KATES PEAT MARWICK & CO.

THE WESTERN CANADIAN MARKET FOR STEEL CASTINGS

Contract # 1918

DEPARTMENT OF REGIONAL ECONOMIC EXPANSION

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PRIVATE

February 11, 1974

Mr. A. G. MacLennan
Department of Regional
Economic Expansion
Industrial Development Branch
161 Laurier Avenue West
Ottawa, Ontario

Dear Mr. MacLennan:

We are pleased to submit our report, entitled "The Western Canadian Market for Steel Castings".

This report summarizes the results of our study, which describes the markets for jobbing castings of mild or carbon steel, low alloy steel, manganese steel, and high alloy steel, including stainless, in the geographic regions of Manitoba, Saskatchewan, Alberta and British Columbia. In addition, the Northwest Territories market is referred to.

THE OPPORTUNITY

Based on current plans as related to us during the survey, we see little opportunity to add significant new capacity to western steel production, whether in B.C. or the Prairies. However, if the plans for the McKenzie Valley pipelines proceed, or the assorted plans for refineries and petro-chemical complexes are realised, we feel that they will almost certainly result in increased demand for Alberta foundries, and, by displacing Saskatchewan consumers, could create a need for a new Saskatchewan foundry.

The major areas of custom would seem to lie in mining and manufacturing activity.

NEW MARKETS

Within British Columbia, the provincial government is investigating the feasibility of railcar manufacture, and if this project proceeds, then a significant increase in local castings demand is anticipated.

Mr. A. G. MacLennan February 11, 1974

In the Prairies, and the Northwest Territories, a large increase in activity is forseen in oil, gas, and petro-chemicals, which is also expected to sharply increase demand for castings. However, in view of the political nature of the decisions involved, we feel it would be premature at this stage to predicate foundry expansion on the basis of the larger projects, particularly the McKenzie Valley Pipeline.

NEW MATERIALS

Large mining operations are currently conducting wear trials of Neoprene and rubber mill liners and lifter bars, imported from Sweden. If these materials prove to have longer life and equal efficiency, we feel that a significant decrease in requirements for manganese steel liners, which represents an important market for steel castings, is possible. Other mining operators spoke of steel fabrications and fibreglass as alternatives to castings, but saw little immediate threat of these items replacing steel castings.

AREAS OF CONCERN

The nature of the casting market in western Canada was that foundries tended to produce either large castings for the extractive industries, or smaller castings for manufacturing. Since the two markets appear to require quite different types of equipment, the target markets and capital equipment of any new facility would need to be carefully defined.

We take pleasure in submitting this report to you, and have enjoyed undertaking this assignment on your behalf.

Yours truly

Kates, Peat, Marwick & Co.

THE WESTERN CANADIAN MARKET FOR STEEL CASTINGS

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Under current economic conditions, and in light of the expansion plans currently anticipated or committed, we anticipate no requirement for additional steel jobbing capacity in B.C., even if the B.C. Railroad produces railcars in the Province, the feasibility of which is currently being investigated.

Similarly, under current economic conditions, we foresee a shortage of all types of steel in the Prairies amounting to 241-341 tons, which we strongly doubt could justify a new facility. Only a marginal expansion of one of the two major Prairies foundries could quickly alleviate this shortage. Alternatively, if the British Columbia practice of pouring steel and iron in the same facility were followed, 240 tons would represent a useful sales increment to any new iron foundry.

However, if any of the large projects currently being planned in Alberta or N.W.T. should proceed in 1974, significant new demands would be made on Alberta foundries, which could displace Saskatchewan buyers. In this eventuality, a small foundry in Saskatchewan might be justified, located in the Saskatoon area.

SPECIAL ASPECTS OF THE SHORTAGE

Considerations of the size of castings in the target market should not be overlooked. Any new foundry in Alberta would be wise to

investigate the possibility of producing large valve and pump bodies, and impellers, while a new Saskatchewan facility would probably be better advised to consider producing smaller castings in larger quantities. Few complaints were encountered as to the quality of castings except where they were to be used in high pressure applications.

THE OPPORTUNITY

Based on current plans as related to us during the survey, we see little opportunity to add significant new capacity to western steel production, either in B.C. or the Prairies. However, if the plans for the McKenzie Valley Pipelines proceed, or the assorted plans for refineries, and petro-chemical complexes, are realised, we feel that they will almost certainly result in increased demand for Alberta foundries, and, by displacing Saskatchewan consumers, could create a need for a new Saskatchewan foundry.

The major areas of custom would seem to lie in mining and manufacturing activity, but the advent of imported rubber liners and lifter bars may represent a real threat to traditional markets for manganese steel liners used in ore refining.

In the medium- to long-term, we feel sure that if the Canadian government proceeds with its plans to maximize domestic production of oil and gas, and if the parts can be purchased in Alberta, significant expansion of casting consumption lies ahead, particularly for the Prairies.

II - THE WESTERN CANADIAN MARKET FOR STEEL CASTINGS

INTRODUCTION

This report summarizes the results of a brief analysis of the western Canadian merket for steel castings, including mild or carbon steel, manganese steel, low alloy steel and high alloy steel, taken in broad perspective. The purpose of the study was:

- to determine the current market conditions throughout the West for steel
- to determine whether any obvious opportunities for economic development exist, and to give our impressions of the nature of these opportunities
- to serve as a promotional tool in approaching interested parties for DREE.

This report is intended to indicate where areas of promise lie, and not to analyze these areas of promise. Such analysis would necessarily be the subject of a more detailed study, having regard to specific types of steel, quality, volume, and weight per casting parameters.

Method of Approach

The study was undertaken in accordance with your requirements as set out in a letter from Mr. M. J. Brennan of your Regina office dated September 27, 1973, and our subsequent interpretation of these requirements, as outlined in our letter of proposal dated October 5, 1973, which was later accepted. Contact with the Department of Regional Economic Expansion was maintained during the course of the study by

Mr. Dotchin, these contacts being established with Mr. Hore, of the Western Task Force on Iron and Steel in Ottawa, and Mr. Brennan of the Regina office.

In assessing the supply side of the market, 10 of the 13 foundries pouring steel were visited personally, and the other three were telephoned because of the distance of the foundries concerned. In only one case was resistance encountered. For each foundry except Esco Ltd., a detailed, five page questionnaire (see Appendix A) was completed, which gave considerable detail of the operations of these foundries.

In determining the demand for casting products, a blanket telephone survey was conducted of 400 probable users, with a follow-up interview of those companies purchasing more than $200,000 of ferrous castings per year. In all, 36 detailed questionnaires were completed. A copy of this questionnaire is included in Appendix B.

Additionally, contact was made with the relevant departments of provincial governments, the Department of Industry, Trade & Commerce in Ottawa, the American Foundrymen's Society in Chicago, and the Steel Founder's Society of America in Cleveland, to verify, where possible, the aggregate figures obtained from direct interviews, and industry trends.

III - CONSUMPTION

GENERAL

The figures which quantify provincial demand are based on the interview program, and largely encompass the manufacturing and primary materials sectors. The primary materials sector encompasses cement manufacture, mineral extraction and refining, and timber based industries. Demand figures include western purchases made by CN/CP Railway systems, but are derived from supplying foundries rather than from the railways themselves because the railways could not estimate their purchases without considerable research. Such data will be supplied later, as it becomes available. Local railroad purchases are relatively small, with the majority of castings being purchased strictly on price from large eastern foundries, notably Dofasco and Canadian Steel Foundries. Since the railroad companies transport the castings themselves, F.O.B. factory price is critical and, in this respect, the eastern foundries have an undoubted advantage as confirmed by several western foundry operators. In addition, in selling castings to the railroads, problems such as licensing and patents, not to mention quality, are difficult to overcome.

In calculating incremental demand, we have asked consumers to estimate their additional requirements to 1973 purchases, based on the year-to-year forecasts of sales; on castings which they would buy, but cannot due to the current shortage; and current castings

imports which would be sourced locally if available. As far as possible, re-sourcing of castings purchased in other Prairie foundries to foundries in the same province was excluded from the figures for incremental demand. It should be noted that notwithstanding the relationship between recorded supply and recorded demand, the incremental demand figure represents an additional requirement for castings at the consumer level. We feel, therefore, that there is a reliable indicator of the need for extra capacity. The year-to-year sales increases, as a component of incremental demand, indicate expectations based on current business conditions, and could quickly be scaled back if a sudden downturn should occur.

We feel that the respondents' awareness of the client for whom this work was undertaken and their agreement with the need for such a study engendered a co-operative attitude among buyers. In very few cases was there less than wholehearted approval of the need for and aims of the fact-gathering.

Finally, the companies interviewed frequently supplied a dollar value for their casting purchases as opposed to a tonnage figure. In order to convert dollar values to tonnage, an average price of $975 per ton was applied to mild steel, $900 per ton to manganese steel, $1,250 per ton to low alloy steels, and $2,500 per ton to high alloy steels (including stainless).

HISTORICAL CONSUMPTION

Historical consumption data were not available from statistical sources, since the information is not gathered at the national or provincial levels. Any data relating to historical consumption would need to be gathered on a company-by-company basis, and most companies were plainly reluctant to devote the time necessary to gather such information from their records, with many refusing outright.

Statistical data available from the Federal Government relates to production figures which are detailed in Section IV as "Canadian Shipments of Steel Castings 1963-1972."

A breakdown of total steel production by geographic region is also given, but further details, in the form of geographic regional breakdowns by type of steel, are not available from Statistics Canada because of confidentiality requirements.

The Provincial Governments do not have comparable figures available for Provincial Production.

The interview data relating to 1973 production and the projected growth for 1974 and 1975 are more meaningful in assessing future production and in assessing the balance of supply and demand.

FIGURE 1

END USES OF STEEL CASTINGS RANKED
BY PERCENTAGE OF CONSUMPTION

(A) Carbon Steel

Railway Operating	39.18%
Railway Cars and Locomotives	18.65%
Exports	14.80%
Machinery and Tools	11.00%
Natural Resources and Extraction	9.45%
Automotive and Aircraft	3.00%
Miscellaneous	3.92%
	100.0%

(B) Alloy Steels (including Low Alloy, High Alloy + SS, Manganese)

Natural Resources and Extraction	49.13%
Machinery and Tools	11.88%
Construction	11.37%
Railway Cars and Locomotives	10.43%
Railway Operating	5.55%
Exports	4.34%
Miscellaneous	7.30%
	100.0%

FIGURE 2

CURRENT AND INCREMENTAL JOBBING STEEL CASTING DEMAND BY PROVINCE - 1973

PROVINCE	CURRENT DEMAND (TONS)				INCREMENTAL DEMAND (TONS)				
	MILD OR CARBON STEEL	LOW ALLOY	MANGANESE	HIGH ALLOY AND STAINLESS	MILD OR CARBON STEEL	LOW ALLOY	MANGANESE	HIGH ALLOY AND STAINLESS	TOTAL INCREMENT (TONS)
MANITOBA	193	67	1,225	19	1 Ton	-	-	-	1 Ton
SASKATCHEWAN	71	10	76	35	262 Tons	- + 100-200 Tons Unspecified	33 Tons	88 Tons	483-583
ALBERTA	1,140	10	282	46.0	315	87	-	167	569
TOTAL PRAIRIES:	1,404	87	1,583	100	578	87 + 100-200 Tons	33	255	1053-1153
BRITISH COLUMBIA	2,428	692 + 114 Tons (Est.)	2,259	180	420	88	251	38	797
TOTAL WEST	3,832	779 + 114 Tons (Est.)	3,842	280	998	175 +100-200 Tons	284	293	1850-1950

END USES OF STEEL CASTINGS

The end uses of steel castings, on a national basis, are listed in Figure 1, opposite, for both carbon or mild steel and alloy steels. These details are derived for 1972 from Statistics Canada publication 41-001, and it should be noted that railways and natural resource extraction industries account for 67% of carbon steel consumption and 65% of alloy steel consumption. Thus it would appear evident that, in the case of railways, a small number of very large customers exist, while with natural resource extraction, the consuming companies would tend to be smaller consumers, but well dispersed in relatively remote areas.

CHARACTERISTICS OF PROVINCIAL DEMAND

Current and incremental demand for steel castings by province are shown in Figure 2, opposite.

Manitoba

Mild steel is consumed in Manitoba primarily by the mining companies, with smaller amounts going to manufacturing industry. Mining accounts for 61% of jobbing mild steel consumption, with the remainder going to manufacturing industry. Low alloy steels appear to be consumed entirely by the mines, as are stainless and high alloy steels. Eighteen per cent of manganese steel appears to be consumed by the mines, and 82% by the railroads.

As a consequence of the very simple consumption pattern in the Province, the customers are fairly readily defined. The pattern consists of very large consumers with considerable geographic dispersal (the mines), and the remainder may be termed geographically intense (Winnipeg area), with several small consumers of mild, and three large consumers of manganese steel castings.

Three railroads appear to consume castings made locally. These are C.P.R., C.N.R. and B.C.R.R.

The major mines consuming castings are Inco Ltd., Thompson Mine, Sheritt-Gordon Mines, and Hudson's Bay Mining and Smelting.

The two major consumers in manufacturing industry appear to be Motor Coach Industries and National Products Ltd.

It is readily apparent that the mining companies largely dictate the production patterns for Manitoba demand, which tends to fall into a pattern of large, blanket orders given once yearly for regular deliveries of very heavy castings in small to medium quantities for use as liners. As such, quality requirements are largely visual, and abrasion resistance. The remaining purchases would tend to be used for inventories and emergency replacements for underground operating equipment, and mill items such as pump bodies, valve bodies, etc. These items are in the small to medium weight range, with a higher quality requirement, and very fast turnaround time. No fears of shortage were expressed, but increasing lead times were encountered.

The railroads may be termed sophisticated buyers of largely manganese castings in high volumes. Weights may vary considerably, as may quality requirements, but the real competition occurs on price, largely with eastern foundries pouring very large tonnages.

Large buyers in manufacturing industry are obtaining lead times of eight to ten weeks for simple castings in high volume, and up to 20 weeks for machine quality castings in high volume. Twenty weeks is considered unsatisfactory by buyers. The bulk of these castings for manufacturing industry weigh between 10 to 50 pounds for the large volume items, and one to twenty-five pounds for the small quantity items. Small buyers are encouraging lead times of six to nine months.

In conclusion, few major consumers were worried about shortages of castings although lead times were increasing. Small consumers were extremely concerned about long lead times, and were switching temporarily to fabrications as a result. Some expressions of need for new capacity were made, but not with any degree of real urgency or emphasis.

Of total steel demand of 1,504 tons located, 17% was for mild steel, four per cent was for low alloy steel, 81% was for manganese steel, and one per cent was for stainless steel castings.

Saskatchewan

The market characteristics of steel castings demand in Saskatchewan are almost entirely predicated by the demands of the mining industry, either in the guise of operating potash mines, machine shop servicing those mills, or in a few cases, Original Equipment Manufacturers

selling to the mines, with cement manufacture being the only significant deviation.

On this basis, mining (operating mines, services, and O.E.M. equipment manfuacturers) accounts for 70% of Saskatchewan mild steel consumption, 61% of manganese steel consumption, 100% of low alloy steel consumption, and 100% of high alloy and stainless steel consumption.

Of the total 192 tons of steel jobbing castings demand we located, 37% was for mild steel, 40% was for manganese steel, 5% was for low alloy, and 18% was for high alloy and stainless steels.

The major steel castings buyers in the province are:

- Inland Cement Ltd.
- Bird Machine Ltd.
- IMC Potash Ltd.
- PCA Potash Ltd.
- ABC Mfg. Ltd.

and they account for 64% of all steel castings purchased, by weight.

There are no foundries pouring steel castings in Saskatchewan, the required castings coming from Foothills Foundary in Alberta, Abex Foundary in Manitoba, and imports from the U.S.A. and the U.K. These castings generally fall into the heavier weight ranges with low quantities for the mine operators, and mine service establishments, but many of these castings must be of machine quality for replacement parts.

The mining machinery manufacturers purchase low to medium weight castings in small to medium quantities, with higher requirements for dimensional tolerence and hardness, but low requirements for visual inspection.

Buyers anticipate price rises of approximately 10% in 1974, with one respondent quoting 20%. Lead times quoted were two to three weeks for smaller castings in mild steel, while deliveries for large castings and for stainless steels, in some cases reach eight months. Deliveries for manganese steels were quoted at five to six months. In spite of these lead times, buyers generally express satisfaction with deliveries because advance scheduling is possible. However, they express dissatisfaction with delivery of imported castings.

Some temporary switching to forgings was noted, and some buyers felt that plastics and fibreglass were becoming a suitable substitution material for castings, particularly in mining applications of high abrasion or corrosion. However, the companies who saw a substitution by plastics were well aware of the resin shortage.

Most Saskatchewan companies looked to Alberta as the natural source of supply for Canadian steel castings.

Two significant areas of increased consumption were encountered in the province. ABC Mfg. of Canada Limited feels that if a source of stainless steel castings were found, it could purchase significant quantities on behalf of both itself and it's U.S. parent, while a new manufacturing venture in Saskatchewan could be a significant consumer of mild and alloy steels when established.

Alberta

The Alberta market for steel castings is highly geared to oilfield equipment and services, with cement manufacture, and other manufacturing industry being the secondary consumers.

Major consumers in the province are:

- FWI Canada Ltd.
- Stream-Flo Valves Ltd.
- Burnco Industries Ltd.
- Canada Cement Laforge Ltd.
- Barber Industries Ltd.

These five consumers account for 70% of all jobbing steel castings consumed in the province (by tonnage) in 1973, the total tonnage (excluding local purchases by local shops of CPR and CNR) amounting to 1,478 tons. Of this 1,478 tons, 77% is mild steel, 19% is manganese steel, three per cent is high alloy and stainless, and one per cent is low alloy steel.

Of the manganese steel purchased, 85% is consumed by the three cement manufacturers in the province.

As will be noted later, there are three foundries currently pouring steel castings in Alberta, of which the principal source is Foothills Foundry Division of Irving Industries.

The cement manufacturing sector purchases primarily manganese steel and high alloys, mainly in quantities of less than 100 pieces, and weights of more than 150 pounds per piece. Two companies report lead times of six to twelve weeks, which is considered satisfactory. while the other reports four to six months, which is not satisfactory.

Price rises of five to fifteen per cent are expected, and all three felt that service and quality was good, with the exception of delivery. The need for further steel foundries to increase competition was expressed. No trends to substitution were noted.

Manufacturing industry (other than pumps, valves, valve controls, and oilfield equipment) was composed mainly of agricultural equipment and special vehicles, and the bulk of the requirement was for mild steel castings of less than 50 pounds, in medium to large quantities. Most castings were of machine quality, with a high uniformity of product and quality necessary. Lead times varied from customer to customer, but fell in the range of one to three months, which was unacceptable for all but one manufacturer. The exception noted had delivery periods of six months, but this was satisfactory because advance scheduling was used.

Of the six companies contacted, three companies felt service was good considering the problems of raw material supply, two felt that deliveries were slow, and one stated that he could not obtain sufficient castings. Three felt that more steel foundry capacity was necessary.

Anticipated price rises of five to fifteen per cent were noted for 1974. Oilfield equipment and services, the remaining major area of steel castings demand, purchases primarily mild steel castings of below 150 pounds in weight, and in medium to small quantities per release.

Most castings are of machine quality, with a high uniformity requirement. Paradoxically, small users of castings are obtaining lead times of four to six weeks, while large users note lead times of two to six months. Fifty per cent of these consumers profess to be satisfied with this situation, while 50% are not. Fifty per cent are actively seeking new suppliers, and these are not necessarily the same people who express dissatisfaction with deliveries.

Again, 50% are satisfied with their suppliers, under current conditions, although constant expediting is necessary, while 50% feel that overall levels of service, particularly from Foothills foundry, is indifferent. All feel that additional steel capacity is necessary, and look for average price rises in 1974 of between seven to fifteen per cent.

Future demand will be increased if a new pulp mill in the province begins purchasing replacement parts from foundaries rather than from proprietary parts manufacturers, and if a local mine purchases manganese castings locally instead of importing. Additionally, development of the Athabasca Tar Sands is expected to significantly increase demand for valves, and hence steel castings, and the

construction of the many chemical processing complexes currently being discussed could have similar effects. The many current developments in oil, gas, and chemical activity within Alberta and the North West Territories are primarily political decisions, and an accurate assessment of the potential they would create for steel castings cannot be calculated with accuracy at this stage.

British Columbia

The British Columbia market for steel castings is composed primarily of mining operators and manufacturing industry, with a minor sector filled by cement manufacturing.

Major consumers of castings within the province are:

- Lornex Mines Ltd.
- Gibraltar Mines Ltd.
- Bingham Pump Ltd.
- Gearmatic Ltd.
- S. Madill Ltd.
- Brunette Machinery
- Kenworth Truck Ltd.
- Granduc Mines.

These eight consumers account for 81% of all steel jobbing castings purchased (that we were able to locate) in the province, the total identified being 5,673 tons, of which 43% was mild steel, 12% was low allow steel, 40% was manganese steel, and three per cent was

stainless or high alloy steel. Two per cent was unidentified. 90.3% of mild steel is consumed by the manufacturing sector, as is a significant proportion (60.8%) of the low alloy steels. Manganese steels are purchased primarily by the mining industry. Stainless steels are purchased mainly by manufacturing industry, with 75% of B.C. consumption.

The mining sector purchases primarily low quality (visually inspected only) castings in the heavy weight ranges, with small quantities per release. Delivery times vary widely according to supplier, and we have encountered delivery periods ranging from three to six months for manganese, to three to eighteen months for low alloy. Because these items are scheduled well in advance, these lead times are perfectly acceptable, except in emergency situations. General levels of service are felt to be adequate, and prices are competitive, but some evidence of concern about availability was evident, as many felt that new capacity was required. Price rises of 10% to 20% were anticipated.

A possible threat to the important market for manganese liners is apparent, with a number of mines experimenting with rubber and/or neoprene liners and lifter bars imported from Sweden. If these items prove to be longer wearing than manganese, and if they become readily available, then there is little doubt that some shrinkage of the market for liners can be expected, as replacement of a set of steel liners is costly in terms of labour and downtime.

The manufacturing sector purchases primarily mild and high alloy steels, largely under 100 pounds in unit weight, the major exception being Bingham pump, which purchases primarily in the heavier weight ranges. The valve and pump manufacturers order in small quantities of zero to fifty pieces per release, while the others appear to order large release quantities. Most small to medium purchasers quote lead times of two to four months, while very large purchasers quote four to eleven months, which figures are all considered unsatisfactory.

Because many of the castings in this sector must be machined, and pressure containing, the quality requirement is high; we received comments that B.C. foundries must upgrade the quality of their products.

Most buyers felt that general levels of service are adequate to good given current levels of demand, but that constant expediting was required and deliveries were a problem. Many stated that either additional capacity was required, or local foundries would need considerable modernization.

Forgings and fabrications were felt to be more competitive to castings, but few felt that they could utilize these processes to reduce casting purchases. One buyer felt that porosity was such a problem that he planned to switch from castings to components fully machined from bar stock.

Average price rises for 1974 of 10% to 15% were expected, although one manufacturer anticipated a 30% rise.

Only one significant new market for steel castings was noted, and this was the B.C. Government project to manufacture railcars in that province. Should this project proceed, a large requirement for steel castings would be generated, although problems are anticipated in price levels, patents and licenses for manufacture of parts , and quality.

No other significant new markets were discussed in B.C., but expansion by existing consumers is expected to lead to increasing demands on steel castings suppliers.

The Northwest Territories

Discussions with the Government of the Northwest Territories, Department of Industry, have elicited the information that there is no manufacturing industry within the Territory, the primary industry being mining.

The three principal mines are:

- Giant Yellowknife Mines Ltd.
- Cominco Mine, Yellowknife
- Cominco Mine, Pine Point.

The Department estimates that these three mines would purchase an aggregate of 150 tons of nickel cadmium steel per year, but we feel that supplies of liners have been overlooked. Whether or not this is true, the only effective consumer would be Giant Yellowknife Mine, because the two Cominco mines would almost certainly obtain their requirements from the Cominco captive foundry in Trail, B.C.

FUTURE MARKET GROWTH

The major consuming industries of steel castings are currently working at high levels of demand, with consequent high requirements for castings. But world economic conditions are currently extremely confusing, and are expected to have differing effects on the major steel castings consuming industries in Canada.

The Forest Based Industry

The forest based industry is here defined to include timber plus pulp and paper. The timber industry is strongly oriented to exports for construction purposes, important customers being the U.S.A. and Japan. With uncertain economic prospects in the United States, and very poor prospects in Japan, building activity in these two countries is rapidly declining, which is expected to result in decreased demand for timber, and hence decreasing levels of activity for timber exporters. It is therefore to be expected that activity levels of the Canadian timber industry will decline, and with it the demand for timber machinery. The timber machinery industry is an important consumer of castings, particularly in British Columbia.

A world shortage still appears to exist for paper, leading to increasing levels of activity within this industry in Canada, which is a significant exporter. We therefore anticipate that demand levels by this industry for castings will be maintained and even increased over the next 12 months.

Minerals and Mining

Reputable economists throughout the world have expressed contradictory opinions about the world economy over the last two months, with some foreseeing an economic depression, and others seeing merely a decreased rate of economic activity. If the consensus of these reports can be accepted, economic activity will decrease over the medium term, and with it the demand for metals. This would, in all probability, result in decreasing output from the mining sector, with consequent reduced throughput. The purchase of steel castings is thus also expected to decline in the medium term. Also, the current trials of rubber liners and lifter bars for processing machinery, if successful, could conceivably lead to a rapid decrease in the use of cast steels for mill liners, and we recommend therefore that close attention be paid to these trials by the foundry industry.

Railroads

Should demand for timber and minerals decline, then shipments, and hence railroad activity will decline also, and with it the replacement rate of wearing parts. This factor should only marginally effect western foundries, primarily Abex. However, the expressed intention of the British Columbia government to increase railroad services in that province as a means of opening up the interior, and the intention to contain the economic benefit of the expansion within B.C. by building railcars in the province, could lead to a significant increase in casting requirements locally if the railcar facility proceeds.

Oil, Gas and Chemicals

With the current energy crisis in North America, extensive plans are being made to decrease dependence on foriegn oil suppliers, with the consequence that serious consideration is being given to expansion of petrochemical plants, refineries, pipe lines for oil and gas, and tar sands exploitation. Any or all of these activities will increase demand for castings, and will be centred on Alberta. In the event that the McKenzie Valley pipelines are proceeded with, massive numbers of valves will be required, which in turn will require increased foundry capacity.

However, the decisions to proceed or not with such large ventures is largely political, and hence rational determination of future requirements is extremely difficult, because of the large element of uncertainty.

Increasing activity in the Athabasca Tar Sands is fairly certain, but the prime contractor for Syncrude has not as yet finalized the design, so that determination of incremental demand for castings to be used on the project is impossible.

Since some reputable journals now forsee a world oil surplus in 1975, even greater uncertainty should be attached to these schemes, except for the declared aim of self-sufficiency proclaimed by the Canadian and U.S. governments. On balance, we would anticipate future expansion will be necessary for those companies active in this sector of the economy, resulting in increasing need for castings.

IMPORTS

Statistical data relating to imports of steel castings by type of steel or by province of destination are not available from Provincial or Federal government agencies.

However, during the survey, large consumers were asked if they were importing steel castings, with the following results:

IMPORTS OF STEEL CASTINGS (TONS) 1973

	Mild Steel	Low Alloy Steel	Manganese Steel	High Alloy Steel	Total
Prairies	29	-	72	25	126
B.C.	72	2	2	12	88
TOTAL	101	2	74	37	214

These data have not been included in the tabulations of provincial supply, but are included in the discussion on "Balance of Supply vs Demand" in Section VI.

IV - PRODUCTION

Under current conditions, the four Prairie foundries pouring steel consider themselves to be very busy and, although they are not turning customers away nevertheless, have five to six month order backlogs. Lead times are increasing accordingly, and for those three foundries pouring steel exclusively, are in the range of 10 to 15 weeks for established customers.

Most of these foundries are encountering difficulty in obtaining labour and are also encountering escalating prices for scrap. However, only one of the four considered that scrap and labour were a serious constraint to growth.

Three of the four were planning to increase production in 1974, primarily by increasing efficiency, while one of these three was considering the possibility of a new foundry in 1975. We found little evidence of a serious commitment by these four Prairie foundries to augment productive capacity to a significant degree in 1974 or 1975, unless the expansion was well in hand. The plans expressed were very tentative, and we suspect that they would be shelved very promptly if business conditions revert to normal.

Only two of the four foundries expect to spend money in the near future on pollution controls, and none of these four appear to view pollution controls as cause for alarm.

In British Columbia, eight companies are currently pouring commercial steel castings, and of these, one refused to co-operate with the survey. Of the remaining seven, only two poured steel exclusively, the remaining five pouring iron as well. All considered themselves very busy, and reported a tight supply situation for both labour and raw materials. The larger steel foundries reported that shortage of steel castings was slight to non-existent, while these same operators felt that production could be rapidly increased if the small operators could overcome a reluctance to operate more than one shift.

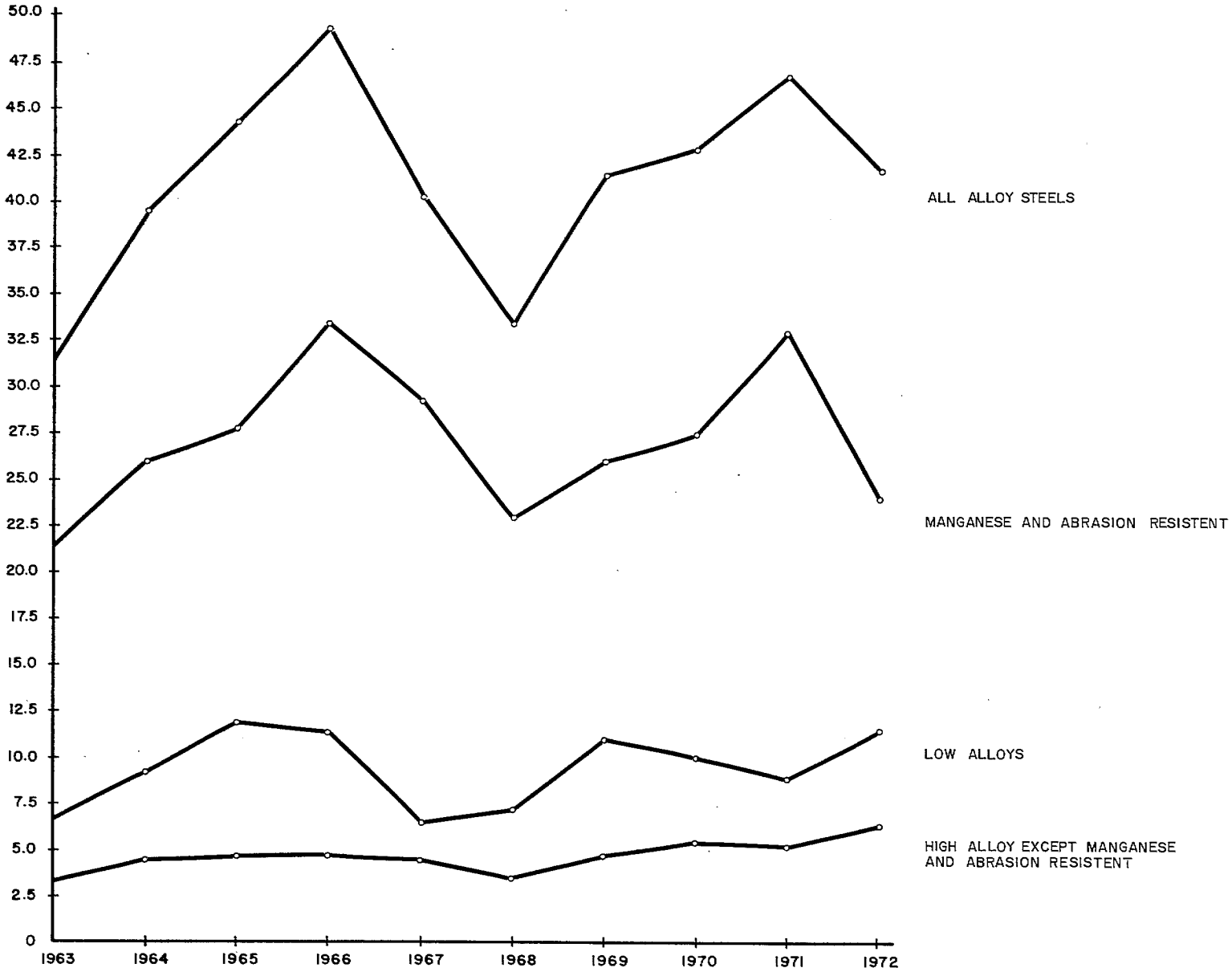
Four of the existing foundries were planning to augment productive capacity, and of these four, two planned major expansions. In addition, two local iron foundries were planning to pour steel castings in 1975 and, although one of these would represent a negligible increase in steel capacity, the other would be expected to have a significant impact if they do pour steel even though the tonnage planned was not divulged. In the latter case, the required equipment had been delivered but had yet to come on stream.

The degree of concern with pollution controls was much more serious in British Columbia than in the Prairies.

Most foundries gave current lead times of six to eight weeks on average, with only one quoting 15 to 20 weeks.

FIGURE 4

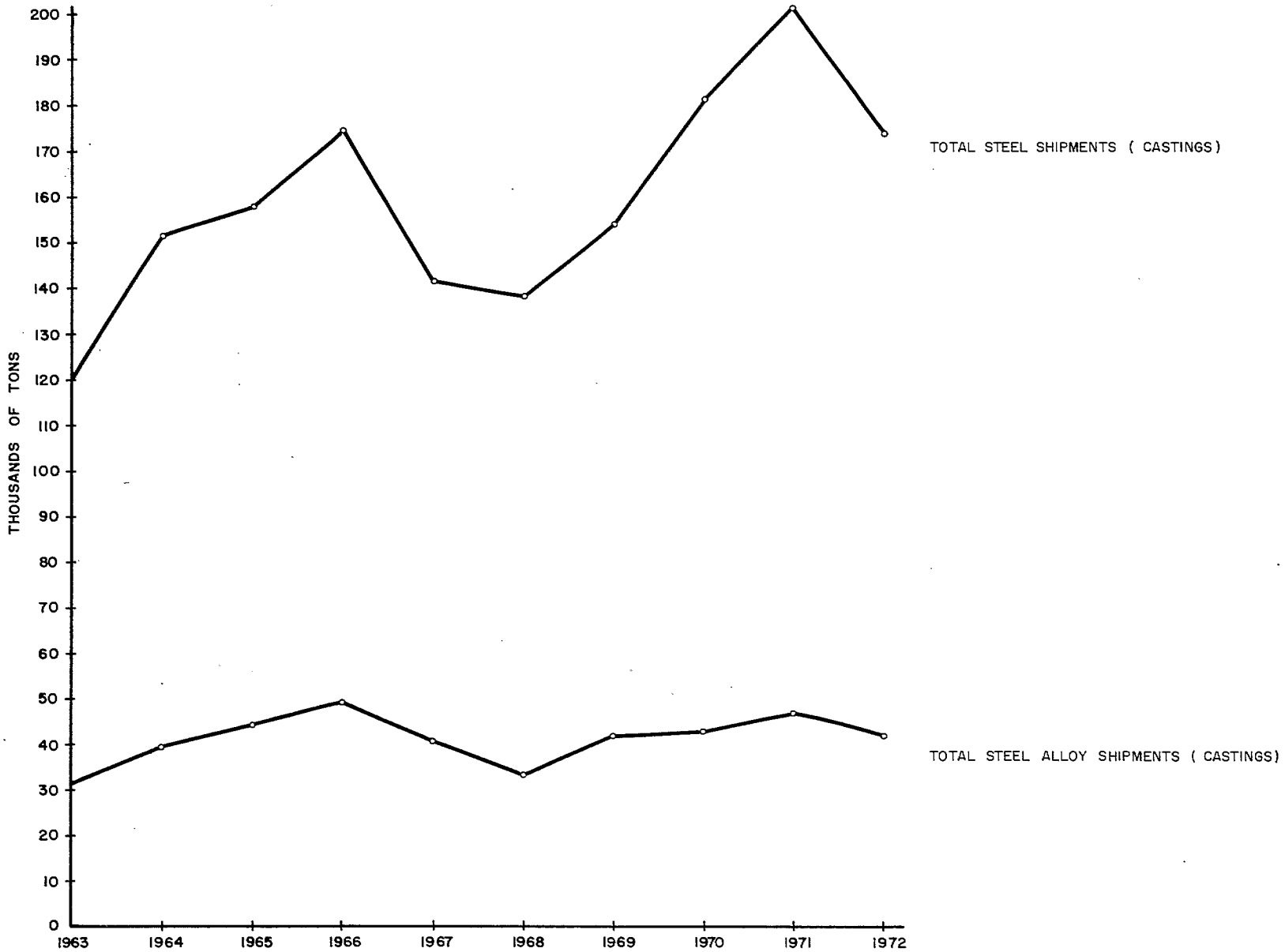
BREAKDOWN OF CANADIAN STEEL ALLOY CASTINGS SHIPMENTS (1963-1972)



SOURCE: STATISTICS CANADA 41-001

FIGURE 3

CANADIAN SHIPMENTS OF STEEL CASTINGS (1963-1972) SHOWING ALLOY STEELS (TONS)



SOURCE: STATISTICS CANADA 41-001

STATISTICAL DATA

From Statistics Canada 41-001, "Canadian Shipments of Steel Castings Showing Alloy Steels (1963-1972)" are detailed in Figure 3, opposite, and a further breakdown of alloy castings shipments is detailed in Figure 4, also opposite. These figures are tabulated on a national basis by the Federal Government, while individual provincial governments do not appear to keep comparable provincial data. Confidentiality requirements of Statistics Canada prevents release of provincial data except on a regional basis for total steel. A breakdown of this data on an East/West basis reveals that, of total steel castings shipped in Canada, Quebec and the Atlantic provinces contribute 42%, Ontario contributes 29.5%, and Western Canada contributes 28.5%.

From Figures 3 and 4, it would appear that the market for steel castings of all types is highly cyclic and, on this basis, one would expect 1973 to be worse than 1972. However, an analysis of production data (also in 41-001) as opposed to shipment data leads us to expect 1973 production will be greater than 1972 by 19.5% if the monthly production patterns of 1972 hold true. Expectations for 1974 are good, but we would hesitate to estimate levels of shipments because of the current uncertainty in world economic conditions, particularly as such conditions will vitally effect demands for metals, paper, timber and railway services. Canadian demand for steel castings

is dependent upon the health of producers of these items in Canada, and prospects for these producers were commented upon under "Future Market Growth" in Section III.

Nevertheless, on an historical basis, the markets for steels have grown as follows during the past 10 years:

	Total Growth	Average Annual Growth
Carbon Steel	46.4%	3.9%
Manganese and Abrasion Resistant	11.5%	1.1%
High Alloy except Manganese and Abrasion Resistant	84.6%	6.3%
Low and Other Alloys	72.3%	5.6%
TOTAL STEEL	42.7%	3.6%

Because a similar breakdown on a regional basis is not available from Statistics Canada, comparable growth figures are not available by metal for the West.

CORRELATION OF STATISTICAL DATA WITH SURVEY RESULTS

The Statistics Canada breakdown of data relating to total production of steel castings by region is based on information received from the following Western foundries:

Al Foundry - Vancouver, B.C.
Abex Ltd. - Selkirk, Manitoba
Cominco Foundry - Trail, B.C.
ESCO Ltd. - Port Coquitlam, B.C.
Foothills Foundry - Calgary, Alberta
Griffin Steel Foundry - Transcona, Manitoba
Reliance Foundry - Vancouver, B.C.
VMD - Victoria, B.C.
Western Canada Steel - Vancouver, B.C.

It should be noted that the above list does not include all foundries pouring steel in the West, but it does include three foundries which we have not interviewed in depth. These three are:

ESCO Ltd. - Port Coquitlam, B.C.
Griffin Steel Foundry - Transcona, Manitoba
Western Canada Steel - Vancouver, B.C.

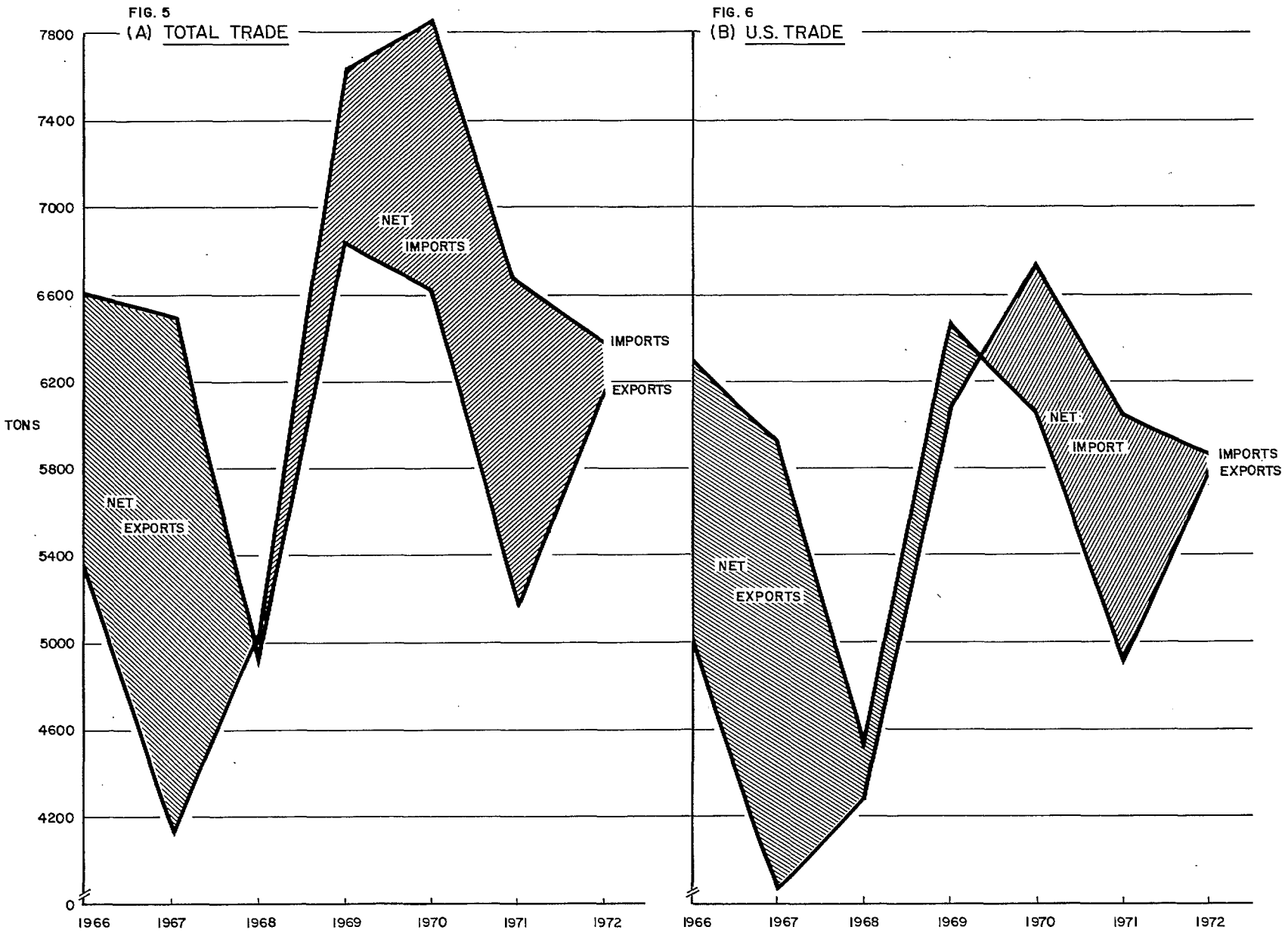
1. ESCO Ltd. declined to co-operate in our study, but did state that their output may be considered totally captive. We have since been advised by competitors and customers that as much as 10-50% of output may be in the jobbing sector, but the types of metal are not known. This uncertainty as to total and/or jobbing tonnage is to be regretted.

2. Griffin Steel Foundry is a very highly automated, totally captive, one-product foundry, producing railway wheels. They pour a significant volume of product tonnage, and the addition of the production of this foundry more than accounts for the apparent discrepancy between our figures and Statistics Canada figures for production.

   While Statistics Canada reports production of 49,443 Tons of Steel Castings in the West in 1972, our figures show that production is 18,348 Tons of Steel Castings, excluding Griffin. The output of Griffin Steel, when added, more than accounts for the discrepancy.

3. Western Canada Steel. The management of that company stated that the principal product of the foundry was

IMPORTS AND EXPORTS OF STEEL CASTINGS (TOTAL & U.S. TRADE) 1966 - 1972



SOURCE : Statistics Canada

> primary steel for rolling and that, although custom castings were sold, they were sold seldom, and were very large. The company tended to pour castings of a size no other foundry could pour, and the management did not seem to regard the company as a custom foundry at all. All custom castings were specials, and we retained the impression that they were poured more as a customer service effort for major customers rather than for any other reason.

As a result of the above noted sources of possible error, we feel it probable that Statistics Canada data slightly understates steel casting production, but that, on balance, we have provided a fair and objective accounting of the production of jobbing steel castings.

IMPORTS AND EXPORTS

Data regarding Canadian imports and exports of steel castings are shown opposite, Figure 5 for Total Trade, and Figure 6 for U.S. Trade. Further detail, in terms of type of steel imported and exported, is not available, although it would be possible, for a fee, to obtain a breakdown by province of total steel imports. However, as this would be based purely on Port of Entry rather than on Province of Destination, such figures would be of only marginal utility, and are not included. Moreover, because exports by province would not be available except on a regional level, and for total steel exports rather than by alloy types, they would also be of doubtful utility. Therefore, we have confined the Statistical Data to the national level, although comment on the figures derived from the survey are included.

The figures for total trade and U.S. trade are depicted graphically in Figures 5 and 6 on identical scales and, by visual comparison, it is readily apparent that the preponderance of our foreign trade in steel castings is with the United States, as would be expected when transportation costs are taken into account.

It is moreover interesting to note that Canada was a net exporter of castings until 1968 in total trade, and until 1969 in U.S. trade, becoming a net importer in both total and U.S. trade after these dates. Exports increased sharply from 1971 to 1972 for both total and U.S. trade, while imports continued to decline, narrowing the trading gap in terms of tonnage to a negligible amount. We feel sure that the improvement in the trading picture so far as the national economy was concerned was due largely to currency realignments, but we also feel that the strength of U.S. domestic demand in the last three quarters of 1973 should lead to the continued reduction of exports, especially as the booming U.S. domestic demand coincides with a heavy rate of U.S. foundry closures due to the dual effects of the Occupational and Safety Health Act and the Environmental Protection Act. We further feel that the attrition due to the stringent enforcement of these acts will continue in 1974, but that such attrition may lessen in 1975 because of relaxation in the enforcement which commenced in late 1973. This relaxation was due to the joint pressures of the energy crisis and the

knowledge that, in some cases, the stringency of the EPA requirements and enforcement were proving very damaging to the foundry industry in particular, and hence seriously affecting the productive ability of secondary manufacturers utilizing castings.

We therefore feel it possible that Canada may become a net exporter of castings again within the next two years.

SURVEY RESULTS

In examining and tabulating the survey results, it should be remembered that 7 of the 11 western steel foundries interviewed pour iron as well as steel, usually from the same melting facilities. Therefore, with a few exceptions, the proportions of steel and iron can be changed at will to react to changing circumstances. The same is largely true of the proportions of jobbing and captive work undertaken. Most jobbing foundries would obtain a higher price for their branded products where a market exists, and they will thus tend to maximize captive production.

The results reflect, therefore, the answers given by foundry owners, operators, or managers under current conditions and because of the shortage throughout the West, we feel here also that enlightened self-interest has encouraged an enthusiastic response.

Because there are only four foundries pouring steel, and because the Prairies may be regarded as a regional rather than three

provincial markets, we will discuss it only on that basis.

The Prairies

The four foundries pouring steel in the Prairies are as follows:

Abex Foundry - Selkirk, Manitoba
Foothills Foundry - Calgary, Alberta
Norwood Foundry - Edmonton, Alberta
Quality Steel Foundry - Edmonton, Alberta

Of these, Norwood Foundry is primarily a producer of iron castings, pouring a very small amount of stainless steel. The market for this stainless steel is unspecified, but it is ordered in very small quantities (primarily one off) and is sold as custom castings rather than captive production. It contributes less than 10% of the jobbing stainless produced in the Prairies.

Abex Foundry pours both alloy irons and steel castings, but less than 25% of production is iron. Steel production covers the range of steel types, with less than 50% of total production sold in Manitoba, and more than 25% leaving the West, including exports.

Manganese steel is the major product of the foundry, accounting for more than 50% of production, and it is sold primarily to the railroad and the mineral extraction industries, with less than 25% of total steel sales destined for manufacturing industry.

A minor amount of mild steel and high alloy steels is used internally, while some items of manganese steel are manufactured and sold as branded products, which are taken into inventories and sold as off-the-shelf items.

Abex contributes roughly 60% to the jobbing steel casting production of the Prairies and, if Esco is not included, contributes 32% to the total West. It covers the entire weight range in producing mild steel, while stainless castings tend to be very light, and manganese castings tend to fall in the heavier weight ranges.

Foothills Foundry in Calgary accounts for approximately 30% of the total steel casting jobbing production in the Prairies, or some 16% to the total West if Esco is again excluded. The company pours the range of steel types, but the majority of steel poured is mild or low alloy, with lesser amounts of manganese and stainless. Mild steel is poured in small to medium size runs, while low alloy steel is poured in either very small or medium-large production quantities. Stainless and manganese are all in short runs. All steels are produced up to all but the very heaviest weight ranges, the effective maximum casting weight being two tons. The company appears to have important customers in manufacturing industries, as well as in logging, mining, and oil. More than 50% of production remains in the Prairies, the remainder being sold in B.C. and Eastern provinces.

Quality Steel Foundry accounts for the remainder of the non-stainless steels poured, supplying Alberta manufacturers and oil field companies with the full range of steel types. The company appears to be highly flexible in terms of quantities and unit weights and has grown strongly (300%) in terms of floor space since 1969. Current utilization of capacity is very low, the proprietor feeling the supply of labour and raw materials is restricting growth and utilization.

As a consequence of the low utilization, lead times are currently quoted as one week by the proprietor and little new capital investment is envisaged.

Prairie Overview

The two largest foundries report bouyant demand for their product with order books filled for approximately five to six months, although these foundries do not appear to view themselves as fully stretched. The two smaller foundries are not nearly so busy in terms of capacity utilization, with constraints due to labour and raw material availability.

Abex is clearly the largest foundry, pouring in excess of 3,000 net tons, with Foothills pouring more than 1,000 net tons. Quality Steel pours less than 1,000 tons, and Norwood pours less than 100 tons.

The Region exports a negligible amount of steel castings, and these are confined to High Alloys and Stainless. However a significant proportion of the castings produced are shipped out

the province of origination, amounting to a full 50%.

Ability to supply local demand is not as yet exhausted in terms of tonnage, but we feel the availability of castings is probably heavily weighted towards castings for the mineral and extractive sectors with little spare capacity to supply secondary manufacturing industry. Any new manufacturing industry utilizing significant volumes of steel castings would encounter great difficulty in obtaining adequate supplies, in the light of current plans for expansion.

The situation could be alleviated if out of region shipments were reduced, but we feel this would be unlikely under current conditions.

British Columbia

Eight foundries were pouring steel castings in British Columbia at the time of the survey, the largest being Esco, Al, and CAE. Esco claimed to be producing castings only as captive tonnage, but differing opinions were encountered from competitors in this respect. As it is also clearly the largest steel foundry, their unwillingness to co-operate must be regretted. If, however, we take the claim at face value, and accept published data as given, they appear to be producing some 5,000 tons annually of finished castings, for sale throughout the West, with an important amount of their business directed to the extractive raw material industries for manganese and high alloys.

Al foundry is the next largest, apparently producing close to 2,000 tons of jobbing castings for the Forestry and Manufacturing Industries. Approximately 75% of production remains in the West, the remainder going to Eastern Canada and exports. The production pattern is geared primarily to small quantity, light weight castings, of varying quality requirements. With more than 50% of production sold to manufacturing industry, the company is very busy, and lead times are becoming extended.

CAE foundry produces in excess of 1,000 tons of finished jobbing steel castings, of which a large proportion is mild steel. Their production is highly geared to manufacturing industry, and covers the spectrum of the weight range, but with the preponderance falling between 1-500 lbs. per peice. Almost the entire production falls into the small quantity configuration. The company enjoys the highest reputation in the province for quality, but also has the highest price and longest deliveries. Only 10% of production appears to leave the Western region.

The remaining major steel foundry is Reliance Foundry, which produces in excess of 750 tons of jobbing steel castings. This company sells primarily to the Mining and Logging Industries, with less than 33% going to manufacturing industry.

Manganese and Mild Steel castings are poured in quantities evenly spread over the entire range, and weight per casting is less than 50 lbs. in the majority of cases.

Low Alloy and Stainless Castings are entirely in the low quantity ranges, with an even weight distribution for low alloy,

and a heavy weight per casting configuration in Stainless.

The company serves primarily the British Columbia market, and is producing at maximum levels, in spite of very short delivery periods. However, as the company is still accepting orders on a selective basis, we assume that more production is possible by shift-work.

The remaining British Columbia foundries pouring steel for the jobbing market are Cominco, Letson and Burpee, Victoria Machinery Depot, and Highland Foundry. Two produce less than 400 tons of jobbing castings, and two produce less than 200 tons.

Of these, Cominco produces a full range of steels, but primarily carbon and low alloy in the medium to heavy weight ranges, for the mining and chemical industries of British Columbia.

Victoria Machinery Depot produces Mild and Alloy Steels in the heaviest weight ranges for the Forestry and Shipbuilding Industries of British Columbia, and Highland Foundry produces the entire range of steels, but primarily Stainless and Manganese in light weight, low quantity configurations. All products of both are consumed within British Columbia. Letson and Burpee produce only Mild and Low Alloy steels of small quantity and light weight for resource and special vehicle manufacturing industries within British Columbia.

None of these foundries quoted lead times of more than ten weeks, and the shortest lead time quoted was three weeks. In general, the castings produced would not need to meet pressure

requirements so far as quality is concerned.

British Columbia Overview

The larger foundries consider themselves very busy, with buoyant demand and increasing lead time, but with available capacity for new orders.

The preponderance of castings produced would be considered of medium quality, with castings of very high quality being produced by CAE.

Exports from the region are negligible, as are shipments of castings out of British Columbia, which amount to some 13% of total production. CAE and Al are the primary suppliers of jobbing castings to out-of-province buyers.

Ability to supply local production is good, but the market for pressure type castings of high quality is currently restricted by high prices and some potential exists in this sector. However, as will be discussed later, a number of local foundries currently pouring steel are seriously considering expansion, and a local iron foundry is also considering pouring steel castings.

Due to the high prices of both raw materials and labour, the British Columbia market for castings has tended to be a discrete market within the Canadian economy, largely served by local, and Northwestern United States foundries. The high attrition rate of these United States foundries due to OSHA and EPA legislation has encouraged local foundries to expand and to actively seek United States business, and also to expand to meet local demand which

is being increasingly cut off from traditional United States suppliers.

METHOD OF MARKETING

In all foundries contacted, jobbing output of steel castings is sold directly to the consuming company. Many foundries do not employ salesmen and rely on the personal efforts of senior management wherever sales efforts are needed. Under current market conditions, such effort is not required.

Only in the sale of captive production were other sales methods encountered. In this case, direct selling, commission agents, and stocking distributors are all methods utilized. ESCO appears to have been particularly successful in marketing to the mining industries by means of a professional sales force, branded products, and a volume discount pricing strategy which has successfully restricted sales of independent competitors.

V - RAW MATERIAL SUPPLY

PRODUCTION INPUTS

Scrap & Pig

In the majority of foundries visited, the real constraints on increased productivity, indeed on total production, are equipment and capacity rather than raw materials. Nevertheless, all foundries reported escalating costs of raw materials, and scarcity of labour.

Scrap is very expensive throughout the West, in some cases approaching the cost of pig iron. Prices ranged from about $64 per ton in Manitoba to about $72 per ton in British Columbia in November, and pig iron has also begun rising in price. Since availability is also tight, foundry operators have little choice but to pay the price and pass on the cost.

With scrap price levels now approaching those for pig iron, substitution is occurring in some cases. However, pig iron as a solution to scrap shortage is of little use because within the last four weeks, a major pig iron supplier has placed his accounts on allocation.

Labour

Another area of short and long term concern is labour. There can be little doubt that a foundry is a dirty work environment, and is demanding in terms of strength and skill. The effect of increased

welfare and unemployment benefits on foundries has been a scarcity of skilled, reliable labour in spite of high levels of unemployment. Turnover is extremely high, and appears to be increasing.

There is also no doubt that the higher educational levels, and higher expectations for a work environment have severely shrunk the pool of labour willing to enter the foundry industry. The effects of this shrinkage are expected to impair the operations of foundries on a continuing basis, particularly if they are not modernized. The only apparent alternative is mechanization, which we would expect to impair the flexibility of small foundries, and to restrict the future supply of skilled foundry personnel. The current very small number of apprentices entering the industry is giving rise to serious concern over the long term availability of skilled labour, particularly in British Columbia.

COMPETITIVE MATERIALS AND PROCESSES

The long term effects of the current labour and raw material problems, and the continuing demand for steel castings are expected, over the long run, to increase the size of a minimum economic order to accomodate increasing mechanization.

In the short term, the situation is causing some temporary switching to competitive materials and processes, particularly fabrication and forging. This switching is held to a minimum by the concurrent price rises of steel products, labour costs associated with welding, and the lack of competent forging facilities in the West. One company

interviewed was importing forgings from Texas to Alberta, because where extensive machining was contemplated, there was little doubt of the superiority of forgings in view of the quality problems, particularly porosity, encountered with locally produced castings. While no consumers reported that orders were refused, most reported extended lead times and general dissatisfaction with delivery. In addition, the previously noted trials of rubber liners and lifter bars may represent a long-term threat.

In conclusion, we feel that switching to other materials and processes is a temporary phenomenon, engendered purely by high prices and extended deliveries of castings. In general, those people currently using castings feel that they are the best material for the designed use, and will continue to be so. In the longer term, however, we foresee that, where small quantities are envisaged, increasing mechanization will force the substitution of castings with fabrications.

VI - BALANCE OF DEMAND VS SUPPLY OF JOBBING CASTINGS

In all western provinces, those foundries pouring steel exclusively (as opposed to steel and iron) tended to regard all types of steel as within their range of capability, that is, they poured mild steel, manganese steel, low alloy steel and high alloy steels from the same facilities as part of their normal line of business.

Only three foundries did not pour the complete range of steels, and those three poured iron as well as steel.

Accordingly, in our analysis of supply vs demand, we will consider the resulting difference in total as justification (or not) for a foundry, rather than on the basis of individual types of steel, even though we discuss the balance for each individual type.

As a necessary prelude to determining the balance of supply and demand in the west, we must determine the regional supply of jobbing castings by type of steel. For this purpose, we define regional supply as indicated jobbing tonnage poured minus exports of jobbing castings minus jobbing castings shipped out of province of origin and intra-regional shipments. Since we have previously isolated jobbing castings from captive castings in export tonnages and out of province shipments, no arbitrary percentage of the quoted figure need be taken to estimate jobbing shipments.

FIGURE 9

BALANCE OF DEMAND VS. SUPPLY - STEEL CASTINGS

Type of Steel	Area	Current Demand	Incremental Demand	Expected 1974 Total Demand	Current Indigenous Supply	Inter-Provincial Shipments	Total Area Supply
Mild or Carbon Steel	Prairies	1,404	578	1,982	701	296	997
	B.C.	2,428	420	2,848	2,058	160	2,218
	Total West:	3,832	998	4,830	2,759	456	3,215
Low Alloy	Prairies	87	87	174	529	199	728
	B.C.	692	88	780	571	143	714
	Total West:	779	175	954	1,100	342	1,442
Manganese	Prairies	1,583	33	1,616	1,023	560	1,583
	B.C.	2,259	251	2,510	458	285	743
	Total West:	3,842	284	4,126	1,481	845	2,326
High Alloy And Stainless	Prairies	100	255	355	239	165	404
	B.C.	180	38	218	328	82	410
	Total West:	280	293	573	567	247	814
Total West All Steels:		8,733	1,750	10,483	5,907	1,890	7,797

FIGURE 8

WESTERN REGIONAL SUPPLY OF STEEL CASTINGS BY TYPE

	Indicated Jobbing Tonnage Poured 1973				− Exports of Jobbing Castings				= Tonnage Retained In Canada				− Jobbing Castings Shipped Out Of Province of Origin				= Remainder Of Jobbing Castings				+ Intra-Regional Shipments				= Regional Supply Of Jobbing Castings			
	Mild	Mang.	Low Alloy	High Alloy & SS	Mild	Mang.	Low Alloy	High Alloy & SS	Mild	Mang.	Low Alloy	High Alloy & SS	Mild	Mang.	Low Alloy	High Alloy & SS	Mild	Mang.	Low Alloy	High Alloy & SS	Mild	Mang.	Low Alloy	High Alloy & SS	Mild	Mang.	Low Alloy	High Alloy & SS
British Columbia	2,383	571	771	376	48	22	23	6	2,335	549	688	370	277	91	117	42	2,058	458	571	328	160	285	143	82	2,218	743	714	410
Prairies	1,153	2,361	939	687	-	-	-	96	1,153	2,361	939	591	452	1,338	410	352	701	1,023	529	239	296	560	199	165	997	1,583	728	404
Total West	3,536	2,932	1,650	1,063	48	22	23	102	3,488	2,910	1,627	961	729	1,429	527	394	2,759	1,481	1,100	567	456	845	342	247	3,215	2,326	1,442	814

FIGURE 7

WESTERN STEEL FOUNDRY PRODUCTION BY PROVINCE & DESTINATION (TONS) PROVINCE

Region Or Province	Total Gross Tonnage At Capacity	Total Net Tonnage In 1973	Jobbing Tonnage				Captive Tonnage				Exports of Jobbing Castings				Out of Province Shipments of Jobbing Castings			
			Mild	Mang.	Low Alloy	High Alloy & SS	Mild	Mang.	Low Alloy	High Alloy & SS	Mild	Mang.	Low Alloy	High Alloy & SS	Mild	Mang.	Low Alloy	High Alloy & SS
British Columbia	26,860	11,683	2,383	571	711	376	987	347	344	97	48	22	23	6	277	91	117	42
				+ 144 unspecified			+ 5,720 unspecified											
Prairies	16,475	5,900	1,153	2,361	939	687	110	551	-	100	-	-	-	96	452	1,338	410	352
Total West	43,335	17,583	3,536	2,932	1,650	1,063	1,097	898	344	197	48	22	23	102	729	1,429	527	394
				+ 144 unspecified			+ 5,720 unspecified											

The resulting data are shown in Figures 7 and 8, opposite. In eliminating interprovincial shipments to calculate "Remainder of Jobbing Castings", we have derived a value which may be compared with net jobbing tonnage to assess regional self-sufficiency. However, in determining the need for new facilities, the aggregate value of "Regional Supply of Jobbing Castings" must include interprovincial shipments in words in order to gauge the Canadian tonnage available within the market.

The figures quoted for demand in most cases include imports, which will be considered as contributing to the size of the imbalance of supply vs demand. The justification for this step is that in assessing the need for new capacity, imports should be substituted by locally produced product as far as possible, and hence the import tonnage represents potential demand for local foundries.

Having derived Prairie, B.C., and total western supply, we may, with reference to Figure 1, "Current and Incremental Demand", compute expected 1974 demand on the basis of the expressed requirements of regional industry, and relate such demand to expected tonnage available in 1974, assuming expected levels of operations for both consumers and producers are attained.

This comparison of current demand and current supply by type of steel, with imports included in consumption but excluded from production is detailed opposite in Figure 9.

We feel it prudent to note that while our interview program was exhaustive in terms of manufacturing industry, only the principal companies producing primary materials were interviewed, and we therefore feel it possible that demand may be understated by 10%. However, we feel certain that our data relating to production is accurate, subject to the estimating abilities of the foundry operators.

THE RATIONALE FOR ESTABLISHING NEED

In determining the need or otherwise for new or expanded production facilities, we have worked on the assumption that unless demand exceeds supply, then additional capacity is unnecessary.

However, the point could be justifiably made that if demand equals supply, then an effective shortage will exist, because inevitably some foundry productive capacity will not be equipped to produce castings of the required configuration, and that if demand only equals supply, that would be justification enough for a new small foundry. However, an implicit assumption of the latter argument is that all foundries are working at their effective capacity, whether the constraints be labour, space, melting capacity, moulding capacity, or raw materials. Such is clearly not the case in western foundries, and we consequently feel that our rationale is justified.

CASTING SIZE CONSIDERATIONS

The problems of casting size must be carefully considered in the context of western steel foundries, because a large sector of the market (notably mill liners) requires large heavy castings, while the remaining sector would require much smaller castings. This represents a considerable problem in selecting equipment for a foundry if both markets are to be served, particularly in B.C. We would therefore recommend serious consideration be given to this problem by any putative investor, with particular reference to the target market of the foundry.

THE PRAIRIES

Figure 9 shows that under current levels and configurations of supply, and anticipated levels of demand in 1974, a shortage of 985 tons of mild steel, a surplus of 554 tons of low alloy steel, a shortage of 33 tons of manganese steel, and a surplus of 49 tons of high alloy and stainless steels will exist, to give a total shortage in all types of steel amounting to 515-615 tons, when an unspecified increment of 100-200 tons is added. If the 126 tons of known imports are added to this figure, to give some indication of potential market for a new foundry, the total becomes 641-741 tons. But we anticipate that an extra 400 tons will be produced in 1974 over 1973 levels, so that the effective market available for a new facility would be only 241-341 tons under prevailing conditions. Thus, if current conditions pertain

for 1974, we can foresee no economic justification for a new foundry, unless the steel could be poured in some new iron foundry.

However, the effective caveat is "current anticipation of 1974 demand". We feel it entirely possible that the Prairies would not be affected by any possible downturn in economic activity nationally, and indeed may rise to even higher levels of business activity as the pressure of oil exploitation and exploration increases. In such a case, the increase of business levels for 1974 over 1973 could be measured as a percentage and applied to the level of casting demand in 1973. This in turn would permit a new measurement of demand with which to compare level of supply and hence determine the new tonnage required. Again, this would permit some detailed feasibility studies to be made, if the required foundry size is determined.

In the event that the McKenzie Valley Pipeline is approved, then the Alberta and NWT economies can be expected to boom. In addition, once purchasing commences for the Syncrude project, demand for castings could increase substantially, if local suppliers can win supply contracts. Many other projects are currently under consideration in Alberta such as refineries, chemical plants, etc. which could boost local consumption. If this should occur, we anticipate that Saskatchewan consumers may encounter real difficulty in procuring sufficient steel castings, and this could justify a new steel foundry, particularly in the Saskatoon area.

However, if a competent local iron foundry could also acquire the expertise to pour steel castings, it could build up significant local volume as well as forstall the problem.

Few complaints were voiced in the Prairies concerning quality. However, any facility which desired to cater to this market would be wise to consider carefully not only the size factor of castings (as discussed previously) but also the quality aspects of it's target market. These problems could be minimized in Saskatchewan because the consuming companies are all primarily in different aspects of the same industry.

BRITISH COLUMBIA

Before proceeding to discuss the balance of supply and demand in British Columbia, we feel that we should reiterate the unfortunate effect that the non co-operation of Esco Ltd. has had on the survey in that province. If their net product amounts, as we assume, to approximately 5,000 tons, then the percentage of jobbing work included in that tonnage is very significant in the light of our results. We have been informed by competitors of Esco that the percentage of jobbing castings poured by that company could range anywhere from 10% to 50% of total production, and taken at the minimum, B.C. would have an indicated shortfall of castings. However, if taken at the maximum B.C. would have a surplus. Moreover, the method of marketing pursued is also significant, because if mill liners are defined as a captive product, the tonnage is applied to an area of demand which we have defined as jobbing. Clearly

then, foundry expansions, or new foundry capacity serving this area of the steel market would require more detailed investigation.

Again, even if the survey missed 10% of demand, the same discrepancy will hold true in respect of a surplus or a shortage dependent on the jobbing input of Esco Ltd. into the B.C. market.

However, based on Figure 9, British Columbia will have anticipated shortages against expected 1974 demand of 630 tons of mild steel, 66 tons of low alloy steel, and 1,767 tons of manganese steel. A surplus of 192 tons of high alloy and stainless steels is expected. The net effect will be a shortage of 2,271 tons of all types of steel, to which should be added 114 tons of unspecified demand to give a new total of 2,385 tons. If the 88 tons of imports we identified are added, the shortfall is 2,473 tons.

We anticipate that increases of 3,900 tons could be phased in over 1974, so that clearly, little justification exists for a new facility if not already committed, because the planned increases will be more than adequate to cope with current expectations of 1974 demand (though dislocations of supply will occur until these expansions come on stream). Indeed, if Esco produces significant jobbing tonnage, it is highly likely that interprovincial shipments and exports will need to be sharply increased to utilize the new capacity, unless B.C. Rail proceeds (during the course of 1974-1975) with it's plan to construct railcars in B.C.

As discussed previously, the size factor of foundry production must be carefully planned in B.C.

VII - EXPANSION PLANS

The Prairies

Of the four foundries located in the Prairies, most are planning to increase production, as required, by increases in efficiency. Abex has stated that it entertains no current plans for facility expansion, while Norwood expects additional throughput by increased moulding efficiency.

Quality Steel Foundry has recently enhanced melting capacity, as has Foothills, and these alterations are expected to increase Prairie productive capacity by some 400 tons in 1974.

In addition, one of the existing foundries is considering the establishment of a new foundry to pour very large steel castings, but has been investigating the possibility for some considerable period, apparently without commitment. At this stage, we attach little probability to an early move on the part of this foundry.

Additionally, two local consumers of castings are giving some consideration to establishing their own foundries as a means of guaranteeing adequate supply. Of these two, one lacks credibility because of the newness of the enterprise (in spite of powerful backing) and the other does not appear to have proceeded past the initial feasibility study stage.

Therefore, apart from the aforementioned increases in melting capacity, which appear to be on stream now, little firm commitment for major expansion is evident.

British Columbia

Of the seven foundries which co-operated with the survey in B.C., only two appear not to be planning expansion, with the other five planning expansion ranging from minimal efficiency improvements to new foundries.

Additionally, three iron foundries were giving consideration to pouring steel, primarily by utilizing planned or ordered new melting equipment.

The Cominco foundry at Trail, which until recently poured purely for Cominco internal demand, has now entered the jobbing market, and at the same time has commenced expanding production. It expects to increase its penetration in the jobbing market, with the increase in capacity primarily utilized for that purpose.

Two major steel foundries are known to be considering major expansions, with, in one case, a new facility under active consideration. In both cases, should they come to fruition, a major increase in net tonnage poured for the whole province is anticipated.

On the basis of the plans expressed to us at the interviews, we feel it probable that up to 3,900 tons of extra jobbing net tonnage

capacity could be added to existing capacity over the next two years by existing steel foundries, and the three iron foundries now giving consideration to pouring mild steel could increase that figure.

However, since the time that the interviews were made, a major iron foundry considering pouring steel appears to have modified this intention in the light of strong demand for iron castings. We feel that so long as current demand levels persist, this foundry will continue to pour iron rather than steel, but that when iron demand decreases, steel will be introduced to the range of products.

Also, one of the smaller steel foundries and one of the smaller iron foundries are considering increases of steel production from new facilities, but neither were able to be specific about tonnages.

The outside possibility exists that one of the local large consumers could erect a foundry for largely captive production. We feel that this probability is fairly remote, unless the local supply situation deteriorates badly, which we feel is unlikely.

It is felt that much of the increased capacity will be destined for manufacturing industry, and this implies castings in medium to large quantities. It should be noted that all companies concerned appear financially sound, technically competent, and well able to undertake the planned expansion if they so decide, whether they are currently consumers or foundries.

We conclude that current expansion plans are more than adequate to meet expected demand in the light of current knowledge, which of course excludes Esco Limited, it's production, and it's future plans.

APPENDIX A

FOUNDRY QUESTIONNAIRE

FOUNDRY QUESTIONNAIRE

1. What types of metal do you pour?

   What tonnages at capacity?

   How do you see these changing in 1974 and 1975?

   By what percent?

2. What types of steel do you pour, and what % of total steel production is each?

3. What types of iron do you pour, and what % of total iron production is each?

4. By type, what is the price range of each?

5. By type, what production quantities do you pour?

		0-50	50-100	100-500	500-1,000	1,000+
Iron	(1)					
	(2)					
Steel	(1)					
	(2)					
	(3)					
	(4)					

6. By type, what weights do you pour?

		0-10lb.	10-25lb.	25-50lb.	50-150lb.	150+lb.
Iron	(1)					
	(2)					

6. (Continued)

	0-10lb.	10-25lb.	25-50lb.	50-150lb.	150+lb.
Steel (1)					
(2)					
(3)					
(4)					

7. By type, what percentage of capacity is jobbing, and which captive?

8. By type, what is the maximum flask size you could utilize?

9. What is the weight of the heaviest casting you could comfortably pour?

10. Would you say that business is (a) Poor (b) Fair (c) Average (d) Good (e) Couldn t be better.

11. Have you undergone any recent expansion or modernization? What?

12. Are you currently doing so, or do you plan to do so? What?

13. Do you have any special areas of interest or expertise?

14. With whom do you compete, for Canadian business? Competitor names

(a)	B.C. Foundries	%
(b)	Foundries West of Ontario	%
(c)	Canadian foundries	%
(d)	Other foundries (U.S., Japan, Europe, etc)	%

15. Do you export castings?

Where?

Who are your Canadian competitors?

Who are your other competitors?

What percentage of production by type of metal is exported?

16. What do you feel are the major consumer industries of your castings?

17. What companies do you know that buy significant amounts of castings? By industry grouping and importance within that industry.

	Company	Industry	Importance
B.C. -			
Prairies -			
U.S. -			
Other -			

18. What percentage of (a) Local, (b) B.C., (c) Prairies, castings demand is filled from other than B.C. Saskatchewan, Manitoba, and Alberta? (In your opinion.)

To what companies and industries?

Why?

19. Do you see any new markets for castings opening up in the next 5 years? What?

20. At what percentage of capacity are you currently operating, by metal?

21. How do you sell castings - captive, direct, commission agent, other. Please specify.

22. What QC do your customers require - NDT, Batch Certification, Plant Inspection, Sampling, Chemical and Dimensional?

23. What percentage of your production is shipped?

    (a) Locally How are your castings transported?

    (b) B.C.

    (c) Prairies

    (d) Canada

    (e) Export

24. Within the last 5 years, have you lost orders or customers because they switched to (a) Non-ferrous castings, (b) Forgings, (c) Fabrication, (d) Powder Metal, (e) Plastic, (f) Other (specify)? Which?

25. Is the technical development of any of these products such as to cause you to worry about your future markets?

26. Not a question. Note state of repair, degree of automation.

27. Will Pollution controls necessitate, or has it, capital expenditures within the next 5 years?

    How much?

    To what degree are you concerned?

28. Do you plan to increase the range of metals you pour?

29. What are current lead times by metal?

APPENDIX B

CASTING CONSUMER QUESTIONNAIRE

CASTING CONSUMER QUESTIONNAIRE

1. What do you manufacture?

2. What is the value of your annual casting purchases, by metal and tonnage?

3. By metal, how much comes from captive foundries (%)?

4. By metal, what are the weights per casting that you order as percentage of total for that metal?

		0-10lb.	10-25lb.	25-50lb.	50-150lb.	150-500lb.	500+1b.
Iron	(1)						
	(2)						
Steel	(1)						
	(2)						
	(3)						
	(4)						

5. What services do you require from suppliers - delivery, M/C, testing?

6. By metal, what are your release quantities for castings?

		0-50	50-100	100-500	500-1,000	1,000+
Iron	(1)					
	(2)					
Steel	(1)					
	(2)					
	(3)					
	(4)					

7. What is the frequency of releases per year?

8. Do you purchase for plants other than this one?

   Where are they?

9. Are you actively searching for new supplier foundries?

   Why?

10. What are your foundry lead times by metal?

    Is this satisfactory?

11. Do you see prices easing or getting worse?

    What annual price rises do you expect?

12. Do you anticipate changes in the amount of castings you purchase either due to other processes or other metals? Why?

    Would you consider it likely that this company would instal or expand captive capacity?

13. In the near future, do you see any processes, metals, or materials become more competitive to castings? (fabrication, powder metal, forging, non-ferrous castings, plastics, other - what?)

14. Have you within the past 2 years, or do you plan in the near future, to make a permanent switch to another material or process in place of ferrous castings?

    What material did you switch to? Why?

15. Are you importing castings? From where? What companies? What metals? At what price range?

16. Are your foreign supplies becoming (a) more expensive, (b) harder to obtain, (c) poorer in quality?

17. Do you consider that more provincial foundry capacity is necessary? In what metals? In your opinion, who would be the most competent foundry operation in this province?

18. What are your comments with regard to service from your current casting suppliers? Are these comments true for all types of iron/steel?

19. Are you purchasing a significant number or value of iron or steel valves?

APPENDIX C

DETAILED ANALYSIS OF STEEL FOUNDRY QUESTIONNAIRE

Foundry Name	Current Capacity Utilization	Shifts	Total Gross Tonnage At Capacity	1973 Total Net Tonnage (Steel Only)	Total Captive	Total Jobbing	Jobbing Tonnage				Captive Tonnage				In Canada But Outside Home Province				Exports & Type (Tons)				Expanded Production Due to Efficiency Productivity Or Capacity Increase For Jobbing
							Mild	Mang.	Lo Alloy	High Alloy & SS	Mild	Mang.	Lo Alloy	High Alloy & SS	Mild	Mang.	Lo Alloy	High Alloy & SS	Mild	Mang.	Lo Alloy	High Alloy & SS	
Cominco	NK	NK	NK	960	720	240	156	84 unspecified (est.)			720 unspecified				NIL				NIL				480 Tons Total
Letson & Burpee	75%	NK	650	300	150	150	150	-	-	-	150	-	-	-	NIL				NIL				30 Tons Mild
CAE	70%	2	4,450	950	160	790	514	24	95	158	104	5	19	32	62	3 All Jobbing	11	19	62 Captive	-	-	19 Captive	172 Tons Total
VMD	60%	2	960	318	NIL	318	254	60 Tons			-	-	-	-	-	-	-	-	-	-	-	-	---------
Highland	45%	2	300	80	NIL	80	4	32	4	40	-	-	-	-	-	-	-	-	-	-	-	-	Not Known
Al	100%	3	7,500	3,250	1,300	1,950	975	392	488	95	650	260	325	65	406	163 50% Jobbing	203	40	81	33 50% Jobbing	41	8	3250 Tons Net Total
Reliance	65%	1	3,000	825	165	660	330	123	124	83	83	82	-	-	12	6 All Jobbing	4	3	8	5 All Jobbing	2	2	---------
Esco	NK	NK	10,000 est.	5,000 est.	5,000 est.	0 est.	-	-	-	-	5000 unspecified				NK	NK	NK	NK	NK	NK	NK	NK	Not Known
BRITISH COLUMBIA	-	-	26,860	11,683	7,495	4,188	2,383	571 + 144 unspecified	711	376	987 +5720 unspecified	347	344	97	480	172	218	62	151	38	43	29	3932 Tons
Norwood	100%	NK	100	50	NONE	50	-	-	-	50	-	-	-	-	-	-	-	13	-	-	-	-	Yes-But Not Spec.
Quality Steel	40%	1	2,900	600	NONE	600	360	60 est.	120	60 est.	-	-	-	-	-	-	-	-	-	-	-	-	400 tons
Foothills	90%	NK	5,400	1,680	175	1,504	689	176	605	34	-	176	-	-	345	88 All Jobbing	303	17	-	-	-	-	97 Tons
Abex	80%	3	8,075	3,570	585	2,986	104	2,125	214	543	110	375	-	100	107	1,250 Jobbing	107	322	-	-	-	96 Jobbing	None
PRAIRIES	-	-	16,475	5,900	760	5,140	1,153	2,361	939	687	110	551	-	100	452	1,338	410	352	-	-	-	96	497 Tons
TOTAL WEST	-	-	43,335	17,583	8,255	9,328	3,536	2,932 + 144 unspecified	1,650	1,063	1,097 + 5720 unspecified	898	344	197	932	1,510	628	414	151	38	43	125	4,429 Tons

APPENDIX D

DETAILED ANALYSIS OF CURRENT AND INCREMENTAL STEEL CASTING DEMAND

MANITOBA DEMAND

	CURRENT STEEL				INCREMENTAL STEEL			
	MILD	LOW ALLOY	MANG.	STAINLESS STEEL & HI-ALLOY	MILD	LOW ALLOY	MANG.	STAINLESS STEEL & HI-ALLOY
ıicago Blower	1 Ton	-	-	-	-	-	-	-
National Prods.	30 Tons	-	-	-	-	-	-	-
ɔnarch Mcy.	$ 3,000	-	-	-	$ 750	-	-	-
Motor Coach	35 Tons	-	-	-	-	-	-	-
Metal Industries	1 Ton	-	-	-	-	-	-	-
ɔy Mfg.	$ 5,000	-	-	-	-	-	-	-
ıco, Thompson	$ 35,000	-	-	$40,000	-	-	-	-
Sheritt Gordon Mines	$ 20,000	-	$180,000	-	-	-	-	-
ıdson's Bay M & S	$ 60,000	$ 60,000	$ 22,500	$ 7,500	-	-	-	-
CNR, CPR, & BCRR	-	-	1000 tons	-	-	-	-	-
	67 tons + $123,000 = 193 tons	$60,000 = 67 tons	1000 tons + $202,500 = 1225 tons	$47,500 = 19 tons	$750 = 1 ton			

ALBERTA DEMAND

	CURRENT STEEL				INCREMENTAL STEEL			
	MILD	MANG.	LOW ALLOY	HI-ALLOY $ SS	MILD	MANG.	LOW ALLOY	HI-ALLOY & SS
[redacted]Coy Bros.	7½ Tons	-	-	-	4 Tons	-	-	-
Consolidated Concrete	$20,000	-	-	-	-	-	-	-
[redacted]rnco Industries	-	120 Tons	-	-	-	-	-	-
[redacted]ble Cultivators	$10,000	-	-	$ 5,000	-	-	-	-
Foremost Developments	$20,000	-	-	-	-	-	-	-
[redacted]nada Cement	-	$97,000	-	-	-	-	-	-
Alberta Oil Tool	$10,000	-	-	$50,000	$ 2,500	-	-	$12,500
[redacted]ream-Flo Valves	$250,000	-	-	-	$25,000	-	-	-
[redacted]ee-On Mfg.	$75,000	-	-	-	-	-	-	-
Texsteam Ltd.	$44,000	-	-	-	-	-	-	3 Tons
[redacted]extrack-Nodwell	$35,000	-	-	-	-	-	-	-
Barber Industries Calg.	$150,000	-	-	-	-	-	-	-
[redacted]T Canada Ltd.	$375,000	-	-	-	$75,000	-	-	-
[redacted]heritt-Gordon Refining	$12,500 Est.	$12,500 Est.	$12,500 Est.	$12,500 Est.	NK	NK	NK	NK
Inland Cement	-	$10,000	-	$40,000	-	-	-	-
[redacted]kar Collieries	$15,000	-	-	-	$15,000	-	-	-
[redacted]rdinal River Coal	-	-	-	-	$ 5,000	-	-	-
McIntyre-Porcupine Mines	-	-	-	-	$23,400	$18,000	-	$ 2,600
[redacted]alta Coal	-	$15,000		-	-	-	-	-
P & G Cellulose	-	-	-	-	$40,000	-	-	$360,000
[redacted]S	$15,000	-	-	-	$15,000	-	-	-
Val-Tek Ltd.	$29,250	-	-	$ 6,750	$25,000	-	-	$ 4,500
[redacted]c. Small M/C Shops	$43,500	$26,000	-	$21,000 + 7½ T.	$77,000	-	-	$11,250 + 7½ Tons
[redacted]	7½ Tons + $1,104,250 = 1140 T.	120 Tons + $145,000 =282 T.	$12,500 = 10 Tons	7.5 Tons + $95,250 = 45.6 T.	4 Tons + $303,000 = 315 T.	$78,000 = 87 Tons	-	10½ Tons + $391,000 = 167 Tons

BRITISH COLUMBIA DEMAND

	CURRENT STEEL				INCREMENTAL STEEL			
	MILD	LOW ALLOY	MANG.	STAINLESS STEEL & HI-ALLOY	MILD	LOW ALLOY	MANG.	STAINLESS STEEL & HI-ALLOY
Bingham	$750,000	-	-	$300,000	$187,000	-	-	$ 75,000
nger Valve	$ 15,000	-	-	$ 20,000	$ 3,750	-	-	$ 5,000
armatic	442 Tons	-	-	-	88 Tons	-	-	-
S. Madill	$ 27,000	$456,000	-	-	$ 4,000	$ 68,400	-	-
yes Truck	-	$ 50,000	-	-	-	$ 10,000	-	-
Northwood Props.	$ 2,000	-	-	-	-	-	-	-
CO Mfg.	$ 4,000	-	-	-	-	-	-	-
stern quipment	$ 6,700	-	-	-	-	-	-	-
Progressive ngineering	$ 88,800	-	$ 5,500	$ 16,650	$ 8,900	-	$ 550	$ 1,665
Cancar Ltd.	$ 18,000	-	-	-	-	-	-	-
ov. of B.C.	$ 1,000	-	-	-	-	-	-	-
Nicholson- rdie Ltd.	$142,500 = 114 Tons (Est.)				-	-	-	-
Brunette Mach.	$100,000	$ 20,000	$ 40,000	-	-	-	-	-
roCan Pulp & Paper	$ 7,000	$ 7,000	$ 7,000	-	$ 3,150	$ 3,150	$ 3,150	-
nada Cement	-	$ 22,500	$ 6,000	-	-	-	-	-
Gibraltar Mines	-	72 Tons	222 Tons	-	-	-	-	-
Brenda Mines	-	-	$100,000	-	-	-	-	-
anby Mines	-	$ 20,000	$ 20,000	-	-	$ 10,000	$ 10,000	-
Lornex Mines	-	-	$1,300,000	-	-	-	$195,000	-
thlehem Copper	-	-	80 Tons	-	-	-	-	-
Lamb-Cargate Ltd	$ 32,000	-	-	$ 600	-	-	-	

BRITISH COLUMBIA DEMAND (Continued)

	CURRENT STEEL				INCREMENTAL STEEL			
	MILD	LOW ALLOY	MANG.	STAINLESS STEEL & HI-ALLOY	MILD	LOW ALLOY	MANG.	STAINLESS STEEL & HI-ALLOY
Construction Aggregates Ltd	-	-	$ 90,000	-	-	-	$ 9,000	
Cement	-	12 Tons	5½ Tons	8½ Tons	-	2 Tons	1 Ton	2 Tons
Kenworth Truck	488 Tons	-	-	-	35 Tons	-	-	-
Burrard Dry Dock	50 Tons	-	-	3½ Tons	-	-	-	-
MacMillan Bloedel	-	-	$ 25,000	-	-	-	-	-
Wagner Engineering	$ 40,000	-	-	-	$ 60,000	-	-	-
Page & Page Ltd	$100,000	-	-	-	-	-	-	-
Miranda Mines	-	$ 20,000	$ 80,000	-	-	-	-	-
Granduc Mines	$220,000	$165,000	$ 82,500	$ 82,500	$ 22,000	$ 16,500	$ 8,250	$ 8,250
	980 Tons + $1,411,500 = 2428 Tons	84 Tons + $760,500 = 692 Tons	307½ T. $1,756,000 = 2259 Tons	12 Tons + $419,750 = 180 Tons	123 Tons + $289,300 = 420 Tons	2 Tons + $108,050 = 88 Tons	1 Ton + $226,000 = 251 Tons	2 Tons + $90,000 = 38 Tons
	+ 114 Tons (Est.)							