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Profiles of Major Suppliers to the Automotive Industry
Volume 2: Iron, Steel and Aluminum Suppliers to the Automotive Industry

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16. Abstract

This study summarizes extensive information collected over a two-year period (October 1978 to October 1980) on suppliers of parts and components, materials, and machine tools to the automotive industry in the United States. The objective of the study was to provide data and information in support of analyses of the U.S. automotive industry. The results of this effort are published in seven volumes --- Volume I: Overview; Volume II: Iron, Steel, and Aluminum Suppliers to the Automotive Industry; Volume III: Plastics, Glass, and Fiberglass Suppliers to the Automotive Industry; Volume IV: North American Parts and Component Suppliers to the Automotive Industry; Volume V: Multinational Automotive Parts and Components Suppliers; Volume VI: Foreign Automotive Parts and Components Suppliers; and Volume VII: Machine Tool Suppliers to the Automotive Industry.

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PREFACE

Automobile manufacturers, in general, produce only selected, key elements and subassemblies for their final product, and rely on a widespread and complex logistics network including material suppliers, foundries and fabricators for wide variety of other necessary components going into the finished automobile.

Because of the importance of the automobile industry to the United States and to the world economy, it is important to understand the makeup of the logistics infrastructure and to understand its internal interrelationships and workings with the industry it supports.

The purpose of this study was to gather all possible and pertinent information on suppliers to the automotive industry, and to present it in a form for ease of reference and further analysis.

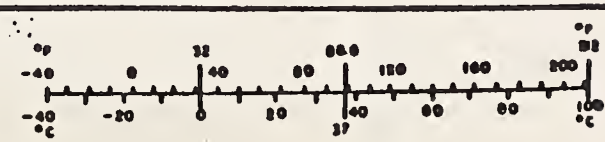
METRIC CONVERSION FACTORS

Approximate Conversions to Metric Measures

Symbol	When You Know	Multiply by	To Find	Symbol
		LENGTH		
in	inches	2.5	centimeters	cm
ft	feet	30	centimeters	cm
yd	yards	0.9	meters	m
mi	miles	1.6	kilometers	km
		AREA		
in^2	square inches	6.5	square centimeters	cm^2
ft^2	square feet	0.09	square meters	m^2
yd^2	square yards	0.8	square meters	m^2
mi^2	square miles	2.6	square kilometers	km^2
	acres	0.4	hectares	ha
		MASS (weight)		
oz	ounces	28	grams	g
lb	pounds	0.45	kilograms	kg
	short tons (2000 lb)	0.9	tonnes	t
		VOLUME		
tsp	teaspoons	5	milliliters	ml
Tbsp	tablespoons	15	milliliters	ml
fl oz	fluid ounces	30	milliliters	ml
c	cups	0.24	liters	l
pt	pints	0.47	liters	l
qt	quarts	0.95	liters	l
gal	gallons	3.8	liters	l
ft^3	cubic feet	0.03	cubic meters	m^3
yd^3	cubic yards	0.76	cubic meters	m^3
		TEMPERATURE (exact)		
°F	Fahrenheit temperature	5/9 (after subtracting 32)	Celsius temperature	°C

Approximate Conversions from Metric Measures

Symbol	When You Know	Multiply by	To Find	Symbol
		LENGTH		
mm	millimeters	0.04	inches	in
cm	centimeters	0.4	inches	in
m	meters	3.3	feet	ft
m	meters	1.1	yards	yd
km	kilometers	0.6	miles	mi
		AREA		
cm^2	square centimeters	0.16	square inches	in^2
m^2	square meters	1.2	square yards	yd^2
km^2	square kilometers	0.4	square miles	mi^2
ha	hectares (10,000 m^2)	2.5	acres	
		MASS (weight)		
g	grams	0.035	ounces	oz
kg	kilograms	2.2	pounds	lb
t	tonnes (1000 kg)	1.1	short tons	
		VOLUME		
ml	milliliters	0.03	fluid ounces	fl oz
l	liters	2.1	pints	pt
l	liters	1.06	quarts	qt
l	liters	0.26	gallons	gal
m^3	cubic meters	35	cubic feet	ft^3
m^3	cubic meters	1.3	cubic yards	yd^3
		TEMPERATURE (exact)		
°C	Celsius temperature	9/5 (then add 32)	Fahrenheit temperature	°F



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1. INTRODUCTION

Economic, political, and regulatory pressures are causing unprecedented modifications in the design and manufacture of automobiles. As the auto manufacturers strive to downsize and increase the efficiency of their vehicles, they are changing their demands for materials. The effects of these changes are thus having significant effects on the companies that supply materials to the auto industry.

