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Metric monitor

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In Halifax

Drafting students ready for metric work world

With the complex construction industry slowly but surely converting to metric, drafting students at Halifax Regional Vocational School are preparing for a metric work world by drafting a metric house plan as part of the course requirements for their two-year certificate.

Drafting instructor Arie le Pair says the metric drafting idea was generated a little over a year ago at the time the Canada Mortgage & Housing Corporation required house plans in metric.

Mr. le Pair, Alex Van Gorp, the principal, and Willis Hall, assistant

director of curriculum development for the Nova Scotia Ministry of Education and a Metric Commissioner, were aware that several other related areas were already metric: elementary school mathematics and science text books are completely metric; science and trade courses have contained an increasing amount of metric units for the past six or seven years; the apprenticeship programs offered by the department of labour include metric; and related sectors such as architecture, real estate and construction are well into the implementation phase.

Continuing education programs for employees have been given throughout the province for the past three years to upgrade tradesmen in large industries such as the Halifax Shipyards, Hermes Electronics, Michelin and several others.

As well, the teaching staff at the Halifax Regional Vocational School has been trained for the past four years both in general SI or in specific work applications in their field of work.

So the time was ripe for Mr. le Pair's metric drafting program.

The metric plans for a family residence are drawn according to the *Canadian Code on Residential Standards*, the *Standard on Architectural Drawing Practices*, and the *National Standard on Building Drawing*. Also used is *CMHC's Canadian Wood Frame House Construction* manual. According to Mr. le Pair, one difficulty is that there are still too few drafting textbooks using metric units and several old imperial text books have to be converted into metric.

A complete house plan such as Mr. le Pair's class is drafting takes a student about three months to complete. This includes plot plan, perspective, floor, basement, elevations, fireplace, wall sections and stair details, roof framing, electrical plan, kitchen details, door and window schedules and finish schedules. All work is in strict accordance with local building codes and ordinances. Principal Van Gorp says that his students, along with some 4 500 others in 13 vocational schools throughout the province with similar metric programs, are now ready to face a metric working environment.

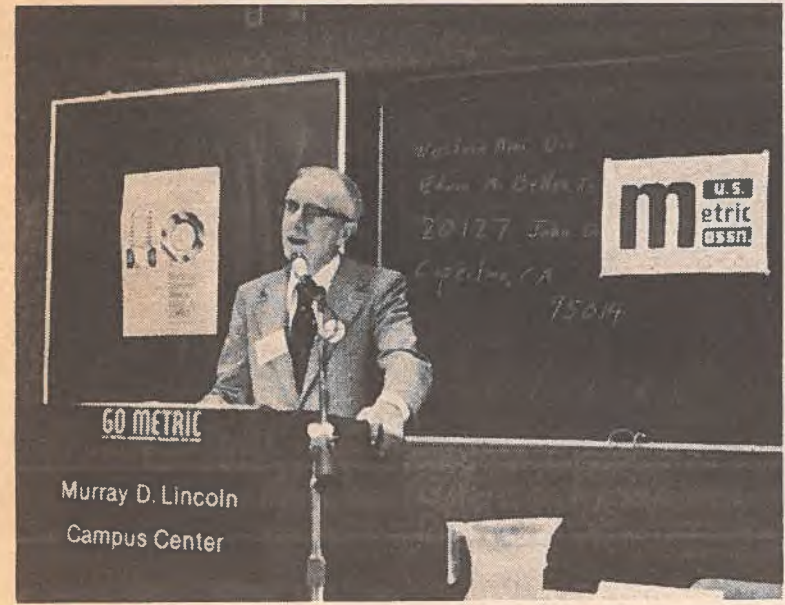


Arie le Pair with his students working on a three-month drafting assignment of a residence in metric units. In the background is an information board to help students identify with metric units. Mr. le Pair says that once students realize the simplicity of SI they appreciate it.

Meeting in the U.S.A.



A highlight of the United States Metric Association's annual meeting held in May at the University of Massachusetts, Amherst, Mass., was a panel on the extent of metric conversion in individual states. Above (l to r) are Ed Stadolnik, moderator from Massachusetts, Mary Heslin Commissioner of Consumer Protection, Connecticut and Ellen Pimbley of the New York metric group.



Retiring president of the U.S. Metric Association (USMA) Louis F. Sokol is seen here addressing the annual meeting of the Association. "To me the large number of votes cast and the steadily mounting number of new members for the USMA indicates our nation's interest in the metric changeover is increasing" said Sokol who has served as president since 1971.

**See P.8
 for news on
 the U.S.**



Drafting instructor Arie le Pair (r) and student Steve Grace show the plan of a metric house to their "client", MCC Commissioner Willis Hall who is assistant director of curriculum development for the Nova Scotia department of education. Steve, who designed this plan, says that he prefers metric because the numbers are easier to work with and there are no fractions. Mr. Hall says that young people going into the work world will be far better off than old timers and doubts that a reputable architect would hire anyone who would not know metric.

The economic advantages of metric conversion in Canada

The following address was given to the U.S. Metric Association's 1980 Annual Conference held in May at the University of Massachusetts, Amherst, Massachusetts, by Paul C. Boire, Executive Director, Metric Commission Canada.

Basis for metric conversion in Canada

As far back as 1871, the Metric Weights and Measures Act made the metric system legal for use in

trade in Canada. It was not until 1970, however, that the Canadian government tabled in the House of Commons the White Paper on Metric Conversion, outlining the broad principles favouring the adoption of The International System of Units (SI):

"(I) The eventual adoption in Canadian usage of a single coherent measurement system based on metric units should be acknowledged as inevitable and in the national interest.

- (II) This single measurement system should come to be used for all measurement purposes required under legislation, and generally be accepted for all measurement purposes.
- (III) Planning and preparation in the public and private sectors should be encouraged in such a manner as to achieve the maximum benefits at minimum cost to the public, to

(To page 6)

Around the world with metric

This issue of the Monitor continues a series of articles reporting the degree of metric conversion which has been achieved in individual countries.

Bangladesh

To all intents and purposes, there is no single system of measurement in Bangladesh, where the

imperial system, metric measurement and a great variety of local measures coexist.

Decided by a Pakistani law passed in 1967, the metric system was gradually being introduced in Bangladesh when the war of liberation interrupted the process in 1971. The question of metric conversion was once again raised in 1978 following the creation of a

Weights and Measures Bureau or Institute of Metrology.

Pakistan

The application of the provisions of Act No. V of 1967 for the introduction of metric measurement in Pakistan was delayed by technical and administrative difficulties. It was only in 1972 that a program for the conversion of measurement, spread over five years, could be set up; this program began in 1974 and aimed at converting directly to SI units.

Three committees were set up: a metric committee, a technical subcommittee and a subcommittee on publicity. The metric committee's mandate was to coordinate the entire conversion program and to study the recommendations of the two subcommittees.

A Metrication Board for Civil Engineers was also set up, along with eight study groups, to recommend the most appropriate SI units in the light of present conditions in the technical and industrial sector of Pakistan.

Many preliminary studies and projects on metric conversion were carried out: the establishment of new specifications and conversion tables, the incorporation of SI units in elementary and secondary school textbooks, the purchase of metric measuring devices and search for qualified manufacturers, the training of personnel, the creation of a Department of Weights and Measures at Islamabad and of regional offices, etc.

The Department of Weights and Measures cooperates actively with the Metrication Board in view of achieving metric conversion in every sector of the national economy.

In 1976, the responsibility for the implementation of the new system of measurement was transferred to the provincial governments. For its part, the federal government is now responsible for establishing and verifying the standards, giving advice on conversion to the new units and on training provincial inspectors and organization personnel and monitoring the progress of metric conversion in the provinces.

The national metric prototypes (metre and kilogram) are pre-

served at the National Physical Standards Laboratory at Islamabad; this laboratory also holds the reference standards which are used to verify the secondary and working standards.

Metric conversion is already well underway and is completed in a number of sectors of the national economy; hence, it is presently nearly 100% complete for gas pumps, 80% for match manufacturers and the textile industry and 60% in civil engineering.

The federal Department of Weights and Measures is pursuing its program of total conversion to SI in industry, important government services and agencies, civil engineering and mechanical, electrical and electronic industries.

As for the general public, used to traditional measures such as the seer, the tola, the maund, the yard, the pound, etc., every means is being used to conduct a massive information campaign for the metric education of the public.

Sri Lanka

While used for a number of years in high school and university science courses and in research laboratories, the metric system was not used in other areas; only imperial measurement was used.

After metric conversion was adopted in 1970-06 and Bill No. 24 was passed in 1974 (recognizing SI as the main measurement system), Sri Lanka, while continuing to permit the use of imperial measures, proceeded to carry out its conversion program. To this end, Act No. 17 of 1976 established the National Metric Conversion Authority in order to facilitate the adoption of the metric system and to take all the appropriate measures so that the metric system becomes the only system of measurement in Sri Lanka.

The conversion program adopted is in two parts:

1. The development of the Standard Weights and Measures Laboratory, responsible for establishing measurement standards for all physical dimensions necessary for the economy of Sri Lanka.
2. The changeover to metric measurement of all activities over a transition period of seven to ten years.

At the present time, significant progress has been achieved in the exclusive or partial use of metric measurement in the following areas: import and export of merchandise; prepackaged products; textiles (sold by the metre since 1978-10); liquid fuel (gradual conversion of gas pumps); industry; agriculture (tea, rubber, paddy); education (SI is being taught in high schools, in universities in physics and chemistry and partially in the technical faculties and schools of architecture); road traffic and transportation (speed and distance signs in kilometers, vehicle and road features, railways); construction and civil engineering; and statistics.

Mauritius

Three types of measurement units are in use in Mauritius: metric, British and old French measures.

Parliament has decided upon total metric conversion and a new Act adopting SI units will soon be passed.

Cyprus

On 1974-06-19 Metric Act No. 19 was passed in Cyprus, but the conversion of measures only began gradually to be introduced in 1976-05. The government is authorized to set dates for the metric conversion of different categories of products and companies.

Provisions have been made to ensure as orderly a transition as possible from the imperial and traditional local systems of measurement to the new metric measures. A measurement laboratory has been established to preserve the national standards (length, mass and volume) and to verify the standards used by weights and measures inspectors and the establishment of appropriate regulations.

In 1977-03, rules were published regarding SI units: names and symbols of the base units, lists of SI prefixes, definitions and symbols of the derived units, units outside the International System which are permitted.

Upcoming Meetings

DATE	COMMITTEE	PLACE
80-08-05	Sector 62.21 — Flavour crystals	Toronto
80-08-11	Subcommittee 63.06 Packaged waters	Vancouver
80-09-04	Sector 9.60 — Labour organizations	Ottawa
80-09-04	Sector 62.24 — Miscellaneous food products	Toronto
80-09-12	Sector 9.10 — Health & welfare	Fredericton
80-09-12	Sector 2.04 — Motor vehicle & parts manufacturers	Toronto
80-09-16	Sector 8.45 — Paper & allied industries	Toronto
80-09-16	Sector 9.40 — Accommodation & food services	to be announced
80-09-17	Steering committee 7	Toronto
80-09-23	Sector 7.42 — Sporting goods	Toronto
80-09-23	Steering committee 9	Toronto
80-09-09	Advisory committee on information policy (ACIP)	Ottawa

Meeting of Metric Commission Canada

80-09-10/11	59th meeting	Ottawa
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Exhibits

80-07-13/15	Toronto Jewellery Show	Toronto
80-07-14/17	Canadian Home Economics Association	Saskatoon
80-07-27/80-08-04	La Foire Brayonne	Edmundston, N.B.
80-08-11/16	Old Home Week	Charlottetown
80-08-14/80-09-01	Canadian National Exhibition	Toronto
80-08-21/31	Central Canada Exhibition	Ottawa
80-08-21/80-09-01	Expo — Quebec	Quebec City
80-08-24/30	Atlantic National Exhibition	Saint John, N.B.
80-09-01/06	Fredericton Exhibition & Provincial livestock show	Fredericton, N.B.
80-09-02/06	Kinsman fall fair	St. John's, Nfld.



Metric Commission Canada

Commission du système métrique Canada

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New industry guide will help conversion process

The guide *Fishing in Metric* is intended as an introduction to the metric system, System International (SI).

Most supplies and services being used by fishermen and the rest of the fishing industry will be offered in metric form by 1981.

Some fishing gear is already being made to metric standards; new navigation charts are being issued giving depths in metres instead of feet; some packaging of fish and seafood products already conforms to metric standards; and weather forecasts are being broadcast giving wind speed in kilometres per hour, temperature in degrees Celsius and air pressure in kilopascals. The trend will continue.

Fisheries and Oceans, along with other government agencies, will phase into the metric system over the next two years, until all regulations affecting quotas, mesh sizes, size limits etc., will be given in metric units.

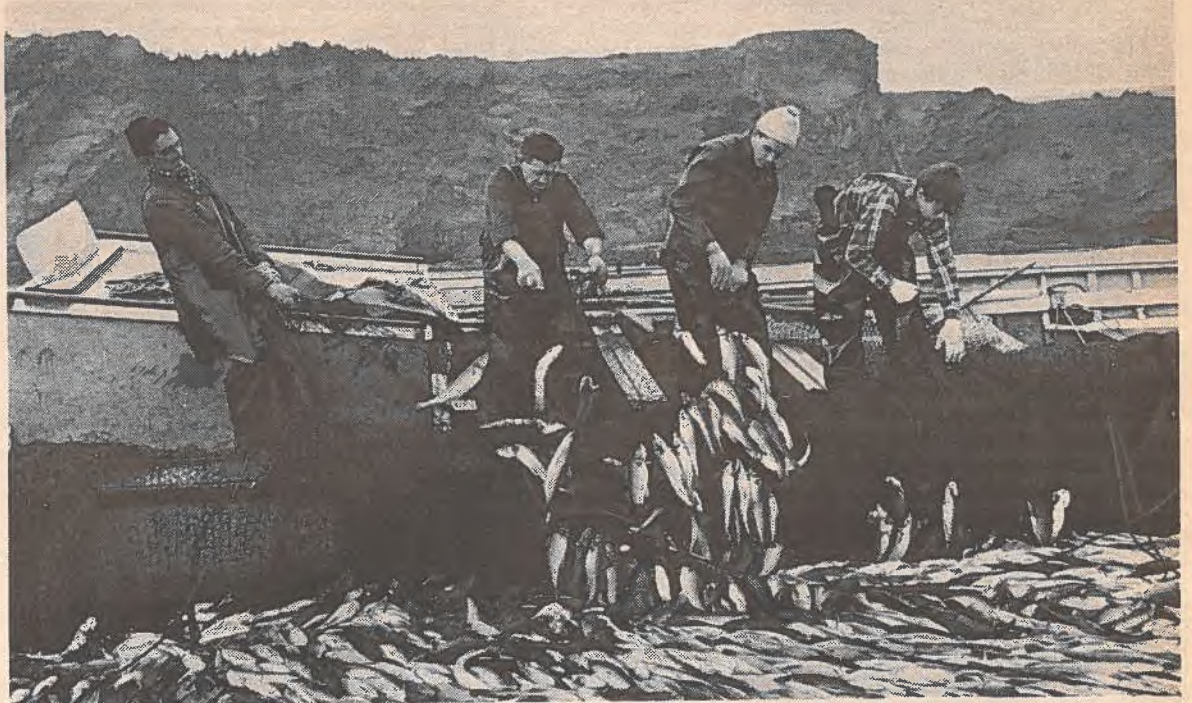
When legislation and regulations have been changed, further information material will be directed to fishermen to make the conversion to metric as smooth and painless as possible.

Why metric?

Canada has joined the majority of countries and has adopted the international metric system of weights and measurements. Presently 99 per cent of the world's countries use the metric system or are converting to it. The conversion is necessary if Canada is to keep its position as a major exporter to these countries.

The commercial fishing industry as all other Canadian industries, will be converting most of its units of measurement to metric. The benefits to the industry will be significant as most of our fisheries products are exported. The United States presently imports most of our fisheries products and they too are converting to metric. Markets for Canadian fisheries products are now expanding to all areas of the world, where metric is the standard system.

The conversion in the fishing industry will essentially be completed by 1981-01 and will involve cooperation between all levels of government and the fishing industry. The transition has been planned to involve minimal cost and inconvenience to the fishing industry.



The guide *Fishing in Metric* will provide useful information on metric terms used and their relationship to your fishing activities. To obtain your copy please write to:

Communications Branch
Fisheries and Oceans
Ottawa, Ontario
K1A 0E6
or

Metric Commission Canada
Box 4000
Ottawa, Ontario
K1S 5G8

Construction industry council urges specifiers to "go metric"

The Construction Industry Development Council (CIDC) has called upon owners, architects, engineers, manufacturers, builders and contractors to catch up the slack in the Canadian construction industry's metric conversion program.

CIDC chairman, R.G. Johnson of Toronto, noted that some owners or their designers had hesitated to have their plans and specifications prepared in metric because of uncertainty as to whether or not the metric conversion timetable was to be altered. "Recently, however, the third edition of the *Construction metric conversion plan* was published and it officially re-confirmed the original schedule. Construction owners and specifiers should therefore be reassured and go metric if they have not already done so. Experience has shown that designers will enjoy the benefit of cost savings when working in metric", he said.

The Council, comprised of senior representatives of construction management and

labour, the architectural and engineering professions, manufacturing and education, stated that it was in full support of the conversion to the metric system for the construction industry. It urged all concerned to minimize the transition period.

Mr. Johnson recalled that the Canadian construction industry had strongly advocated metric conversion over a decade ago. "When the Metric Commission was subsequently established to provide a secretariat, a steering committee for the construction industry was nominated by the Canadian Construction Association, the Housing & Urban Development Association of Canada, the Royal Architectural Institute of Canada, the Association of Consulting Engineers of Canada, Construction Specifications Canada and the Canadian Institute of Quantity Surveyors. In other words, the conversion plan for the industry was developed by experienced practitioners from the industry".

"A lead time of well over three

years was provided before metric construction tenders were called for. The plan was published back in 1975, with M-Day set for 1978-01-01. The timetable provided another three-year period for the transition whereby the industry would be working predominantly in metric. That three-year period ends this year. Whereas there has been a steady build-up in the volume of construction specified in metric, the tempo of the conversion program in some areas has been below expectations," Johnson added.

"The principal cost factor in the industry's metric conversion program is borne by the manufacturers and suppliers of materials. Accordingly, it is most desirable that the period in which dual inventories must be maintained is not extended unnecessarily. The sooner that metric construction is indeed predominant, the sooner the greater efficiencies sought by the construction industry in converting to metric will be realized," he said.

Engineering units

U.S. mining journal now reporting exclusively in metric units

Mining Engineering, a technical journal of the U.S. mining industry, commenced sole usage of metric units in its issue of 1980-02. The following is an extract from that article.

Brace yourself. Beginning with this issue, all engineering units will be reported in SI units. The exception to this is the technical papers section, where units may be reported by dual notation.

For the past four years, ME has reported all units of measurement first in SI, followed in parentheses by the equivalent English value. This policy was designed to aid magazine readers through a transitional period from English unit reporting to SI unit reporting.

In 1979-10, the SME-AIME publications board completed the English-to-SI transition by requesting the editorial staff, beginning 1980-02, to report exclusively in SI. The publications

board also requested the editors to prepare a chart of SI conversions useful to ME readers.

Editor's note: A comparable Canadian publication is the *Canadian Mining and Metallurgical Bulletin*. Though dual units are still in use, an increasing number of technical articles are written employing solely SI units, according to editor J.I. McGerrigle.

Modern metric system simplest, most orderly

Those who have studied the subject closely say that the modern metric system (SI) is the simplest, most orderly and comprehensive system of units ever developed. There are only seven base units in the International System of Units compared to 53 in the imperial system. In SI all the other units needed for whatever purpose are derived from these base units by simple multiplication or division

without internal conversion factors. In addition, the multiples and submultiples of units of the International System are related by 10 or a factor of 10 whereas there is a need in the yard/pound system for a number of different factors in relation to each measurement quantity, such as 12 inches in a foot, three feet in a yard, and 1760 yards in a mile.



R.B. Hayhoe Company

Tea bag sales go well in metric



The Hayhoe tea bags have displayed the metric symbol for three years now with positive results. Makers of Flowerdale Tea and Mountain blend coffee, the R.B. Hayhoe company's early decision to use only metric-size packaging has met with favourable customer reaction, says sales and marketing manager J.R. Morrison. "The fact that the tea bags are marketed in 125, 250, 375 and 500 g packs with each containing 50, 100, 150 and 200 bags respectively has made it easy for the customer to make a cost comparison per bag" he says. For more information on the use of the metric symbol, write for the free leaflet *The national symbol for metric conversion* to: A/Director, Information, Metric Commission Canada, 240 Sparks St., Ottawa K1A 0H5. The symbol is now displayed on a wide variety of Canadian products and publications.

Cascade method success in school system

A cascading method of information was used to educate the educators at the Saskatoon public school board.

Derek Hill, assistant superintendent of schools for the Saskatoon Board of Education says that six years ago the mathematics advisory committee, comprised of ten members from various schools, was enlarged to some 20 members who had one thing in common: interest in carrying out metric conversion throughout the elementary school system.

Under the leadership of Dr. Hill and with the collaboration of advisory committee member George Odegard, the metric conversion committee articulated an initial metric conversion plan and subsequently met with some 40 school principals for a few half-day sessions of information on metric units and their use in the schools.

Principals to teachers

Dr. Hill says that the principals in turn transferred their knowledge to selected teachers who attended metric seminars organized by the initial metric conversion committee. These teachers thus acquired enough knowledge to become metric coordinators for their respective schools.

These metric coordinators then proceeded to repeat the process with the remaining 600 teachers in their school system using hands-

on seminars on general SI or on units needed in their particular field of education. Dr. Hill explains that tactile and visual methods proved a success and were much preferred by participants to the academic method. Within six months the teachers had become conversant with metric units and were ready to start training their 15 000 elementary school students.

Co-ordination important

Dr. Hill adds that all teachers were careful to coordinate the learning of metric units with the conversion programs in secondary schools and collegiates. They wanted to make sure their students would integrate other schools with the knowledge of a common system of measurements already in place in those institutions.

Mr. Odegard, now mathematics consultant for the school system, describes those first years of conversion as "years of exchange and pioneer spirit among the teachers". Truly metric material was short and in demand and teachers shared everything. For a while the curriculum was revised to include more decimals and less fractions in order to prepare the children for the metric system. The first truly metric mathematics textbook was available in 1978.

The work world

Dr. Hill points out that through most of this metric training period, conversion in industry was kept in mind so that children would be able to enter a work world that was using the same system of measurements as they. The biggest problem encountered is conversion in the machine shop. Conversion there is expensive and will take more time because new metric equipment will be bought only on a gradual phase-in program.

After the training of the teachers, the parents were invited to join the metric cascade of information so that they in turn could understand and help their children. The advisory committee on metric conversion prepared a sample information meeting for parents in which two-thirds of the schools subsequently participated. This information evening was basically similar in content to the seminars used in training the teachers.

Dr. Hill likes to recall there was a tremendous response from the parents and says they appreciated the hands-on approach and the freedom it afforded of learning only what they felt they needed to know. He feels that the cascade information transfer proved excellent, allowing them to train 15 000 students as well as their teachers and parents, at minimum cost and within a span of only a few years.



Dr. Derek Hill (right) and George Odegard who started the metric program for the Saskatoon Board in 1974 discuss the monitoring of the program.

The world of metric activity book

The *World of Metric* activity book is an excellent tool to help students in grades 7 and up to learn metric. This workbook has been designed to give the students a thorough understanding of the metric system by providing activities that will encourage him to "think metric".

It will help them understand what measurement is, why the

metric system was chosen and how it works and provide enough practice so that the student can think in metric units rather than convert.

Throughout the workbook emphasis has been placed on estimating length, area, volume, capacity, mass or temperature before the quantity is actually measured.

The *World of Metric* is available at five copies for \$13 from:

Ginn and Company
Educational Publishers
3771 Victoria Park Avenue
Scarborough, Ontario
M1W 2P9

Tel.: (416) 497-4600.

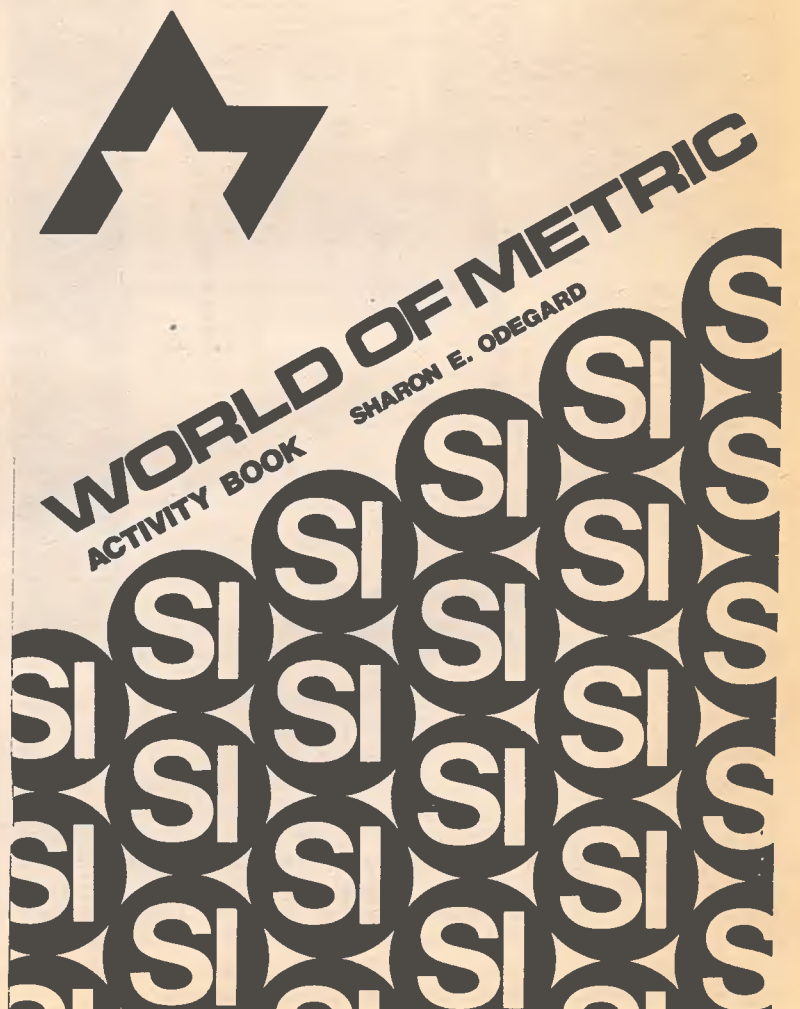


Metric Commission Canada Commissioner Betty Robinson from Saskatoon (left) discusses a training technique from *The World of Metric* with author Sharon Odegard, mathematics teacher at Kelsey Institute of Technology in Saskatoon, Saskatchewan. This workbook, first published in 1973, was the first product to ask for and receive permission to use the metric symbol. The use of this symbol is granted to products or publications as a guarantee that the metric aspects are in accordance with Metric Commission Canada policies on good metric practice and conform to the national standard of Canada on correct usage of the metric units and symbols.

Moveable exhibits: helping consumers to become familiar with metric units



MCC site officer Evelyn Doolar manning the booth at the midtown shopping plaza in Saskatoon, Saskatchewan says that visitors seem to know quite a lot about metric units and just take a leaflet home for practical future reference. This booth is part of a group of moveable exhibits shown in medium-sized cities across Canada to help consumers familiarize themselves with foods sold in grams and kilograms.



Potash mine markets exports in metric

Nearly half the world's known supply of potash, a basic fertilizer ingredient essential for plant growth, is found 1200 m deep under Saskatchewan.

Cominco's multi-million dollar potash operations, located about 32 km southwest of Saskatoon, produce about 800 000 t/a (tonnes per year) and have sufficient reserves to allow the mine to continue for 100 a at present production rate. Seventy-five percent of the potash is sold throughout North America and the balance is destined for world markets. Which means that the total potash industry in Saskatchewan exports in the order of 10 000 000 t/a at about \$60/t.

Cominco corporate offshore markets are all metric sales. Their metric conversion started in 1977, with all mine plans and ore production figures in metric units. General superintendent Mick

Henningson says that the company knew metric was coming and they refused to stick their heads in the sand.

Conversion was facilitated by the fact that the plant is computer controlled and monitored. This meant that it was simply a matter of altering the computer programs to give outputs and printouts in the appropriate metric units. The conversion was done gradually to ensure operator acceptance; the first conversion was on the temperature units, then volume, area, length, and finally, pressures.

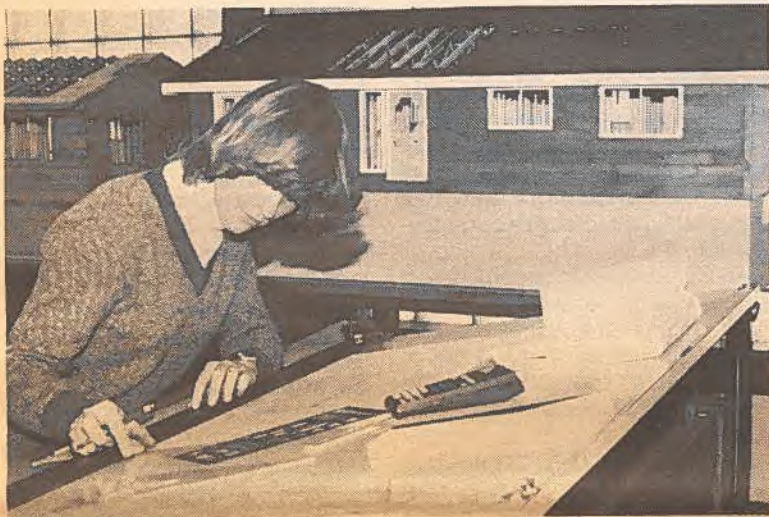
Mr. Henningson says price lists and quoted prices for products were in metric units as of 1980-07-01. Customer invoicing after this date will be in metric units as well. Freight charges and bills of lading will be in dual mode until 1981-01-01, after which time they will be exclusively in metric units.



Mine superintendent Peter Jones (above) shows how the potash ore is extracted by drilling a tunnel 3 m wide with the mining machine. There are 300 km of tunnels so far at Cominco.

Drafting students (from page 1)

Building a model house at Halifax Regional Vocational



Michèle MacDonald is oblivious to all but her drafting. The metric model house in the background was drawn by the architectural drafting class and made by the carpentry class. The electrical shop added wiring and plumbing, with the pipes made to fit and installed in the machine shop.



Machine shop instructor Arthur Veinot, r, and student Wade Smith, cut internal thread on a lathe with metric capabilities.



Darcy Drummond Morris, executive vice-president (retired) of Cominco and MCC Commissioner since 1971 organized a visit of the Cominco all-metric potash operations just outside of Saskatoon in May. We see him here (centre) with mine superintendent Peter Jones and (left to right) fellow commissioners Steve Gossage, Arnold Groleau and Betty Robinson.

The active life of an MCC information officer

From carpets to kilopascals and from dockyards to kitchen recipes, the Metric Commission information office in Halifax has the answers.

The office, opened by the Commission in 1977, maintains regional public relations directed at the media and advertising agencies, business, industry, education, associations and other interested groups to help Nova Scotians during metric conversion.

About 100 requests for information are handled each month

ranging from general inquiries from the public to specific questions from industry personnel concerning their conversion programs.

Information officer Eileen Stubbs says that interest in different areas of the metric system generally follows the national program. For instance during the road speed and distance signs conversion, questions in that area were frequent but now that people have become familiar with kilometres she hardly ever gets questions in that sector anymore. On the other

hand questions relating to gas consumption are understandably frequent.

To help her in her work, Mrs. Stubbs has compiled comprehensive files of metric information classified according to subject and frequency of requests. These files are updated periodically in order to remain in step with the national conversion program. Questions of a technical nature requiring specific expertise are referred to Metric Commission Canada sector plan managers concerned.

For bulk information of a more general nature, the N.S. Information office keeps a good supply of publications for distribution on request to organizations or individuals, including schools.

The largest number of requests for information come from institutions and companies (61%), while individual callers make up the next largest group (25%) with the balance divided between government departments and educational institutions.

As well as providing information from the office in downtown Halifax, Mrs. Stubbs gives courses on demand to various organizations in the private or public sectors. Recently, for instance, she

A busy Halifax office



Eileen Stubbs, information officer in charge of the Metric Commission Canada regional information office in Halifax.

gave seminars on general SI to Can Four Ltd., a wholesale furnishings and finishing supplies firm, to secretaries at the Nova Scotia Power Corporation and to municipal employees in Truro, N.S.

Media relations are also part of the information services handled by the MCC office. Mrs. Stubbs has been guest on a number of radio

and television programs, the last of which was an open line radio show in CHNS-Halifax, where she answered questions about metric in general.

Asked about the general public reaction to metric in Nova Scotia, Mrs. Stubbs says that complaints or negative comments make up less than 1% of total requests for information.

Economic advantages

(from page 1)

industry, and to government at all levels."

The House leaders of all parties spoke, at that time, in the House of Commons, in favour of the policy conclusion that metric conversion was inevitable and in the national interest.

The White Paper was quite specific about some of the economic advantages of converting. Here are a few of the economic arguments presented at that time:

"Important benefits of conversion are to be found in the ability to maintain and expand Canadian trade with nations in the metric sphere. Because of the vital importance of foreign trade to Canada, especially the need for growth in exports of manufactured goods, there must be serious concern about damage to Canada's competitiveness in world markets as a result of the pace of changeover to the metric system in the world at large."

Exports to U.S.A. - Motor vehicles and parts

This is particularly important for Canada since in 1978, 26% of our GNP was in exports, compared to only 7% in the U.S.A.

"The view is held in certain sectors of industry that Canada

should not attempt conversion independently of the United States. The Canadian automobile industry, with its close ties with the United States involving common designs, production, and marketing programmes, is cited as an illustration".

"It appears generally the practice of the larger international automobile companies to design in the measurement system of the different countries in which they manufacture. Metric or non-metric design may be translated and adapted as occasion demands. The same companies, in their international operations, are conscious of the great practical advantages of common standard stock sizes of metal materials, common standard fasteners, and common designs for production and maintenance spares."

The U.S.A. is going metric too!

Some Canadians, and I suppose, some Americans too, have a misconception about metric conversion in the United States, which of course is Canada's major trading partner. Just a month ago a statement by President Carter in the report of the U.S. Metric Board to Congress re-affirmed the pre-

sent U.S. administration's support for metric conversion.

The United States Congress made the metric system legal in 1866. The United States passed a Metric Conversion Act in 1975. With confirmation by the Senate, of the United States Metric Board in March 1978, and the steady conversion of many United States industries and services to metric, all of Canada's trading partners either operate in metric units or are converting to them. Well, not quite. North Yemen has not decided to adopt SI yet, and we do have one export contract for a few million dollars with them. It is a fact that 70% of Canada's exports go to the United States. The automobile and parts related manufacturing sector in the United States, however, is leading metric conversion in North America. About 70% of manufacturing and orders for parts are already in metric units.

General Motors 1980 X-model cars are 90% metric. GM has stated publicly it intends to complete the conversion of its operations by 1982. These developments are significant for employment and production levels in over 200 companies with over 100 000 employees in southern and central Ontario and southwestern Quebec, since 31% of Canada's



MCC Executive Director Paul C. Boire addressing the 1980 annual meeting of the U.S. Metric Association held in May at the University of Massachusetts, Amherst, Mass.

1978 exports to the United States were in motor vehicles and parts. This is our biggest single manufactured export to the United States. It amounted to over \$11 billion in 1978. These changes would have taken place without a Canadian government policy on metric conversion. The investigation and planning undertaken by Canadian suppliers in response to the government's policy, however, has helped them to minimize the costs and maintain employment in the industry.

A General Motors corporation group vice president, Mr. Alex C. Mair, has stated that for the corporation, including the Canadian plants, metric conversion costs in the 1973-1979 period have been minimal. GM's metric conversion expenses over that period had been estimated at nine million dollars. Conversion costs turned out to be less than one percent of cost estimates that had been made in the mid 1960's. Mr. Mair has stated publicly that the offsetting benefits or cost avoidance offsets the corporate expense of metric conversion - by a factor of 10 to 15 to 1.

Exports to U.S.A. - distilled spirits

The Federal Alcohol Administration Act in the United States has been amended, and prohibits any bottling or imports of wines and spirits, unless they are in specific metric sizes only, after 1979-01 (wines) and 1980-01 (spirits). Canada exports both products to the U.S.A., particularly spirits. You might be surprised to know too, that there is a growing market for exports of cider and mineral water in metric sizes to the U.S.A.

Cidrebec of Rougemont, Quebec, near Montreal, exports apple cider to the United States. They have found the use of metric containers advantageous. They eliminate the confusion which exists due to the difference between Canadian and American ounces and gallons. The sizes now used are 250 mL, 750 mL, 1 L and 2 L. Many people are unaware that a U.S. fluid ounce is 29.6 mL while a Canadian fluid ounce is 28.4 mL. A Canadian gallon of 160 fl. oz. is thus not 1.25 times bigger than a U.S. gallon of 128 fl. oz. but 1.20 times bigger.

Sports equipment

Cooper Canada Ltd. (Toronto, Ontario) began exporting ice hockey equipment to the United States in a small way in the late 1930's and to Europe and Japan in the 1940's and 1950's. Today, this equipment is sold in metric units in almost every country in Europe, as well as Korea, Singapore, Hong Kong, Morocco, South Africa, Australia and New Zealand, Argentina and Japan. Cooper

Canada exports baseball equipment in metric units to Germany, France, Belgium, Holland, Italy, the United Kingdom and Japan. Cooper Sports equipment is now sold in 35 countries.

The company says that metric units are indispensable to it because they constitute the only measurement language used in all its markets around the world.

House construction

Sefel Properties and Development Ltd. have constructed Calgary's first major condominium development to be completely designed, tendered, budgeted and constructed using metric dimensions. This 262-unit three story walk-up apartment complex features six floor plans from which evolve 23 different unit sizes. "The transition to metric construction has been virtually 100% trouble free," said Sefel Properties vice-president of construction, Bing Runquist. "In fact in areas such as estimating, it actually became easier and more accurate since we were only dealing in one set of measurement (millimetres rather than several (fractions, inches, feet and yards))."

Newsprint represented 6% of our exports to the U.S. in 1978. The newsprint mills began shipments in metric units in Canada in 1978-01-01. They persuaded U.S. producers to ship and bill in metric units at the same time as Canadian exporters to the U.S., i.e. 1979-01-01. Thus about 9 000 000 t (tonnes) of newsprint from Canada is now metric, as is another 3 000 000 t in the United States.

Market pulp shipments have been metric for some time. To all intents and purposes the world newsprint industry is now metric.

Atlantic Coast

Abitibi-Price company has a pulp and paper mill in Grand Falls, Newfoundland. About one-third of the mill's output goes to the United Kingdom and Northern Europe, one-third to Latin America and the Caribbean, and the remainder to South America and the Mediterranean. It has been shipping newsprint to certain customers in metric terminology since the 1940's, in accordance with the policy of Abitibi-Price to sell and ship products to customers in the measurement language that the customer prefers.

Pacific Coast

Prince George Pulp and Paper Limited is located in Prince George, B.C. and has been operating since 1966. Over 600 persons are employed in woodland and mill operations produc-

Fuel consumption guide accents "less is better" principle

When estimating your vehicle's fuel consumption, you should record your odometer reading at tank fill-up time, run the vehicle as you normally would, then have the tank completely refilled and record the number of litres used and the new odometer reading. The quantity consumed divided by the distance travelled all multiplied by 100 determines the litres per hundred kilometres figure. Greater accuracy is obtained if total distance travelled and litres consumed over several refills are used to make the calculation. A new car will need to be "run-in" for 4000 to 6000 km before meaningful fuel consumption measurements can be made.

Metric and fuel consumption

Metric conversion in Canada is taking place over a period of years. Speedometers and odometers in vehicles were required to be in kilometres as of 1978-01, coincident with most road sign conversions. The fuel volume measurement changed from gallons to litres during 1979. The exact metric unit of fuel consumption is litres per hundred kilometres or L/100 km. This unit is used internationally, and makes consumption and cost calculations relatively simple.

L/100 km

Less is Better

When service stations began converting their fuel pumps from gallons to litres in 1979-01, the system of rating fuel efficiency by mileage, that is, miles per gallon of fuel, no longer applied.

"Fuel economy" now becomes "fuel consumption", and is measured in litres per hundred kilometres - L/100 km.

Whereas under the old system the higher the mileage the more economical the vehicle, now the

reverse is true and the smaller the fuel consumption figure, the better. With the new change in measuring vehicle economy in actual volume of fuel used to drive a given distance, you can readily identify your fuel costs.

How to calculate fuel consumption

Just like the new consumption figure, the calculation is now reversed. Instead of dividing distance travelled by fuel used (miles/gallons) to obtain "mileage", you will now divide the amount of fuel used by the distance travelled (litres per kilometre) and then multiply by 100 to obtain fuel used for 100 km. This gives the fuel consumption in litres per hundred kilometres - L/100 km.

How to use fuel consumption

Buying a New Car: There are many factors in choosing a new car, but with today's fuel prices, low fuel consumption is one of the most important. The car with the lowest consumption rating will give best fuel economy.

Car Maintenance: When the consumption figure rises on your car it means something is wrong and it's time for a tune-up or repairs.

To estimate trip costs: Divide the distance to be travelled by 100 and multiply by the consumption figure to obtain approximate fuel needed for the trip.

Remember: Less is Better

Examples

A. Comparing Fuel Consumption of New Vehicles

Car A rated at 10L/100 km
Car B rated at 8 L/100 km (Car B uses 2 L less fuel than Car A per 100 km travelled)
Annual distance travelled = 15 000 km

Annual Fuel Savings in litres Car B over Car A:

$$- 2 \times \frac{\text{annual distance travelled in kilometres}}{100}$$

i.e. $- 2 \times \frac{15\,000}{100} = 300 \text{ L}$

B. Estimating Vehicle Fuel Consumption

Distance travelled: 400 km
Fuel used: 32 L
Fuel used per hundred kilometres = $\frac{32}{400} \times 100 \text{ L} = 8 \text{ L}$
Fuel Consumption = 8 L/100 km

C. Estimating Trip Costs

Planned trip distance = 1200 km
Usual vehicle fuel consumption = 9.5 L/100 km
Estimated fuel use = $\frac{9.5}{100} \times 1200 \text{ L} = 114 \text{ L}$

The brochure *Fuel Consumption Guide 1980*, published by Transport Canada, is available from the following sources:

In person from:

- Most local provincial or territorial motor vehicle license agency offices
- Most participating new car dealers.

By mail from:

- Public Affairs Branch, Transport Canada, Ottawa, K1A 0N5
- Bulk copies are available in multiples of 250. For further information on technical matters, write to:**
Energy & Emissions Engineering, Motor Vehicle Regulations Division, Road and Motor Vehicle Traffic Safety Branch, Transport Canada, Ottawa, Ontario K1A 0N5.

Advantages

(from page 6)

ing pulp and paper. The mill produces 100 000 t per year of multiwall sack kraft paper in addition to other forest products. About 95% of this production is exported to almost all parts of the world. The company reports that its conversion to SI helped to both develop and maintain these extensive export markets.

Alberta

Crude and refined petroleum and coal products in 1978 accounted for 6.2% of our exports to the U.S.A. Natural gas distribution and transport amounted to another 6%.

Intercomp Resource Development and Engineering Ltd., based in Calgary, Alberta, is one of a growing number of Canadian companies operating internationally in the metric system. Intercomp is a team of professionals involved in resource industry activities, including petroleum engineering, geology, petrophysics, economics, management and computer simulation of oil and gas reservoirs and pipeline networks.

Intercomp's services are used by governments and oil companies in many parts of the world including Europe, the Middle East, the Far East, South America and Africa. These services include detailed geological and reservoir engineering studies, petrophysical evaluations and turn-key studies of major gas utilization projects.

For example, the Oil and Natural Gas Commission of India recently purchased 30 mathematical reservoir simulation software along with several months of instruction and training of their personnel in Canada. Modelling software and the training were all required to be in metric units.

Due to Intercomp's expertise in the areas of reservoir engineering and digital log analysis, many companies and governments enter their professional staff, geologists and engineers in its training programs. These programs range from one week to two years in duration and entail a thorough involvement in the metric system of measurement.

Audio-visual training program

"Amazing metric" kit does it

"The Amazing Metric" is an audio-visual training program available to all federal, provincial and municipal government departments, crown corporations and public utilities and educational institutions. In addition, a few kits are available on a loan basis to industry and the private sector. (For more information, please contact: Ms Pat Parent, Metric Commission Canada, 240 Sparks St., Ottawa, Ont. K1A 0H5, tel. (613) 593-6800.)

This bilingual training kit gives you an interesting overview of the seven base units and their symbols (the units for length, mass, volume and temperature), why SI is easier and faster than the imperial system, how to add, subtract, multiply and divide using decimal numbers, easy methods to calculate area, volume and capacity, why the term mass is preferred to weight, what a wind speed of 115 km/h means to you, how a Celsius thermometer can help you, how to write or type the symbols for metric units correctly and what you've always wanted to know about metric but were afraid to find out.

Each kit consists of:
• a complete carousel of 80 coloured slides

Ability to work in metric increases productivity

During the last two decades the professional reputation earned by the Association of Consulting Engineers of Canada (ACEC) member firms has created a twenty-fold increase in the demands for their services by countries beyond Canada's borders. The ACEC and its member-firms' activities in international markets are prompted through participation in organizations such as the International Federation of Consulting Engineers (FIDIC), CIDA and the World Bank, amongst other international institutions. Working in international markets requires a great deal of accommodation and adaptation to changing policies and practices in Canada and abroad. Engineering consultants rely heavily on the exportation of their services. In 1977, 17% (\$200 million) of total billings were derived from abroad.

The ACEC estimates that one million dollars worth of consulting work generates sales of five million dollars worth of goods and services in other sectors of the Canadian economy. The conversion to the metric system by consulting engineers therefore increases the demands in Canada for metric products. In this way it stimulates many other sectors of the economy to convert.

The ability to work in metric units provides a distinct advantage to Canadian engineers assigned to export projects for work outside Canada because it presents the opportunity to integrate North American and European work for a successful end result.

Canadian publishers find metric market in U.S.A.

McGraw-Hill Ryerson Limited of Toronto in 1973 had committed themselves to a publishing program in which all or most new or revised titles would contain SI metric units of measurement. As of 1976-11, the company had sold more than 225 000 copies of its new SI publications, with approximately six per cent to the export market.

Approximately 98 per cent of 14 000 Canadian SI metric copies exported by this firm have been sold to the educational market in the U.S.A. Representing 50 metric titles, they are designed for academic technical and business courses in elementary and secondary schools and university markets.

The U.S. parent firm is particularly interested in these recent sales which represent an interim test for future U.S. metric programs. The texts exported include such subjects as mathematics, machine shop training, electronics and similar topics. Some of the publications have been exported to Australia and Britain, two other countries that have embarked on metric conversion programs.

SRA (Science Research Associates) of Willowdale, Ontario estimates that its export sales, especially to the United States, will increase 20-25% over the next three to four years.

Many other Canadian companies have found increased productivity and increased export markets based on their metric products.

Sysco of Nova Scotia between 1974 and 1976 exported 40 000 t of 60 kg/m rails to Poland, even though their facility is old and they are having trouble competing for business in customary measurement units.

In Quebec

Domtar Ltd. of Montreal has reported savings in their asphalt roofing shingles lines. This was achieved through both conversion to the metric sizes and rationalization, despite necessary machine changes. In brief, Domtar has reported a 12% increase in manufacturing productivity and an 18% decrease in time required to apply their asphalt shingles, thus a reduction in installation labour costs. They have also reported advantages in material handling and storage.

The Singer Sewing Machine Co. in St. Jean, Quebec, has expanded its European market to other countries such as Sweden, Germany, the United Kingdom and Finland. The total number of machines exported to Europe in 1978 was approximately 15 000 units.

In Ontario

Steel Company of Canada (Stelco) officials have said that they feel that the major benefit will arise

through eventual savings in inventory costs due to rationalized product lines.

Canada's metric conversion program has created an entirely new domestic and export market for a Markham, Ontario company (Spectrum Educational Supplies Ltd.) and a two-year-old associated manufacturing business. Seventy-five percent of the companies' business represents exports, mainly to the U.S.A. but also to Australia, Britain and West Germany.

Manitoba

In 1977 a new company, Roy Legumex Inc. of St. Jean, Manitoba, was formed to build a new plant and to contract, process and market dry peas and other specialty crops from Southern Manitoba. Employment today varies seasonally from 12 to 25 persons.

The company's clients are located mainly in Belize, Guyana, Colombia, Venezuela, France, Germany, Hong Kong, Holland, Iran, Japan, Malaysia, Singapore, South Africa, Surinam, the United Kingdom, the United States and several Caribbean islands.

Since 1976, more and more clients abroad and at home have been asking the company to ship in metric packs. The company gladly obliges since this has helped to maintain good relations with important customers and to keep large accounts in foreign markets.

Alberta

Dura-Com Images of Edmonton, Alberta reports that it has been working in metric units since 1978-03 and that by 1978-07 contracts in metric units represented 40% of total sales. The company also reports that many Canadian companies that formerly bought from United States companies have now turned to Dura-Com because of its capability in metric units.

Expanding and Maintaining Markets

Marine Engineering - British Columbia

Swan Wooster has been involved primarily in the marine field beginning with the design of wharves, piers, breakwaters and similar harbour projects. They have expanded into many related areas such as master planning of major world ports, and in-house development of various computer

programs such as an analytical tool in the determination of wind, wave and berthing forces on marine structures in very deep water.

Swan Wooster, although they have only about 400 employees, has worked in some 38 different countries. During 1978 alone, projects in 22 countries were undertaken. With the exception of Swan Wooster's work in the U.S.A. virtually none of these consulting commissions could have been obtained without a willingness and demonstrated ability to work in the metric system, and to produce all drawings and tender documents in this system. In recent years the value of Swan Wooster's engineering services alone for work in metric units has exceeded \$5 000 000/a.

Possibly more important are the materials and supplies and Canadian machinery that have been sold as a direct result of Canadian consultants' presence in foreign countries.

The ability to build sophisticated machinery to metric specifications was undoubtedly a factor in Hawker Siddeley Canada Ltd., Canadian Car (Pacific) Division, Surrey, B.C., obtaining an order in the \$20 million range from the U.S.S.R. for edge-banding equipment. The ability of Canadian Car (Pacific) Division to produce a wide range of equipment to metric standards has given new impetus to marketing programs aimed at further expanding world wide sales.

The plant also develops and manufactures equipment for making board from various types of fibre. Recently, a complete process line to produce exterior grade structural building panels from rice husks was shipped to the Philippines. The equipment, also made to metric standards, will produce some 500 panels a day, each 1 200 mm by 2 400 mm. The rice husks from which they are made are a residue of the rice milling process. They were previously considered valueless and presented a serious disposal problem.

Cost savings and cost avoidance

"Cyanamid Canada spent four hundred thousand dollars on conversion, excluding consumer product lines," says L. Nelson Vrooman, executive assistant to the president. "The four year metric conversion program has already yielded tangible benefits. Savings from packaging rationalization are running sixty thousand dollars a year. As a result, Cyanamid has recovered 60% of its total cost so far and ultimately will show a profit on metric conversion." ("Chemical Week", issue dated 1979-04-11)

"In 1973 Dupont (in Canada) converted their neoprene packaging operation, settling on a 25 kg sack for both domestic and foreign shipments. Dupont, in making the switch to 25 kg sacks from 50 lb bags recovered its conversion costs in less than a year and has since been saving two hundred thousand dollars annually because of the elimination of dual inventory for foreign and domestic accounts and improved distribution efficiency." ("Chemical Week" issue dated 1979-04-11)

Conclusion

Back in 1970 the White Paper on Metric Conversion in Canada sketched some of the economic arguments favouring a strong commitment to metric conversion. The advantages included increased productivity and the expansion of markets abroad, not to mention growing metric markets right next door in the U.S.A. It would seem that ten years later the experiences of many Canadian companies is establishing hard evidence that metric conversion produces substantial economic benefits.

