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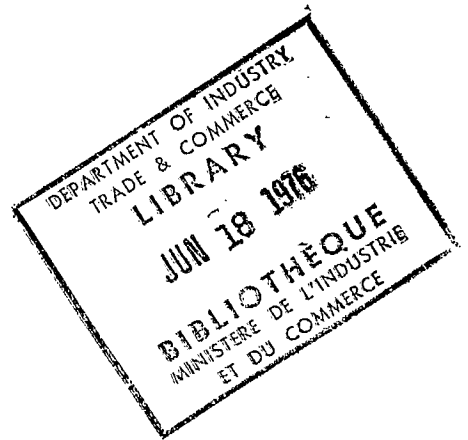
Summary of

**CANADIAN MACHINERY
PRODUCTION CAPABILITIES**



Industry, Trade
and Commerce

Industrie
et Commerce



SUMMARY OF CANADIAN MACHINERY
PRODUCTION CAPABILITIES

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A. PROFILE OF MACHINERY SECTOR

Some 2,000 companies with approximately 120,000 employees are engaged in the production of machinery and equipment for the resource, processing, manufacturing and service industries.

Canadian production of machinery and equipment is currently at \$4.2 billion annually of which \$1.3 billion, or 30 per cent, is exported. Because of the wide range of equipment needed by Canadian industry, the machinery sector has specialized in selective areas where it has a distinct competence and can be internationally competitive. Other Canadian machinery requirements are met by imports which currently are approximately \$4.6 billion per year.

The technical competence of the Canadian machinery industry is generally on a par with other advanced industrial nations. Many Canadian manufacturers have developed unique equipment and capabilities to meet particular requirements of the domestic market. In addition, the industry has access to the results of research and development conducted by large multi-national corporations as many have established plants in Canada. Scale of production is not always a competitive factor as much of the equipment is custom designed to meet particular user requirements. The result is a specialized industry based on good custom engineering capability, high labour skills and a high degree of technical competence to meet the specific needs of Canadian and international demands.

Canada has a strong body of engineering and consulting firms which complement the activities of machinery producers, particularly on large investment projects in such areas as forestry, mineral exploitation, electric power generation, airport and harbour development. These firms have experience and expertise in feasibility studies, engineering design, process control, equipment procurement, construction, installation, training and start-up. In addition, the consultants can group together several Canadian machinery producers in consortia arrangements for the supply of turnkey projects. In some cases such turnkey projects involve joint ventures or other co-operative arrangements with foreign suppliers for participation in third countries.

B. DESCRIPTION OF CAPABILITIES

1. MINERAL INDUSTRIES EQUIPMENT

The Canadian machinery industry can supply the bulk of the equipment required for all phases of mineral exploitation. It is particularly strong in such areas as:

- Diamond drilling (wire line and non-wire line)
- Material handling: mine hoists (double drum or friction type), shaft conveyances (skips and cages), conveyors (including stacker/reclaimers)
- Mineral beneficiation: complete concentration plants (crushing, screening, grinding, filtering, flotation)
- Asbestos processing plants (from raw ore to packaged fibre)
- Aluminum processing plants (electrolytic processing)
- Nickel processing plants (concentrate to matte)
- Smelting and refining (electrolytic zinc plants)
- Copper smelters (continuous smelting process)

Canadian consulting firms have been active in many countries in the fields of mineral exploration, process engineering, plant design and construction, as well as machinery and equipment procurement and environmental ecological control. This expertise covers such areas as: the analysis of the economics of mineral deposits; the planning for the extraction of the ore, whether by alluvial, open-pit, underground mining, solution mining or in-situ leaching; and the design and construction of ore beneficiation plants, smelters and refineries.

2. METALLURGICAL INDUSTRY EQUIPMENT

Canadian industry has developed an extensive line of metallurgical industry equipment ranging from smelting furnaces to finishing equipment such as slitters and roll forming machines. Canada is particularly strong in the following areas:

a) "Mini" or "Market" Steel Plant Services and Equipment

Canada has developed an international reputation in the field of "mini" or "market" mill equipment and technology. Canada can supply the complete range of equipment such as arc melting furnaces, continuous casting machines, reheat furnaces, rolling mills and accessory equipment for rolling bars and small structural shapes.

b) Finishing Equipment

Canadian firms produce finishing equipment for flat rolled products including slitters, shears, levelers, paint, annealing and galvanizing lines and roll forming equipment.

c) Industrial Furnaces

Canadian companies can supply a wide range of industrial smelting and heat treating furnaces along with auxiliary equipment.

d) Engineering and Consulting Services

Engineering and consulting firms in the metallurgical area offer a full range of services, from operating and process technology right through to project management and start-up.

3. CEMENT PLANTS

Canadian industry can supply complete cement plants for foreign customers on a turnkey basis. This includes such cement plant equipment as kilns, grinders, quarrying machines and materials handling equipment.

4. FOREST INDUSTRIES EQUIPMENT

This sector includes all machinery used in harvesting and processing raw materials from the forest to its end product, whether it be board or pulp and paper, including woodworking equipment.

a) Forest Harvesting Equipment

In recent years, the increased mechanization of forest harvesting operations has resulted in the development in Canada of highly sophisticated and yet rugged equipment, characterized by versatility and mobility, in the fields of tree harvesting, log handling, slashing and chipping. Canadian equipment can be adapted to meet the needs of any harvesting situation. The major equipment lines include:

- Feller-bunchers and delimiters
- Skidders
- Loaders and load aligners
- Logging trucks and trailers
- Tracked all-terrain vehicles (ATV's)
- Mobile debarkers and chippers

b) Sawmill and Woodyard Equipment

Canadian manufacturers are producing a wide range of internationally competitive sawmill and woodyard equipment, including:

- Log loaders and carriages
- Conveyors of all types (for logs, lumber chips and refuse)
- Multiple band saws
- Sorters and stackers
- Planers
- Pneumatic conveying and dust collecting equipment
- Refuse disposal equipment - including burners and boilers
- Drying kilns

c) Pulp and Paper Mills

Canada is a major world competitor in the manufacture of equipment for pulp and paper mill complexes, including:

- Stock preparation equipment of all kinds (including batch and continuous digesters)
- Pulp drying machines
- Paper machines for the manufacture of all types and grades of papers

This includes equipment for the manufacture of paper from rice straw pulp, abaca, bagasse and waste fibrous materials.

d) Boardmill Equipment

Canadian manufacturers possess advanced technology and can supply internationally competitive machinery for the manufacture of veneer, plywood, fibreboard, hardboard, particleboard, waferboard and gypsum board. This includes equipment for inspection, detection and control throughout the process line; complete paint and finishing lines; and heavy duty multi-stacked presses and kilns.

e) Woodworking Equipment

Canada has developed highly sophisticated V-grooving machines for the furniture and cabinet making industry. These machines are being successfully marketed in many countries.

In addition, Canadian woodworking equipment manufacturers have selective capabilities in the following areas:

Board feeders, including moulder return feed units
Drill presses, lathes, presses
Gluing machines and laminated wood beam equipment
Joiners, planers and combination joiner-planers
Kilns
Routers, sanders, saws and cutter heads
Splicers, mortisers and tenoners

f) Consultants

Canadian consultants in this field are active, domestically and abroad, in feasibility and market studies, in the supervision and management of timber enterprises, along with the design and construction of forestry complexes including lumber, plywood, particleboard, pulp and paper mills of all types. A number of Canadian consultants have specialized in the design of processes and plants for the treatment of effluents from pulp and paper and other forestry products operations.

5. POWER GENERATION EQUIPMENT

Canadian manufacturers have established an international reputation as suppliers of power boilers (steam generators). Canada produces the complete range of sizes for all types of fuel, with highly specialized technology for the burning of low grade coal. Complete packaged units with all the accessories have been installed in many countries.

Excellent facilities exist in Canada for the design, model testing and manufacture of all sizes and types of hydraulic turbines. Canadian manufacturers have established themselves as major suppliers to electric power utilities in Canada and abroad.

Gas turbines are available as sets for generation of electric power or for compressor service on gas pipelines. Designs include both heavy duty and the aero engine types, the latter adapting the new generation of aircraft jet engines for industrial use.

Both the small industrial steam turbines and the large utility models are produced in Canada and offered in the export market.

Approximately 60 Canadian firms are suppliers of major components and services for CANDU nuclear power stations. These firms have acquired the technical know-how to cope with the unique requirements of the CANDU program in terms of quality, reliability and ability to meet exacting dimensional and material standards.

In addition to the above, a broad range of auxiliary power equipment such as fuel handling equipment, exhaust purification equipment, condensers, pumps and heat exchangers are available for the export market.

6. OIL AND GAS EQUIPMENT

Canada has a wide range of capability from initial exploration to the refinery gate. For instance, Canadian firms have expertise in drilling service contracting, particularly in the 2,000 - 3,000 foot (500 - 1,000 metre) range. Geophysical exploration can be conducted with the use of aerial survey techniques, ground testing, oil seismic and scientific equipment - all of which are manufactured in Canada. Pipeline systems have been developed along with the necessary compressor stations and services. Canadian firms can also supply oil and gas conservation facilities and services.

7. CHEMICAL AND PETROCHEMICAL EQUIPMENT

Canadian manufacturers produce the broad range of machinery and equipment that is required by the industries engaged in the processing and production phases of the chemical and petrochemical industries. The following are examples of the types of equipment marketed both domestically and internationally: columns, fractionators and catalytic converters; pressure vessels and tanks; reactors; heat exchangers; distillation equipment; cryogenic vessels; compressors; pumps and valves; and steam generating equipment.

Firms in this field provide specialized services and equipment for the construction, testing and inspection of pipelines. Some firms provide pollution control equipment for air purification, monitoring, waste water treatment and noise reduction designed especially for these industries. Unique fire fighting equipment has also been developed.

In addition, Canadian consultants and construction companies have the capability for complete petroleum refinery, petrochemical and chemical projects including: feasibility studies, process equipment packaged systems, design, procurement, construction, commissioning and training.

8. WATER RESOURCES EQUIPMENT

Canadian companies have supplied ground water drilling services and equipment, including rigs, in many foreign markets.

Canada can supply complete municipal water system packages including filtration plants for the production and distribution of potable water and sewage treatment equipment.

9. AGRICULTURAL EQUIPMENT

Canada produces a broad range of equipment for most phases of agricultural production and provides services in specialized areas. The following are the major types of equipment and services Canada offers in this field.

a) Land Clearing, Drainage and Irrigation Equipment

Canada possesses considerable expertise in the breaking of land to make it suitable for agricultural production. Equipment for this purpose includes breaking plows, rotary plows for pulverizing roots and sapplings, root windrowers, rock pickers, small dig and carry scrapers, dozer blades and land planes. In addition, specialized equipment for building drainage ditches, laying field tile and stationary and mobile irrigation systems are manufactured by Canadian companies.

b) Livestock Raising Equipment and Services

This is a rapidly developing area of agricultural competence within Canada which includes consulting expertise for ranching and cattle handling, as well as automated feeding facilities for cattle and hogs. A wide range of equipment used in the barn is complemented by the specialized material handling equipment used in the storage and feeding of grain, forage and silage.

c) Dry Land Grain Farming Equipment

Canada possesses wide ranging experience in techniques related to grain production in regions having limited rainfall. These techniques have been developed to meet the requirements of large-scale farming practices used in the growing of wheat and other cereals in the Canadian prairies and the Mississippi Delta region of the United States. This type of agricultural production is centered around tractors in excess of 100 h.p.; tillage equipment which causes minimum disturbance to the soil surface and thus reduces soil erosion; and seeding machines that result in maximum germination in minimum moisture conditions. Canada is a major producer of the large four-wheel drive tractors, self-propelled combines and swathers employed in this type of farming. Also, Canada manufactures specialized cultivating, spraying and harvesting equipment for the larger grain farms.

d) Horticulture and Machines for Special Applications

Specialized capabilities exist in Canada in know-how and equipment for the production of certain vegetable and fruit crops. Canadian manufacturers are able to provide a full range of potato growing, cultivation and harvesting machinery; tobacco production equipment from the transplanting of seedlings to the curing of the harvested leaf; and specialized machines used in the production of fruit such as rotary concentrate sprayers and flotation grading and separation equipment.

e) Feed Preparation and Grain Processing Equipment

Canada is known throughout the world as a designer and builder of grain terminals and storage facilities. These installations include sophisticated materials handling systems, concrete and metal storage silos as well as feed mills. Also, Canadian consultants can undertake feasibility studies from the growing of the grain through all stages up to the production of flour or feedstuffs. In addition, specialized knowledge and equipment is available for the production and processing of oil seeds including unique machinery for the deodorizing of vegetable oils.

10. CONSTRUCTION EQUIPMENT

Canadian construction equipment companies have the technical and manufacturing capabilities to produce road building and general construction equipment for export markets. The following equipment is available for export from Canada:

- Road graders
- Front-end loaders
- Power shovels and cranes
- Hydraulic truck-mounted cranes
- Self climbing and rail-mounted tower cranes
- Paving equipment
- Hydraulic excavators
- Vibratory self-propelled compactors and rollers
- "Walk-behind" vibratory compactors and rollers
- Static and truck-mounted concrete mixers
- Concrete pumps
- Rock drilling equipment for blasting purposes
- Concrete products making and handling machinery
(e.g. pipes, blocks, slabs, tiles, etc.)

In addition to the above list of equipment, Canadian firms have sold and installed asphalt plants; concrete plants; and rock crushing, washing and screening plants in many foreign countries.

Tracked bulldozers and dig-carry-haul scrapers are two major construction items that are not made in Canada.

11. MATERIALS HANDLING EQUIPMENT

Canadian industry can supply the very broad range of materials handling equipment. This includes:

Overhead cranes and other hoisting equipment such as derricks, winches, hand and electric hoists and general purpose industrial hoists

Passenger and freight elevators, moving sidewalks, escalators and dumb waiters

Conveyors and conveying systems including baggage handling systems for modern airports

Industrial vehicles such as fork lift trucks, pallet trucks, stackers, tractors and trailers

12. PLANT MACHINERY

Although Canada does not produce the entire range of machine tools and plant machinery, a number of Canadian firms have developed unique products or capabilities in specialized areas. The following illustrates the kinds of equipment currently being marketed in foreign countries.

Packaging machinery for such processes as heat sealing, pouch filling, cartoning, labelling, strapping

Rubber processing machinery, equipment to produce rubber drive belts and machinery to produce and repair rubber conveyor belts

Shoe making machinery (plastic type)

Leather (hide) processing machinery

Textile needles

Metal forming and cutting machinery for such functions as shearing, honing, lathe work, press work, tracing, precision moulds and dies

Machinery to make grinding wheels

Precision moulds and dies for plastic processing machines

Injection moulding and blow moulding plastics machinery for production of plastic containers and plastic sheets

In addition to the manufacture of specialized products on a standard or "off-the-shelf" basis, the Canadian industry has a strong capability for the manufacture of custom-engineered machinery to meet particular plant requirements. A typical example is the extensive Canadian experience in the production of automated assembly or transfer machines for the automotive industry.

13. SERVICE INDUSTRIES EQUIPMENT

a) Chain Saws

Canadian manufacturers produce a wide variety of gasoline powered chain saws which are capable of satisfying the diversity of needs of the hobby man through to those of the professional logger. Canadian companies also produce accessories such as sprockets, guide bars and saw chain. These Canadian products are being sold in more than 50 export markets.

b) Auto Service (Garage) Equipment

A wide range of automotive service equipment found in automotive service stations or body repair shops is available from Canadian production. In addition, most mechanics' hand tools are manufactured in Canada and are available for either Metric or British unit functions. This equipment has been successfully marketed in North America, Europe and Japan.

c) Food Preparation and Service Equipment

The Canadian food preparation equipment manufacturing sector has developed a strong international competence for the supply of catering, commercial cooking, refrigeration, food preparation and service equipment for use in establishments such as hotels, restaurants, take-out franchises, hospitals, educational institutes and office buildings. In addition, mobile kitchen facilities have been developed for remote job sites.

d) Industrial Refrigeration Equipment

Canadian industrial refrigeration equipment manufacturers and consultants have developed considerable expertise in commercial facilities for cold storage and freezing of perishable goods such as fish, meat products and vegetables.

e) Food Processing Equipment

Canadian manufacturers have developed expertise in such areas as breweries and distillery equipment, fish processing equipment, abattoirs and other meat processing equipment. Canada has also established a competent consulting capability in this field.

f) Other Specialized Service Equipment

Canadian firms manufacture specialized service industry equipment which has been exported to many countries. The range of such equipment available from Canada includes:

Heating, air conditioning and fuel burning equipment

Locksets, keys and key cutting machines

Vending equipment

Selective laboratory and medical equipment

Floor maintenance equipment

Supermarket equipment