For example, some metal suppliers are facing sudden increases in orders for aluminum or high strength steels. Other suppliers, such as iron casting suppliers or other traditional auto materials suppliers, are experiencing decreases in demand. These firms must either identify new markets for their products or develop new product lines more in keeping with auto industry requirements.

Thus, there are many key questions facing each of the metals industries including:

- Will the aluminum industry be prepared to meet auto industry demand for aluminum products? Will the aluminum companies go outside the United States to obtain primary aluminum?

- Will the steel industry develop lightweight products and continue its predominance as a supplier of structural materials to the auto industry?

- Will large captive foundries make an increasing share of automotive iron castings if total demand decreases?

The actions and decisions that are made by the automobile suppliers can have significant impacts on the overall health of the economy and on local employment trends and economic activity.

1.1 SCOPE AND OBJECTIVES OF THIS REPORT

This report attempts to provide basic industry information that will be useful to government decision makers as they attempt to understand the economic changes that government automotive regulations have instigated or encouraged. It can also help determine the economic effects of future regulations. The report analyzes specific companies in the steel, aluminum, and casting industries. For each company, information is provided on:

- Company size and structure, including revenues, profit and employment statistics and corporate organization.
- Major markets and products, including percent of sales to the auto industry, major automotive consumers, major automotive products, sales strategy, new product plans and market strategy.
- Production and operations, including production capacity and output, major automotive facilities, and plans for new plants, plant modernization and expansion.
- Financial status including profitability and investment return, capital spending, capital structure and working capital management.
- Research and development plans, including budgets and nature of work.
- Labor and government relations, including government-industry interaction and company-union interaction.

The report places special emphasis on company plants and operations, focusing heavily on the location of the plants, plant capacity, percent of sales to the auto industry, major automotive products and planned expansions to the plants. This information is of particular significance since major decisions are continually being made (e.g., decisions regarding plant shutdowns, new plant development and plant expansion) which are likely to have far-reaching impacts.

1.2 METHODOLOGY

Information for this report was obtained, wherever possible, from published sources. These include:

- Magazine and trade journal articles
- Annual reports and 10K's
- Security analysts' reports on companies
- Company marketing literature and advertisements
- Annual meeting speeches
- Speeches before the New York Society of Security Analysts
- Plant guide books.

In addition, plant specific information generally required contacts with the companies. Some information, such as specific customers supplied by particular plants, was generally found to be proprietary and thus could not be included in this report. Other information, such as the location of plants that do supply a significant amount of their output to the auto industry, could usually be obtained. In certain cases, information was obtained from experts familiar with the various metal industries.

1.3 ORGANIZATION

This report is divided into three sections, one each on the steel industry, aluminum industry, and casting industry. The sections begin with an overview that presents the size and structure of the industry, its relevance to the auto market, and the key issues currently confronting the industry. Then company analyses are given for the major corporations in the industry.

2. STEEL INDUSTRY

Ever since the Bessemer process of making steel economically was perfected in the 1850's, the steel industry has been a cornerstone of the industrial might of this country. Since about the 1920's, when steel replaced wood as the primary material for making automobiles, the two industries, automobile and steel, have been virtual partners in the business of building and selling the more than 100 million automobiles on the road in America today.

Every automobile that rolls off the assembly line is 50 percent steel, making steel the dominant material in automaking. The automotive community is also the steel industry's largest single customer, accounting for nearly 20 percent of all domestic steel shipments.

2.1 SIZE AND STRUCTURE OF DOMESTIC STEEL INDUSTRY

2.1.1 Size of Industry

Shipments of steel mill products in 1979 were 100.3 million tons up from 97.9 million tons in 1978. Sales totaled $56.7 billion in 1979, up 18.9 percent over the 1978 total of $47.7 billion. Net income for the industry declined by 7 percent from $1.4 billion in 1978 to $1.3 billion in 1979. Industry employment was about 450,000 persons in 1979. (See Table 2-1.)

TABLE 2-1. U.S. STEEL INDUSTRY SHIPMENTS, SALES, INCOME AND EMPLOYMENT

	1979	1978	Percent Change 1979 over 1978
Shipments (Millions of Tons)	100.3	97.9	+2.5
Sales (Billions)	$ 56.7	$ 47.7	+18.9
Net Income (Billions)	$ 1.3	$ 1.4	-7.1
Total Employment: 450,000 (1979)			

2.1.2 Structure

Figure 2-1 illustrates the structure of the steel industry. As shown by the shaded boxes in the diagram, the steel industry consists primarily of three types of operations:

- Mining Operations, i.e., companies or divisions of companies which specialize in extracting raw materials from the earth such as iron ore. These operations—often owned by the steelmakers—are also involved in shipping these raw materials to refineries for processing.

- Refining Operations, i.e., facilities which specialize in converting the raw materials plus scrap metal into a primary product, such as iron or steel.

- Finishing Operations, i.e., facilities which specialize in converting the raw steel into various sizes, shapes and forms such as bars, rods, sheets, plates, and wire. In many cases the refining and finishing operations are combined in one huge facility, or grouping of facilities.

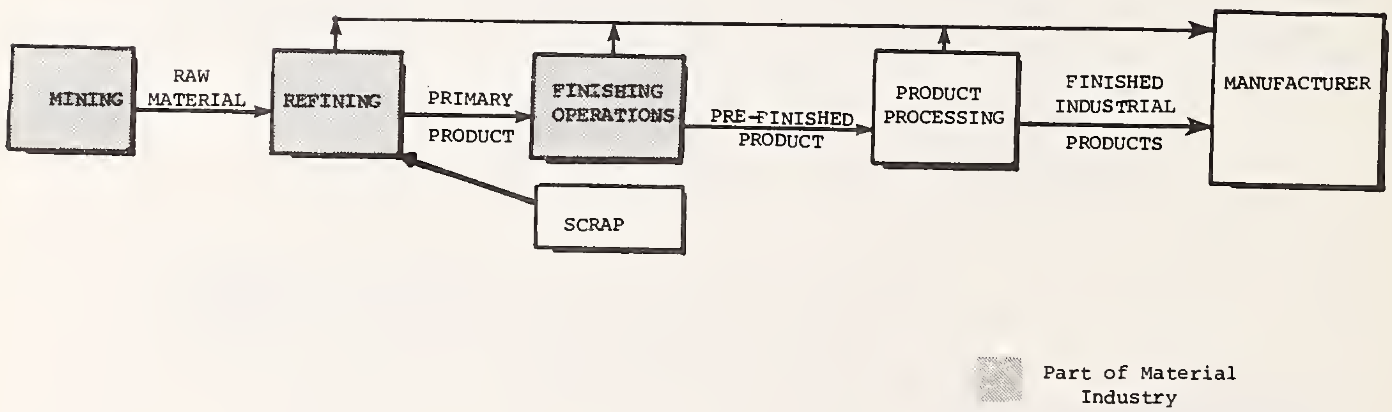

FIGURE 2-1. STRUCTURE OF STEEL INDUSTRY

The Steel Making Process

Basically, a steel making operation begins by mixing iron ore, coke (baked coal) and limestone in a blast furnace. Under intense heat in the blast furnace the iron ore is reduced to molten iron. The iron is then moved to an open hearth furnace, basic oxygen furnace, or electric furnace where the iron is converted to steel by removing carbon in the iron. Alloying agents are also added at this time to form various grades of steel. The open hearth furnaces and electric furnaces can run on an 85 percent and 100 percent scrap metal charge respectively, thus eliminating the molten iron production step. From the steel making furnaces the metal is ladled into molds, when the liquid solidifees into ingots.

The ingots, still hot on the inside, are placed in hot soaking pits to achieve uniform temperature throughout, and then transferred to hot rolling mills, where they are transformed into slabs, blooms or billets. The slabs, blooms and billets are then made into hot and cold rolled plate, sheet and strip steel, structural steel and rails, or bars and rods.

A recent development, continuous casting, has eliminated the making of ingots. In this process, molten steel is taken directly from basic oxygen furnaces and run through giant rollers which produce continuous slabs, blooms or billets. One U.S. steelmaker, National Steel, currently produces 40 percent of its steel slabs with this process, a figure which is on a par with the average for all Japanese steelmakers. Other U.S. steelmakers cast a far smaller percentage of their steels.

Dominant Companies

Over 70 percent of industry sales and shipments were captured by seven steelmakers in 1979. Each of the seven major steelmakers is fully integrated, which means in essence that each controls, to varying degrees, all three of the basic steelmaking operations. Each has its own mining operations, each produces great quantities of refined (raw) steel, and each produces millions of tons of finished steel annually.

Because the seven top steelmakers command such a controlling share of steel production, and because all work so closely with the automotive community, this report will deal exclusively with these producers. Table 2-2 identifies and summarizes the 1979 performance of these seven firms in terms of sales and shipments.

TABLE 2-2. PERFORMANCE OF SEVEN LARGEST STEELMAKERS (1979)

Company	Sales ($ Billion)	Shipments (000 Tons)
U.S. Steel	$12.93	21,000
Bethlehem Steel	7.14	13,436
*LTV (J&L & Youngstown Steel)	4.17	8,538
Armco	5.04	6,004
National	4.23	8,258
Republic	3.99	7,374
Inland	3.64	6,036
Seven Company Total	41.14	70,646
Seven Companies as Percent of Total Industry	72.6	70.5

* LTV figures are those for combined J&L and YS&T operations, not for entire corporation.

2.2 PRODUCTS OF THE STEELMAKERS

Although the steel industry produces more than 130 million tons of raw steel annually, its principal products are the finished steels it makes from this raw steel. These are hot and cold rolled sheet and strip carbon steels, carbon steel plate, steel bars and rods, structural steel shapes, galvanized steels and special steels such as high strength/low alloy steels, increasingly important for automotive use. Some typical automotive applications for steel are:

- Body shell
- Frame
- Suspension components
- Exhaust system
- Fuel tank
- Bumpers
- Wheels
- Gears
- Springs.

2.3 MAJOR STEEL MARKETS

In addition to automotive, which was 18.6 percent of steel industry sales in 1979, other major markets are building and construction, equipment and machinery, containers and packaging, and railroads and shipbuilding. Steel service centers, which sell to a wide variety of local industries, consume 18 percent. Other major steel markets together with their percent of total shipments are shown in Table 2-2.

2.4 MAJOR ISSUES AFFECTING STEEL INDUSTRY

Although 1979 was a good year for the domestic steel industry, the situation began to worsen by the end of the year as declining auto and construction sales and the worsening recession took its toll. By and large, the domestic steel industry is beset by problems and challenges on all sides, and how it is meeting these challenges and coping with these problems may well have profound effects on the automotive industry—and the nation—in years to come. The major issues impacting on the domestic steel industry remain:

- Maintaining steel's share of the automotive market as Detroit struggles to lighten its cars
- Lessening steel's dependence on the automotive community
- Supporting the considerable weight of environmental regulations on its facilities
- Modernizing its facilities to keep the domestic industry competitive with overseas steel producers in both technology and productivity
- Stemming the tide of cheaper imported steels.

Each of these issues are discussed below.

2.4.1 <u>Maintaining Steel's Share of the Market</u>

As America's automakers struggle to cut the weight of their products more and more each year, they are turning to whatever materials will best meet their requirements for light weight, strength, durability, availability and cost. This means, increasingly, that aluminum and plastics are moving into areas once the sole province of steel.

TABLE 2-3. MAJOR STEEL MARKETS

Major Market	Product Shipments (Net Tons)	Percent of Total
Automotive	18,624,000	18.6
Building & Construction	14,078,000	14.0
Equipment Machinery	6,027,000	6.0
Containers & Packaging	6,770,000	6.8
Railroads & Shipbuilding	4,127,000	4.1
Steel Service Centers	18,263,000	18.2
Oil & Gas	3,738,000	3.7
Appliance, Utensils & Cutlery	2,141,000	2.1
Steel for Converting & Processing	5,057,893	5.0
Independent Forgers, NEL	1,254,549	1.3
Agricultural Equipment	1,978,000	2.0
Industrial Fasteners	933,567	.9
Export	2,007,489	2.0
Electrical Equipment	2,821,000	2.8
Other*	12,441,602	12.5
TOTAL	100,262,000	100.0%

* Includes ordnance and other military, aircraft and aerospace, mining.

To counter this, steelmakers have developed whole new families of high strength/low alloy steels, and are working diligently to refine these and other lightweight steels to make them more formable and generally useful to the automakers.

The steelmakers are also expending enormous effort to develop new automotive applications for existing steels—such as stamped rack and pinion components, and experimental stamped steel engine blocks. They have also made significant strides in perfecting anti-corrosion steels that are still highly paintable.

2.4.2 Lessening Steel's Dependence on the Automotive Market

In addition to finding new automotive uses for steels, the steelmakers have embarked on a concerted effort to wean their businesses from over-dependence on the automotive market. One major steelmaker, for instance, sold 31 percent of its products to the automotive market ten years ago, but deliberately reduced this to 21 percent by expanding sales to service centers, consumer durable, appliances, and other markets. This same steelmaker has also secured control of a major West Coast savings and loan association to insulate the company "from the cyclical nature of the steel business."

While most other steelmakers are not going so far afield from steel in their attempts to lessen their dependence on the automotive market, all are working hard to build up their non-automotive markets.

2.4.3 The Burden of Environmental Constraints

Although few could argue convincingly against the need to clean up American industry—especially the steel industry—the economic burden borne by the domestic steelmakers to do so is staggering. In 1977 alone, steelmakers spent more than $1 billion on environmental projects, compared with $2.5 billion for all other capital projects combined.

How much of this would be spent on "normal" capital improvements if it were not being devoted to environmental improvements is hard to say, but the need for modernization of facilities is so severe it appears certain that the environmental expenditures are making it difficult for steelmakers to keep pace with the rapid overseas technological advances. Environmental regulation additionally boosts operating costs. The Council on Wage and Price Stability estimates that EPA-mandated spending will account for 10 percent of all production costs by 1983. What they cannot recover by raising prices—which puts them at the mercy of low-priced foreign steels—the steelmakers are recovering by slashing research, maintenance and other budgets.

2.4.4 Modernizing Facilities

With or without the burden of environmental constraints, the domestic steelmakers would still need to devote enormous energy and capital to modernizing and improving facilities that lag behind those of Japan and some European Economic Community nations technologically. But faced with possible decline of automotive markets, steelmakers are proceeding cautiously to avoid expending scarce capital at a time when the market appears to be flattening out.

Many steel executives foresee a boom in steel demand by the mid-80's, however, and are reluctant to shut down all their older—and inefficient—plants, lest they be caught with great demand and no way to meet it. But U.S. Steel, as Bethlehem did two years ago, found it could no longer sustain some of its aged plants, and shut several plants down in 1979.

2.4.5 Imported Steel Invasion

Imported steel shipments to the U.S. totaled more than 20 percent of domestic shipments again in 1979. Much of this steel was priced below what U.S. steelmakers can sell it for, and the situation is exacerbated by lower productivity rates and often less-than-competitive steelmaking facilities within the domestic steel industry. The Federal Government's Trigger Price Mechanism appeared to enjoy some success in limiting the surge of imported steel, but was suspended when U.S. Steel launched "dumping" charges against overseas steelmakers. Domestic steelmakers feel the high percentage of imported steel makes it hazardous for them to expand their own facilities into a position of overcapacity.

3. U.S. STEEL

U.S. Steel is the largest steel company in the United States. It is also one of the most aggressive steel companies in terms of finding new applications for its products in the auto industry. Within the last year, U.S. Steel closed several of its old and inefficient plants resulting in large financial losses. However, management feels its new streamlined organization will be more competitive in the future. Automotive sales are very important to this company, but the company is highly diversified into non-automotive and non-steel operations including chemicals and plastics.

3.1 CORPORATE SIZE AND STRUCTURE

U.S. Steel is the largest integrated producer of steel and steel products in the U.S. and one of the most diversified. The firm's business ventures extend from steel manufacturing and finishing to chemicals, resource development, fabricating and engineering, and domestic transportation and utilities.

3.1.1 Revenue, Profit and Employment Statistics

Sales in 1979 were approximately $13.0 billion, about $2 billion higher than in 1978. After writing down $800 million in plant closings and recording a stunning $561.7 million fourth quarter loss, U.S. Steel closed out 1979 with a $293 million loss for the year. In comparison, the company had net profits of $242 million in 1978. Employment was about 171,600. (See Table 3-1.) Approximately 27 percent of U.S. Steel sales and 86 percent of U.S. Steel operating income in 1978 came from its non-steel businesses.

TABLE 3-1. U.S. STEEL
REVENUE, PROFIT AND EMPLOYMENT

Year	Revenues (Millions)	Profits (Millions)
1979	$12,929	($293)
1978	$11,050	$242
Average Number of Employees: 171,654 (1979)		

3.1.2 Corporate Organization

U.S. Steel recently installed a new chairman, David M. Roderick, and a new president, William R. Roesch. These two executives moved up after the retirement of the former chairman, Edgar B. Speer. Under these officers, the firm is organized into five operating groups—Steel Manufacturing, Chemicals, Resource Development, Fabricating and Engineering, and Domestic Transportation and Utility Subsidiaries.

Steel Manufacturing is the largest of the groups, and is the primary business of the firm. It includes domestic iron ore, coal and limestone operations integrated with steel plants which produce and sell a wide range of steel products. Also included within the steel manufacturing group are ore and steel transportation operations and the sale of steel mill products.

Functions of the other four groups are as follows:

- Chemicals. This group includes the production and marketing of various industrial and coal chemicals, polystyrene resins and agricultural chemicals.

- Resource Development. This group primarily includes the operations of both domestic and foreign businesses, involving the search for and development of new mineral and energy reserves.

- Fabricating and Engineering. This group primarily includes the fabrication and erection of structural steel for buildings, bridges, storage tanks, and other structures and the fabrication of barges, ship sections, transmission towers, large diameter pipe, and a variety of standard fabricated steel products.

- Domestic Transportation and Utility Subsidiaries. This group includes domestic barge lines, gas utility companies and common carrier railroads.

An overview of this organization is presented in Figure 3-1.

3.2 MAJOR MARKETS AND PRODUCTS

Figure 3-2 presents the major market information for U.S. Steel.

3.2.1 Major Markets

Major markets (for the steel manufacturing group) include transportation (including automotive), steel service centers, construction, containers, machinery, and others. Shipments of steel were 21 million tons in 1979, up only slightly from 20.8 million tons the previous year. Approximately 17 percent of 1979 steel shipments went to the transportation industry.

MARKET DATA

Major markets: Steel service centers, construction, transportation (including automotive), containers, machinery, other.

Percent of sales to transportation industry: Approximately 17 percent.

Supplies to: GM, Ford, Chrysler, numerous suppliers.

Major automotive products: Hot and cold rolled sheets, coated sheets, hot rolled strip and hot rolled bars.

FIGURE 3-2. U.S. STEEL MARKET DATA

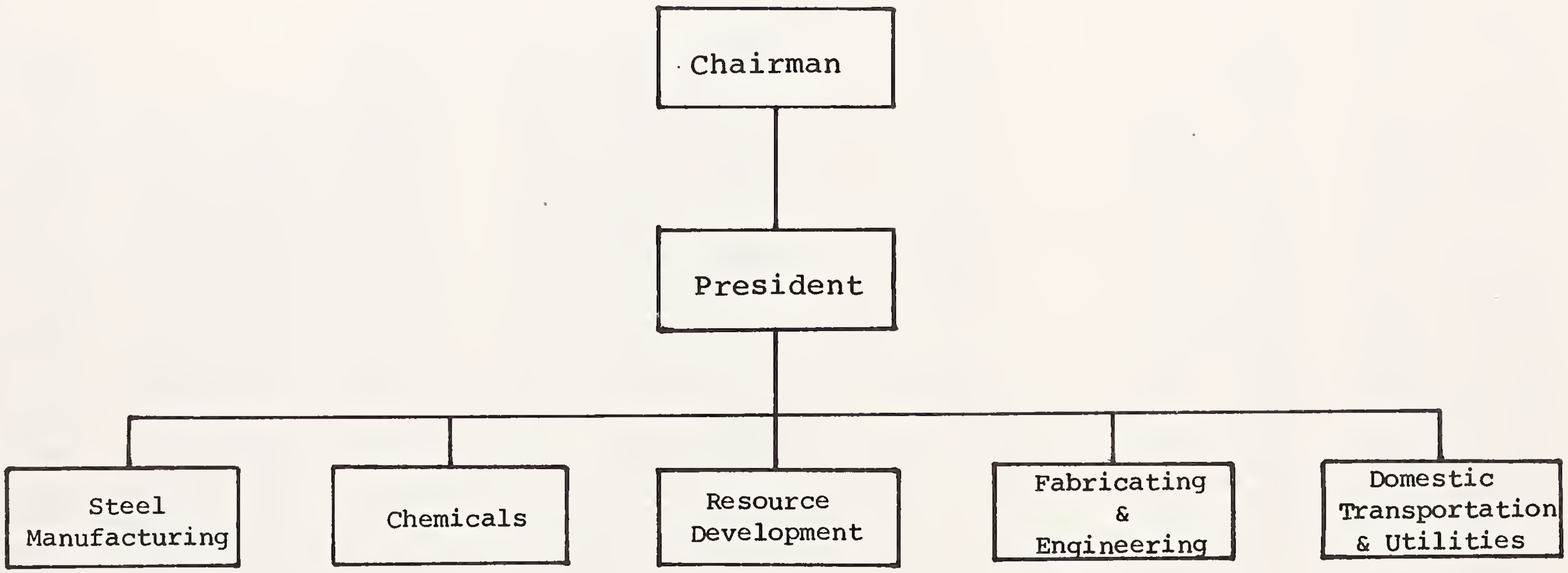

FIGURE 3-1. MAJOR OPERATING GROUPS OF U.S. STEEL

3.2.2 Major Products

Major automotive products include hot and cold rolled sheets, coated sheets, hot rolled strip, and hot rolled bar. Automotive applications of these material products are found in car bumpers, wheels, frame members, engine mounts and body and structural panels.

Sales Strategy

The theme of U.S. Steel's corporate advertising program is "the sound strengths of U.S. Steel—the many plusses that make it a leader in American industry." The program is aimed at a wide range of audiences including customers, government officials, businessmen, financial analysts, and private investors as well as the general public. Hard hitting and factual, the program is designed to enhance the corporate reputation. The program emphasizes U.S. Steel's technical, functional and organizational strengths, the company's position as an extremely broad-based supplier of products and "the need to remain strong."

New Product Plans

U.S. Steel has been helping Detroit in two areas: weight reduction and corrosion resistance. In weight reduction, U.S. Steel's latest development is Dual Phase 80, a high strength steel that increases in strength after forming. In corrosion resistance, U.S. Steel is advertising their product GALVA-ONE, a one-sided electrogalvanized sheet that gives effective corrosion protection, along with outside paintability. The plating technique was developed by U.S. Steel research and a production line for GALVA-ONE sheet has been installed at the Gary, Indiana, works.

Other products under development by U.S. Steel to help meet the needs of automakers include:

- An intake manifold fabricated from stamped steel that is 40 percent lighter than a cast iron unit and holds potential for reducing cold start emissions.

- A stamped steel engine block that has a tremendous potential as an automotive cost and weight saver.

- A stamped steel exhaust manifold that is 20 pounds lighter than a cast iron unit and holds potential for reducing cold start emissions.

- A cone brake system that can reduce weight, improve efficiency and minimize material and machining costs. The new cone brake for a subcompact car's front wheels weighs 14 pounds, 12 ounces each, and for the rear brakes weighs 13 pounds, 12 ounces each, thus providing a 50-pound weight savings per vehicle.

- A simpler, safer, more efficient door system that eliminates posts, reduces weight, and is virtually vandalproof.

- A fabricated steel rack and pinion steering housing that would provide a weight and cost savings and replace the cast aluminum unit.

- A new high strength steel bumper system that weighs about one-fourth less than existing steel systems, and is designed to comply with the proposed Federal automotive bumper standard for 1980.

3.2.3 Marketing Stretegy

U.S. Steel has for several years followed a strategy of decentralization. The entire steelmaking operation is divided into four regional steel units, with control of both production and sales in the hands of the heads of the regional divisions.

U.S. Steel states that steel companies should be preserving the facilities they have, not abandoning them. "The needs of the country are going up and the capability of the industry is coming down. The gap is widening—there's no question the country needs more steel capacity," according to the company chairman.

Thus, U.S. Steel's corporate policy over the next five to ten years will be to "continue to make investments in steelmaking where they are justified by profitable growth in the marketplace." It is concentrating on maximizing return on those products with the greatest profit potential, produced in the firm's most efficient facilities. Such markets include:

- Capital goods market where there presently exists heavy order backlogs for industrial machinery, freight cars, and barges.

- High strength, low alloy steel market where U.S. Steel experts believe that by the mid-1980's, the use of high strength, low alloy steels will be a major factor in the auto industry, turning up in such items as bumpers, wheel rims, jack posts, steering column assemblies, pulleys, brackets, and control areas.

3.3 PRODUCTION AND OPERATIONS

U.S. Steel owns plants which are engaged in the production of raw steel and steel mill products in a variety of forms and grades. It also owns or leases a number of domestic coal properties, limestone properties, and iron ore properties. Plants and major facilities permanently shut down in 1979 included: Joliet-Waukegan (IL) Works, except for a rod mill at the Joliet plant; New Haven (CT) Works; Torrance (CA) Works; the 140" plate mill at Fairfield (AL) Works; the 80" hot strip mill at Gary (IN) Works; and the iron foundry at South Chicago (IL) Works. The rod mill at Pittsburg (CA) Works; the wire mill at Fairfield (AL) Works; and Youngstown (OH) Works were shut down completely in 1980. The wheel and axle manufacturing operation at McKees Rocks, Pennsylvania, is scheduled to close in 1981.

3.3.1 Major Automotive Plants

U.S. Steel does not have any plants which are devoted solely to the auto industry or which are predominantly auto industry dependent. Of U.S. Steel's steelmaking plants, those plants which serve the automotive industry the most include Fairfield Works, Gary Works, Lorain-Cuyahoga Works, Edgar Thomson-Irwin Works and Fairless Hills Works. Youngstown Works, a facility that used to serve the auto industry, closed in 1980. These plants are discussed below.

Youngstown Works

U.S. Steel's Youngstown works was typical of American steelmaking facilities that are being scrapped. Begun in 1892, it became less and less competitive over recent years, and U.S. Steel was reluctant to spend a lot of money trying to modernize. On the other hand, the plant was profitable and accounted for about 3 percent of the company's raw steel output per year (approximately one million tons). This, however, represents only about 25 percent of the plant's 4.488 million tons per year raw steelmaking capacity. As shown in Figure 3-3, the plant also had 2.5 million tons per year of steel rolling capacity.

Following extensive litigation, this plant was closed in the spring of 1980. One of the biggest problems facing the plant was the high cost of complying with EPA's air pollution standards. In 1971, U.S. Steel put expensive electrostatic precipitators on open hearth furnaces at Youngstown but the Federal Government recently called for new, even more expensive equipment to cleanse the air. Other problems included:

- The high cost of complying with EPA's water pollution standards. Up until now the EPA granted a water pollution permit allowing the plant to dump specified amounts of toxic materials into the adjacent Mahoning River. However, stricter standards would have required large amounts of investment by 1981.

- The high cost of energy. The Youngstown plant last year did away with one of its serious pollution problems by eliminating its cokemaking facilities. The problem, however, is that in eliminating its pollution problem, Youngstown also sacrificed a valuable source of energy—coal gas. Lacking this coal gas, the Youngstown works would have had to buy a lot of expensive natural gas for its various furnaces and soaking pits.

CLOSED 1980

Company U.S. Steel Corp. County Mahoning Plant Size

Plant Youngstown Works Congressional District

Address 912 Salt Springs Rd.
Youngstown, Ohio 44509

Standard Metropolitan Statistical Area 99

No. of Employees 1320

Telephone 216-792-9031

Primary SIC Code(s) 331221, 331222, 331231, 331244

Products (Automotive)	Capacity /year	Processes Used	Consumed by (Automotive)
Steel ingots Semifinished steel shapes and forms Hot rolled steel sheet & strip Activities: Eng., Mfg.	2.5 million tons-raw 4.488 million tons-rolled	Casting & rolling	NCA* *NCA Not Currently Available

FIGURE 3-3. YOUNGSTOWN PLANT DATA

- Transportation. Unlike the Great Lakes facilities which bring in iron ore economically on huge boats, the Youngstown works obtained its ore via expensive truck and train shipments. Inside the plant were other transportation problems as well. The plant's layout had changed considerably over the years and as new equipment replaced the old, the flow of materials through the plant did not approach the efficiency found in a modern plant. Furthermore, semifinished steel produced at Youngstown had to be shipped six miles to its finishing mills, another costly operation.

Prior to shutdown, the plant operated as a "mini-mill." U.S. Steel had consolidated many of the plant's operations and produced a minimum number of products for a minimum number of customers. Products manufactured by the plant included ingots, semifinished steel shapes and forms, and hot rolled steel sheet and strip.

Fairfield Works

Fairfield is one of U.S. Steel's most important but also most troublesome plants. The problem has been that the new coke battery blast furnace and the third Q-BOP vessel that were recently added to the plant had an adverse effect on U.S. Steel's earnings due to the high initial costs and start-up expenses associated with this equipment. According to U.S. Steel, however, these are the building blocks to improve the efficiency of raw steelmaking production at the plant. Modern, efficient Q-BOP's accounted for all of Fairfield's raw steel production.

Plant capacity presently includes 3.5 million tons per year of raw steel and 818 million tons per year of finished steel. Products produced by the plant include hot rolled steel sheets, stripped structural shapes and pilings, tin plate, black plate and terne plate, and wire products. The plant employs 300 workers. (See Figure 3-4.)

Company U.S. Steel Corp. County Jefferson Plant Size ______

Plant Fairfield Works Congressional District ______

Address ______ Standard Metropolitan Statistical Area 73 No. of Employees 300

Telephone (205) 783-8011 Primary SIC Code(s) 331231, 331243, 331232, 331510

Products (Automotive)	Capacity	Processes Used	Consumed by (Automotive)
Hot rolled steel sheets Stripped structural shapes and pilings Tin plate, black plate and terne plate Activities: Div. Hqt. Mfg.	3.5 million tons, raw 8.8 million tons, rolled	Rolling, plating, heat treatment, drawing, forging	NCA

FIGURE 3-4. FAIRFIELD WORKS DATA

Gary Works

Gary is one of the few U.S. plants large enough to take advantage of the economies of scale. The plant has a big blast furnace, a big slab caster, a Generation II strip mill and a fairly new structural mill. It has both top blown and bottom blown oxygen vessels and is located in the Chicago area in the heart of the metalworking market.

Despite what would appear to be a very favorable situation, Gary has consistently been a low-profit operation. One of the problems has been a new blast furnace which was installed in 1974 to produce an additional 8,500 tons per day of raw steel. The furnace has never lived up to its expectations.

Nonetheless, the company has made a commitment to improve the performance of primary metals production at this plant as well as increase finishing capacity. To satisfy this commitment, the company is rebuilding the blast furnace. In addition, corporate management has brought in Japanese assistance to attempt improvement in blast furnace production. Other actions being taken to improve efficiency and productivity at this plant include:

- Increasing average ingot weight
- Closing down four non-competitive bar mills.

Present plant capacity includes eight million tons of raw steelmaking capacity including a three-furnace Q-BOP shop and 25.75 million tons of steel finishing capacity. Major products include hot rolled steel sheet and strip, cold rolled steel sheet and strip, tin plate, black plate and terne plate. The plant also produces the new one-sided, electrogalvanized sheet product developed by U.S. Steel research to combat corrosion which will be used for exterior automotive body panels. The plant employs 8,000 workers. (See Figure 3-5.)

Company U.S. Steel Corp. County Lake Plant Size

Plant Gary Works Congressional District

Address 1 N. Broadway
Gary, Indiana 46402

Standard Metropolitan Statistical Area 89

No. of Employees 8,000

Telephone (219) 994-2000

Primary SIC Code(s) 331231, 331270, 331232

Products (Automotive)	Capacity	Processes Used	Consumed by (Automotive)
Hot rolled steel - sheet & strip Cold rolled steel - sheet & strip Tin plate, black plate and terne plate Activities: Eng., R&D, Mfg.	8 million tons - raw 25.750 million tons - rolled	Rolling & Plating Annealing, