to the Metro station entrance, consisted of various building units housing such public facilities as shops, boutiques, washrooms, restaurant, snack bars, small bandshell, information booth, etc.
2. DIMENSIONS —
  - b. Area: 107,427 sq. ft. (lot area).
  - c. Height: Varies from 10' to 20'.
  - d. Stories: One.
3. FOUNDATIONS — Concrete spread footings 4'-6" below grade.
4. STRUCTURE — 100 Wood Beams and joists sup-

ported by solid block. Foundation piers and columns at several locations.

5. WALLS & EXTERIOR CLADDING — Rough vertical boarding.
6. ROOF — Wood girders and joist construction supported by wood columns on solid block foundation piers. Built up roofing on 1" wood deck.
7. WINDOWS & ENTRANCES — None; skylights in some areas. Solid core and wood framed glass doors.
8. INTERIOR FINISHES —
  - a. Floors: Plywood, concrete, wood plank.
  - b. Walls: Drywall or wood siding, stained or painted.
  - c. Ceilings: Exposed wood structure, drywall.
9. MECHANICAL SYSTEMS —
  - a. Plumbing: Standard commercial type.
  - b. Heating, ventilation, air conditioning: Electric heating, centrifugal type roof exhausters, electric forced flow wall heaters; 3000 W, 208 V type.
  - c. Kitchen: Supplied and installed by Concessionaires.
10. ELECTRICAL —
  - a. Power: 225 KVA sub-station located in basement of restaurant transforming to 120/208 V.
  - b. Lighting: Incandescent and fluorescent.
12. FIRE PROTECTION — Standard CCWE fire alarm system.
14. EXTERIOR WORK (where part of the construction contract ) — Landscaping, paving, site furniture, etc. by CCWE.

## EXPO SERVICES AREA F

### A. GENERAL DATA

1. NATURE OF PAVILION/STRUCTURE — Temporary.
2. LOCATION — Expo Area: Cité du Havre;  
Lot No. 2460;  
Key Plan No. 237.
3. OWNER (or contracting body) — Canadian Corporation for the 1967 World Exhibition.
4. DESIGN ARCHITECT — John Andrews, Toronto
6. CONSULTING ENGINEERS —
  - a. Structural: Norbert Seethaler, Toronto
  - b. Mechanical and electrical: Ellard Willson & Assoc. Ltd., Toronto
9. GENERAL CONTRACTOR — Coronation Construction Ltd., Montreal

### B. GENERAL DESCRIPTION OF PAVILION/STRUCTURE

1. FUNCTIONAL DESCRIPTION — This area linked various pavilions and consisted of two restaurants of 150 and 125 seat capacity, a cafeteria, snack bars, a band shell, public washrooms and 50 boutiques of 100 sq. ft. each.
2. DIMENSIONS —
  - c. Height: Varies from 10' to 30'
  - d. Stories: One
3. FOUNDATIONS — Flat slab on grade and spread footings
4. STRUCTURE — Single storey structures with timber roof supported on either plywood box panels acting as columns in boutiques or load bearing block walls and piers in restaurant and snack bars.
5. WALLS & EXTERIOR CLADDING — Painted concrete block and stained plywood (fire retardant varnish).
6. ROOF — Boutiques, built up plywood deck on plywood box beams; elsewhere, built up plywood deck on joist and beams; built up roofing over decks.

7. WINDOWS & ENTRANCES — Fixed glass in wood frames, solid flush doors.

### 8. INTERIOR FINISHES —

- a. Floors: concrete, wood (finished floor applied by concessionaires), asphalt.
- b. Walls: Plywood (stained with fire retardant varnish), painted drywall, painted concrete block.
- c. Ceilings: Painted drywall, exposed structure.

### 9. MECHANICAL SYSTEMS —

- a. Plumbing: Central public washroom using standard plumbing fixtures; complete system of yard drainage, water distribution, sanitary sewers to C.C.W.E. provisions.
- b. Heating, ventilation, air conditioning: No heating or air conditioning (supplied and installed by concessionaires); sanitary exhaust ventilation for washrooms only.
- c. Kitchen: Kitchen equipment supplied and installed by concessionaires; washrooms for restaurant using standard plumbing fixtures; drainage and cold water provisions for kitchen.

### 10. ELECTRICAL —

- a. Power: Two electrical rooms, each containing 1-450 KVA, 12.5 KV - 120/208 V, 3  $\phi$  4W Transformer; power for snack bars, restaurants and boutiques (each boutique being on a separate meter).
- b. Lighting: Exterior incandescent only (located under canopies), fluorescent in public washrooms.
- c. Audio-visual systems: conduit for sound at performance area, sound system and conduit for boutique areas.

12. FIRE PROTECTION — Standard CCWE fire alarm system, fire retardant treatment of wood.

14. EXTERIOR WORK (where part of the construction contract) — Site furniture, landscaping, asphalt paving.

15. Other items of particular interest —



- a. Brief description: Prefabricated stressed skin beams and panels, Plywood both sides of wood framing.
- b. Location: Roof of restaurant.

16. COMMENTS — Although the architect expressed basic satisfaction with what had been accomplished, he stressed that architectural control and co-ordination were made difficult by the fact that the concessionaires did not know their final requirements until late in the overall process.

## EXPO WAREHOUSE

### A. GENERAL DATA

1. NATURE OF PAVILION/STRUCTURE — Temporary.
2. LOCATION — Expo Area: La Ronde;  
Lot No. 5523;  
Key Plan No. 507.
3. OWNER (or contracting body) — Canadian Corporation for the 1967 World Exhibition.
4. DESIGN ARCHITECT — Donaldson, Drummond, Sankey, Montreal.
9. CONSULTING ENGINEERS —
  - a. Structural: Structural steel design by the steel fabricator, Standard Structural Steel Limited, Montreal.
  - b. Mechanical and electrical: Herbert L. Wax & Associates, Montreal.
9. GENERAL CONTRACTOR — Coronation Construction Limited, St. Laurent, Quebec.

NOTE: This was a "package deal" project. The contractor supplied all services including design.

### B. GENERAL DESCRIPTION OF PAVILION/STRUCTURE

1. FUNCTIONAL DESCRIPTION — This building contained storage space for the use of C.C.W.E. concessionaires in addition to staff washrooms and offices.
2. DIMENSIONS —
  - a. Size: 216' x 327'.
  - b. Area: 71,000 sq. ft.
  - c. Height: 18'.
3. FOUNDATIONS — Concrete spread footings at columns.
4. STRUCTURE — Structural steel (27'-9" x 44' bay grid).

5. WALLS & EXTERIOR CLADDING — Corrugated cement-asbestos panels (walls), formed enamelled steel (fascia), exposed patterned cement block (one wall elevation).

6. ROOF — Built-up roofing on steel deck.

7. WINDOWS & ENTRANCES — No windows; fiberglass, overhead, manually operated doors.

### 8. INTERIOR FINISHES —

- a. Floors: Asphalt paving.
- b. Walls: Cement block, cement-asbestos.
- c. Ceilings: Exposed structure and steel deck.
- d. Stories: One.

### 9. MECHANICAL SYSTEMS —

- a. Plumbing: Sprinkler system; standard plumbing.
- b. Heating, ventilation, air conditioning: Building was ventilated by two 11,000 cfm wall exhaust fans.

### 10. ELECTRICAL —

- a. Power: 575V service entry, step down to 120/208 V service for conveniences with 300 KVA dry core transformer.
- b. Lighting: High output fluorescent (on 575 V service).

12. FIRE PROTECTION — Sprinkler system, manual fire alarm system.

13. SAFETY FEATURES — Emergency lighting (battery operated).

14. EXTERIOR WORK (where part of the construction contract) — Asphalt paving, loading dock, landscaping, chain link fence, guard booth at entrance gates.

16. COMMENTS — This was a very economical project, conducted on a competitive "package deal" basis. The contractor supplied all services, including design and demolition (should the building not be required after Expo).

## FORT EDMONTON—PIONEERLAND

### A. GENERAL DATA

1. NATURE OF PAVILION/STRUCTURE — Temporary.
2. LOCATION — Expo Area: La Ronde;  
Lot No. 5260;  
Key Plan No. 524.
3. OWNER (or contracting body) — Canadian Corporation for the 1967 World Exhibition.
4. DESIGN ARCHITECT — Etienne J. Gaboury, St. Boniface, Manitoba.
5. LOCAL ARCHITECT — H.C. Desautels, Montreal.
6. CONSULTING ENGINEERS —
  - a. Structural: Burgoyne and Thomassen, Winnipeg.
  - b. Mechanical: Sugiyama, Mitchell & Associates, Winnipeg.
  - c. Electrical: E.P. Debusschere, Winnipeg.
9. GENERAL CONTRACTOR — Legardeur Construction Inc., Montreal.

### B. GENERAL DESCRIPTION OF PAVILLION/STRUCTURE

1. FUNCTIONAL DESCRIPTION — Pioneerland was the reconstruction of an 1890's Western town similar to Dawson City. It included the Golden Garter Saloon, the Klondyke House Restaurant, the Wake Up Jake Saloon Restaurant, a row of shops and stores, museum, jail, a log fort with amusement galleries, the Flume Ride and a Logging Championship arena.
2. DIMENSIONS —
  - a. Size: Approximately 6 acres.
  - d. Stories: 2 maximum.
3. FOUNDATIONS — Spread footings.
4. STRUCTURE — All Wood
5. WALLS & EXTERIOR CLADDING — Wood with shakes, tongue and groove boards, rough sawn.
6. ROOF — Wood Shakes.

### 7. WINDOWS & ENTRANCES — Wood.

### 8. INTERIOR FINISHES —

- a. Floors: Wood.
- b. Walls: Wood, plaster.
- c. Ceilings: Wood.

### 9. MECHANICAL SYSTEMS —

- a. Plumbing: Standard plumbing fixtures and piping.
- b. Heating, ventilation, air conditioning: Electric baseboard heating. A/C units for large rooms; exhaust fans for toilets and kitchens.
- c. Kitchen: For restaurants.
- d. OTHER: Bar in saloon.





10. ELECTRICAL —

- a. Power: 600 V primary service with separate transformers in building. One transformer
  - 100 KVA to 120/208 V
  - 150 KVA to 120/208 V
  - 225 KVA to 120/208 V
  - 45 KVA to 120/208 VTwo transformers 75 KVA to 120/208 V
- b. Lighting: Incandescent (public areas), fluorescent (offices).

d. Other: Public address system.

- 12. FIRE PROTECTION — Fire hose cabinets and extinguishers, standard CCWE fire alarm system.
- 14. EXTERIOR WORK (where part of the construction contract) — Boardwalks and pole forest.

## FOUNTAIN OF THE SWANS

### A. GENERAL DATA

1. NATURE OF PAVILLON/STRUCTURE — Temporary.
2. LOCATION — Expo Area: Ile Sainte-Hélène;  
Lot No.: Swan Lake.
3. OWNER (or contracting body) — Canadian Corporation for the 1967 World Exhibition.
4. DESIGN ARCHITECT — J.M. D'Orsay, Montreal (Architectural illumination Consultant).
9. GENERAL CONTRACTOR — Siemens of Canada Limited, Montreal.
10. OTHER CONTRACTORS OF SPECIAL INTEREST — Pare & Quart, Montreal (substation 1000 KVA).

### B. GENERAL DESCRIPTION OF PAVILION/STRUCTURE

1. FUNCTIONAL DESCRIPTION — The fountain actually consisted of three sub-fountains, each containing three circular pontoons 10' in diameter, and joined to a central buoy by means of subsurface structures on which were mounted floodlights. Pumps were suspended below the surface within a draught of 16'. They were arranged to send vertical spouts to 80' (100' was possible but not considered necessary); parabolic spouts to 50'; low "crown" jets to 40' or 60'. The patterns possible from this arrangement were numerous. They were alternated and combined asymmetrically with colored lights by means of programmed tapes. On windy days, when blown spray became a problem, regular tapes were replaced with those programmed to give low water shows.
2. DIMENSIONS —

a. Size: 3-10' diameter pontoons within 25' diameter circle or equilateral triangle.

c. Height: Maximum 100' spout.

### 3. FOUNDATIONS — Mass concrete anchor blocks.

4. STRUCTURE — Pontoons tied to the buoy by a steel sub structure. Both the buoy and the pontoons were made of stainless steel.

### 9. MECHANICAL SYSTEMS —

a. Plumbing: Aeration of water spouts by special nozzles to provide proper light defraction.

### 10. ELECTRICAL —

a. Power: 1,000 KVA; 240KVA for floodlighting, 700 KVA for pump, remainder plus safety factor for panel. Maximum HP, 33 with 4" diameter nozzle. Minimum, 15 HP. 423-500 W submerged floodlights with red, blue, turquoise and amber filters.

16. COMMENTS — The intent of the design was to provide a pleasant background to the pavilions surrounding the lake; it was not meant to be a spectacle of primary importance. The asymmetrical playing of the waters was a requirement of the designer, who also requested an ordered transition between compositions, each of which was 90 seconds long. Accordingly, rest periods were introduced which ended with each new composition suddently bursting into life. This was quite dramatic at times and provided an intentional element of surprise to the show.

The fountain system was assembled and laid out on the ice of winter. This was done at such a time when it would no longer freeze in but still when the ice was thick enough for men to work. It was also designed to be sunk for later winter protection.

## GARDEN OF STARS

### A. GENERAL DATA

1. NATURE OF PAVILION/STRUCTURE — Temporary.
2. LOCATION — Expo Area: La Ronde;  
Lot No. 5250;  
Key Plan No. 545.
3. OWNER (or contracting body) — Canadian Corporation for the 1967 World Exhibition.
4. DESIGN ARCHITECT — Max W. Roth, Montreal.
6. CONSULTING ENGINEERS —
  - a. Structural: Dr. F.M. Kraus, Montreal.
  - b. Mechanical: T.G. Anglin Engineering Co. Ltd., Montreal.
  - c. Electrical: Mendel, Brasloff, Lassman and Sidler, Montreal.
8. OTHER CONSULTANTS — Bolt, Beranek and Newman, Cambridge, Mass. (acoustics); Abe Feder, New York (lighting).
9. GENERAL CONTRACTOR — Secant Construction Company, Montreal.
10. OTHER CONTRACTORS OF SPECIAL INTEREST — RCA Victor Company Limited, Montreal (sound system).

### B. GENERAL DESCRIPTION OF PAVILION/STRUCTURE

1. FUNCTIONAL DESCRIPTION — The building housed a 1,500 seat multi-purpose auditorium. Contained within it was a large triangular stage, on each side of which were first three rows of tables and then, a bleacher-type seating area. Under the bleacher sections were located offices, dressing rooms, service areas and a snack bar and kitchen.
2. DIMENSIONS —
  - a. Size: 161' to each side (triangular plan).
  - b. Area: 34,850 sq. ft.
  - c. Height: 51'-6".
  - d. Stories: One plus basement.

3. FOUNDATIONS — Concrete piles, reinforced concrete foundation walls.
4. STRUCTURE — Reinforced concrete; post tensioned ring beams running along 3 sides; precast concrete units for floor of bleacher area.
5. WALLS & EXTERIOR CLADDING — Exposed striated concrete (sand blasted), striated concrete block, painted cement-asbestos louvres.
6. ROOF — Built up roofing over concrete deck.
7. WINDOWS & ENTRANCES — Entrances: Plate glass in black anodized aluminum frames.
8. INTERIOR FINISHES —
  - a. Floors: Ozite carpet generally, epoxy on concrete, vinyl asbestos floor tile (service areas).
  - b. Walls: Wood slats, on masonite (walls of bleachers), painted plaster, exposed sand blasted concrete and a limited amount of painted concrete block (service and auditorium areas).
  - c. Ceilings: Wood fiber and cement board set in the formwork (HERAKLITH imported from Austria, a material similar to TECTUM) (auditorium), acoustical tile (service areas), cement plaster (snack bar and exterior soffits).
9. MECHANICAL SYSTEMS —

- a. Plumbing: Standard; gas fired domestic hot water system.
- b. Heating, ventilation, air conditioning: Only the auditorium area was air conditioned - 9 roof mounted air cooled condenser units serving 9 package air handling units (fan coil, direct expansion units). Three units at each corner of triangle, feeding into wall grilles; almost 100% recirculating air with minimum of air makeup; 6-20T units and 3-30T units; total capacity, 210T. Heat was supplied by gas fired duct heaters (18 units, 2 per each air supply unit) (auditorium) and electric baseboard heaters (washrooms, offices and dressing areas).

Ventilation was handled mechanically by exhaust fans in washrooms, service areas, kitchen, offices and transformer room. Auditorium ventilation was part of the A.C. system.



- c. Kitchen: Part of snack bar installation; air conditioning by concessionaire.

#### 10. ELECTRICAL —

- a. Power: 600/347V secondary service entry, 1000 amp. main breaker; step down to 120/208V service with transformer substation consisting of the following dry core transformers, 1-150 KVA and 1-75 KVA.
- b. Lighting: Incandescent, fluorescent (service areas).
- d. Other: Elaborate theatrical lighting and sound reinforcement system.

- 11. SPECIAL TRAFFIC CONVEYING EQUIPMENT — Three hydraulic stage lifts.

- 12. FIRE PROTECTION — Hose cabinet; all wood materials treated with fire retardant paint.

- 13. SAFETY FEATURES — Emergency lighting, automatic smoke detection system in ductwork, fire alarm system.

- 16. COMMENTS — This building was an ambitious project, well detailed and constructed, but its design was, unfortunately in the gay and lively spirit of La Ronde. Its triangular form was a direct expression of the shape of the auditorium contained. The seating arrangement, around all three sides of the stage (theatre in the round), was well handled with excellent sight lines from every seat.



## GYROTRON

### A. GENERAL DATA

1. NATURE OF PAVILION/STRUCTURE — Permanent.
2. LOCATION — Expo Area: La Ronde;  
Lot No. 5323;  
Key Plan No. 535.
3. OWNER (or contracting body) — Canadian Corporation for the 1967 World Exhibition.
4. DESIGN ARCHITECT — Sean Kenny, London, England.
6. CONSULTING ENGINEERS —
  - a. Structural: Boyd Auger, London, England.
  - b. Mechanical: Hurter Todd & Meyer, Montreal.
  - c. Electrical: N.J. Pappas & Assoc. Co. Ltd., Montreal.
7. LOCAL ASSOCIATE CONSULTING ENGINEERS —
  - a. Structural: De Pooli & Borek, Ville La Salle, Quebec.
8. OTHER CONSULTANTS — British Ropeway Engineering (Rides); Messmore & Damon, New York (special effects); Century lighting, New York (lighting); Theatre Projects, London (sound).
9. GENERAL CONTRACTOR — Douglas Bremner Contractors & Builders Ltd., Montreal.
10. OTHER CONTRACTORS OF SPECIAL INTEREST — G.M. Gest Contractors Ltd., Montreal (electrical) and Bridge and Tank (ride).

### B. GENERAL DESCRIPTION OF PAVILION/STRUCTURE

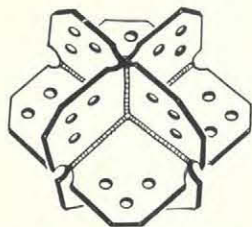
1. FUNCTIONAL DESCRIPTION — The largest and most interesting structure on La Ronde, the Gyrotron consists of two pyramid-shaped elements enclosed within aluminum space frames. The first and largest, containing the "Space" ride, is connected by an aerial bridge with the red volume of the second, the "Volcano". Capacity is 3,000 persons per hour.
2. DIMENSIONS — 215'-4" high.
3. FOUNDATIONS — Reinforced concrete friction piles.

4. STRUCTURE — A triangular lattice space frame of 16' aluminum tubes of 6" diameter, the wall thickness of which vary with the loading. The frame was analysed by computer. Joints were made by flattening the ends of tubes and then bolting through to galvanized iron connecting plates.
5. WALLS & EXTERIOR CLADDING — Aluminum clad, paper honeycombed, sandwich panel with wood edges; butt jointed and suspended from the space frame.
8. INTERIOR FINISHES —
  - b. Walls: Acoustic treatment added to interior where required.
9. MECHANICAL SYSTEMS —
  - d. Other: Gasoline motor emergency main ride drive.
10. ELECTRICAL —
  - a. Power: 600 KV Primary service transformed for lighting and audio equipment to 110/208 V. 100 HP main ride drive.
11. SPECIAL TRAFFIC CONVEYING EQUIPMENT — The cable-connected, four-person ride cars are mounted on a monorail and so constructed that the seats do not tilt during the convoluted ride. At the boarding and disembarkation platforms the cars swing into line with a coordinated belt moving at the same reduced speed from which passengers board the cars and also onto which they get out of the cars. The slowing down of the cars for loading and unloading is accomplished very ingeniously without any effect upon the rest of the circuit.
12. FIRE PROTECTION — Carbon dioxide extinguishers in electrical room.
13. SAFETY FEATURES — There is a very extensive rescue system. The ride can be manually hauled around if all locomotion fails. If the rail jams, people can be evacuated from all locations by catwalk, rope safety gear, and mechanical "painters" platforms. Full emergency lighting is provided for the above operations. There are observers and a P/A system covering all parts of the ride to forestall unruly behaviour or dangerous actions. A keyed bar restrains the passengers for added security.
15. OTHER ITEMS OF PARTICULAR INTEREST — Ride system.

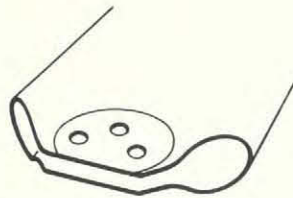


- a. Brief description: See No. 11 above.
- c. Manufacturer or producer: Bridge and Tank Company.
- d. Nearest source of more information: British Ropeway Engineering.

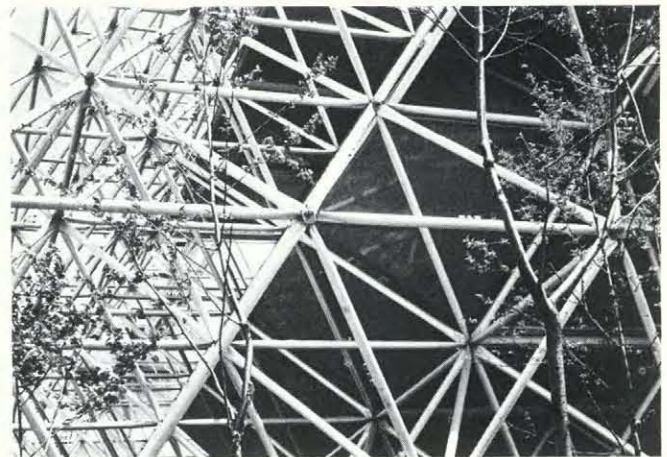
16. COMMENTS — Architecturally, this structure is significant only as another example of aluminum space frame construction. As a visual element, it is quite successful; as a ride, a rather tame experience.



FABRICATED STEEL JOINT



SHAPED END OF ALUMINUM TUBE





## LA RONDE EMPLOYEES CAFETERIA

### A. GENERAL DATA

1. NATURE OF PAVILION/STRUCTURE — Temporary.
2. LOCATION — Expo Area: La Ronde:  
Lot No. 5763;  
Key Plan No. 510.
3. OWNER (or contracting body) — Canadian Corporation for the 1967 World Exhibition.
4. DESIGN ARCHITECT — Joseph Baker, Montreal.
6. CONSULTING ENGINEERS —
  - a. Structural: F.M. Kraus, Montreal.
  - b. Mechanical and electrical: Mendel, Brasloff, Lassman & Sidler, Montreal.
9. GENERAL CONTRACTOR — Treco Ltee., St. Romuald, Quebec.

### B. GENERAL DESCRIPTION OF PAVILION/STRUCTURE

1. FUNCTIONAL DESCRIPTION — At first planned to be a stable for a horse ride concession, this building was converted into a temporary cafeteria.
2. DIMENSIONS —
  - a. Size: 70' & 20' x 30'
  - c. Height: 18'.

- d. Stories: One.

3. FOUNDATIONS — Slab on grade.
4. STRUCTURE — Poles backfilled with concrete to 5'-0" deep; Timber truss.
5. WALL & EXTERIOR CLADDING — 3/8" plywood and dado of horizontal planking.
6. ROOF — Painted plywood panels overlapping 3".
7. WINDOWS & ENTRANCES — Fibreglass panels. Wood doors.
8. INTERIOR FINISHES —
  - a. Floors: Painted concrete.
  - b. Walls: Painted wood and plywood.
  - c. Ceilings: Exposed structure painted.
9. MECHANICAL SYSTEMS —
  - a. Plumbing: 4 WC, 6 basins, 3 urinals.
  - b. Heating, ventilation, air conditioning: Exhaust fan for kitchen hood. Free standing A/C unit.
  - c. Kitchen: Capacity 100 meals an hour.
10. ELECTRICAL —
  - a. Power: No record for revised scheme.
  - b. Lighting: Fluorescent.
12. FIRE PROTECTION — Fire extinguishers.

## LA RONDE PUBLIC SAFETY AND ADMINISTRATION

### A. GENERAL DATA

1. NATURE OF PAVILION/STRUCTURE — Temporary.
2. LOCATION — Expo Area: La Ronde;  
Lot No. 5450;  
Key Plan No. 520.
3. OWNER (or contracting body) — Canadian Corporation for the 1967 World Exhibition.
4. DESIGN ARCHITECT — Duplessis, Labelle, Derome, Montreal.
6. CONSULTING ENGINEERS —
  - a. Structural: Monarque, Morelli, Gaudette, Laporte, Montreal.
  - b. Mechanical & electrical: Dagenais, Dupras, Gauthier, Gendron, Moreau, Montreal.
9. GENERAL CONTRACTOR — Leonard J. Weber Construction Company, Montreal.
10. OTHER CONTRACTORS OF SPECIAL INTEREST — Pare Quart, Montreal (foundation contractor).

### B. GENERAL DESCRIPTION OF PAVILION/STRUCTURE

1. FUNCTIONAL DESCRIPTION — This building housed administration offices, a fire department, a police department, and a first aid centre.
2. DIMENSIONS —
  - a. Size: 148' x 128'.
  - b. Area: 6,352 sq. ft.
  - c. Height: 23'.
  - d. Stories: Two.
3. FOUNDATIONS — Approximately 18" thick reinforced concrete mat.
4. STRUCTURE — From ground floor to second floor, concrete slab on bearing masonry walls. From second floor to roof, masonry bearing wall with wood roof trusses and wood roof deck. Fire department wing, masonry bearing walls, steel roof joists with mill deck roof.

5. WALLS & EXTERIOR CLADDING — 4" red face brick, 8" concrete block back-up units, 2" rigid insulation, plaster and drywall finish.

6. ROOF — 4 ply tar and gravel; 2" insulation placed below wood deck.

7. WINDOWS & ENTRANCES — Double hung redwood windows. Solid core wood doors in wood frame.

### 8. INTERIOR FINISHES —

- a. Floors: Vinyl asbestos tile on concrete.
- b. Walls: Exposed concrete block, painted; drywall on wood studs, painted.
- c. Ceilings: Wood suspension with gyproc sheathing and fiberboard acoustical tile glued to the gyproc (ground floor); "Tectum" applied to wood furring (second floor).

### 9. MECHANICAL SYSTEMS —

- a. Plumbing: Standard washroom fixtures.
- b. Heating, ventilation, air conditioning: Central boiler plant, hot water radiator system. Exhaust ventilation only, no air conditioning.
- c. Kitchen: Three staff kitchens with minimum equipment for snacks.

### 10. ELECTRICAL —

- a. Power: 75 KVA dry type transformer, 120/208 V, 3 phase, 4 wire entrance, 575 Volts.
- b. Lighting: Fluorescent throughout with some incandescent.
- d. Other: Electric time clock controlled by grand master clock at CCWE headquarters.

12. FIRE PROTECTION — Fire alarm system, portable fire extinguishers.

14. EXTERIOR WORK (where part of the construction contract) — Asphalt paving.

16. COMMENTS — This was an attractive, well designed and detailed building, constructed very economically with standard materials and techniques. It did not however, completely fit into the gaiety of the La Ronde atmosphere.

## LA SPIRALE

### A. GENERAL DATA

1. NATURE OF PAVILION/STRUCTURE — Permanent
2. LOCATION — Expo Area: La Ronde;  
Lot No. 5280;  
Key Plan No. 547.
3. OWNER (or contracting body) — Von Roll Ltd.,  
Montreal.
6. CONSULTING ENGINEERS —
  - a. Structural: Felix M. Kraus, Montreal.
9. GENERAL CONTRACTOR — Dominion Bridge,  
Montreal.
10. OTHER CONTRACTORS OF SPECIAL INTEREST — Acme Ltd. (Elevators), Montreal.

### B. GENERAL DESCRIPTION OF PAVILION/STRUCTURE

1. FUNCTIONAL DESCRIPTION — Brought from Switzerland, this structure consists of a ring shaped lift (with a 60 passenger cabin) travelling up and down a 340' high tubular tower, around which it also rotates as it moves.

### 2. DIMENSIONS:

- a. Size: 21' diameter lift with an inside diameter of 12'-0".
- c. Height: 340'.
- d. Stories: Two story lift.

3. FOUNDATIONS — A massive concrete pad, 12'-0" thick, on 12 piles into which the steel tower was grouted.

4. STRUCTURE — Internally braced steel tube.

### 10. ELECTRICAL —

- a. Power: 550V
- b. Lighting: 6 floodlights, 220V each.
- d. Other: PA system.

12. FIRE PROTECTION — Extinguishers.

13. SAFETY FEATURES — Governed by national elevator code.

14. EXTERIOR WORK (where part of the construction contract) — Approach ramps to double storey lift.



## LATERNA MAGIKA

### A. GENERAL DATA

1. NATURE OF PAVILION/STRUCTURE — Semi-permanent (three years).
2. LOCATION — La Ronde.
3. OWNER (or contracting body) — Czechoslovakian Government (State Theatre Radio).
4. DESIGN ARCHITECT — Jean A. Gélinas, Montreal.
6. CONSULTING ENGINEERS —
  - a. Structural: Lalonde Valois Lamarre Valois Associates, Montreal.
  - b. Mechanical and Electrical: Pierre de Guise and Associates, Montreal.
9. GENERAL CONTRACTOR — Janin Construction, Montreal.

### B. GENERAL DESCRIPTION OF PAVILION/STRUCTURE

1. FUNCTIONAL DESCRIPTION — The building housed a 600 seat theatre for the viewing of live three-dimensional cinema. As such, it contained the necessary facilities for both film and stage productions. Presentations consisted of actors performing against film backdrops.
2. DIMENSIONS —
  - a. Size: 130'-8" X 80'-8".
  - b. Height: 22'.
  - c. Stories: One storey with back stage mezzanine and projection room over the entrance lobby.
3. FOUNDATIONS — Reinforced concrete spread footings and 12" concrete foundation walls.
4. STRUCTURE — Standard rolled steel columns and light steel trusses 48" deep on 5'-0" centres.
5. WALLS AND EXTERIOR CLADDING — Exposed painted steel columns with split shingles and cedar siding panels on building paper, on 3/4" plywood on furring.
6. ROOF — Flat asphalt and gravel built up roofing on 2" insulation on steel decking.

7. WINDOWS AND ENTRANCES — No windows; aluminum framed "Store Front" standard section entrance

### 8. INTERIOR FINISHES —

- a. Floors: Carpet (auditorium), wood (stage), concrete with sealer (periphery rooms and service areas).
- b. Walls: Gypsum board partitions. Interior of exterior walls exposed.
- c. Ceilings: Metal suspension of gypsum board.

### 9. MECHANICAL SYSTEMS —

- a. Plumbing: 5 WCs., 25 basins, 2 urinals, 2 showers.
- b. Heating, ventilation, air conditioning: Six A/C units on roof, each 10,000 lbs. capacity; three exhaust fans.
- d. Other: Fire risers.

### 10. ELECTRICAL —

- a. Power: Primary service to three transformers, 25 KVA ASEC Monophase 600 V at 220/330V 3 pole, 4 phase and one transformer 45 KVA 600 V at 120/208V 3 pole.
- b. Lighting: 120V incandescent with special stage lighting and exterior floodlighting. Fluorescent in offices.
- c. Audio-visual systems: Theatre amplification system and projectors.
- d. Other: A/C motors and hot water.

### 11. SPECIAL TRAFFIC CONVEYING EQUIPMENT —

Flush conveyor for stage effects.

### 12. FIRE PROTECTION —

Smoke detectors and fire alarm bell system connected with standard CCWE fire alarm system. Hose cabinets and extinguishers.

### 15. OTHER ITEMS OF PARTICULAR INTEREST —

Exterior control console for stage effects at the rear of seating.

### 16. COMMENTS —

The Building was designed to be as

simple as possible because of the requirement that all investments and performer expenses be paid from the proceeds of the pavilion's operation within the duration of Expo.

The noise level through the exterior was rather high and had to be countered acoustically. No reflection of light from the stage necessitated a dark color scheme. Fast construction.

*Le Village*



## LE VILLAGE

### A. GENERAL DATA

1. NATURE OF PAVILION/STRUCTURE — Permanent.
2. LOCATION — Expo Area: La Ronde;  
Lot No. 5160;  
Key Plan No. 541.
3. OWNER (or contracting body) — Canadian Corporation for the 1967 World Exhibition.
4. DESIGN ARCHITECT — A. Poulin, Ayotte, Vincent & Derome, Montreal.
6. CONSULTING ENGINEERS —
  - a. Structural: St. Amont & Vezina & Assoc., Montreal.
  - b. Mechanical & Electrical: Roy & Vaillancourt, Chomedey, Quebec.
  - d. Other: Jacques Beauchemin & Assoc.
8. OTHER CONSULTANTS — Prof. Leslie Doelle, McGill University, Montreal (acoustical); Jean Claude Rinfret, Head Decorator for Radio Canada (interior decorating).
9. GENERAL CONTRACTOR — Boujac Construction Ltd., Laval, Quebec.

### B. GENERAL DESCRIPTION OF PAVILION/STRUCTURE

1. FUNCTIONAL DESCRIPTION — This complex consists of 20 small structures and two large ones. Contained, during Expo, were restaurants, drinking halls, snack bars, an ice cream parlour and numerous boutiques selling pieces of art and handicraft, some of which were made on the premises.
2. DIMENSIONS — Not applicable.
3. FOUNDATIONS — Spread concrete foundations.
4. STRUCTURE — Heavy timber.

5. WALLS & EXTERIOR CLADDING — Rough wood and concrete block with stone cladding (typical of old Canadian stone work).
6. ROOF — Asphalt shingles, roofing felt, 2" rigid insulation, 3/8" plywood.
7. WINDOWS & ENTRANCES — Wood frames and doors.
8. INTERIOR FINISHES —
  - a. Floors: Slate, quarry tile, carpet, resilient flooring.
  - b. Walls: Rough plaster, textured plaster.
  - c. Ceilings: Exposed wood (fire retardant stained).
9. MECHANICAL SYSTEMS —
  - a. Plumbing: Standard.
  - b. Heating, ventilation, air conditioning: Electric heating; A/C in entertainment buildings and restaurants.
  - c. Kitchen: \$80,000 of equipment for approximately 500 meals per hour.
10. ELECTRICAL —
  - b. Lighting: 110/208 V exterior lighting designed to harmonize with the old world theme.
  - c. Audio-visual systems: Public address system for music.
12. FIRE PROTECTION — Fire alarm system, hose cabinet.
14. EXTERIOR WORK (where part of the construction contract) — Landscaping (designed by the architects but supervised by Sasaki Strong Associates, Toronto).
16. COMMENTS — This was an interesting complex, designed in contemporary terms but in keeping with the spirit of a traditional French-Canadian village.



## MAINTENANCE AND CUSTOMS

### A. GENERAL DATA

1. NATURE OF PAVILION/STRUCTURE Permanent.
2. LOCATION — Expo Area: Ile Sainte-Hélène;  
Lot No. Jacques Cartier Bridge;  
Key Plan No. 505.
3. OWNER (or contracting body) — National Harbours Board; Montreal Harbour.
4. DESIGN ARCHITECT — L.V. Shultz, Montreal.
6. CONSULTING ENGINEERS —
  - a. Structural: D'Allemagne & Wiechula, Montreal.
  - b. Mechanical & electrical: Brais, Ouellette, Frigon, Brett, Hanley, Berthiaume, Montreal.
9. GENERAL CONTRACTOR — Cook & Leitch Ltd., Montreal.

### B. GENERAL DESCRIPTION OF PAVILION/STRUCTURE

1. FUNCTIONAL DESCRIPTION — This was an existing building under the Jacques Cartier Bridge to which alterations and additions were made in order to house an air conditioned office space, a garage and storage areas. In addition, roof joists covered with metal decking were suspended beneath the roadbed above to protect the structure.

5. WALLS & EXTERIOR CLADDING — Existing walls painted.

### 8. INTERIOR FINISHES —

- a. Floors: Existing.
- b. Walls: Metal stud partitions, gypsum board both sides.
- c. Ceilings: Metal suspension, gypsum board ceilings to offices.

### 9. MECHANICAL SYSTEMS —

- a. Plumbing: Standard fixtures and plumbing, sprinkler system.
- b. Heating, ventilation, air conditioning: Gas fired A/C units "Dravo" (1,500,000 BTU, 500,000 BTU, 750,000 BTU) used with distribution ducts above suspended ceilings, and one Trane A/C unit.

### 10. ELECTRICAL —

- a. Power: 600 V Primary to 150 KVA 120/208 V transformer.
- b. Lighting: Fluorescent, incandescent (storage and stair spaces).

### 12. FIRE PROTECTION — Automatic sprinkler system.

### 14. EXTERIOR WORK (where part of the construction contract) — Painting and new ramps to second floor.

## MARINA MAINTENANCE BUILDING

### A. GENERAL DATA

1. NATURE OF PAVILION/STRUCTURE — Permanent.
2. LOCATION — Expo Area: La Ronde;  
Lot Not 5360;  
Key Plan No. 548.
3. OWNER (or contracting body) — Canadian Corporation for the 1967 World Exhibition.
4. DESIGN ARCHITECT — Rosen, Caruso, Vecsei and Martin, Montreal.
6. CONSULTING ENGINEERS —
  - a. Structural, mechanical and electrical: Lalonde, Girouard & Letendre, Montreal.
9. GENERAL CONTRACTOR — Omega Construction Co. Ltd., Montreal.

### B. GENERAL DESCRIPTION OF PAVILION/STRUCTURE

1. FUNCTIONAL DESCRIPTION — Maintenance and repair shop building for the use of boaters at the Marina.
2. DIMENSIONS —
  - a. Size: 25' x 66'.
  - b. Area: 2,200 sq. ft.
  - c. Height: 17'.
  - d. Stories: One.
3. FOUNDATIONS — Reinforced concrete foundation walls and footings; slab on grade for floor.

4. STRUCTURE — Structural steel, wood roof joists, T & G roof deck.
5. WALLS & EXTERIOR CLADDING — Corrugated painted asbestos panels, painted exposed steel and plywood fascia.
6. ROOF — Asphalt shingles on wood deck.
7. WINDOWS & ENTRANCES — Sheet glass in industrial steel sash; aluminum entrance door in wood frame.
8. INTERIOR FINISHES —
  - a. Floors: Vinyl asbestos floor tile (locker room and corridor), exposed concrete.
  - b. Walls: Painted asbestos panels and plywood.
  - c. Ceilings: Painted exposed structure.
9. MECHANICAL SYSTEMS —
  - a. Plumbing: Standard; electric domestic hot water system.
  - d. Other: Sprinkler system (dry type).
10. ELECTRICAL —
  - a. Power: 600 V service entry step down to 120/208 V service with 75 KVA dry type transformer.
  - b. Lighting: Incandescent and fluorescent.
12. FIRE PROTECTION — Extinguishers, dry type sprinkler system.
16. COMMENTS — This was a purely functional building built on a limited budget with a sloped roof.

## MARINER'S HOLLOW

### A. GENERAL DATA

1. NATURE OF PAVILION/STRUCTURE — Permanent.
2. LOCATION — Expo Area: La Ronde;  
Lot No. 5220;  
Key Plan No. 552.
3. OWNER (or contracting body) — Canadian Corporation for the 1967 World Exhibition.
4. DESIGN ARCHITECT — Rosen, Caruso, Vecsei and Martin, Montreal.
6. CONSULTING ENGINEERS —
  - a. Structural, mechanical and electrical: Lalonde, Girouard & Letendre, Montreal.
8. OTHER CONSULTANTS — Galemio & Goldstein, Montreal (lighting).
9. GENERAL CONTRACTOR — Omega Construction Co., Ltd., Montreal.

### B. GENERAL DESCRIPTION OF PAVILION/STRUCTURE

1. FUNCTIONAL DESCRIPTION — This structure is the principal building of the Marina complex and serves as the Social Club. The multi-level building houses a 150 seat restaurant, a grill bar for 50, a roof observation deck, offices, ancillary facilities, rest rooms, showers and lockers for boaters.
2. DIMENSIONS —
  - a. Size: 92' x 92'.
  - b. Area: 11,675 sq. ft.
  - c. Height: 39' to top of roof; 60' to top of dominating stair tower.
  - d. Stories: Three plus partial basement for boiler room and a roof observation deck.
3. FOUNDATIONS — Concrete piles and reinforced concrete foundation walls.
4. STRUCTURE — Reinforced concrete with structural steel and mill deck roof infill structure.
5. WALLS & EXTERIOR CLADDING — Exposed concrete with horizontal random form-work pattern.
6. ROOF — Painted galvanized metal over mill deck; hypalon over concrete beams; stained sealed glass unit





in aluminum frames for skylight strip windows.

7. WINDOWS & ENTRANCES — Sealed glass units in stained wood frames; plate glass in painted aluminum frames for entrances and doors.

8. INTERIOR FINISHES —

- a. Floors: Carpet, paving brick (ground floor lobby and entrances), vinyl asbestos floor tile (offices and snack bar), ceramic tile (washrooms), exposed concrete (locker rooms), stained wood deck (exterior terraces).
- b. Walls: Exposed concrete, glazed tile (washrooms and snack bar), vinyl (snack bar), concrete block either painted or plastered (offices).
- c. Ceilings: Stained wood slats (restaurant and bar areas), suspended cement plaster (ground floor).

9. MECHANICAL SYSTEMS —

- a. Plumbing: Standard; gas fired domestic hot water system.
- b. Heating, ventilation, air conditioning: Multi-zone AC system serving 3 separate zones; direct expansion cooling coils, air cooled condenser, distribution ductwork to floor or ceiling grilles and diffusers. Steam coils in multi-zone units for heating; gas fired boiler. Ventilation part of AC

system with separate exhaust of washrooms, kitchen and showers.

- c. Kitchen: Kitchen for restaurant and counter facilities for snack bar were installed by the concessionaire.

- d. Other: Gas service to kitchen and boiler.

10. ELECTRICAL —

- a. Power: 600 V service entry, step down to 120/208 V service with 225 KVA dry type transformer.

- b. Lighting: Incandescent.

11. SPECIAL TRAFFIC CONVEYING EQUIPMENT — Dumbwaiter serving kitchen.

12. FIRE PROTECTION — Hose cabinets, extinguishers, fire retardant stain to wood, fire proofing of steel with gyproc.

13. SAFETY FEATURES — Battery operated emergency lighting system.

16. COMMENTS — This well conceived and impressive, octagonal structure is very appropriate for a marina building. To help provide a marine character, its roof was designed in the form of two pointed sails and includes a "Crows' nest".

PAVILION D'HONNEUR (FORMERLY THE HÉLÈNE  
DE CHAMPLAIN RESTAURANT)

A. GENERAL DATA

1. NATURE OF PAVILION/STRUCTURE — Permanent.
2. LOCATION — Expo Area: Ile Sainte-Hélène;  
Key Plan No. 365.
3. OWNER (or contracting body) — City of Montreal.
4. DESIGN ARCHITECT — Jacques A. Chicoine, Montreal.
6. CONSULTING ENGINEERS —
  - b. Mechanical: Services des Travaux Publics, Ville de Montreal.
8. OTHER CONSULTANTS — Claud Hinton, Interior Decorator, Montreal.
9. GENERAL CONTRACTOR — City of Montreal.

B. GENERAL DESCRIPTION OF PAVILION/STRUCTURE

1. FUNCTIONAL DESCRIPTION — The Hélène de Champlain Restaurant is an existing red stone building. It was renovated and altered to function as a reception centre for visiting dignitaries and also to

provide temporary on site resting facilities for Pierre Dupuis, the Expo Ambassador, and important guests.

8. INTERIOR FINISHES —

- a. Floors, walls and ceilings: Renovated to match existing.

9. MECHANICAL SYSTEMS —

- b. Heating, ventilation, air conditioning: New exhaust fan for interior toilet. Air conditioned overall except in kitchen. Changed heating from oil to gas.
- c. Kitchen: Changed propane gas supply to natural. Installed larger exhaust fan for increased kitchen equipment. Added kitchen in basement. Capacity of restaurant, 150 meals per hour.

10. ELECTRICAL —

- b. Lighting: Rewiring and lighting where required.

12. FIRE PROTECTION — Extinguishers.

14. EXTERIOR WORK (where part of the construction contract) — Entrance gate and fence.

16. COMMENTS — Difficulty was encountered in trying to match the existing red stone; it was very friable and unpredictable.

**PUBLIC SAFETY (CITÉ DU HAVRE & ILE NOTRE-DAME)**

**A. GENERAL DATA**

1. NATURE OF PAVILION/STRUCTURE — Temporary.
2. LOCATION — Expo Area: Cité de Havre; Ile Notre-Dame;  
Lot No. 2210, 4026  
Key Plan No. 220; 490.
3. OWNER (or contracting body) — Canadian Corporation for the 1967 World Exhibition.
4. DESIGN ARCHITECT — Chadwick Pope & Edge, Montreal.
6. CONSULTING ENGINEERS —
  - b. Mechanical & electrical: Pageau & Morel, Montreal.
8. OTHER CONSULTANTS — J.S. Le Fort, Ottawa.
9. GENERAL CONTRACTOR — R.E. Stewart Construction Corp., Montreal.

**B. GENERAL DESCRIPTION OF PAVILION/STRUCTURE**

1. FUNCTIONAL DESCRIPTION — Each building consisted of a first aid block and a police and fire station block joined by a common entrance platform.
2. DIMENSIONS —
  - a. Size: 102' x 32' and 72' x 41'.
  - b. Area: 5,547 sq. ft.
  - c. Height: 15'.
  - d. Stories: One.
3. FOUNDATIONS — Concrete strip footings and foundation wall to grade, 4'-6" deep.

4. STRUCTURE — Balloon stud timber frame structure with battered exterior walls.
5. WALLS & EXTERIOR CLADDING — 1/2" water resisting gypsum board on 2" x 4" stud, 2" batt insulation, vapour barrier.
6. ROOF — Asphalt and gravel on 1" fiberboard and 3/4" T & G planking.
7. WINDOWS & ENTRANCES — Wood sash windows, wood doors.
8. INTERIOR FINISHES —
  - a. Floors: Resilient tile.
  - b. Walls: Gypsum board.
  - c. Ceilings: Gypsum board.
9. MECHANICAL SYSTEMS —
  - a. Plumbing: 6 WCs, 7 basins, 1 urinal, 5 sinks, 4 showers, 1 bath; standard plumbing.
  - b. Heating, ventilation, air conditioning: Induction air conditioning units below windows; roof exhaust fans from toilets and kitchen hood.
  - c. Kitchen: Staff (domestic type).
10. ELECTRICAL —
  - a. Power: Primary service, single phase 115/230 V.
  - b. Lighting: Incandescent, fluorescent (offices).
  - d. Other: Fire alarm system of area.
12. FIRE PROTECTION — Fire extinguishers and standard CCWE fire alarm system.
16. COMMENTS — These two identical buildings were designed to be tasteful but functional and unassuming, in no way to be mistaken as pavilions.



## PUBLIC SAFETY (ILE STE-HÉLÈNE)

### A. GENERAL DATA

1. NATURE OF PAVILION/STRUCTURE — Temporary.
2. LOCATION — Expo Area: Ile Sainte Hélène;  
Lot no. 3095;  
Key Plan No. 350.
3. OWNER (or contracting body) — Canadian Corporation for the 1967 World Exhibition.
4. DESIGN ARCHITECT — Jean Serge Le Fort, Ottawa.
5. LOCAL ASSOCIATE ARCHITECT — Chadwick Pope & Edge, Montreal.
6. CONSULTING ENGINEERS —
  - a. Structural: K.M. Design Consultants Ltd., Montreal.
  - b. Mechanical & electrical: Pageau & Morel, Montreal.
7. LOCAL ASSOCIATE CONSULTING ENGINEERS —
  - a. Structural: W.A. Marshall, Montreal.
9. GENERAL CONTRACTOR — Ron Engineering Construction (Quebec) Ltd., Montreal.

### B. GENERAL DESCRIPTION OF PAVILION/STRUCTURE

1. FUNCTIONAL DESCRIPTION — This building consisted of three separate blocks, which housed police and communications facilities, a fire station, and a medical aid station.
2. DIMENSIONS —
  - a. Size: 128' x 30', 176' x 32', 56' x 48'.
  - b. Area: 18,560 sq. ft.
  - c. Height: 10'-3"; 16'-0" (fire station).

- d. Stories: One.

3. FOUNDATIONS — Concrete strip foundation under walls and spread footings under columns.
4. STRUCTURE — Steel rolled columns and light steel trusses.
5. WALLS & EXTERIOR CLADDING — Gypsum stud partitions, painted concrete block.
6. ROOF — Wood joists, 5/8" plywood sheathing, 1" insulation, asphalt and gravel roofing.
7. WINDOWS & ENTRANCES — Wood window frames and doors.
8. INTERIOR FINISHES —
  - a. Floors: Resilient flooring on concrete slab.
  - b. Walls: Gypsum board.
  - c. Ceilings: Gypsum board.
9. MECHANICAL SYSTEMS —
  - a. Plumbing: 15 WCs, 1 bidet, 17 basins, 1 bath, 3 sinks, 10 showers; standard plumbing.
  - b. Heating, ventilation, air conditioning: Gas fired boiler and hot water system heating. Unit gas heaters in fire station.
  - c. Kitchen: Domestic size for staff only.
10. ELECTRICAL —
  - a. Power: 120/208 V service entry provided by C.C.W.E. to distribution panel.
  - b. Lighting: Fluorescent (offices), incandescent (services, garage and corridors).
  - d. Other: Central automatic fire alarm system for district.
12. FIRE PROTECTION — Fire alarm system, fire hose cabinets and extinguishers.

## QUEBEC LIQUOR BOARD STORE

### A. GENERAL DATA

1. NATURE OF PAVILION/STRUCTURE — Temporary.
2. LOCATION — Expo Area: Ile Sainte-Hélène;  
Lot No. 3178;  
Key Plan No. 341.
3. OWNER (or contracting body) — Canadian Corporation for the 1967 World Exhibition.
4. DESIGN ARCHITECT — Jean Michaud, Montreal.
6. CONSULTING ENGINEERS —
  - a. Structural: Labrecque, Vezina & Associates, Montreal.
  - b. Mechanical & electrical: Scharry & Ouimet, Montreal.
9. GENERAL CONTRACTOR — R. Lasalle Construction, Montreal.

### B. GENERAL DESCRIPTION OF PAVILION/STRUCTURE

1. FUNCTIONAL DESCRIPTION — The building consisted of basement and ground floor storage areas (including refrigerated storage) and ground floor sales for liquor and wines. There was a direct public exit to the nearby metro station.
2. DIMENSIONS —
  - a. Size: 130' x 43'.
  - b. Area: 7,140 sq. ft.
  - c. Height: 15'.
  - d. Stories: One plus basement.
3. FOUNDATIONS — Spread reinforced concrete footings and foundation walls.
4. STRUCTURE — Timber.
5. WALLS & EXTERIOR CLADDING — Stucco.
6. ROOF — Built up roofing over wood deck on flat

areas; plastic roofing membrane over plywood and stained spruce battens to sloped areas.

7. WINDOWS & ENTRANCES — Plate glass in plastic frames (windows); plate glass in aluminum frames (entrances).

### 8. INTERIOR FINISHES —

- a. Floors: Brick (entrance vestibules), vinyl asbestos floor tile (ground floor public areas), exposed concrete or wood (basement and storage areas).
- b. Walls: Stucco (public areas), exposed concrete block (storage), exposed concrete (basement), insulation (refrigerated storage room).
- c. Ceilings: Expose wood deck and structure; stained (public areas) and natural (all other areas).

### 9. MECHANICAL SYSTEMS —

- a. Plumbing: Standard; electric domestic hot water system.
- b. Heating, ventilation, air conditioning: None (natural ventilation).
- d. Other: Compressor for refrigerated storage area.

### 10. ELECTRICAL —

- a. Power: 120/208 V service entry provided by C.C.W.E. to distribution panel.
- b. Lighting: Incandescent (public areas), fluorescent (service areas).

12. FIRE PROTECTION — Fire extinguishers, fire retardant (clear) stain to wood.

16. COMMENTS — A difficult design problem arose from the fact that the liquor outlet had to be integrated with the METRO station and planned so that customers leaving the outlet, after purchasing spirits, would exit directly into the station and not the C.C.W.E. grounds.

A limited budget resulted in the use of simple forms, details and materials.

## THE SAFARI

### A. GENERAL DATA

1. NATURE OF PAVILION/STRUCTURE — Temporary.
2. LOCATION — Expo Area: La Ronde;  
Lot No. 5100;  
Key Plan No. 5-110.
3. OWNER (or contracting body) — Safari Incorporated.
4. DESIGN ARCHITECT — Paul Green-Armytage,  
Montreal.
5. LOCAL ASSOCIATE ARCHITECT — A. Hoffman,  
Montreal.
6. CONSULTING ENGINEERS —
  - a. Structural: Per Hall, Couture, Van Walsum,  
Montreal.
  - b. Mechanical & Electrical: Same.
9. GENERAL CONTRACTOR — Tower Corporation  
1961 Limited, Montreal.

### B. GENERAL DESCRIPTION OF PAVILION/STRUCTURE

1. FUNCTIONAL DESCRIPTION — Included within the grounds, were a mountain, containing the Safari Train tunnel, an animal shelter, offices and a doll exhibit; various thatched "African" huts and shelters; ticket booths and washrooms and a landscaped zoological garden.
2. DIMENSIONS —
  - a. Size: Not applicable.
  - b. Area: Lot 104,950 sq. ft.
  - c. Height: Mountain 43'-0".
  - d. Stories: Multi-level.
3. FOUNDATIONS — Concrete block walls (floored huts); Concrete pads ("mountain" wood columns); Posts in ground (shelters).
4. STRUCTURE — Timber truss and columns (mountain); Balloon frame and rafters (huts); Post

and beams (shelters).

5. WALLS & EXTERIOR CLADDING — Stucco on metal lath (mountain and huts).
6. ROOF — Stucco on metal lath (mountain); thatch (shelters).
7. WINDOWS AND ENTRANCES — Wood frame windows and wood doors.
8. INTERIOR FINISHES —
  - a. Floors: Floor joist and boarding, concrete, asphalt.
  - b. Walls: Stucco.
  - c. Ceilings: Exposed.
9. MECHANICAL SYSTEMS —
  - a. Plumbing: Standard fixtures and plumbing in washrooms.
  - b. Heating, ventilation, air conditioning: Hot water tanks; exhaust fan for animal shelter.
10. ELECTRICAL —
  - a. Power: 75 KVA transformer 600 V - 120/208 V.
  - b. Lighting: 60 KW.
  - d. OTHER: Public Address system (jungle background noises).
11. SPECIAL TRAFFIC CONVEYING EQUIPMENT — Safari trailer train. Land rover with train.
12. FIRE PROTECTION — Fire extinguishers.
13. SAFETY FEATURES — Cages and chains.
14. EXTERIOR WORK (where part of the construction contract) — Extensive landscaping.
16. COMMENTS — During the design process, a 1/10th scale mock-up model of the mountain was constructed from which its structure was devised. The original scheme was much more extensively landscaped and it is unfortunate that it was not completely adopted. The grounds, at the time of Expo, were too open and sparse.



## SKY RIDE STATIONS — LA RONDE

### A. GENERAL DATA

1. NATURE OF PAVILION/STRUCTURE — Permanent.
2. LOCATION — Expo Area: Esplanade;  
Dolphin Lake;  
Lot No. 5440; 5150;  
Key Plan No. 519, 540.
3. OWNER (or contracting body) — Canadian Corporation for the 1967 World Exhibition.
4. DESIGN ARCHITECT — Norman Slater, Montreal (Acted as consultant to Canadian Bridge & Tank Co. of Canada Ltd., on the stations).
6. CONSULTING ENGINEERS — Engineering consultants to C.C.W.E. on all phases of development and construction of the sky ride complex were Per Hall, Couture, Van Walsum & Assoc., Montreal. The contractor, Canadian Bridge & Tank Co. of Canada Ltd., conducted their own design which, in turn, was checked by the above consultants.
8. OTHER CONSULTANTS — British Ropeway Engineering Co. Ltd., London, England. (Consultants to contractor).
9. GENERAL CONTRACTOR — Canadian Bridge & Tank Co. of Canada Ltd., Hamilton.

### B. GENERAL DESCRIPTION OF PAVILION/STRUCTURE

1. FUNCTIONAL DESCRIPTION — This is a permanent aerial ride spanning Lake Dophin. It possesses a double track system, 1700' long, supported by three towers with a maximum rise of 120'. Ninety fiberglass gondolas carry passengers between the two stations which consist of covered decks, open at the sides, with ramps to upper embarking levels. One of the stations has an office block set under its upper deck.

#### 2. DIMENSIONS —

Esplanade Station	Dolphin Lake Station
a. Size: 96' X 59'	72' X 58'
b. Area: 6100 sq. ft.	4200 sq. ft.
c. Height: 29'-6"	28'-4"
d. Stories: two.	two.

3. FOUNDATIONS — Concrete piles and reinforced concrete foundations.
4. STRUCTURE — Structural steel with metal roof deck with concrete topping.
5. WALLS & EXTERIOR CLADDING — Stained wood planking (balustrades), painted concrete block (office walls).
6. ROOF — Built up roofing over metal deck.
7. WINDOWS & ENTRANCES — Sheet glass in painted steel sash (offices only).
8. INTERIOR FINISHES —
  - a. Floors: Concrete (office and upper level), asphalt (lower level), mill deck (ramps).
  - b. Walls: Concrete block (offices).
  - c. Ceilings: Painted drywall (office), painted structure (decks and roof).
9. MECHANICAL SYSTEMS —
  - a. Plumbing: Standard plumbing to office wash-rooms; electric hot water system.
10. ELECTRICAL —
  - a. Power: 600 V service entry and power for ride equipment, step down to 120/208 V service for lighting and controls with 15 KVA dry type transformer (both stations).
  - b. Lighting: Incandescent.
  - d. Other: Separate emergency power service entry.
12. FIRE PROTECTION — Extinguishers.
13. SAFETY FEATURES — Elaborate evacuation system devised for ride breakdowns, cable catches, switch & trip, etc.
16. COMMENTS — The ride gives one a spectacular view of La Ronde and much of the remaining Expo site. Great attention was paid to passenger safety (inclusion of latest safety devices).

## VISITORS SERVICES CENTRE

### A. GENERAL DATA

1. NATURE OF PAVILION/STRUCTURE — Temporary.
2. LOCATION — Expo Area: Ile Sainte-Hélène;  
Lot No. 3210;  
Key Plan No. 348.
3. OWNER (or contracting body) — Canadian Corporation for the 1967 World Exhibition.
4. DESIGN ARCHITECT — Strutt and Adamson, Ottawa.
6. CONSULTING ENGINEERS —
  - a. Structural: John Adjeleian, Ottawa.
  - b. Mechanical & electrical: Goodkey Weedmark & Assoc., Ottawa.
9. GENERAL CONTRACTOR — Secant Construction Co. Ltd., Ville D'Anjou, Montreal.

### B. GENERAL DESCRIPTION OF PAVILION/STRUCTURE

1. FUNCTIONAL DESCRIPTION — This building was originally designed as the Plaza de las Americas Pavilion (a combined effort on the part of the South American countries). As such, it was conceived somewhat similarly to Africa Place (10 clearly defined cubical volumes arranged about a roofed courtyard). During Expo, it was actually used to house the Children's Lost and Found, an information centre and a first aid station.
2. DIMENSIONS —
  - a. Size: 146'-8" x 140'-0" (overall).
  - b. Area: 8,000 sq. ft. (enclosed).
  - c. Height: 26'-0".
  - d. Stories: One plus mezzanine service area.
3. FOUNDATIONS — Spread footings on grade for

columns, concrete piers for floor beams.

4. STRUCTURE — Timber floors and walls, centre concrete column.
5. WALLS & EXTERIOR CLADDING — Timber, glazed walls with vertical wood fins and 3/4" plywood panelling over 2" x 6" studs.
6. ROOF — Timber, umbrella trusses cantilevered from a central concrete column, 33'-4" square. Asphalt and gravel on 1" T & G boarding on purlins.
7. WINDOWS & ENTRANCES — Wood window frames and doors.
8. INTERIOR FINISHES —
  - a. Floors: 3/4" plywood.
  - b. Walls: 5/8" gypsum board.
  - c. Ceilings: Metal lath and acoustic plaster on purlins.
9. MECHANICAL SYSTEMS —
  - a. Plumbing: Standard.
  - b. Heating, ventilation, air conditioning: Plug-in-mobile radiators (heating); exhaust fans in toilets and electrical rooms; heated and conditioned air to service area only.
  - c. Kitchen: Standard domestic (for staff only).
10. ELECTRICAL —
  - a. Power: 12.5 KV service entry, step down to 120/208V, 3 pole, 4 phase service with 150 KVA dry type transformer.
  - b. Lighting: Fluorescent, incandescent (service area).
12. FIRE PROTECTION — Fire extinguishers, pressurized water and CO 2 in electrical room, standard connection to C.C.W.E. fire alarm system.

## YOUTH PAVILION

### A. GENERAL DATA

1. NATURE OF PAVILION/STRUCTURE — Temporary.
2. LOCATION — Expo Area: La Ronde;  
Lot No. 5400;  
Key Plan No. 529.
2. OWNER (or contracting body) — Canadian Corporation for the 1967 World Exhibition.
4. DESIGN ARCHITECT — Ouellet Reeves & Alain,  
Town of Mount Royal, Montreal.
6. CONSULTING ENGINEERS —
  - c. Electrical: Lorrain Tourigny Dubuc & Gérin Lajoie, Montreal.
8. OTHER CONSULTANTS — François Lamy & Associates Inc., Beloeil, P.Q. (designer).
9. GENERAL CONTRACTOR — Prieur Enterprise,  
Laval des Rapides, P.Q.

### B. GENERAL DESCRIPTION OF PAVILION/STRUCTURE

1. FUNCTIONAL DESCRIPTION — Dedicated to the aims and desires of youth, this pavilion consisted of 12 thematic cells (grouped in a semi-circle), a theatre and dance hall and an administration area, all arranged around a central open-air court.
2. DIMENSIONS —
  - a. Size: 200' diameter.
  - b. Area: 18,000 sq. ft.
  - c. Height: 40' to top of mechanical loft; 8'-18' high cells.
  - d. Stories: One generally; three in mechanical area at theatre.
3. FOUNDATIONS — Reinforced concrete shallow strip foundation.
4. STRUCTURE — 2" x 4" Balloon frame.
5. WALLS & EXTERIOR CLADDING — Stud with stucco on gypsum lath (exterior grade) both sides.
6. ROOF — Laminated wood spans over theatre in

dance hall; "Cocoon" (trade name) Vinyl Plastic covering over plywood on wood trusses and rafters.

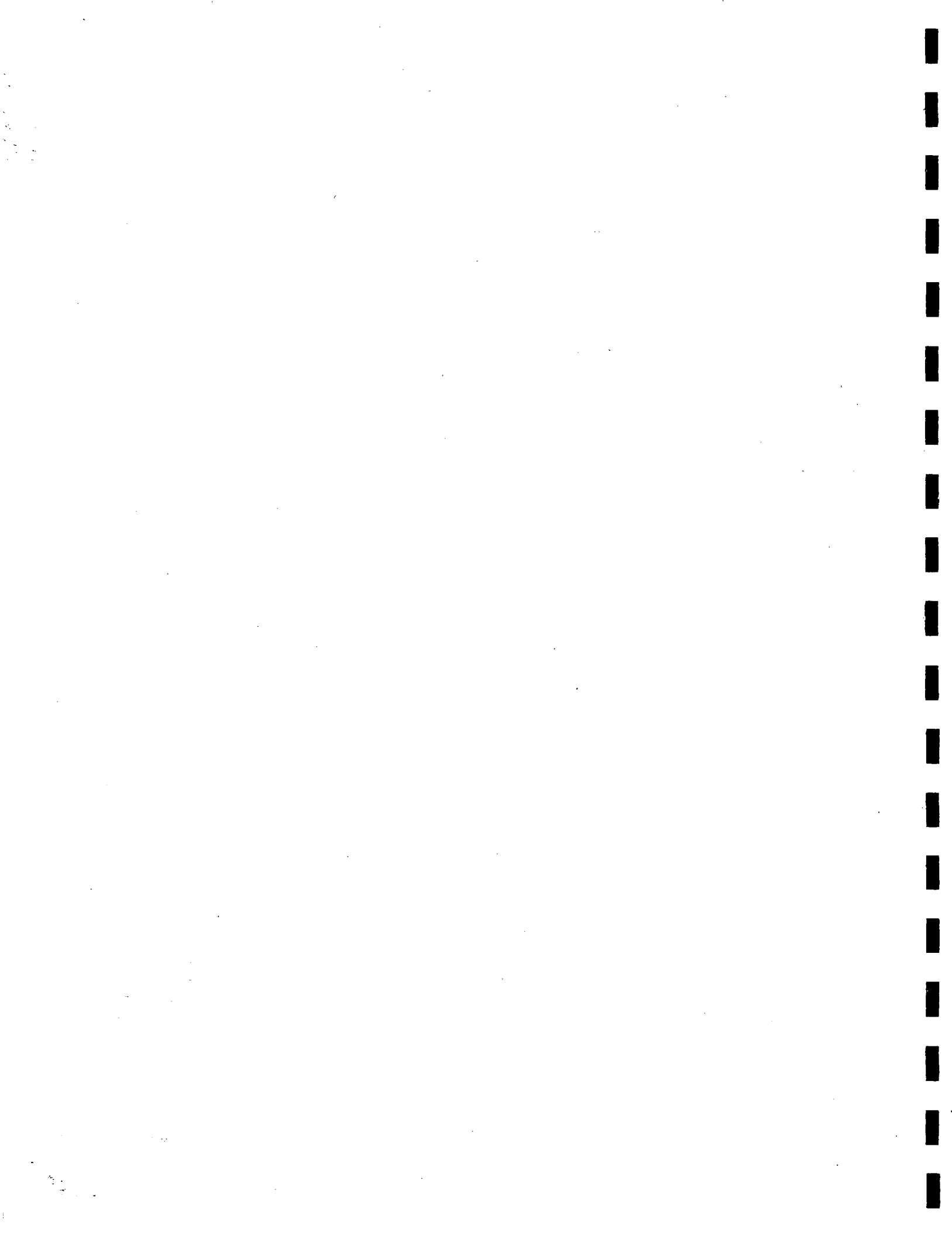
7. WINDOWS AND ENTRANCES — Redwood, single glazed; wood entrances.
8. INTERIOR FINISHES —
  - a. Floors: Asphalt, painted.
  - b. Walls: Stucco, cedar boarding in theatre.
  - c. Ceilings: Stucco on cells, exposed wood in theatre and dance hall.
9. MECHANICAL SYSTEMS —
  - a. Plumbing: Standard.
  - b. Heating, ventilation, air conditioning: 250 KW cable in conduit floor heating. 7.5 ton, A/C unit for theatre; 3 ton, A/C unit for lighting gallery.
  - c. Kitchen: Snack bar off dance hall.
10. ELECTRICAL —
  - a. Power: 400 Amp., 600 Volt, primary transformed for motors, heating and projectors.
  - b. Lighting: 30 KW lighting panel.
  - c. Audio-visual systems: Theatre and dance hall audio system and displays in the thematic cells (back projected film).
12. FIRE PROTECTION — Alarm stations, fire hose cabinet, fire extinguishers, standard connection to CCWE alarm system.
14. EXTERIOR WORK (where part of the construction contract) — Central Court. Shallow footings were successful during the winter to a degree that surprised the architects. Good drainage of fill that it was built on a contributing factor.
16. COMMENTS — A very tight budget necessitated the use of cheap materials which were not completely suitable. Exterior stucco, for example, became water stained and began to disintegrate quite early, while the thin roof membrane showed too clearly all plywood joints. In addition, the lack of a definite program at the beginning was responsible for functional failures during actual operation (i.e. dance hall was too small).





**ENGINEERING**

**AND PUBLIC WORKS**





## BRIDGE OF THE ISLES

### A. GENERAL DATA

1. NATURE OF PAVILION/STRUCTURE — Permanent.
2. LOCATION — Expo Area: Ile Sainte-Hélène to Ile Notre-Dame.
3. OWNER (or contracting body) — Canadian Corporation for the 1967 World Exhibition.
6. CONSULTING ENGINEERS —
  - a. Structural: Beaulieu & Trudeau, Montreal.
8. OTHER CONSULTANTS — Claude Beaulieu et Bertrand, Montreal.
9. GENERAL CONTRACTOR — J.G. Fitzpatrick Company Limited, Montreal. Substructure: Walsh (Canadian) Construction Company Limited, Ville Brossard, Quebec. Superstructure: Canadian Bridge Division of Dosco Industries Limited, Ville St. Pierre, Quebec.

### B. GENERAL DESCRIPTION OF PAVILION/STRUCTURE

1. FUNCTIONAL DESCRIPTION — This bridge is the continuation of the Concordia Bridge transport system.

2. DIMENSIONS — 688' long in 4 spans of 166'-4-1/2"; width 94'. Depth of members from road bed to soffit 10'.
3. FOUNDATIONS — Reinforced concrete 4'-0" into bed rock.
4. STRUCTURE — The bridge consists of two simply supported spans, each stayed at mid spans from their sides by cables anchored to twin concrete towers sited in mid river. Each span is made up of two longitudinal box girders supporting floorbeams designed to be composite with the concrete deck. The longitudinal girders are supported at mid-span by a transverse box girder anchored to staying cables. It differs from the Concordia Bridge in that the road is in composite concrete and not steel. This, though heavier, is more economical in the smaller spans.
16. COMMENTS — The problem was well solved within the restrictions that were imposed: a maximum road elevation of 67 feet; an ice and flood height of 57 feet; only one pier at centre span. In addition, the designers were asked to make sure that the design of the abutment towers did not conflict with nearby pavilions.

Very attractive and of unusual design, the bridge is believed to be the first of its kind in the world. For further information, see the report of the Structural Steel Awards Program (1966) sponsored by the Department of Industry and others.



## CONCORDIA BRIDGE

### A. GENERAL DATA

1. NATURE OF PAVILION/STRUCTURE — Permanent.
2. LOCATION — Cité de Havre (McKay Pier) to Ile Sainte-Hélène (Ile Verte).
3. OWNER (or contracting body) — Canadian Corporation for the 1967 World Exhibition.
6. CONSULTING ENGINEERS —
  - a. Structural: Beaulieu & Trudeau, Montreal.
8. OTHER CONSULTANTS — Claude Beaulieu et Bertrand, Architects, Montreal.
9. GENERAL CONTRACTOR — Dufresne Engineering Company Limited, Montreal (substructure) and Dominion Bridge Company Limited, Lachine (superstructure).
10. OTHER CONTRACTORS OF SPECIAL INTEREST — Charles Duranceau Ltee., Duron (Quebec) Ltd. (Epoxy paint), Montreal.

### B. GENERAL DESCRIPTION OF PAVILION/STRUCTURE

1. FUNCTIONAL DESCRIPTION — This bridge provides the main access from Mackay Pier to Ile Sainte-Hélène carrying a road, an express rail system and two footpaths. The railway was to be temporary and removed after Expo to provide a full width roadway.
2. DIMENSIONS — 94' wide by total 2255' with two end spans of 340' and centre spans of 525'. Depth of structure 16'-0" roadbed to soffit.
3. FOUNDATIONS — Reinforced concrete to rock and bedded 4'-0" into rock. Reinforced concrete abutments.
4. STRUCTURE — Geometrically, the structure consists of a trapezoidal single box girder with two cantilevered arms. The deck of the bridge—steel plate

stiffened by closed ribs—acts as both the floor for the sidewalk and roadway and as the top flange of the trapezoidal box girder. The stiffened deck plate also acts as the top flange of the floorbeams and forms the orthotropic plate deck.

14. EXTERIOR WORK (where part of the construction contract) — Cable stayed erection system.

### 15. OTHER ITEMS OF PARTICULAR INTEREST —

- a. Brief description: Structural steel coated with one coat of epoxy over sand blasted steel on the deck only.
- b. Manufacturer or producer: Duron (Quebec) Limited.
- d. Nearest source of more information: Beaulieu et Trudeau, Montreal.

16. COMMENTS — The structural system of this bridge is very economical over long spans due to its lightness, but not useful say, below 400'. The expense of erection could have been less, if time and conditions had been more suitable, that is, the box girder could have been closed and floated and then hauled up into place. As it was, shorter pieces had to be used with a cable suspension system to help speed erection. A prestressed concrete system would have been too heavy and deep and no cheaper. In addition, the time element would have been against its use. The problem of determining how many piers could be used (maximum of four, it was discovered) was studied in conjunction with the CCWE joint committee on Hydraulics and worked out on the Lasalle Hydraulic Laboratory model.

Believed at the time of its design to be the longest of its type in the world, the bridge is elegant and clean lined, possessing a slimness that could never have been achieved with concrete. It was termed, "A brilliant design in every respect", by the Design Award jury of the Structural Steel Awards Program (1966), sponsored by several groups including the Department of Industry, from which further information is available.

## COSMOS WALK

### A. GENERAL DATA

1. NATURE OF PAVILION/STRUCTURE — Temporary.
2. LOCATION — Expo Area: Ile Sainte-Hélène to Ile Notre-Dame.
3. OWNER (or contracting body) — Canadian Corporation for the 1967 World Exhibition.
6. CONSULTING ENGINEERS —
  - a. Structural: Swan Wooster Engineering Company Limited, Montreal.
  - c. Electrical: Canadian Corporation for the 1967 World Exhibition.
9. GENERAL CONTRACTOR — Walsh (Canadian) Construction Company Limited, Ville Brossard, Quebec (substructure), and Anglin Norcross, St. Lambert, Quebec (superstructure).
10. OTHER CONTRACTORS OF SPECIAL INTEREST — Timber Preservers Limited, New Westminster, B.C. (laminated beams).

### B. GENERAL DESCRIPTION OF PAVILION/STRUCTURE

1. FUNCTIONAL DESCRIPTION — Pedestrian crossing with two lanes, and minirail crossing two ways. The bridge was originally to be built after the spring ice had disappeared, but due to rescheduling the design was modified to be built before the ice had passed

beneath. This entailed raising the shore ends of the bridge at this time, and also seating the centre span higher than design level. This elevation has remained at the centre, the ends have been lowered. Timber laminated structure was chosen for its re-use value, also the hollow steel, gravel filled, caissons can be easily removed.

2. DIMENSIONS — Length: 675' (5 spans of 135');  
Width of each lane 20'; Total 55' wide.
3. FOUNDATION — 17'-0" diameter steel caissons sunk to rock and filled with gravel, and anchored with prestressed cable, 8 per caisson, grouted 20'-0" into rock, 285 Kips tension per cable. Reinforced concrete abutments.
4. STRUCTURE — Laminated girders 7'-0" deep by 14" wide (span 135'), decking 2" x 6" on edge supported on 10" x 18" stringers at 9' - 0" centres, 9" x 47" diaphragm beams at 1/3 spans.
16. COMMENTS — Use of laminated wood beams made this bridge one of the most attractive at Expo. Built to handle the largest volume of pedestrian traffic of any such structure at the fair, it became an exhibit in itself for Canadian wood products. Design was economical (due to light loading) and allowed for future re-use of structural members. A camber was introduced in order to counteract the usual sagging effect of a straight bridge and provide clearances required by the Harbour Board.

Construction was greatly facilitated by the fact that the caissons were able to be sunk dry in a drained channel.



## EXPO EXPRESS BRIDGE

### A. GENERAL DATA

1. NATURE OF PAVILION/STRUCTURE — Temporary.
2. LOCATION — Expo Area: Ile Notre-Dame to La Ronde.
3. OWNER (or contracting body) — Canadian Corporation for the 1967 World Exhibition.
6. CONSULTING ENGINEERS —
  - a. Structural, mechanical and electrical: Monti Lefebvre Lavoie Nadon & Assoc., Montreal.
9. GENERAL CONTRACTOR — Walsh Canadian, Quebec (substructure) and Dominion Bridge, Montreal (superstructure).

### B. GENERAL DESCRIPTION OF PAVILION/STRUCTURE

1. FUNCTIONAL DESCRIPTION — This bridge was erected to carry the express transit system across Lemoyne Channel from Ile Notre-Dame to La Ronde.
2. DIMENSIONS — 762'-9" x 35'0" (including catwalks), two spans of 254' and two of 126'-10;1/2".
3. FOUNDATIONS — 2 concrete piers in rock and one on steel tube piles.
4. STRUCTURE — Twin box girders interconnected by bracings.
16. COMMENTS — Very economical and rigid, the bridge is an example of relatively advanced structural design. Erection was very swift. Sections were fabricated on La Ronde and then slid out and over previously added sections until the complete bridge was in place.

## EXPO-EXPRESS HABITAT '67 STATION

### A. GENERAL DATA

1. NATURE OF PAVILION/STRUCTURE — Temporary.
2. LOCATION — Expo Area: Cite du Havre.
3. OWNER (or contracting body) — Canadian Corporation for the 1967 World Exhibition.
4. DESIGN ARCHITECT — Andre Blouin, Montreal.
6. CONSULTING ENGINEERS —
  - a. Structural and electrical: Dillon Associates, London, Ontario.
9. GENERAL CONTRACTOR — Ron Engineering & Construction (Quebec) Ltd., Montreal.
10. OTHER CONTRACTORS OF SPECIAL INTEREST — Canadian Awning Company Limited, Ville d'Anjou, Quebec (canvas roofs).

### B. GENERAL DESCRIPTION OF PAVILION/STRUCTURE

1. FUNCTIONAL DESCRIPTION — Located opposite Habitat, the station consisted of a platform sheltered by a canvas roof.
2. DIMENSIONS —
  - a. Size: 480' x 20'.

b. Area: 9,600 sq. ft.

c. Height: 30'.

d. Stories: One.

3. FOUNDATIONS — Concrete piles supporting roof structure.

4. STRUCTURE — 50' span roof truss of aluminum tubular members held together by universal joints as manufactured by Triodetic Structures Limited, Ottawa. Columns were of square steel tubing.

6. ROOF — Canvas roofing laced around steel supporting cables.

8. INTERIOR FINISHES —

a. Floors: Wood planks.

c. Ceilings: Exposed structure and canvas.

10. ELECTRICAL —

a. Power: Supplied from main entrance station, on Cite du Havre.

b. Lighting: Fluorescent.

16. COMMENTS — The station was a light temporary structure covered with striped, white and purple canvas. Its 6 peaks read clearly and gayly against the background of the harbour.

## EXPO-EXPRESS ILE NOTRE-DAME STATION

### A. GENERAL DATA

1. NATURE OF PAVILION/STRUCTURE — Temporary.
2. LOCATION — Expo Area: Ile Notre-Dame.
3. OWNER (or contracting body) — Canadian Corporation for the 1967 World Exhibition.
4. DESIGN ARCHITECT — André Blouin and Beaulieu, Lambert & Tremblay, Montreal.
6. CONSULTING ENGINEERS —
  - a. Structural: Beaulieu, Trudeau & Associates, Montreal.
  - b. Mechanical and electrical: Dillon Associates, London, Ontario.
9. GENERAL CONTRACTOR — Desourdy Construction Limitee, Ville Jacques Cartier, Quebec.
10. OTHER CONTRACTORS OF SPECIAL INTEREST — Lord & Fils Compagnie Limitee, Ville Jacques Cartier (roof structure) and Canadian Awnings Company Limited, Ville d'Anjou, Quebec (canvas).

### B. GENERAL DESCRIPTION OF PAVILION/STRUCTURE

1. FUNCTIONAL DESCRIPTION — Like the Place des Nations station, this one also functioned on two major levels. The lower level located 15' above grade, acted as a distribution platform for the two arrival platforms (one on each side of the track) located on the upper one. Each arrival platform was linked by four staircases and two escalators to the lower distribution platform.
2. DIMENSIONS —
  - a. Size: Distribution platform, 24' x 500'.

b. Area: Upper level roof area, 40,000 sq. ft.

c. Height: 54'.

d. Stories: Two.

3. FOUNDATIONS — Reinforced concrete piles supporting superstructure.
4. STRUCTURE — Reinforced concrete pillars supported steel bridge structure; reinforced concrete slab supported train tracks. Bridge structure spans were between 75' and 87'-6".
5. WALLS AND EXTERIOR CLADDING — Canvas roof slopes protected upper level platforms.
6. ROOF — Canvas supported on steel cables spaced on 4'-2" centers; supporting roof posts on 12'-6" module.
8. INTERIOR FINISHES —
  - a. Floors: Wood planks.
  - c. Ceilings: Exposed roof structure and canvas.
10. ELECTRICAL —
  - a. Power: 300 KVA substation.
  - b. Lighting: Incandescent (stairs and escalators), fluorescent (platforms).
11. SPECIAL TRAFFIC CONVEYING EQUIPMENT — Four escalators.
12. FIRE PROTECTION — Stand pipe system.
16. COMMENTS — Remarks made concerning the Place des Nations station apply to this station as well although, structurally, it was somewhat lighter in appearance. Its canvas roof was colored bright yellow and white.



## EXPO-EXPRESS LA RONDE STATION

### A. GENERAL DATA

1. NATURE OF PAVILION/STRUCTURE — Temporary.
2. LOCATION — Expo Area: La Ronde;  
Lot No. 5600;  
Key Plan No. 513.
3. OWNER (or contracting body) — Canadian Corporation for the 1967 World Exhibition.
4. DESIGN ARCHITECT — Issalys & Gareau, Lalonde & Pauer, Montreal.
6. CONSULTING ENGINEERS —
  - a. Structural, mechanical and electrical: Dillon Associates, London, Ontario.
9. GENERAL CONTRACTOR — J.G. Fitzpatrick Limited, Montreal.

### B. GENERAL DESCRIPTION OF PAVILION/STRUCTURE

1. FUNCTIONAL DESCRIPTION — The terminal station of the rapid transit system, it consisted, like the Place des Nations and Ile Notre-Dame stations, of arrival and distribution platforms located on two levels and connected by stairs and escalators. Over-

head, it was protected by the usual brightly colored (orange and white), translucent plastic cover. Below, at ground level, were located public washrooms, mechanical and storage rooms and a Red Cross station, in addition to one of the main entrances to the Expo site, for which the station structure acted as enclosure.

### 2. DIMENSIONS —

- a. Size: 550' x 53'-4".
- c. Height: 21' (platform), 56' (ridge).
- d. Stories: Two.

3. FOUNDATIONS — Franki Piles, 1'-4" diameter, retaining walls of reinforced concrete.

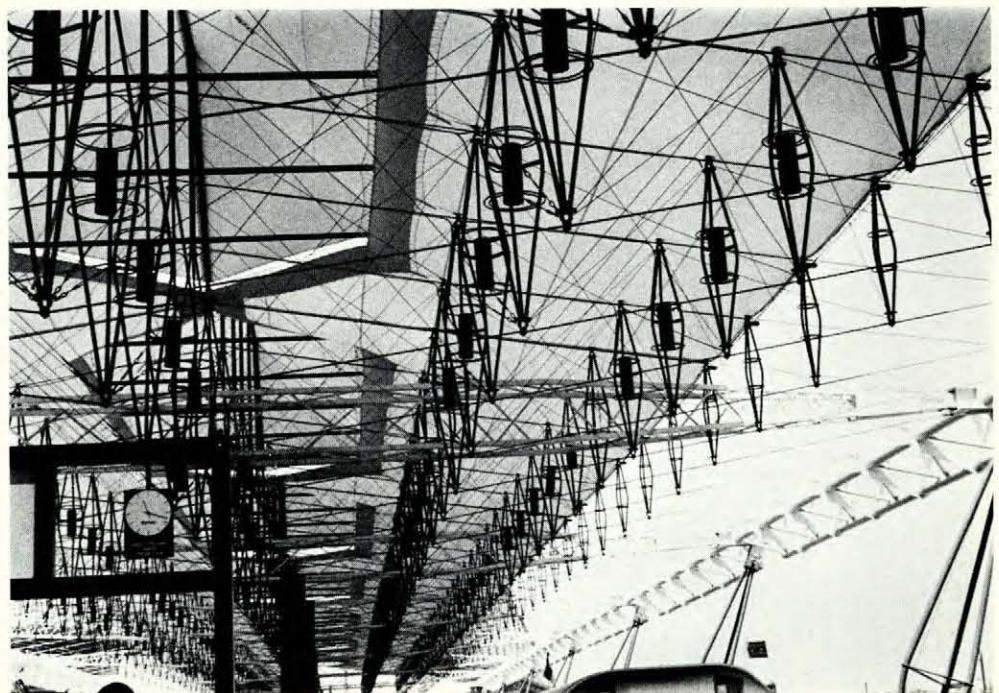
4. STRUCTURE — Plate girders and rolled sections with precast concrete platforms, rolled steel columns.

5. WALLS AND EXTERIOR CLADDING — Concrete block and exposed concrete from diagonal formwork.

6. ROOF — Suspended diamond strut system of steel cables, covered with translucent polyvinylchloride fabric.

7. WINDOWS & ENTRANCES — Pressed steel windows in wood frames, standard metal doors and frames. Turnstile control at main gate.

*Interesting network  
of roof framing*



8. INTERIOR FINISHES —

- a. Floors: Mastic asphalt (platforms), concrete float finished (service areas) having joints in concrete slab of concourse.
- b. Walls: Concrete block painted.
- c. Ceilings: Gypsum board on metal suspension system.

9. MECHANICAL SYSTEMS —

- a. Plumbing: 26 WCs, 20 basins 6 urinals. Standard plumbing and drainage.
- b. Heating, ventilation, air conditioning: Exhaust fans to toilets and electrical rooms. Supply air fan and heaters to toilets.

10. ELECTRICAL —

- a. Power: Primary service to 2 transformers of 75 KVA 600 V - 120/208 V, 3 pole. One transformer, 45 KVA 600 - 120/208 V; the other, 112 1/2 KVA 600 - 120/208 V.
- b. Lighting: Incandescent (platform), fluorescent (underneath).
- c. Audio-visual systems — Public address system for crowd control.

11. SPECIAL TRAFFIC CONVEYING EQUIPMENT — Two escalators.

12. FIRE PROTECTION — Fire hose cabinets.

13. SAFETY FEATURES — Painted "stand back" lines on platforms.

15. OTHER ITEMS OF PARTICULAR INTEREST —

- a. Brief description: Discontinuous compression member suspended cable trusses carrying translucent fabric roofing.
- b. Location: Platform shelter.
- d. Nearest source of more information: Mr. J. Pauer, Montreal.

16. COMMENTS — General remarks made concerning the Place des Nations station apply here as well, with added emphasis on the problem which resulted from heavy traffic flow (at times, facilities proved to be totally inadequate).

Erection of the roof structure proceeded more quickly than was expected due to good co-operation and pre-planning on the part of the contractor. To sustain possible light snow loads (April, 1967), extra cables were installed along the lower chord which were structurally redundant later, but helped simplify initial erection. The roofing material, itself, was vented to relieve wind pressure.

Lighting was neatly integrated with the roof struts giving indirect light into the orange and white roof fabric and direct light (generally considered too bright) to the platform area.

Overall, like the stations, this one was very successful visually especially when its light (2 lbs. per sq. ft.), "floating", colored roof was viewed against the strictly utilitarian structure of the Jacques Cartier Bridge behind it. In this position, it effectively functioned as a unifying boundary marker.

## EXPO-EXPRESS PLACE DES NATIONS STATION

### A. GENERAL DATA

1. NATURE OF PAVILION/STRUCTURE — Temporary.
2. LOCATION — Expo Area: Ile Sainte-Hélène.
3. OWNER (or contracting body) — Canadian Corporation for the 1967 World Exhibition.
4. DESIGN ARCHITECT — Andre Blouin and Beaulieu Lambert and Tremblay, Montreal.
6. CONSULTING ENGINEERS —
  - a. Structural: Beaulieu Troudeau & Associates, Montreal.
  - b. MECHANICAL AND ELECTRICAL: Dillon Associates, London, Ontario.
9. GENERAL CONTRACTOR — Desourdy Construction Limitée, Ville Jacques Cartier, Quebec.
10. OTHER CONTRACTORS OF SPECIAL INTEREST — Lord and Fils Compagnie Ltée., Ville Jacques Cartier, Quebec (roof structure) and Canadian Awning Company Limited, Ville d'Anjou, Quebec (canvas).

### B. GENERAL DESCRIPTION OF PAVILION/STRUCTURE

1. FUNCTIONAL DESCRIPTION — This elevated mass transit station functioned on two major levels. The lower level, located 15' above grade, acted as a distribution platform for the two arrival platforms (one on each side of the track) located on the upper one. Each arrival platform was linked by four staircases and two escalators to the lower distribution platform.
2. DIMENSIONS —
  - a. Size: Distribution platform, 24' x 500'.
  - b. Area: Upper level roof area, 40,000 sq. ft.
  - c. Height: 54'.
  - d. Stories: Two.

3. FOUNDATIONS — Reinforced concrete piles supporting superstructure.
4. STRUCTURE — Reinforced concrete pillars supported steel bridge structure; reinforced concrete slab supported train tracks. Bridge structure spans were between 75' and 87'-6".
5. WALLS & EXTERIOR CLADDING — Canvas roof slopes protected upper level platforms.
6. ROOF — Canvas supported on steel cables spaced on 4'-2" centres; supporting roof posts on 12'-6" module.
8. INTERIOR FINISHES —
  - a. Floors: Wood planks.
  - c. Ceilings: Exposed roof structure and canvas.
10. ELECTRICAL —
  - a. Power: 300 KVA substation.
  - b. Lighting: Incandescent (stairs and escalators), fluorescent (platforms).
11. SPECIAL TRAFFIC CONVEYING EQUIPMENT — Four escalators.
12. FIRE PROTECTION — Stand pipe system.
16. COMMENTS — Supported by a permanent bridge structure, the station was combined with a service road on one side. The canvas roofing was brightly colored (green and white) and supported by a very ingenious and well executed steel cable system. Its only drawback was the fact that it acted as wall cladding and obscured the view to the site from the upper level, thus cutting people off from the fair atmosphere below. Traffic flow, in spite of the numerous stairs and escalators, was not well organized.

In general, as visual elements, the Expo Express stations were very successful. Because of their long, colorful tent-like forms, they became prominent landmarks which helped to both orientate visitors and define site boundaries.



## EXPO-EXPRESS MAINTENANCE BUILDING

### A. GENERAL DATA

1. NATURE OF PAVILION/STRUCTURE — Temporary.
2. LOCATION — Expo Area: La Ronde;  
Key Plan No. 500.
3. OWNER (or contracting body) — Canadian Corporation for the 1967 World Exhibition.
6. CONSULTING ENGINEERS —
  - a. Structural, mechanical and electrical: G. Grenier, Engineer of Foundation of Canada Engineering Corporation Limited.
8. OTHER CONSULTANTS — Dominion Bridge Company Limited, Lachine, Quebec (Design and erection).
9. GENERAL CONTRACTOR — Paré and Quart — Foundation Company of Canada, Montreal.

### B. GENERAL DESCRIPTION OF PAVILION/STRUCTURE

1. FUNCTIONAL DESCRIPTION — Of standard industrial construction, this minimal structure housed maintenance facilities for the Expo Express trains. Included were three tracks for light and heavy repair and an inspection pit.
2. DIMENSIONS —
  - a. Size: 500' x 75'.
  - b. Area: 37,500 sq. ft.
  - c. Height: 23'-6".
  - d. Stories: One.
3. FOUNDATIONS — Spread footings under columns,

slab on grade.

4. STRUCTURE — Portal frame (structural steel).
5. WALLS & EXTERIOR CLADDING — Corrugated galvanized steel siding, service rooms insulated.
6. ROOF — Corrugated galvanized steel.
7. WINDOWS AND ENTRANCES — Industrial steel sash, metal doors and frames.
8. INTERIOR FINISHES —
  - a. Floors: Concrete.
  - b. Walls: Gypsum board (office and service areas).
  - c. Ceilings: Gypsum board (office and service areas).
9. MECHANICAL SYSTEMS —
  - a. Plumbing: Standard fixtures and plumbing in washrooms.
  - b. Heating, ventilation, air conditioning: Electrical baseboard heating (service area); fan coil suspended heaters fired by propane gas (maintenance shed). Exhaust fan from washroom; roof ventilation.
10. ELECTRICAL —
  - a. Power: 600 V to 150 KVA - 120/208 V.
  - b. Lighting: Fluorescent.
11. SPECIAL TRAFFIC CONVEYING EQUIPMENT — "I" beam monorail for transport of heavy parts.
12. Fire Protection — Hose reel stations.

## MINIRAIL STATION LE VILLAGE

### A. GENERAL DATA

1. NATURE OF PAVILION/STRUCTURE — Temporary.
2. LOCATION — Expo Area: La Ronde;  
Lot No. 5125.
3. OWNER (or contracting body) — Canadian Corporation for the 1967 World Exhibition.
4. DESIGN ARCHITECT — Poulin, Ayotte, Vincent, Derome, Montreal.
7. LOCAL ASSOCIATE CONSULTING ENGINEERS —
  - a. Structural, mechanical and electrical and communications: Herter Todd & Meyer, Montreal.
10. OTHER CONTRACTORS OF SPECIAL INTEREST — Laminated Structures Ltd. Montreal (prefabrication of Timber Structure).

### B. GENERAL DESCRIPTION OF PAVILION/STRUCTURE

1. FUNCTIONAL DESCRIPTION — Located adjacent to the "lay-by" yard, this station, like the one at Pioneerland, had various facilities incorporated under its platforms. At the lowest level were a maintenance shop and transformer rooms; at the second level, artists' quarters for changing and relaxation.
2. DIMENSIONS —
  - a. Size: 197' x 46'.
  - b. Area: 9000 sq. ft.
  - c. Height: 48'.
  - d. Stories: Three.
3. FOUNDATIONS — Reinforced concrete walls on strip foundations.
4. STRUCTURE — Reinforced concrete basement and floor with timber structure bolted above it. Scissor trusses over platforms.
5. WALLS & EXTERIOR CLADDING — Exposed concrete (1st floor), 1" vertical cedar boarding (2nd floor). Building paper, 1/2" insulsheathing, 2" x 4" stud wall with 2" insulation, vapour barrier, 1/2" gypsum board.
6. ROOF — Asphalt shingles, roofing paper, 2" x 6" T & G sheathing, purlins, scissor trusses. Built up asphalt and gravel roofing over reinforced concrete (exposed lower levels).
7. WINDOWS & ENTRANCES — Standard steel windows. Picture window, wood framed, in lounge; higher, wood, top hinged, outward opening windows in service rooms.
8. INTERIOR FINISHES —
  - a. Floors: Concrete and hardner, asphalt over membrane on main concourse.
  - b. Walls: Concrete unfinished, gypsum board painted.
  - c. Ceilings: Concrete unfinished, none in artists' quarters.

### MECHANICAL SYSTEM —

- a. Plumbing: 1 WC and basin in maintenance area; 4 WCs, 4 basins and 4 showers in artists' quarters. Hot water.
- b. Heating, ventilation, air conditioning: Maintenance shop (gas unit heaters), artists' quarters (electric heating), ventilation (transformer rooms).

### 10. ELECTRICAL —

- a. Power: 12 KV power transformed to 750 KVA; 440 V for the minirail system.
- b. Lighting: Lighting transformer provided 120/208 V.
- c. Audio-visual systems: Public address system on 120/208 V; telephone communication between control booths.

12. FIRE PROTECTION — Fire hose cabinets on platforms, pressurized water extinguishers in building, CO2 extinguishers in transformer rooms.

13. SAFETY FEATURES — Yellow "stand back" line on platforms and emergency lighting.

15. OTHER ITEMS OF PARTICULAR INTEREST — Scissor type truss by Laminated Structures Limited, Town of Mount Royal, Quebec.

16. COMMENTS — Except for the ticket booth, all elements were designed to be compatible with the architecture of the area (Le village).

## MINIRAIL STATION-PIONEER LAND

### A. GENERAL DATA

1. NATURE OF PAVILION/STRUCTURE — Temporary.
2. LOCATION — Expo Area: La Ronde;  
Lot No. 5650.
3. OWNER (or contracting body) — Canadian Corporation for the 1967 World Exhibition.
4. DESIGN ARCHITECT — E.J. Gaboury, St. Boniface, Manitoba.
7. LOCAL ASSOCIATE CONSULTING ENGINEERS —
  - a. Structural, mechanical, electrical and communications: Hurter Tood & Meyer, Montreal.
9. GENERAL CONTRACTOR — Rack Construction Ltd., Montreal.
10. OTHER CONTRACTORS OF SPECIAL INTEREST — Laminated Structures Ltd., Montreal (Pre-fabrication of timber Structure).

### B. GENERAL DESCRIPTION OF PAVILION/STRUCTURE

1. FUNCTIONAL DESCRIPTION — This system was comparable to the Ile Sainte-Hélène system with a maximum flow of 2,800 persons per hour. Under the platform area were public washrooms, office space and a transformer room.
2. DIMENSIONS —
  - a. Size: 163' x 52'
  - c. Height: 30'.
  - d. Stories: Two.
3. FOUNDATIONS — Timber poles on concrete pads 6'-0" deep. Reinforced concrete foundations and footings for wall.
4. STRUCTURE — Solid timber trusses on barked timber poles, timber beams and mill deck platforms. Bolts, screws, tenon mortice and steel gusset connections.
5. WALLS & EXTERIOR CLADDING — Cedar vertical siding, furring, 8" and 12" concrete block. Also cedar

vertical siding, 1/4" asbestos board, 2" x 4" stud wall, 5/8" gypsum board.

6. ROOF — Cedar shingles, roofing paper, 3" T & G sheathing, timber trusses. Built up asphalt and gravel roofing over prestressed slabs or 2" x 8" joists (exposed lower levels).
7. WINDOWS & ENTRANCES — Wood windows. Bottom hinge, open-in. Subdivided into small panes.
8. INTERIOR FINISHES —
  - a. Floors: Concrete and hardener.
  - b. Walls: Gyproc painted, concrete block unfinished.
  - c. Ceilings: Gypsum board painted, exposed precast concrete.
9. MECHANICAL SYSTEMS —
  - a. Plumbing: 17 public W.C.s, 13 basins. Designed to be drained in winter.
  - b. Heating, ventilation, air conditioning: No heating; ventilation of washrooms and transformer rooms.
10. ELECTRICAL —
  - a. Power: 12 KV power transformed 5750 KVA; 440 V for the minirail system.
  - b. Lighting: Lighting transformer provided 120/208 V.
  - c. Audio-Visual Systems: Public address system on 120/208 V; telephone communication between control booths.
12. FIRE PROTECTION — Fire hose cabinet on platforms, pressurized water extinguishers in building, CO2 extinguishers in transformer rooms.
13. SAFETY FEATURES — Yellow "stand back" line on platforms and emergency lighting.
15. OTHER ITEMS OF PARTICULAR INTEREST — Cantilevered stair and ramp landings. Modified pole construction to suit combination with dressed timber and connectors.
16. COMMENTS — All elements of the station (except the ticket booth by the C.C.W.E.) were designed to be compatible with the architecture of the area (Pioneerland).

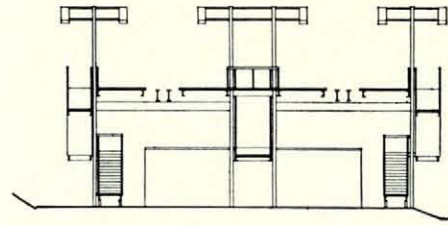


# MINIRAIL STATIONS "B" TRANSPORTATION SYSTEM

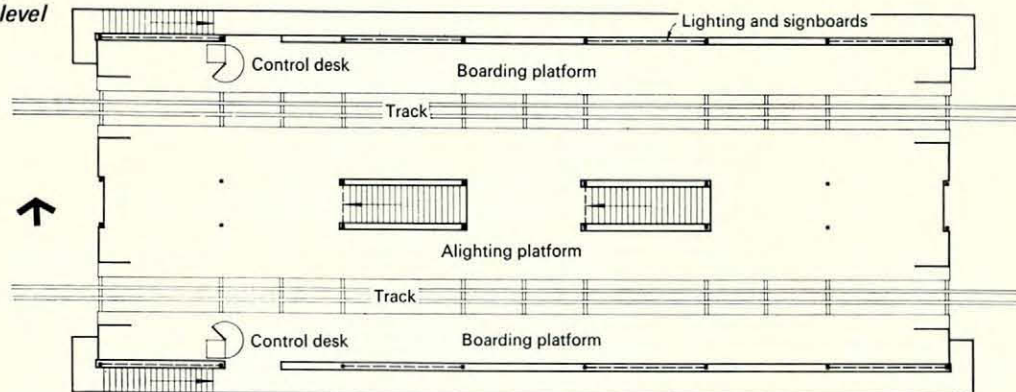
## A. GENERAL DATA

1. NATURE OF PAVILION/STRUCTURE — Temporary.
2. LOCATION — Expo Area: Ile Sainte-Hélène and Ile Notre-Dame.  
Lot No. A. 4235, B. 4426, C. 4043, D. 3182 (Ile Sainte-Hélène), E. 3007  
Key Plan No. 342.

*Cross section*



*Plan at platform level*



*Minirail Station Ile Notre-Dame*



3. OWNER (or contracting body) — Canadian Corporation for the 1967 World Exhibition.
  4. DESIGN ARCHITECT — Hart Massey, Ottawa.
  7. LOCAL ASSOCIATE CONSULTING ENGINEERS —
    - a. Structural, mechanical & electrical: Hurter Todd & Meyer, Montreal.
  9. GENERAL CONTRACTOR — A.N. Bail Limited, Montreal.
- B. GENERAL DESCRIPTION OF PAVILION/STRUCTURE
1. FUNCTIONAL DESCRIPTION — The stations were designed for smooth boarding and disembarkation of passengers and collection of ticket fares. The flow pattern was basic: board on one side, dismount on the other. Means of access included both stairs and ramps. Transformers for the systems were housed under each station. The blue car Ile Notre-Dame system had a capacity of 6,000 persons per hour with each station designed to take a certain proportion of the total. The yellow car system on Ile Sainte-Hélène had a lower capacity of 2,800 persons per hour. The two systems were linked at Station D, adjacent to the Metro Station, under the platform of which was located the maintenance shop of the yellow car system.
  2. DIMENSIONS —
    - a. Size: 140' long (typical) by 58' wide., (station D maximum).
    - b. Height: 11'-0" to platform.
    - c. Stories: Elevated platforms.
  3. FOUNDATIONS — reinforced concrete spread footings.
  4. STRUCTURE — Square steel tube columns and standard rolled sections for beams; mill deck platforms; fully welded construction. Concrete block enclosed transformer rooms.
  5. WALLS & EXTERIOR CLADDING — Open.
  6. ROOF — OPEN.
  7. WINDOWS & ENTRANCES — None. Steel operators booths were partially glazed.
  9. MECHANICAL SYSTEMS —
    - a. Plumbing: None for stations.
    - b. Heating, ventilation, air conditioning: None typical. Station D maintenance - gas fired hot air individual suspended units by Hastings, 80,000 BTU per hour each, 1 make up air-gas unit Hastings 96,000 BTU per hour. All transformer rooms ventilated by exhaust fans.



*Minirail Station Ile Ste  
Hélène*



3. OWNER (or contracting body) — Canadian Corporation for the 1967 World Exhibition.
  4. DESIGN ARCHITECT — Hart Massey, Ottawa.
  7. LOCAL ASSOCIATE CONSULTING ENGINEERS —
    - a. Structural, mechanical & electrical: Hurter Todd & Meyer, Montreal.
  9. GENERAL CONTRACTOR — A.N. Bail Limited, Montreal.
- B. GENERAL DESCRIPTION OF PAVILION/STRUCTURE
1. FUNCTIONAL DESCRIPTION — The stations were designed for smooth boarding and disembarkation of passengers and collection of ticket fares. The flow pattern was basic: board on one side, dismount on the other. Means of access included both stairs and ramps. Transformers for the systems were housed under each station. The blue car Ile Notre-Dame system had a capacity of 6,000 persons per hour with each station designed to take a certain proportion of the total. The yellow car system on Ile Sainte-Hélène had a lower capacity of 2,800 persons per hour. The two systems were linked at Station D, adjacent to the Metro Station, under the platform of which was located the maintenance shop of the yellow car system.
  2. DIMENSIONS —
    - a. Size: 140' long (typical) by 58' wide., (station D maximum).
    - b. Height: 11'-0" to platform.
    - c. Stories: Elevated platforms.
  3. FOUNDATIONS — reinforced concrete spread footings.
  4. STRUCTURE — Square steel tube columns and standard rolled sections for beams; mill deck platforms; fully welded construction. Concrete block enclosed transformer rooms.
  5. WALLS & EXTERIOR CLADDING — Open.
  6. ROOF — OPEN.
  7. WINDOWS & ENTRANCES — None. Steel operators booths were partially glazed.
  9. MECHANICAL SYSTEMS —
    - a. Plumbing: None for stations.
    - b. Heating, ventilation, air conditioning: None typical. Station D maintenance - gas fired hot air individual suspended units by Hastings, 80,000 BTU per hour each, 1 make up air-gas unit Hastings 96,000 BTU per hour. All transformer rooms ventilated by exhaust fans.



*Minirail Station Ile Ste  
Hélène*



10. ELECTRICAL —

- a. Power: 12 KV power transformed to 750 KVA; 440 V for the minirail system.
- b. Lighting: Transformer provided 120/208 V.
- c. Audio-visual systems: Public address amplifiers and loudspeakers.
- d. Other: Bell Telephone communication between control booths.

12. FIRE PROTECTION — Carbon Dioxide 15 lb. fire extinguishers for transformer rooms. Pressurized water with anti-freeze fire extinguishers on all platforms. Standard C.C.W.E. Fire alarm communication system.

13. SAFETY FEATURES — Yellow "stand back" line painted on platforms. Two means of exit from elevated platforms; stair and ramp.

14. EXTERIOR WORK (Where part of the construction contract) — Landscaping and walkways.

15. OTHER ITEMS OF PARTICULAR INTEREST — Handrails.

- a. Brief description: Handrail system proved to be economical. Tubular steel handrails with balustrades at 6'-0" centres and infill fabric panels of Climatite Plastic.
- b. Nearest source of more information: General Contractors.

16. COMMENTS — The stations were well designed (based upon a 3" module), with efficient arrangements for lining up. The structure was designed in a simple, light and economical manner with all members welded for reasons of appearance. Electrical services were designed to run within tubular units.

## OPERATIONS CONTROL CENTRE

### A. GENERAL DATA

1. NATURE OF PAVILION/STRUCTURE — Temporary.
2. LOCATION — Expo Area: Ile Sainte Hélène;  
Lot No. 3250;  
Key Plan No. 336.
3. OWNER (or contracting body) — Canadian Corporation for the 1967 World Exhibition. (jointly sponsored with Canadian General Electric).
4. DESIGN ARCHITECT — Donaldson, Drummond, Sankey, Montreal.
6. CONSULTING ENGINEERS —
  - a. Structural: Dr. F.M. Kraus, Montreal.
  - b. Mechanical and Electrical: Frost, Lindsay & Associates, Montreal.
8. OTHER CONSULTANTS — M.C. Lam & Assoc., Cambridge, Mass. (lighting).
9. GENERAL CONTRACTOR — Charles Duranceau Ltee., Montreal.

### B. GENERAL DESCRIPTION OF PAVILION/STRUCTURE

1. FUNCTIONAL DESCRIPTION — This building housed the operations and communications ("nerve") centre of Expo '67 including offices for the Director of Operations. Computers and other pieces of operating equipment were viewed as exhibits by the public from gallery bridges overlooking them.
2. DIMENSIONS —
  - a. Size: 114' x 115'.
  - b. Area: 19,850 sq. ft.
  - c. Height: 28'.
  - d. Stories: Two.
3. FOUNDATIONS — Reinforced concrete foundation walls on spread footings.
4. STRUCTURE — Structural steel.
5. WALLS & EXTERIOR CLADDING — Stucco on

concrete block and enameled asbestos cement (GLAS-WELD) fascia panels.

6. ROOF — Built up roofing over steel deck.
7. WINDOWS & ENTRANCES — Plate glass in painted aluminum frames.
8. INTERIOR FINISHES —
  - a. Floors: Vinyl asbestos floor tile (lower level), cold mastic flooring (bridges).
  - b. Walls: Stucco on concrete block.
  - c. Ceilings: Acoustical plaster (predominant), suspended acoustical tile.
9. MECHANICAL SYSTEMS —
  - a. Plumbing: Standard; electric domestic hot water system.
  - b. Heating, ventilation, air conditioning: Cooling tower for chillers, 2-50T package chillers feeding 6 air handling units (located in 4 mechanical rooms) and 17 fan coil units in small enclosed offices (one in each); total capacity, 100T. Electrical heating coils in fan coil units and electrical duct heaters in air handling units. Ventilation was part of A.C. system with exhaust fan system to offices.

### 10. ELECTRICAL —

- a. Power: 12,000 V, 2 feeder, incoming service entrance, automatic transfer switch, step down to 120/208V service with 2-300 KVA (TYROMOL) transformers, one for lighting, convenience and computer equipment and the second for mechanical equipment. The transformer substation was shared with the adjoining International Scout Centre.
- b. Lighting: Incandescent; fluorescent (IBM room and entrance handrail).
- c. Audio-visual systems: Part of operations installation.
- d. Other:
  1. Emergency power generator, diesel operated, 15 KVA.
  2. Secondary air circuit breakers in between secondary protection (permitted manual transfer of load of still

operating transformer when other fails).

12. FIRE PROTECTION — Fire hose cabinets, extinguishers.

13. SAFETY FEATURES — Emergency lighting operated by emergency generator; heat detection system; pre-signal, zone, fire alarm system.

15. OTHER ITEMS OF PARTICULAR INTEREST — Floating floor.

- a. Brief description: Cast aluminum panels, 18" x 18", on steel pedestals; panels possessed conduct-

ing vinyl, inlaid tiles.

b. Location: Main computer room.

c. Manufacturer or producer: Bruce E.D.P. Services Limited, Toronto.

d. Nearest source of more information: Same.

16. COMMENTS — elegant, well designed and detailed, this simple, highly functional building served both utilitarian and exhibition purposes. The interesting bridges permitted the public to overlook four courts in which they were able to see the complete and intricate, mechanized workings of the control system.



## TILDEN PEDICAB

### A. GENERAL DATA

1. NATURE OF PAVILION/STRUCTURE — Temporary.
2. LOCATION — Expo Area: Cité du Havre; Ile Sainte-Hélène; La Ronde;  
Lot No.: 2391; 3187; 5443;  
Key Plan No.: 234. 345. 518.
3. OWNER (or contracting body) — Tilden Rent-A-Car Service, Montreal.
4. DESIGN ARCHITECT — Donaldson, Drummond, Sankey, Montreal.
6. CONSULTING ENGINEERS —
  - a. Structural: Mr. D. Dressel, c/o R.R. Nicolet & Associates, Montreal.
9. GENERAL CONTRACTOR — R.M. Clark Construction Co. Ltd., Montreal.

### B. GENERAL DESCRIPTION OF PAVILION/STRUCTURE

1. FUNCTIONAL DESCRIPTION — A compact, very flexible shelter which housed pedicab dispatch centers.
2. DIMENSIONS —
  - a. Size: 16' x 20'
  - b. Area: 320 sq. ft.
  - c. Height: 15'
  - d. Stories: One
3. FOUNDATIONS — 16" diameter concrete piers each 2' deep.
4. STRUCTURE — 1" steel tubing with APTON mechanical connectors.

5. WALLS & EXTERIOR CLADDING — Canvas laced to steel tube framing.

6. ROOF — Canvas and plexiglass skylight.

### 8. INTERIOR FINISHES —

- a. Floors: Precast concrete patio slabs.
- b. Walls: Canvas and painted platewood.
- c. Ceilings: Canvas and plexiglass skylight.

### 9. ELECTRICAL —

- a. Power: 120/208 V service entry provided by C.C.W.E.
- b. Lighting: Incandescent (G-type bare bulbs).

12. FIRE PROTECTION — Fire retardant treatment of canvas and platewood.

### 15. OTHER ITEMS OF PARTICULAR INTEREST — APTON SYSTEM —

- a. Brief Description: Extremely flexible, low cost framing system (mainly used for displays), consisting of 1" square steel tubes and various die cast joints which are used as connectors.
- b. Location: Structural Framework
- c. Manufacturer or Producer: Apton Division of Dexion Ltd., Wembley, Middlesex, England.
- d. Nearest Source of More Information: Metalworks Ltd., Verdun, Quebec.

16. COMMENTS — The unique framing system employed (Apton) proved to be very economical and extremely flexible. Interior lighting through the colored canvas provided the structures with a luminous quality at night.

## TRAILER-TRAIN MAINTENANCE

### A. GENERAL DATA

1. NATURE OF PAVILION/STRUCTURE — Temporary.
2. LOCATION — Expo Area: La Ronde;  
Lot No. 5340;  
Key Plan No. 501.
3. OWNER (or contracting body) — Canadian Corporation for the 1967 World Exhibition.
4. DESIGN ARCHITECT — Joseph Baker, Montreal.
6. CONSULTING ENGINEERS —
  - a. Structural: F.M. Kraus, Montreal.
  - b. Mechanical & electrical: Mendel, Brasloff, Lassman & Sidler, Montreal.
9. GENERAL CONTRACTOR — Treco Ltee, Centre Industriel, St. Romuald, Quebec.

### B. GENERAL DESCRIPTION OF PAVILION/STRUCTURE

1. FUNCTIONAL DESCRIPTION — Two buildings were constructed. One housed staff washrooms and locker; the other, a maintenance shop.
2. DIMENSIONS —
  - a. Size: 48'-9" x 40'; 48' x 40'; 40' x 12'.
  - c. Height: 11' - 1".
  - d. Stories: One.
3. FOUNDATIONS — Strip concrete foundations and 10" concrete wall to grade.

4. STRUCTURE — Laminated wood post and beams; 3'-0" plywood web box trusses over large spans.
5. WALLS & EXTERIOR CLADDING — Plywood panels on 3" x 3" framing.
6. ROOF — Asphalt and gravel flat roof.
7. WINDOWS & ENTRANCES — Standard industrial metal windows.
8. INTERIOR FINISHES —
  - a. Floors: Painted concrete slab on grade.
  - b. Walls: Painted plywood.
  - c. Ceilings: Painted plywood.
9. MECHANICAL SYSTEMS —
  - a. Plumbing: Standard fixtures and plumbing.
  - b. Heating, ventilation, air conditioning: Exhaust fans on roof, 3 gas hot water tanks.
10. ELECTRICAL —
  - a. Power: 600 V primary service split to 2-45 KVA - 120/208 V dry core transformers and 2-30 KVA - 120/208 V dry core transformers.
  - b. Lighting: Fluorescent.
12. FIRE PROTECTION — Fire extinguishers and standard CCWE alarm system.
16. COMMENTS — The buildings were not designed for winter use (to be heated). Because of this, a certain amount of delamination occurred when they were heated during the winter prior to the opening of Expo.





## CREDITS

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### THE ARCHITECTURAL REVIEW

Africa Place — plan.

Canada — plans.

France — plans — upper level, ground floor.

Great Britain — plan, section

Greece — plan, section.

Holland — plans, ground floor, upper level.

Israel — plans, ground floor, upper level.

Ontario — plans, ground floor, upper level.

Switzerland — plans, ground floor, upper level

U.S.A. — plans, ground floor, upper level; section.

Administration Building — plan, section.

Aquarium Building — Exploded drawing.

Scandinavia — plans, first floor, second floor.

### PROGRESSIVE ARCHITECTURE

Holland — wall section.

U.S.A. — full detail page.

Britain — full detail page.

Gyrotron — joint details.

Germany — mast detail.

Man in the Community — section and details.

Cuba — construction details.

Polymer — section.

Africa Place — section.

Israel — roof framing plan, truss diagram.

### THE ARCHITECTS' JOURNAL

Place d'Accueil — section and details.

Minirail Station — plan and section.

Britain — tower construction detail.

Germany — plan, section and details.

Czechoslovakia — first and ground floor plans and section.

Man the Producer — upper and ground level floor plans, section, and all details.

Canada — plan and section.

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