project report

A REVIEW OF THE MARKET FOR BOTTLE AND CAN WASHING AND FILLING MACHINES

prepared for:

Department of Regional
Economic Expansion,
The Government of Canada.

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I

INTRODUCTION AND SUMMARY

A. INTRODUCTION

This study examines the potential market for bottle and can washing and filling equipment in Canada.

The objective is to evaluate potential manufacturing opportunities. These can then be evaluated in greater detail by prospective entrepreneurs.

B. SUMMARY

The total Canadian market for this type of equipment is around $15,000,000 annually. Over 75% of the equipment is imported -- mainly from the U.S.A.

The market is highly specialized and highly segmented. Much of the equipment is complex. Almost all is custom designed to a large extent.

Canadian manufacturers tend to manufacture only the small, simple unsophisticated and low speed equipment. None has a dominant position in the market place.

II

CONCLUSIONS

1. The market is highly specialized and highly segmented.

2. The market is dominated by the large U.S. manufacturers.

3. The simpler, unsophisticated type of equipment is made in Canada.

4. High design and engineering capability is required for the more complex equipment.

5. Opportunities for an expansion of Canadian production seems limited to the manufacture of low speed, unsophisticated equipment.

6. The minimum volume required to justify setting up a new operation is about $500,000 annually.

7. Any new enterprise should consider the manufacture of associated equipment (e.g. cappers).

8. A new enterprise would require above average engineering skills for the customizing of equipment.

9. Overall, the prospects for the expansion of current Canadian production are poor. The segment of the market which is supplied by Canadian manufacturers is small. There are already over one hundred companies competing for a share of the market.

III

COMMODITY

A. WASHING EQUIPMENT

1. Types

Two types of equipment are generally used:

- air cleaners
- liquid wash and rinse

Over 90% of the applications use liquid wash and rinse.

2. Degree of Specialization

Very little specialization other than by speed and size. Cans and bottles may be washed with basically the same equipment.

3. Factors influencing Design

The main factors influencing the design are the size of the container to be washed, the degree of cleanliness required, and the speed of the filling machine.

4. Speeds

Speeds are linked to those of the filling machine in most cases. These range from two per minute to over one thousand per minute.

5. General Structure

The washing machine may consist of several sub units.

- heater

- mixer
- pressurizer
- wash proper (and rinser)
- drier
- motors and controls.

6. Costs

Prices for washers range from $3,000 for a simple washer suitable for a relatively unsophisticated operation to over $250,000. This latter type of equipment might be required for a large bottling plant. A complete range of prices is feasible between the two extremes, but most equipment made tends to be in the $5,000 to $10,000 range.

B. FILLING EQUIPMENT

1. Types

There are many different types of filling equipment. They can be categorized according to:

- nature of product being filled
- filling mechanism
- degree of automation.

(a) Product

Products generally fall into one of four categories:

- still liquid (wines)
- carbonated liquid (coke)

- semi liquid (ketchup)
- dry product (other foods)

Dry product varies with uniformity of pieces, size of particle, stickiness, density and flowability.

Semi liquids vary with viscosity, foaming effects and corrosiveness. Each characteristic will affect some aspect of machine design.

(b) Filling Mechanism

The types of filling mechanisms relate to getting the right amount of product into the container. Mechanically, filling may be done by any of the following methods:

- Dry Products:
  - Gravity
  - Vibratory
  - Belt
  - Auger
  - Vacuum Gravity
  - Cone and Finger.
- Semi-Liquid Products:
  - Piston, Auger, Pump — Volumetric
  - Siphon, Vacuum, Gravity, Vacuum Gravity — Constant Level
  - Pressure Vacuum
- Carbonated Liquids:
  - Counter Pressure

- Gravity Flow
- Constant Level

▶ Counted Products:

- Total count (board, disc or slat)
- Columnar (Roll of tablets)
- Item by Item.

The equipment may be single head, rotary or multi head (up to 72 heads). It may be operated by air, hydraulics of electrically.

(c) Degree of Automation

Equipment will be:

▶ Semi automatic: the container is placed manually and fills automatically.

▶ Intermittent: a group of containers is filled by a multi-head filler.

▶ Continuous: generally a rotary filler.

2. Degree of Specialization

Specialization in the manufacture of filling equipment may occur in three ways generally:

▶ type of product (e.g. carbonated beverages)

▶ type of equipment (e.g. rotary, vacuum, aerosol)

▶ size of container (e.g. 1/2 oz. - 4 oz.)

Aerosols constitute a specialized and expanding market. Aerosols are almost invariably based on rotary equipment. The product sold in aerosols tends to be more homogeneous than other filled products. The equipment therefore has a

more general application to all aerosols.

With relatively minor modifications, cans and bottles can be filled on the same equipment.

3. Factors Influencing Design

The main factors influencing design are:

- the nature of the product to be packaged
- the type and accuracy of filling required (e.g. legal packed weight specifications)
- the speed of packaging required.

4. Speeds

Speeds vary from two a minute for the simplest semi automatic tablet packing machine to 1,200 per minute for a multi (72) head beverage filling machine. Most typical rotary filling machine speeds are in the 200-400 per minute range for four to sixteen ounce containers.

5. General Structure

Filling machines may consist of

- counter, volume measure or level detector
- filler head(s)
- motors and controls
- miscellaneous equipment. This includes such things as pressure equipment, vacuum equipment, heating and refrigeration equipment, carbonation equipment.

6. Costs

Low speed in-line equipment capable of producing up to 100

containers per minute can vary in price from around $3,000 to $10,000. Medium speed fillers producing up to 350 or 400 containers per minute will normally be in the $10,000 to $20,000 range. The more complex ultra high speed equipment can cost over $100,000. This type of equipment is frequently sold as part of a total package. The prices quoted above depend on the size of container being filled and the degree of accuracy required.

IV

MARKET

A. CANADIAN PRODUCTION

Canadian production of bottle and can filling and washing equipment is currently between three and three and one half million dollars annually. This represents approximately twenty per cent of the market. Canadian production is covered in Statistics Canada publication 42-214. Production of this type of equipment as a separate category is given only in 1965 and 1969. In 1970 bottle and can washing and filling equipment is included with sealing, wrapping and packaging equipment, and other general purpose machiner. The combined total was just over 7.5 million dollars in 1970. Appendix A shows the volume of production in each category between 1961 and 1970.

B. IMPORTS

Canadian imports of bottle and can filling and washing equipment and parts totalled almost eleven million dollars in 1971. Estimates based on the first half of 1972 indicate an increase to about thirteen million dollars in 1972.

Details of imports are given in Appendices B and C. The figures are taken from Statistics Canada import statistics under categories 509-04 (Bottle Equipment) and 509-06 (Can Equipment).

The figures show that imports of can washing and filling equipment have remained almost constant in absolute dollars over the past nine years, at approximately three and one half to four million dollars annually. When price changes are taken into account it is possible that imports have in fact declined.

Imports of Bottle washing and filling equipment have increased steadily in terms of total dollars, from a little over five million dollars in 1964/1965 to about eight million dollars in 1971/1972.

C. EXPORTS

Figures are not published separately for Canadian exports of this equipment. However, total exports of all types of packaging equipment were less than five million dollars in 1971. Bottle and can washing and filling equipment represents only about five percent of the total market for all types of packaging equipment. It is highly unlikely that exports are a significant portion of the market.

D. TOTAL

The current total Canadian market is around fifteen million dollars annually. It is highly segmented, with major specialization in specific products. Most large and medium sized installations are custom designed.

E. CONSUMPTION GROWTH

Meaningful Canadian production data is not available. The main inferences with regard to growth must therefore be drawn on the basis of imports. As imports constitute almost 80% of the consumption, the final answer is almost certainly of the correct order of magnitude.

Between 1964 and 1972 the imports of can washing and filling equipment and parts remained almost constant in terms of absolute dollars. When price changes are taken into account there appears to have been a decline in the purchases of this type of equipment.

Between 1964 and 1969 imports of bottle filling and washing equipment remained almost constant in absolute dollars. However, the 1972 estimate of just over nine million dollars compares with just over six million dollars in 1969. This represents almost a fifty percent increase in the three year period. The total market for both types of equipment has increased by roughly fifty percent over the last nine years (in absolute dollars). This represents a growth rate of 4.6% per year. When price changes are taken into account it can be seen that over the long term the market is fairly stable. Developments over the next two to three years should be watched carefully due to the increase over the last three years.

V

CANADIAN PRODUCTION

A. MAJOR PRODUCERS

There are no major producers in Canada. The only Canadian producers are small, job shop, low volume manufacturers.

B. TYPE OF PRODUCTION

Canadian production is made up entirely of small pieces of unsophisticated equipment. This requires only moderate investment in plant and tooling, little design capability and only moderate machine skills. It caters to the low volume packaging plants using low speed equipment.

Many of the firms requiring high volume, ultra fast equipment are subsidiaries of American companies (e.g. Coca-Cola). They almost invariably buy as part of a package from the U.S. parent company. The major U.S. manufacturers also operate in a highly fragmented market. The high design, tooling and engineering content required by the more complex installations can normally only be justified in the larger U.S. market. The total U.S. market for filling equipment was over sixty - seven million dollars in 1970.

With increasing emphasis on higher packaging speeds, and more stringent health and safety measures the level of technology required is likely to increase.

Canadian production is spread through more than 100 different manufacturers, many of whom are U.S. subsidiaries. These act more as an assembler and installer of such equipment rather than a fully fledged manufacturer. The small Canadian job shop manufacturers tend to be located in the major food processing areas where they can service their customers. The main areas are Southern Ontario, the Montreal area, and the Vancouver area.

C. CONCLUSIONS

1. The total market is small.

2. The market is highly segmented.

3. The more expensive equipment requires design and engineering capability.

4. The major manufacturers are U.S. owned.

5. Canadian manufacturers take up those specialized orders which are probably uneconomical for the major producers.

6. The market is relatively static.

7. An expansion of present manufacturing capability must be at the expense of the major U.S. producers.

8. The segmented nature of the market means that a prospective manufacturer would need special design and/or product knowledge.

VI

COSTS

A. PRODUCTION

Exact production costs for all types of equipment are difficult to obtain due to the fact that most of the large equipment is imported. Two approaches have therefore been adopted. Appendix E shows an estimated cost breakdown for several different types of machinery. From these generalized estimates have been made for simple and complex equipment respectively. These estimates are given below for both filling and washing machines.

1. Filling Machines

	Simple	Complex
Sales	100	100
Labour	37	39
Materials	12	10
Utilities	1	1
Cost of Goods Sold	50	50
Gross Margin	50	50
Overhead	30	30
Margin	20	20

2. Washing Machines

	Simple		Complex	
Sales	100		100	
Labour		40		40
Materials		20		17
Utilities		1		1
Cost of Goods Sold		61		58
Gross Margin	39		42	
Overhead		24		24
Margin	15		18	

The type of equipment used in the manufacture of small packaging equipment can be used on the manufacture of other types of equipment. Every effort should therefore be made to incorporate other related equipment. This might include:

- capping and crowning equipment
- labelling equipment
- crimpers
- unscrambling equipment.

Even with such an operation, many fixed costs have to be committed to the filling machine enterprise. The most important among these would be engineering expenses and machining facilities. Engineering costs would be significant both initially and on a continuing basis. This is due to the customized nature of the product. The initial costs of designing and developing filling machines are high. It is estimated that the minimum economic size filling machine operation might require annual slaes of over $500,000, if producing simple equipment. For more complex equipment the minimum volume required would be closer to $1,000,000 annually.

B. TARIFFS

Bottle and can washing and filling equipment and parts carry a 15% import tariff. The main potential export markets are the U.S.A. and Europe. Import taxes for both are around 5%.

Under some circumstances the Canadian import duties may be waived. This normally happens when Canadian manufacturers are unable to produce Canadian requirements. Specific rulings are made in each individual case. This could, however, lead to the importation of certain parts on a duty free basis for assembly in Canada.

VII

LOCATION

A. SITE SELECTION

Site slection may vary according to the type of equipment being made.

1. Simple Equipment/Small Manufacturer

For this type of operation it is essential to be located near the major equipment users. In this way design engineering staff can assist with installation problems and service requirements. The type of company using simple equipment may be a low volume producer with little engineering capability. His service needs will be greater.

2. Complex Equipment/Large Manufacturer

Such a manufacturer will locate near to essential services. These include utilities, transportation etc. A sales office and service facilities may be set up in the main user locations. As many of the users of complex equipment are U.S. subsidiaries, purchases tend to be through the parent company.

B. TRANSPORTATION

Due to the high value and relatively low bulk of the equipment transportation is not a significant cost factor. Most equipment is shipped as main sub assemblies which can then be assembled on site.

C. REGIONAL POSSIBILITIES

It is unlikely that any area outside Southern Ontario could support

a major manufacturer of complex equipment. For smaller equipment it is probable that a market exists in all the main industrial areas to support relatively small businesses. The availability of some engineering and design capability might be important when locating away from the main areas.

VIII

STRENGTHS AND CONSTRAINTS

A. STRENGTHS

1. Certain low volume, low speed equipment is not economical for the high U.S. producers. This portion of the market can be supplied by "local" job shops.

2. The design and engineering requirements for unsophisticated equipment are not high.

3. Initial investment is relatively low when producing simple equipment.

4. The machines used to produce parts for filling and washing machinery can be used to produce parts for other associated equipment (cappers, etc.)

B. CONSTRAINTS

1. The market is highly segmented and specialized. When combined with the fact that the total market is only $15 million, this factor is significant.

2. Many of the larger companies buy through parent companies on the U.S.A. They are therefore partially tied to U.S. manufacturers.

3. High design and engineering capability is required for the more complex equipment. These can normally only be carried by larger companies.

4. The ability to design a "total package" is sometimes required.

5. The volume required to break even on the more complex equipment is relatively high ($1 million annually - a 7% market share).

APPENDICES

APPENDIX A

BOTTLE WASHING AND FILLING EQUIPMENT; SEALING, WRAPPING, AND PACKAGING EQUIPMENT; OTHER GENERAL PURPOSE EQUIPMENT ($000)

(DBS 42-214)

Year	1*	1/2*	2*	2/3*	3*	Total
1970	-	-	-	-	-	7129
1969	2571	-	-	5544	-	8115
1968	-	3504	-	-	9395	12899
1967	-	3136	-	-	6642	9778
1966	-	5474	-	-	5159	10633
1965	1097	-	2043	-	3631	6771
1964	-	-	2125	-	2840	4965
1963	-	-	3931	-	2426	6357
1962	-	-	2502	-	1765	4267
1961	-	-	1855	-	6152	8007

*1 = Bottle washing & filling equipment only
*1/2 = Bottle washing & filling equipment PLUS wrapping & sealing equipment
*2 = Wrapping and sealing equipment only
*2/3 = Wrapping and sealing PLUS other general purpose equipment
*3 = Other general purpose equipment only

APPENDIX B

CANADIAN IMPORTS
BOTTLE WASHING AND FILLING EQUIPMENT AND PARTS
(Statistics Canada 509-04)
(Thousands of Dollars)

Year	Country of Origin			Other	Total	% Change**
	U.S.A.	W. Germ.	UK			
1972*	7636	996	198	326	9156	76
1971	6836	210	55	77	7178	39
1970	7449	347	72	106	7974	51
1969	6067	57	45	34	6203	23
1968	5850	46	53	8	5957	19
1967	4933	41	61	27	5051	-
1966	5428	152	71	18	5669	10
1965	4496	169	102	52	4819	-9
1964	5346	135	91	5	5577	9

* Estimate based on figures for the first half of 1972

** Measures percentage change from the average of 1964 and 1965

APPENDIX C

CANADIAN IMPORTS
CAN WASHING AND FILLING EQUIPMENT AND PARTS
(Statistics Canada 509-06)
(Thousands of Dollars)

Year	Country of Origin			Other	Total	% Change**
	U.S.A.	W. Germ.	UK			
1972*	3690	148	54	150	4042	22
1971	3406	155	72	49	3682	13
1970	2274	31	76	60	2441	(25)
1969	3543	82	31	38	3694	17
1968	4227	10	43	36	4316	40
1967	3489	39	29	25	3582	16
1966	3081	1	26	15	3123	2
1965	3760	13	39	8	3820	25
1964	2278	3	24	-	2305	(25)

* Estimate based on the first half of 1972
** Measures the percentage change from the average 1964/1965

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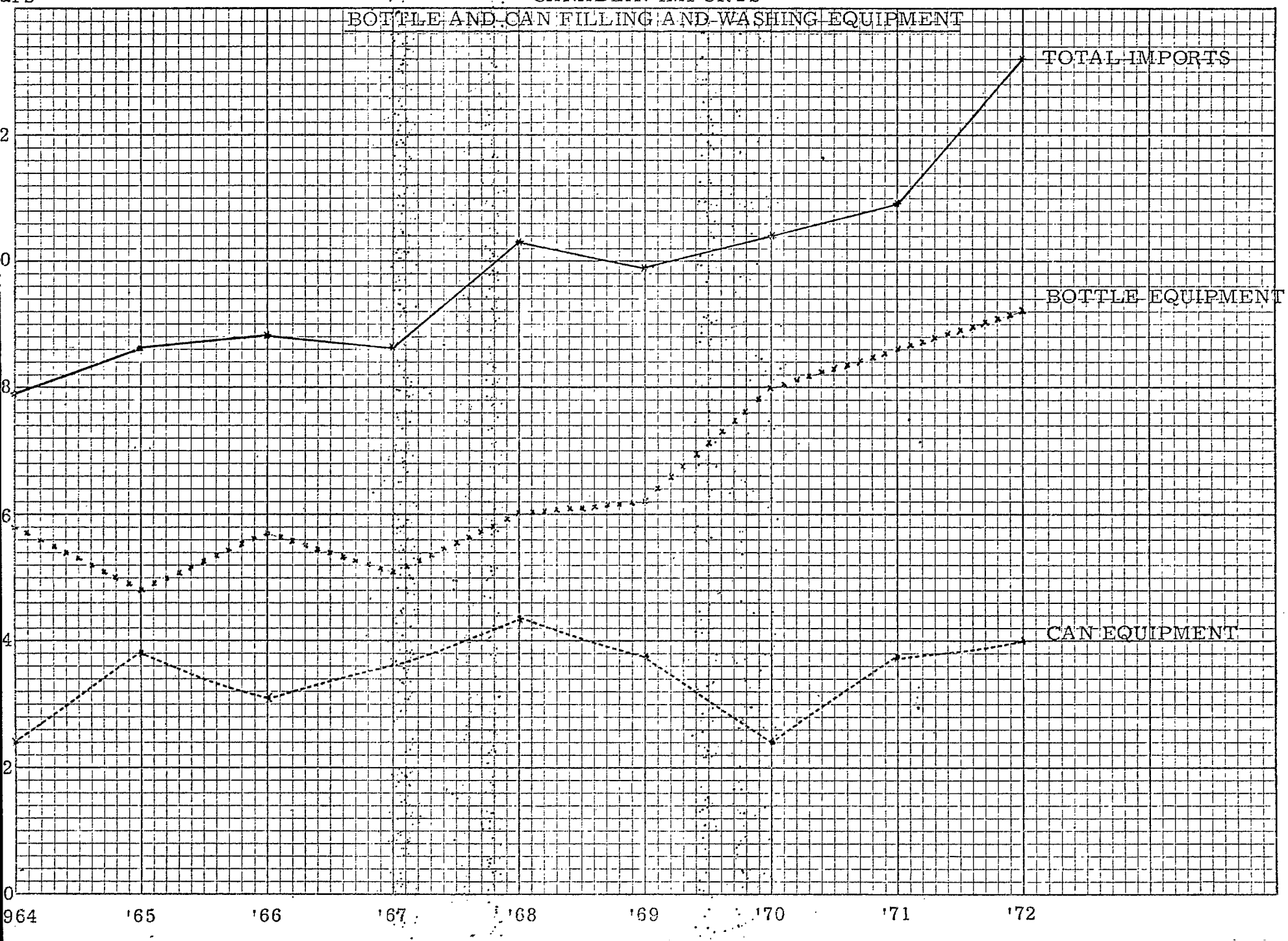
APPENDIX D

CANADIAN IMPORTS

BOTTLE AND CAN FILLING AND WASHING EQUIPMENT



APPENDIX E

TYPICAL COST BREAKDOWNS

This appendix gives several typical cost breakdown estimates. The estimates are for low to medium speed equipment.

	A*		B*		C*		D*	
Selling Price		5,000		35,000		2,840		270,000
Costs: Labour	1,850		13,600		1,130		108,000	
Materials	600		3,500		570		45,800	
Utilities	50		350		30		2,700	
		2,500		17,450		1,736		156,500
Gross Margin		2,500		17,550		1,110		113,500
Overhead	1,500		10,500		680		64,600	
Net Margin		1,000		7,050		430		48,900

*A = In line Filler: 50 containers/min.
*B = Rotary Filler: 250 containers/min.
*C = Small Bottle Washer: 32 bottles/min.
*D = Large Bottle Washer: 800 bottles/min.