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SECTOR PROFILE ⁶
DISCUSSION PAPER

THE CANADIAN CONSTRUCTION INDUSTRY



Government
of Canada
Dept. of
Industry, Trade
and Commerce

Gouvernement
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Industrie
et Commerce



SECTOR PROFILE **INDUSTRY**

THE CANADIAN CONSTRUCTION INDUSTRY

The construction industry is a major sector of Canada's economy. It is a dynamic and growing industry that provides the infrastructure and housing for the country. The industry is characterized by its diversity, with a wide range of activities from residential building to large-scale infrastructure projects. The industry is also highly competitive and is subject to significant fluctuations in demand. The construction industry is a key component of the Canadian economy, and its growth is essential for the country's economic development. The industry is also a major employer, providing jobs for millions of Canadians. The industry is also a major contributor to the country's GDP. The construction industry is a complex and multi-faceted industry, and it is essential for the country's economic development. The industry is also a major employer, providing jobs for millions of Canadians. The industry is also a major contributor to the country's GDP. The construction industry is a complex and multi-faceted industry, and it is essential for the country's economic development.

CONSTRUCTION INDUSTRY

INTRODUCTION

This paper focuses on the activities of firms and individuals engaged in the physical conduct of construction work — developer/builders, general contractors and trade contractors. Detailed consideration is not accorded the role of companies and institutions closely associated with and dependent upon construction activity in the context of architecture, engineering, project management, education, finance, equipment and materials supply, and inspection and testing. In the course of the paper, however, extensive reference is made to such organizations because of the strong linkages which connect them to the process of construction. The paper thus treats the contracting sector of the industry as an industry in its own right.

The construction industry is an important sector of Canada's economy in terms of employment, output and wages and as a consumer of manufactured goods. It also bears a basic relationship to all other industries accounting for some 25 to 30 per cent of capital investments in the manufacturing sector and approximately 60 per cent of all capital investment in Canada. The total value of construction activity in 1976 amounted to \$31.7 billion and by reliable estimates this figure will exceed \$80 billion (in current dollars) annually by 1985.

Traditionally, Canadian construction firms, with few exceptions, have operated only in the domestic market. Over the past two or three years however, several firms have investigated opportunities offshore and some have won contracts. Industry interest in export activity is growing rapidly, but much basic understanding and promotional work is required if Canada is to achieve a reasonable share of the extensive overseas market for construction goods and services.

The construction process is becoming increasingly mechanized, organized and repetitive and now resembles the manufacturing sector to a considerable extent. In this context, the industry has the potential for improvements in productivity and efficiency which would result in considerable benefit to the national economy.

Considering the importance of the construction industry to Canada's economy, the changes that are taking place within the industry, as well as opportunities overseas, it is important that the industry grow and shape itself so as to maximize its contribution to the economy.

DEFINITION

Construction is defined by Statistics Canada as the creation, renovation, repair and demolition of immobile structures and the alteration of the natural topography.

The *Construction Industry* is composed of firms and labour primarily engaged in activities whereby construction is accomplished.

Construction Activity is the output of the construction industry together with the output of construction labour forces in other industries.

STRUCTURE

Size and Significance

The Canadian construction industry is large, diverse and complex. Construction activity accounts for about six per cent of Gross Domestic Product, compared to about four per cent for mining, three per cent for agriculture and 23 per cent for the entire manufacturing sector. The industry employs more than 700,000 workers, some seven per cent of the total Canadian labour force, and construction accounts for 60 per cent of the total investment in fixed assets in the economy.

Industry Segments

The industry in the context of this profile, consists of two major sectors, building construction and engineering construction, each of which is subdivided into several segments. In 1976, the value of work performed by each of these segments was as follows:

Classification of Value of Construction — 1976
(New and Repair)

	<i>\$ billion</i>	<i>% of total</i>
<i>Building Construction</i>		
Residential	11.6	33.4*
Industrial	1.4	4.6
Commercial	3.3	10.5
Institutional	1.5	4.7
Other building	1.2	3.7
Total	19.0	59.9
<i>Engineering Construction</i>		
Marine	0.2	0.5
Roads and highways	2.6	8.2
Water works	1.3	4.1
Dams and irrigation	0.1	0.4
Electrical power	3.1	9.8
Railway, telephone and telegraph	1.2	3.8
Gas and oil	2.3	7.3
Other engineering	1.9	6.0
Total	12.7	40.1
Total Construction	31.7	100.0

*Residential construction has consistently equalled or exceeded 30 per cent of the total value of construction in recent years.

Source: Statistics Canada — "Construction in Canada".

Scale, Size and Type of Companies

The construction contracting industry consists of about 100,000 firms, of which 30,000 are incorporated. Most are small, having sales of less than \$2 million and fewer than 50 employees. There are, however, a few large companies. Only the largest of these have significant public share holdings. Table 1 of the Appendix shows the distribution of incorporated construction firms by size and type for 1973. A comparison of assets and sales of firms can be misleading since some firms make a practice of leasing equipment while others purchase it outright. Of the 30,000 incorporated firms only one per cent have assets greater than \$5 million, yet these firms are responsible for about 23 per cent of the business.

About 200 firms are foreign controlled — 60 per cent of which are owned by American interests. Some 60 of these foreign controlled firms have relatively large assets (in excess of \$5 million). It is estimated that about 10 per cent of construction work in Canada is carried out by foreign controlled firms.

Subsectors of the Construction Industry

<i>Subsector Description</i>	<i>1974 number of incorporated firms</i>	<i>1974 total revenue \$000,000</i>
BUILDING		
<i>Residential</i>		
Builder/developers	2595	2525.7
General contractors	4498	390.8
Subtotal	7093	2916.5
<i>Non-residential</i>		
General contractors	3589	3539.2
Special trade contractors	15885	6119.5
Subtotal	19474	9658.7
ENGINEERING		
Highway, road, street and bridge	1250	1816.6
Other engineering contractors	1961	2669.9
Subtotal	3211	4486.5
Total	29,778	17,061.7

Source: Statistics Canada Publications 61-207, 64-204-208 and Estimates by the Construction and Consulting Services Branch.

The above table indicates that 36.5 per cent of the residential contractors perform 86 per cent of the residential building work. This 36.5 per cent is mainly developer and builder/developer firms with sales in excess of \$500,000.

In the non-residential building segment of the construction industry there are two main groups: general contractors which account for 18.3 per cent of the firms and 36.5 per cent of the work; and special trade contractors which represent 81.7 per cent of the firms and 63.5 per cent of the work.

The engineering sector includes 10.8 per cent of the corporations in construction performing 26 per cent of the corporate work. The number of firms in the engineering sector has remained relatively unchanged over the years although the total amount of work has been increasing in absolute terms and as a percentage of the total construction volume.

Regional Distribution

Regional shares of construction spending reflect population, industry mix, development of natural resources and the rate of regional development. Except for large or specialized projects, construction in Canada is carried out by local firms. The following table shows that while the value of construction

Regional Shares of Construction Spending (billion dollars)

	<i>Average 1951-70</i>	<i>1970</i>	<i>%</i>	<i>1973</i>	<i>%</i>	<i>1976</i>	<i>%</i>
Atlantic Region	8%	\$ 1.3	9.3	\$ 2.2	8.8	\$ 2.6	8.2
Québec	24%	2.8	20.2	5.6	22.7	7.4	23.7
Ontario	34%	5.0	36.2	8.5	34.4	9.8	31.2
Prairies	22%	2.9	20.9	4.8	19.5	7.3	23.3
British Columbia	12%	1.8	13.4	3.6	14.6	4.3	13.6
Canada	100%	\$13.8	100.0	\$24.7	100.0	\$31.4	100.0

Source: Statistics Canada.

expenditures has increased significantly in the 1970's, there has been no significant shift in spending from one region to another over the past 25 years.

In recent years, a substantial part of the total construction expenditure took place in the large metropolitan areas, especially Montreal and Toronto, reflecting the rapid urbanization of Canada.

Construction Linkages with the Economy

The construction industry makes an important direct contribution to Canada's economy and is an important purchaser of materials and services of other sectors.

For each \$100 of output, the construction industry spends approximately \$39 on materials, \$36 for labour, \$14 on the purchase of services, and \$11 on taxes and capital. In other words, for each \$1 of labour costs, \$1.08 is spent on materials, primarily from the manufacturing sector. Table 2 in the Appendix shows the comparison of the figures for construction with those for other sectors of the economy. Construction purchases have their greatest impact on iron, steel and fabricated metal products; lumber and wood products; non-ferrous metal products; cement and concrete products; and other non-metallic mineral products such as clay brick, asbestos products, etc. Quebec and Ontario supply most of their provincial construction material requirements and also a large proportion of the needs of the other regions.

The construction industry's expenditures in the various sectors are:

The Canadian Market for Construction in 1976

	Value of Construction (\$ million)			% of Total Market
	Building	Engineering	Total	
Agriculture and fishing	501	270	771	2.5
Forestry	17	115	132	0.4
Mining, quarrying and oil wells	359	2,679	3,038	9.7
Construction	102	1	103	0.3
Manufacturing	1,060	919	1,979	6.3
Utilities	626	4,819	5,445	17.4
Trade-wholesale and retail	404	19	423	1.3
Finance, insurance and real estate	1,444	136	1,580	5.0
Commercial services	562	9	571	1.8
Housing	10,425	—	10,425	33.1
Institutional services	1,386	13	1,399	4.4
Government departments	1,149	4,434	5,583	17.8
	18,035	13,414	31,449	100.0

Source: Statistics Canada.

Construction Costs

Since construction accounts for 25 per cent to 30 per cent of the manufacturing industry's capital investment expenditures, construction costs affect significantly the manufacturing sector's ability to expand and to compete in domestic and world markets. Construction costs, moreover, have an influence on the selection of sites for industrial development in a regional context. As shown in the table below, regional construction costs for a standard industrial/commercial building, exclusive of land, vary as much as 20 per cent in urban areas across Canada. Land costs can vary a great deal more. Also, regional construction costs vary widely for more complex projects, depending on the local availability of technology, services, equipment, materials and labour.

When comparing the cost of constructing standard industrial buildings in Canadian urban centres with the cost of constructing a similar building in major urban centres of the U.S. the following pattern emerges. The cities located in the northern U.S., or heavily developed areas such as Los Angeles, likely have construction costs comparable with or slightly higher than those prevailing in most Canadian metropolitan centres. In some major southern U.S. urban areas this cost differential is favourable to the United States. Costs in the southern U.S. are lower for several reasons. Labour is plentiful and lower priced than in Canada. Favourable climatic conditions do not impede the construction process and foundation and insulation requirements are less stringent than in Canada. The industry argues as well

that government approval procedures for development in Canada of serviced land are more complex, contributing to total cost differentials between the two countries.

For general comparison purposes the following indexes have been developed for a standard two storey, steel frame, masonry wall, industrial building of 40,000 square feet; land costs are not included. This type of building would cost about \$1 million in Toronto. Figures are for *June 1977*, completed in terms of Canadian dollars.

Indexes of Construction Costs*
Standard Industrial Building

CANADA				UNITED STATES			
Toronto	100.0	Winnipeg	106.4	Raleigh N.C.	73.1	Denver	106.5
Windsor	102.3	Saint John	106.7	Houston	90.1	Seattle	112.4
Halifax	102.8	Sudbury	109.1	Miami	98.3	Los Angeles	112.4
Montreal	103.5	Regina	110.5	Chicago	104.2	Detroit	114.8
Ottawa	104.0	Vancouver	110.9	Kansas City	105.2	New York	118.3
Quebec	104.5	Thunder Bay	116.0				
Calgary	106.1	St. John's	117.0				

*Does not include the cost of land.

Only the labour related (up to about one third of total project cost, excluding land) and management costs are within the direct control of the construction industry. The contractor is basically concerned with the erection/installation of building components or equipment, all of which have prices defined outside the construction industry.

The following table shows regional cost differences for some basic building materials.

Unit Cost of Some Basic Building Materials Canada/U.S. Spring 1977
(Canadian dollars)
3/4"

	4000 psi. Concrete Cu. yd.	8" std. Concrete Block	Formwork Plywood Sq. ft.	Fabricated Structural Steel/ton	Cut/bent Reint. Bar/ton	Vinyl Tile Sq. ft.
CANADA*						
Halifax	33.00	0.56	0.66	520	350	0.49
Montreal	34.78	0.44	0.63	540	360	0.42
Toronto	29.50	0.48	0.60	520	370	0.44
Vancouver	33.38	0.64	0.54	605	375	0.56
U.S.						
New York	31.20	0.45	0.55	685	462	0.53
Raleigh	31.40	0.45	0.53	503	361	0.55
Chicago	29.10	0.49	0.54	543	364	0.52
Houston	29.00	0.45	0.47	523	357	0.63
Denver	33.10	0.50	0.54	590	351	0.65
Los Angeles	30.00	0.45	0.50	552	288	0.56

*Five per cent federal tax included in Canadian material prices.

In general concrete and cement products are somewhat less expensive in the U.S. than in Canada. Prices for fabricated steel are slightly lower in Canada. Plywood is less costly in the U.S. No comprehensive figures are available but in general, building materials, equipment and accessories are considered by the construction industry to be less expensive in the U.S. than in Canada. There is no federal sales tax in the U.S. Canadian federal sales tax is an element in placing the Canadian purchasers of buildings and structures at a competitive disadvantage with those in the U.S.

In overseas areas where construction markets are undergoing rapid development, e.g. the Middle East, materials and equipment from Canada often are not competitive with those from Europe and Japan. Transportation, handling and distribution costs are in general higher in Canada than those

prevailing in countries with which Canada must compete. To the extent that this is so, such costs adversely affect the international competitiveness of the industry.

The relatively high material and equipment prices in Canada not only boost domestic construction costs but make it difficult for Canadian contractors to be competitive in overseas work, particularly when they have to meet certain Canadian content requirements to receive government financing, insurance and other incentives.

An example of regional cost difference has been documented in the discussion paper prepared by the Chemicals Branch of Industry, Trade and Commerce. This paper gives the following typical capital cost indexes for petrochemical plants in three areas of Canada compared to the U.S. Gulf Coast.

Causes of Net Percentage Increase
(Based on 1975 Data)

U.S. Gulf Coast	1.00	<i>Labour</i>	<i>Material</i>	<i>Engineering</i>
Sarnia	1.20	14	4	2
Montreal	1.30	23	5	2
Calgary	1.35	26	5	4

Although labour-related costs represent only about one-third of the cost of new plants of this type, they account for some two-thirds of Canadian cost disadvantage.

High basic construction labour rates along with the higher costs associated with climatic conditions are the prime causes of higher Canadian costs compared to those of the largely non-unionized and climatically more temperate southern U.S. However, in comparison with other areas of the United States, cost differences are less marked.

Wages paid to Canadian construction workers currently run 30 per cent to 45 per cent higher than in manufacturing. When the associated costs are passed on to the manufacturing sector, they add to its cost structure. In 1951 construction workers and workers in manufacturing earned virtually the same average hourly wage, \$1.19 in construction and \$1.18 in manufacturing. The following table indicates that by 1975, the average hourly construction wage was \$7.50 compared with \$5.06 in manufacturing, a 530 per cent increase for construction compared with 329 per cent for manufacturing. However, in comparing hourly wage rates in construction and manufacturing, account must be taken of such factors as job insecurity due to seasonality, uneven work schedules, and fluctuations in construction which reduce the annual income of the construction worker.

Hours and Earnings

	<i>Average Weekly Hours</i>		<i>Average Hourly Earnings</i>	
	1970	1975	1970	1975
	<i>(hours)</i>		<i>(dollars per hour)</i>	
Mining	41.0	40.0	\$3.71	\$6.51
Manufacturing — total	39.7	38.6	3.01	5.06
Non-Durable	39.3	38.0	2.77	4.68
Durable	40.2	39.1	3.25	5.41
Construction — Total	39.2	39.1	4.21	7.50
Building	37.5	37.4	4.36	7.68
Engineering	43.1	42.1	3.92	7.25

Earnings include wage, bonuses and incentives.

Source: Statistics Canada

The wage increases gained by construction unions have tended to lead industry as a whole thus providing precedents for unions representing other industries.

As may be seen from a chart of wage and input price indexes (figure 1, Appendix), construction hourly wage rates have increased by 167 per cent from 1965 to 1975, materials prices have risen 75 per cent while machinery and equipment prices have gone up 80 per cent.

The following table shows growth in average Canadian construction wage rates compared with the average U.S. construction wage rates for the period 1971 to 1976. While average U.S. construction

wage rates exceeded those of Canada by some 16.5 per cent in 1971, Canadian average rates in 1976 exceeded those of the U.S. by 13 per cent.

	1971	1972	1973	1974	1975	1976
Canada	4.75	5.15	5.68	6.43	7.51	8.68
U.S.	5.69	6.03	6.37	6.75	7.25	7.68

Source: U.S. Survey on Business; Statistics Canada Publications.

The composite labour and material price index for Canada and the U.S. for a similar period shows a higher rate of growth in Canada than the U.S.

A number of other elements contribute to the costs of putting construction projects in place. The level of fragmentation in dealings between government and industry has impaired communications and damaged the efficiency of collective bargaining leading to lost time and opportunities, as well as unnecessarily generous contract settlements. Government influence in the areas of codes, standards and the many levels for project approval has led to increased costs through delays and duplication. As well, inefficient management techniques lead to waste and added costs.

Employment and Labour Supply

Of approximately 700,000 construction workers in 1975, between 450,000 and 500,000 constituted a regular body of tradesmen and labourers employed in construction with the remainder entering and leaving the industry in response to cyclical and seasonal conditions. Much of the manpower response to these conditions comes from a "supplementary" construction labour force — students, workers from other industries and unemployed tradesmen. The table below gives the construction labour force as a percentage of Canada's labour force by region.

	Construction labour force	Total labour force	Construction as percentage of labour force
Atlantic region	75	710	10.6
Quebec	163	2,462	6.6
Ontario	242	3,581	6.8
Prairies	138	1,528	9.0
British Columbia	88	1,027	8.6
Canada	706	9,308	7.6

Source: Statistics Canada — Construction in Canada; Canadian Statistical Review.

The construction industry has traditionally relied heavily on immigrants for its skilled workers. Tightening of immigration rules and regulations result in such tradesmen not being so readily available as in the past. Trades training programs in Canada are not adequately filling the gap.

The regional nature of construction requires that labour be especially mobile. Many construction workers will not willingly relocate elsewhere in Canada unless induced by financial incentives and employment benefits.

MAJOR ISSUES SPECIFIC TO THE CONSTRUCTION INDUSTRY

Fragmentation

There are some 200 associations of a trade and/or professional nature concerned with construction in Canada at national, provincial and municipal levels. The difference in perception of

industry problems and issues in and amongst these groups inevitably results in a lack of uniformity in industry's approaches to governments. Each of the associations and groups has, however, a viable "raison d'être" and this mitigates against reduction of such fragmentation in the foreseeable future.

On a more positive side, several of the strong national associations have reasonably uniform perceptions of constraints to the industry's effectiveness. The Canadian Construction Association, the Housing & Urban Development Association of Canada, the Association of Consulting Engineers of Canada, the Royal Architectural Institute of Canada, Construction Specifications Canada and other associations representing the major sub-contractors, have in recent years substantially increased their capability for addressing governments on matters of broad interest and concern to the industry.

The industry is very competitive and firms are exposed to a variety of risks not common in the manufacturing sector. This high risk situation has led to considerable individualism amongst firms. There is as well, a traditional impermanency in relationships between purchasers, labour, contractors and sub-contractors. The result is a highly fragmented industry. More permanent relationships between general and trade contractors and other major groups within the industry — manufacturers, builders, suppliers, etc., even on a regional basis, would reduce but not eliminate fragmentation. Demand for the products and services of the industry is unstable and cyclical as well. Fragmentation also exists in the multiplicity of government departments, agencies and groups having interest in construction.

Governments

All levels of government exert considerable influence, directly and indirectly, on the construction industry. Direct government expenditures on construction account for about one-third of total construction activity. Indirect government involvement significantly influences a further 20 per cent or more of construction in Canada. According to an Economic Council of Canada study, "Toward More Stable Growth in Construction", government expenditures account for about one-third of all construction instability. What stands out, according to the ECC, is that in no region did government spending on construction run counter to the construction cycle over the period considered in its study. Changes in government monetary and fiscal policies also have caused appreciable changes in demand for construction.

Governments also have a direct influence on the level and standard of construction performance through the administration of planning and building regulations, labour codes and other legislation. In some ways this influence benefits the construction process, e.g. through standardization, human welfare and safety, quality control and fair competition. In other ways, efficiency is impeded by lengthy process required for approvals, particularly in land development, and in the slow acceptance of innovative construction products or processes not covered by published regulations.

The industry believes that certain government incentive programs should be expanded to include the construction industry. In this regard, better, cleaner access for the Enterprise Development Program of the Department of Industry, Trade and Commerce and to Export Development Corporation Assistance, are viewed by industry as being desirable and potentially of high benefit. A chief complaint is the length of time between application and decision on government programs of incentive and assistance, which can be especially critical to an industry which lives with urgent tender-call situations.

MAJOR ISSUES HAVING GROSS SECTORAL SIGNIFICANCE

Cyclical and Seasonal Activity

The industry is subject to irregular fluctuations in output, employment and profitability, caused mainly by the wide swings in demand for new construction.

Swings in construction expenditures are considerably more pronounced than those of the economy as a whole. (Figure 2, Appendix).

However, the use of national figures in these illustrations tends to understate the severity of the situation since most construction firms are dependent on regional markets that may be subject to much greater cyclical changes than those of the nation as a whole. Construction instability has been considerably above the national average in British Columbia and Quebec, near average in the Prairies and below average in the Atlantic region.

The cyclical of construction activity is illustrated by the following table:

Value of Construction Activity				
Year	Current \$ billions	% change from previous year	Constant (1971) \$ billions	% change over previous year
1966	11.24	13.2	13.89	6.5
1967	11.62	3.4	13.81	-0.6
1968	12.21	5.1	14.32	3.7
1969	13.21	8.1	14.66	2.3
1970	13.78	4.3	14.61	-0.4
1971	15.86	15.1	15.86	8.6
1972	17.29	9.0	16.37	3.2
1973	20.17	16.7	17.38	6.2
1974	24.69	22.4	18.02	3.7
1975	28.13	14.9	18.19	1.0
1976	31.77	12.0	18.40	1.2
1977 est.	34.35	8.1		

Source: Statistics Canada — "Construction in Canada"

Very large projects such as the Trans Canada Pipeline, the St. Lawrence Seaway and those associated with intensive resource development of the 1950s and 1960s were especially significant in their effect on instability in construction.

Cyclical instability adds immeasurably to the strains between management and labour and distorts the balance necessary for reasonable wage negotiations. This, together with fluctuations in the prices of materials, compounded by the tendency for prices not to fall in periods of downturn, results in inflationary construction costs. Prices for construction (including housing) are subject to a "ratchet effect", because each period of ascending demand places an upward pressure on wages and the costs of other building inputs (materials, equipment, land, etc.) but downturns in activity do not result in offsetting price reductions.

The Economic Council of Canada has stated that "... construction investment ... for several decades, has contributed more to instability of the (Canadian) economy than all other investment sectors combined."

The Council has also indicated that, because of the interdependence of various sectors of the economy, demand instability tends to be multiplied as it passes through the construction industry to the manufacturing and other sectors.

Seasonal factors, especially the severe Canadian winters, cause strong fluctuations in construction activity. Despite recent advances in winter construction techniques, the seasonal unemployment rate regularly reaches 25 per cent in construction (175,000 workers), 3 to 4 times as high as the average in all other industries. (See figure 3 Appendix).

Industrial Relations

The labour component of the industry, with the exception of the residential and certain engineering construction segments, is characterized by strong national and international labour unions which have made significant advances on behalf of their members. Labour gains have been in the direction of improved wages and benefits and have resulted in better working conditions. Moreover, union membership in construction continues to expand, presumably because of effective certification work and negotiation gains in the collective bargaining process. (Apart from Quebec, where union membership is compulsory, employment in commercial, institutional and industrial building construction elsewhere in Canada is 60 to 80 per cent unionized; road and bridge construction is 40 to 45 per cent and residential construction is 15 to 20 per cent.)

With respect to the time lost in industrial disputes over the period 1967-1975, Canada has the worst record among 19 industrial countries surveyed by the Organization for Economic Cooperation and Development (OECD). Canada's construction industry, with approximately six to seven per cent of the labour force, has been responsible for as much as 33 per cent of the total man-days lost by all industries in a given year (1970). In the 1971-76 period, however, man-days lost attributable to industrial disputes in construction averaged 15.6 per cent of all work-stoppages.

Although these figures indicate a rather serious situation, construction management-labour relations have improved in the past decade. It seems, however, that many problems in the construction industrial relations system still stem from the practice of individual trade bargaining. This assertion is borne out by the improved relationships that have resulted through such concepts as multi-trade bargaining, wider area bargaining and pre-project planning.

The recent development of labour relations associations in the construction industry could lead to more effective collective bargaining in a wider and more co-operative context. Such changes in the pattern of labour relations could have a beneficial influence by encouraging greater mutual confidence in the industrial relations system.

Construction Management

Construction managers tend to be defined as "self made men", many having come up through the industry as tradesmen and supervisors to the management level. They usually exhibit a good knowledge of most of the construction skills having received considerable on-site training and experience. However, other management skills (financial management, marketing and labour relations) frequently are lacking among such managers. Some attempts are being made to overcome these deficiencies through seminars and short courses at universities and community colleges in co-operation with industry associations and government.

The integration of construction companies with design firms, manufacturers and financial institutions, to develop and operate the consortia or joint ventures necessary to handle large projects, both in Canada and abroad, will require a large number of managers with modern management skills. The industry's ability to increase productivity and meet the challenges of domestic and export demands would appear to require a considerable improvement in the effectiveness of construction management education and training.

A 1973 study by Urwick Currie and Partners Ltd. entitled "Construction Industry Management Needs", undertaken at the request of the Construction Industry Development Council*, concluded that:

1. "Much of the required education resource already is available but is improperly focussed to meet the industry's needs.
2. "No appropriate vehicle exists to stimulate the communication necessary to solve this problem or to initiate and co-ordinate the supportive activities required to improve management effectiveness through education.
3. "Industry members, educators and representatives of provincial Departments of Education support the creation of a Construction Education Institute for this purpose."

A Construction Education Institute recommended in the study has not been established but remains an active consideration.

International Trade

The Canadian construction industry has considerable expertise that could be applied in international markets, particularly in specialized fields. These include industrial plant construction, communication systems, power generation, housing and certain types of engineering construction. Although the industry traditionally has been domestically oriented and is limited to some extent by the nature of its operations, there appears to be significant opportunity for the export of Canadian construction expertise, along with Canadian materials, prefabricated structures and components.

No accurate statistics are available on construction exports from Canada. It is estimated that in 1976 about \$600 million of overseas construction contracts were carried out by Canadian firms (about 2 per cent of domestic activity). Of this amount, about \$400 million was Canadian content, largely in the form of prefabricated structures. A reasonable estimate of potential for overseas contracts would be 5 per cent of domestic activity by 1980, i.e. \$2.5 billion.

Canadian contractors, by carrying out construction projects in foreign countries, can create a "human" Canadian presence that cannot be achieved through the export of products alone. This presence, reinforced through the establishment of Canadian construction offices and technical

*The CIDC, consisting of some 30 individuals from firms, labour and government, is an advisory body to the Minister of Industry, Trade and Commerce on matters concerning the construction industry.

advisers overseas, can lead to a greater recognition and appreciation of Canadian expertise by foreign clients, resulting in more receptive markets for other Canadian goods and services.

Several countries have asked Canada to second various Canadian experts into their civil services with the foreign country concerned paying all costs in advance. The Americans are heavily involved in this type of scheme, both financially and commercially, particularly in the Middle East. At the present time no mechanism exists within the Canadian government to implement such a secondment program; CIDA for example, does not handle cost-reimbursable programs.

Market opportunities abroad for Canadian construction goods and services lie less with our traditional trading partners, e.g. Europe, U.S., and Japan, than with developing countries, where there is relatively little Canadian government presence. In some of these areas Canada is not represented directly through trade posts (Arabian Gulf, Ecuador, Panama, etc.). Industry contends that, in other countries, there is insufficient staff to service industry's needs (e.g. Saudi Arabia, Nigeria, Algeria).

The governments of the U.S., U.K., France, Germany, Korea and Japan have developed effective means to secure foreign work for their construction industries. The U.S. Corps of Engineers, for example, will design and manage about \$20 billion of construction in Saudi Arabia over the next five years. The Joint Economic Commission U.S.A./Saudi Arabia (JACORE) has 100 advisers (paid for by the Saudis) working within the Saudi civil service, developing policies, standards and designs mutually acceptable to both countries.

The combined five-year plans for Saudi Arabia, Iran and Iraq call for an estimated \$130 billion of construction. Most of this work is beyond the capability of construction industries of these foreign countries. Canadian firms as independent units, or in co-operation with foreign companies well established in the market area, could provide a portion of the construction services and materials required. Recently some significant overseas work has been secured by Canadian firms, notably in the supply of factory built housing and schools, however more participation by our general contractors could be realized. As the massive demand in the Middle East is being satisfied, other opportunities are fast developing in Africa, Latin America and South East Asia.

The multilateral trade negotiations now taking place under the auspices of the General Agreement on Tariffs and Trade are not directly concerned with construction services but rather with international movement of goods. Tariff reductions as a result of the GATT negotiations are unlikely to have a significant impact on the Canadian construction industry.

Domestic Opportunities

On the domestic scene, many developers of major projects, especially of multinational corporations beneficially owned outside of Canada, have awarded contracts for design, construction and project management to foreign-controlled companies without invitation to Canadian controlled firms.

The impact of this reliance on non-Canadian design, procurement and construction is widespread. These imports represent a distinct and growing portion of Canada's current account deficit. Canadian firms, particularly foreign-controlled subsidiaries, purchase a large and increasing volume of business services from abroad. To the extent that these imports inhibit development of comparable domestic services, they cause an under-utilization of Canadian managerial and professional business talents. These purchases represent employment opportunities which are transferred to other countries and limit the growth of Canadian firms. It is estimated that some \$500 million of business services, of which about \$200 million are for engineering designs, are imported annually. This represents about 20,000 lost jobs, 7,000 of which could be classified as highly-skilled. Through the economic-multiplier mechanisms, this \$500 million in reality means much more to Canada and what is worse, these purchases have been increasing at an average annual rate of between 15-20 per cent over the last 10 years.

Capital Requirements

Demand for the output of the construction industry is influenced by the availability of funds and the cost of money. Most contracts are carried out on a fixed price basis with payments to the contractor apportioned according to the progress on the project. Labour and materials invoices frequently come due on shorter cycles than progress payments. Thus, the industry requires sufficient operating capital, which often is difficult to obtain, to cope with this interim financing problem.

The construction industry itself invests less capital per worker than other industries; from 1970 to 1975 for example, its capital assets in machinery and equipment were about half the level of the average for other industries, in part due to a high degree of leasing.

Leasing and renting of equipment provides the contractor with operational flexibility as well as reducing his overhead costs. On the other hand, certain subsectors of the industry, such as highway, road, street and bridge builders, often purchase the necessary machinery and equipment, thus placing a heavy financial burden on the contractor.

Unlike the manufacturing industry, the construction industry does not generate much of its own capital from its shareholders or from its retained earnings. The bulk of its capital is borrowed money. Even the speculative building of apartments, houses, office buildings and light industrial buildings is financed with mortgage loans usually obtained from financial institutions in advance.

The operating financial requirements for construction companies are more onerous than for manufacturing firms since contractors are required to carry more extensive fire, theft and equipment insurance, in addition to special risk coverage for public liability. Specialized bonding companies have been established to provide the industry with additional risk coverage in the form of bid bonds, labour and material and performance bonds. The needs in these areas of insurance and bonding are particularly burdensome for some small firms.

Energy Conservation

The need to conserve energy is providing a challenge for engineers and architects to design more energy-efficient structures and for mechanical and electrical contractors in the installation of new or improved systems. There is, however, little that can be done to reduce energy use during the construction process. To date, little concern, relative to overall construction activity, has been shown by Canadian industry in general to bring about fuel savings in the construction and operation of buildings. The inducement will need to come from the buyers of construction.

Governments have a role to play by promoting energy conservation through example and by encouraging others to conserve through practical regulations. Governments also can help to ensure that adequate technology is available, through research and through dissemination of existing information on energy saving systems and techniques.

Research and Development

Documented research and development expenditures for construction and building materials firms were estimated to be \$40 million in 1975. This amounted to 0.16 per cent of the value of construction work carried out, compared with all scientific R & D which amounted to 1.1 per cent of the Gross National Expenditure. Governments and manufacturers of construction materials contribute to the bulk of this research.

Comparatively little use is made of government incentive programs by the construction industry, since these programs are geared to the operations of manufacturing products rather than to the physical construction process.

Another important point is that the nature of the work of the construction industry influences the ways in which conception, design, supply and construction are carried out. In a manufacturing industry it is fairly common for the initiation of the enterprise, the design and development of the product, the design of the production facilities, and the subsequent operation to be carried out within the sphere of company operations, that is, largely under central control. The opposite is general practice in construction: the enterprise, design, supply and erection of construction are usually carried out by separate agencies whose co-ordination and control have to be arranged specially for each particular job, usually through their respective contractual arrangements. The implications for communications, knowledge transfer, and research can be markedly different in degree, if not in kind, between these two kinds of industries.

Despite the apparent lack of formal research and development by contractors, much is being done on the jobsite in an evolutionary rather than a revolutionary sense. Canadian contractors are quick to develop new methods and techniques that will enable them to complete their work more economically. In most fields, the technical competence and performance of major Canadian contractors is comparable with or better than that of international competitors.

The Science Council of Canada has indicated that there is concern within the industry that more effective communication links are required between R & D laboratories and the application of the

results in the field. Similarly, contractors in particular could bring their needs to the attention of the laboratories more quickly.

PERFORMANCE

Prior to 1970 output per worker in the labour-intensive construction industry paralleled manufacturing. Since that time, construction does not compare favourably, particularly during the recent period of economic slowdown. (See Fig. 4).

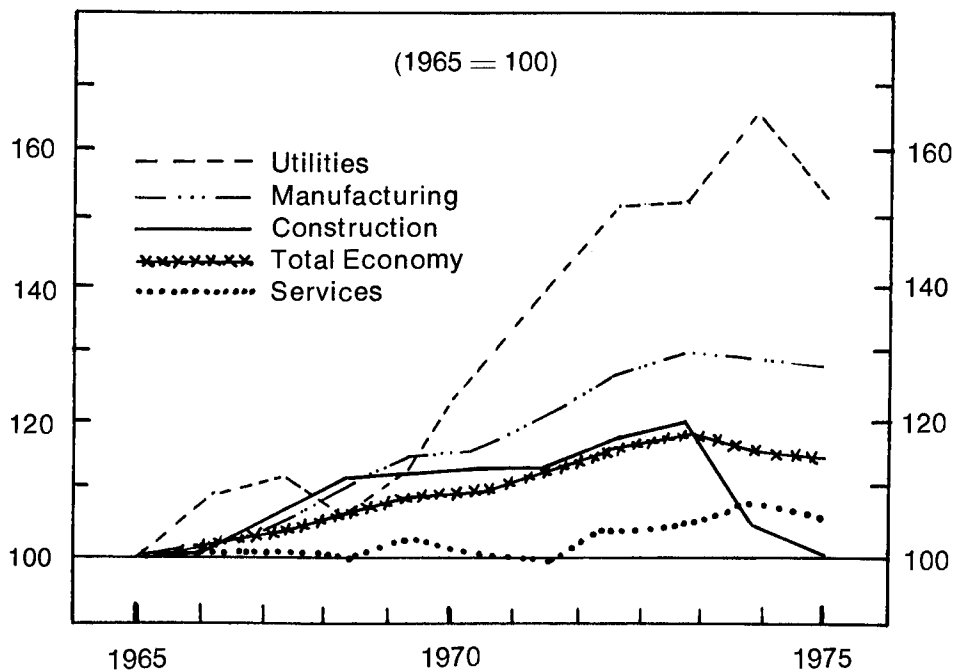
The increase in equipment per worker in most industries may be regarded as the major cause of an increase in output per person employed. The capital stock per employee in construction, as shown in Fig. 5, has not been growing at the same rate as other industries. However, the true rate of growth of equipment per employee is greater than that indicated since equipment leasing, which cannot be adequately measured, has expanded considerably in the construction industry over the last 10-15 years.

Productivity is one determination of unit labour costs. In turn, unit labour costs are of fundamental importance in determining the ability of Canadian industry to continue to compete for its share of the construction market for production and manufacturing facilities.

From 1951 to 1971 unit labour costs in construction rose an average of 2.9 per cent a year as compared with 4 per cent for the manufacturing sector and 3.2 per cent for the economy as a whole. In more recent years, i.e. from 1970 to 1975, as shown in Fig. 6, unit labour costs increased at 12.5 per cent a year in construction as compared with 8.7 per cent in manufacturing.

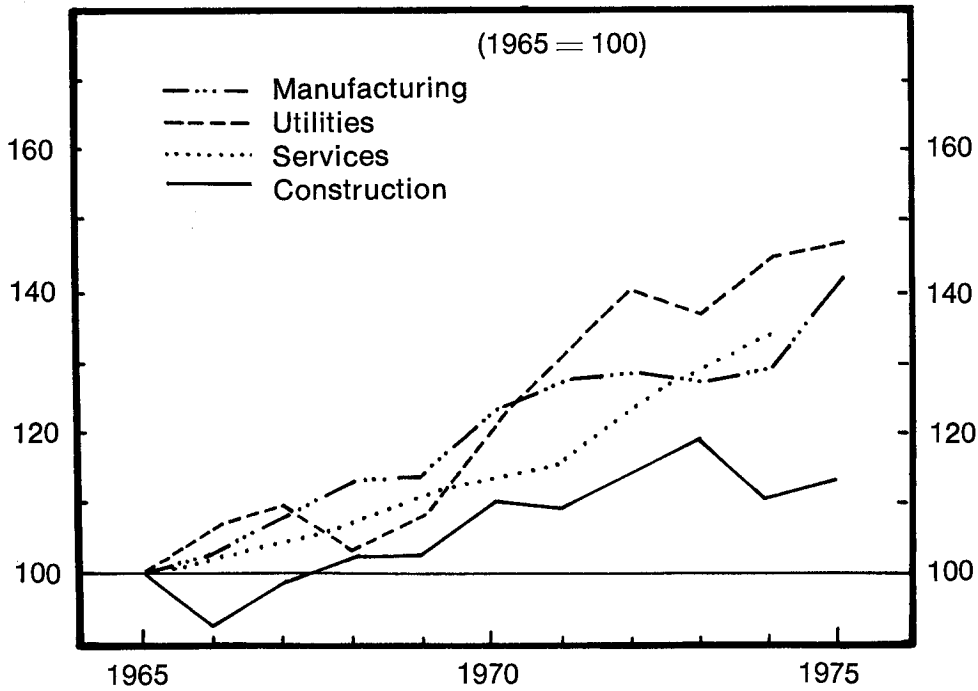
INDEXES OF OUTPUT PER PERSON EMPLOYED — SELECTED INDUSTRIES

(Real Domestic Product per Employed Person)



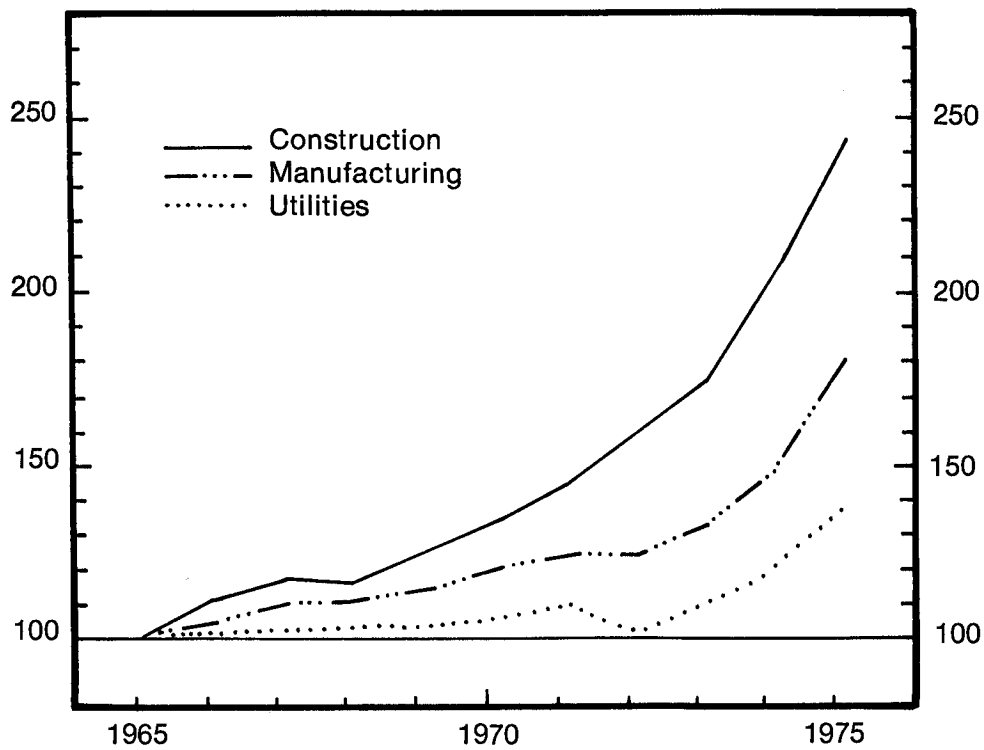
Source: Based on Informetrica Ltd. data

CAPITAL STOCK PER EMPLOYEE — SELECTED INDUSTRIES



Source: Based on Informetrica Ltd. data

UNIT LABOUR COSTS — SELECTED INDUSTRIES



Source: Based on Informetrica Ltd. data

Profitability

When compared with other sectors of the economy, the construction industry does not show any significant difference in terms of profit performance. Profits and return on equity compare well with other sectors as shown in the following table.

	<i>Net Profits / Corporation</i>	<i>Net Profits Total Revenue</i>	<i>Before tax return on Equity</i>	<i>After tax return on Equity</i>
Construction	\$ 15,800	3.1%	19.3%	12.4%
Manufacturing	\$205,100	6.8%	17.5%	10.6%
Forestry	\$ 26,200	6.5%	21.8%	12.9%
Mining	\$362,100	18.1%	12.4%	10.8%

Profits have varied over the past 20 years both in absolute terms and as a percentage of sales, as indicated in the following table.

<i>Year</i>	<i>Number of Corporations</i>	<i>Net Profits \$ millions Before Tax</i>	<i>Net Profits as % of Sales</i>
1953	3,459	94	5.4
1954	4,263	84	4.1
1955	5,307	72	3.1
1956	6,502	97	3.2
1957	7,521	124	3.4
1958	8,703	160	4.2
1959	10,197	134	3.3
1960	11,171	78	1.8
1961	11,811	91	2.1
1962	12,716	71	1.6
1963	12,710	62	1.3
1964	13,844	181	1.6
1965	15,315	190	3.4
1966	14,846	269	3.8
1967	16,183	302	4.0
1968	17,694	277	3.6
1969	19,203	274	3.5
1970	19,974	219	2.5
1971	21,293	351	3.6
1972	22,997	375	3.4
1973	26,539	514	4.0
1974	29,778	733	4.4

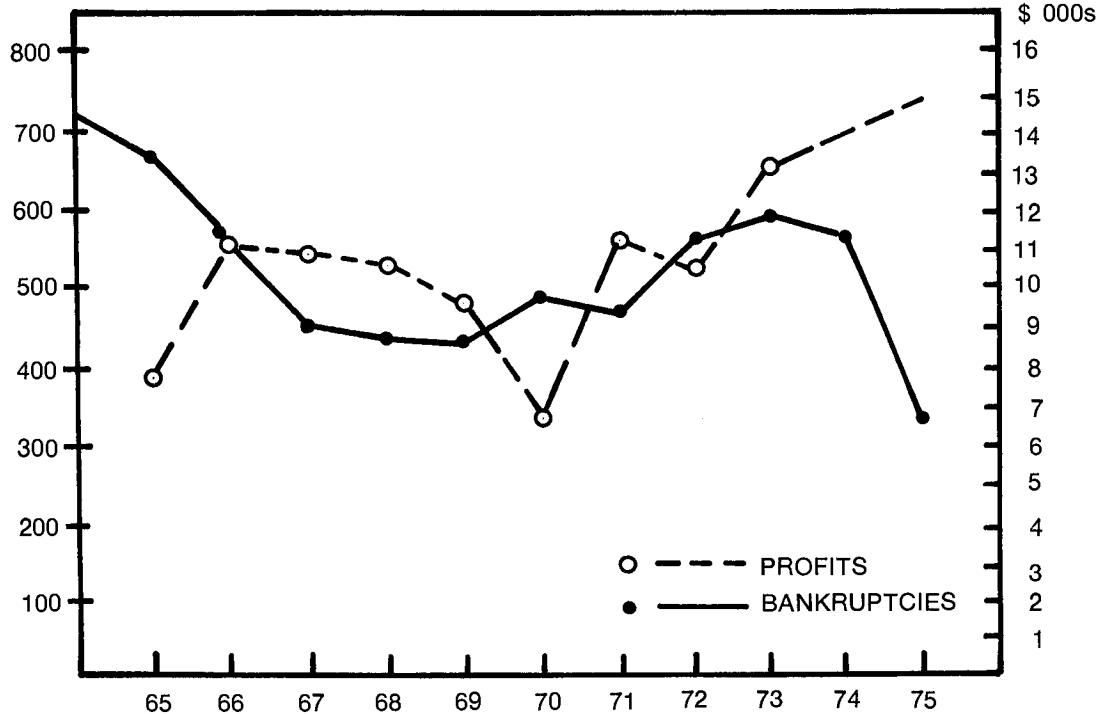
Source: Statistics Canada.

Fig. 7 shows the relationship between profits and bankruptcies. When construction demand levels out and falls, excess capacity develops which puts a strain on profits, and short-term debt ratios decrease resulting in higher bankruptcy rates and business closures. Several lags are inherent in the cycle.

**BANKRUPTCIES TO PROFIT COMPARISON FOR
CONSTRUCTION CORPORATIONS**

NUMBER OF
ANNUAL
FAILURES

AVERAGE
AFTER TAX
PROFITS



OUTLOOK FOR THE CONSTRUCTION INDUSTRY

It has been estimated that Canada will double its present stock of buildings in the next 25 years. The demand for construction in most developing nations will be even more impressive than in Canada. This provides an unparalleled challenge and opportunity for the construction industry both in Canada and abroad, and emphasizes the need for improved productivity and efficiency in the industry.

In the next two to five years however, the building construction subsector of the industry will be faced with a greater than usual uncertainty of domestic demand. The demand for schools, hospitals and related structures will likely continue to be restrained. An excess of stock of certain commercial and residential buildings exists across Canada. Also, the construction and manufacturing facilities, an area that showed considerable promise for construction during 1970-76, remains a depressed market for the industry.

The overall outlook for construction to 1985, prepared by the Canadian Construction Association, using Informetrica data, is shown in the following table.

Construction Outlook 1977-1985
(millions of current dollars)

Source of Work	Intentions 1977	Forecast			
		1978	1979	1980	1981-85
New Construction					
Industrial	10,250	12,875	16,550 ²	20,675	27,975
Commercial (private)	2,175	2,450	2,750	3,075	3,950
Institutional and government	6,175	7,550	8,375	9,300	12,775
Miscellaneous-non-residential	725	875	1,025	1,150	1,550
Housing	8,825	9,175	9,525	10,475	11,900
Total New Construction	28,150	32,925	38,225	44,675	58,150
Repair Construction	5,200	5,850	6,475	7,200	9,425
Valuation adjustment ¹	1,000	1,100	1,375	1,700	2,450
Total Construction	34,350	38,775	44,700	51,850	67,575
Percentage Change, Current \$	8.1	12.9	15.3	16.0	9.2

¹ Represents reconciliation to Private and Public Investment data from National Accounts data.

² Construction of a major natural gas pipeline is assumed to start in 1979 and be largely completed in 1981.

Construction volume in Canada will rise in real terms during the period 1978 to 1985 but the boom levels of 1974 are not anticipated until 1985. It is expected that the period to 1980 will amount to a recovery phase and only after 1980 will any real expansionary trends become apparent. The expansion of non-residential work will be faster than average, accelerating from 1978 or 1979 onwards. The construction of a major pipeline to transport Arctic gas south will cause a significant but temporary increase in construction demand and could cause some problems in supply of resource materials depending on the timing of the work. The effects of the pipeline construction will be felt mainly in Western Canada but pipe producers in Ontario will benefit from major orders.

The number of dwelling completions in 1977 is estimated to be 256,000 units, compared with 236,249 for 1976. A record number of dwelling starts in 1976 (273,000 units) will result in a near record number of completions in 1977. Starts in 1977 are estimated to be 245,000 units. At present there is a substantial inventory of completed or nearly completed units on the market. This is resulting in a levelling off of housing prices from the rapidly rising prices of the past several years.

In the medium term, demand for housing is expected to remain at relatively high levels reaching a peak in 1980 of approximately 250,000 units. After 1980 total housing requirements are forecast to decline continuously until 1995 reaching a low of 160,000 units in 1995. Thereafter demand for housing will recover rather slowly.

TABLE 1

Distribution of Incorporated Construction Firms by Size and Type, 1973 Revised

	Number of Firms	Size in Million Dollars of Net Assets					Total
		Under ¼	¼-1	1-5	5-10	Over 10	
		(Number of firms in percentages)					
Building construction	9,744	73.0	19.7	6.1	0.7	0.5	100.0
Highway, bridge, and street	1,161	57.3	27.2	12.8	1.5	1.2	100.0
Other construction	959	60.7	24.0	11.7	1.9	1.7	100.0
Special trade	14,675	86.5	11.3	1.9	0.2	0.1	100.0
All corporations	26,539	79.3	15.5	4.3	0.5	0.4	100.0
		(Sales volume in percentages)					
Building construction	9,744	23.1	30.1	25.2	5.9	15.7	100.0
Highway, bridge, and street	1,161	6.6	19.0	33.5	12.1	28.8	100.0
Other construction	959	6.6	16.9	29.9	9.8	36.8	100.0
Special trade	14,675	39.1	30.2	19.3	5.5	5.9	100.0
All corporations	26,539	25.5	27.6	24.3	6.9	15.7	100.0

Source: Statistics Canada.

TABLE 2

Output Shares of Major Input Categories in Construction,
Selected Industries and the Total Economy, 1966

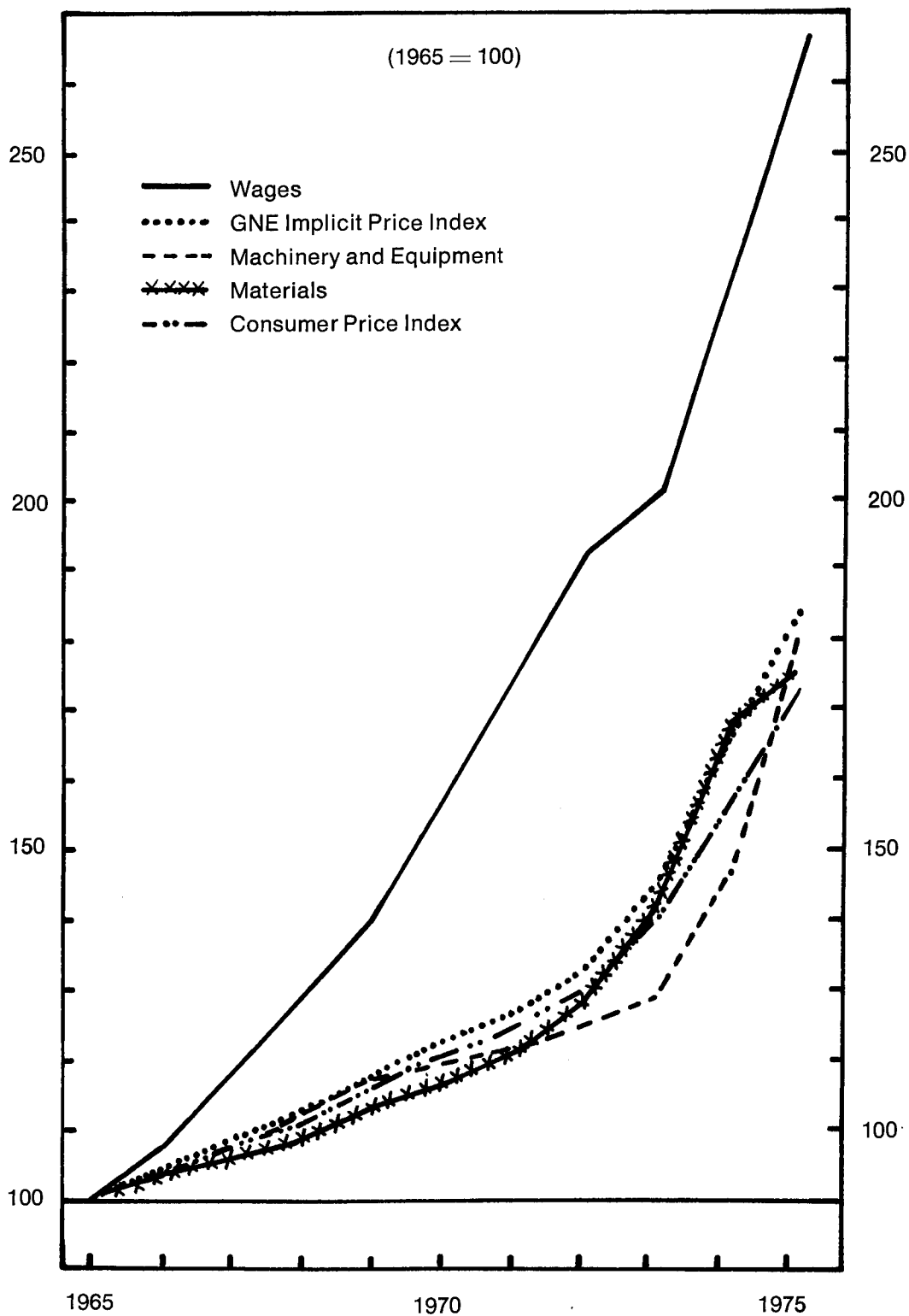
	Construction industry	Mines quarries oil wells	Machinery industry	Transportation equipment industries	Electrical products industries	Electrical power, gas other utilities	Total economy
Materials	38.6	8.8	41.2	55.5	44.5	3.8	29.6
Labour	35.6	23.4	28.6	23.1	29.6	22.2	30.3
Purchases services	14.5	25.7	14.7	12.9	13.6	12.8	21.8
Government services	5.7	1.3	0.8	0.8	0.8	3.0	3.5
Capital	5.6	40.8	14.7	7.7	11.5	58.2	14.8
Total Output	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: *The Input-Output Structure of the Canadian Economy 1961-1966*, 15-505

Data are from the most recent publication which was issued in January 1976.

FIGURE 1

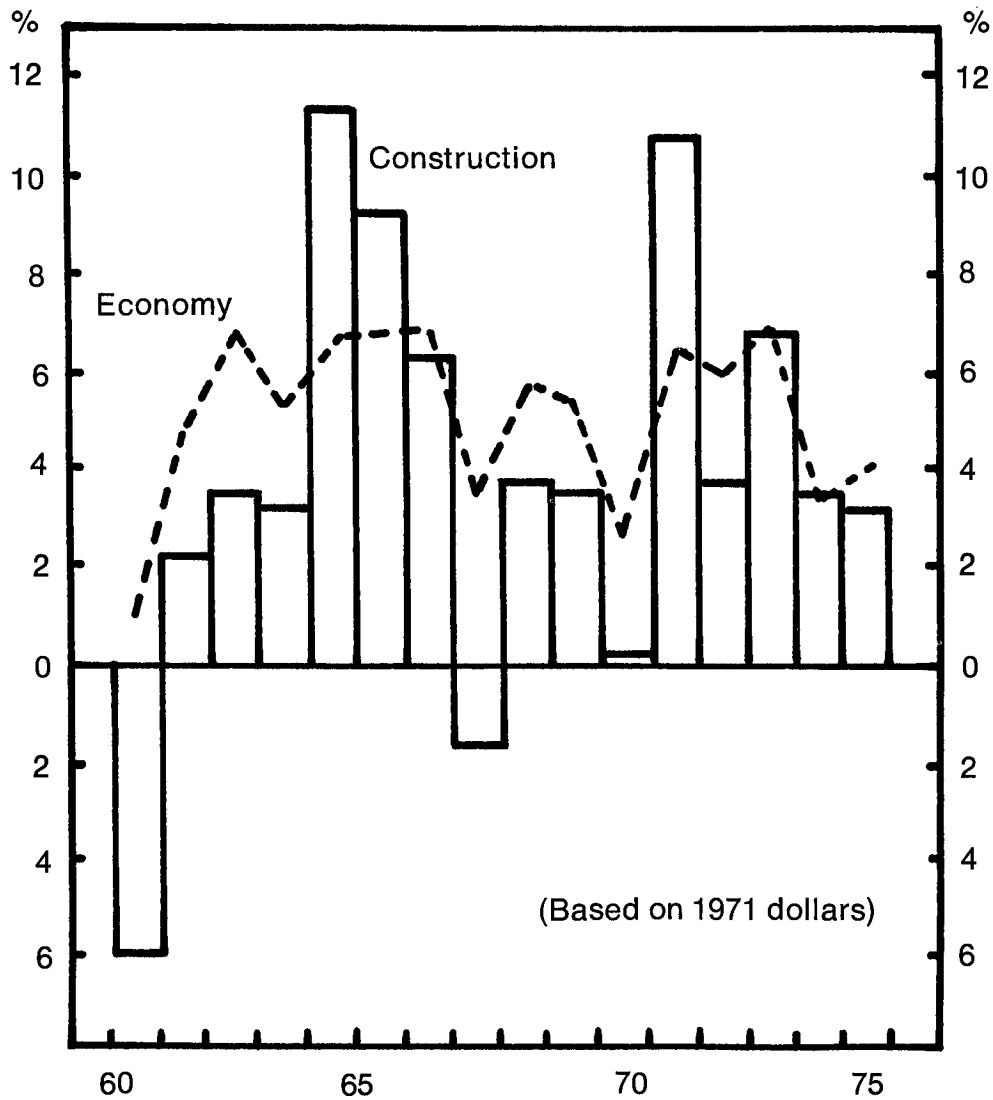
CONSTRUCTION WAGE & INPUT PRICE INDEXES



Source: Statistics Canada Publications

FIGURE 2

**ANNUAL PERCENTAGE CHANGES IN GNP
NATIONAL PRODUCT & CONSTRUCTION EXPENDITURE**



Source: Statistics Canada Publications

FIGURE 3
GENERAL & CONSTRUCTION UNEMPLOYMENT RATES

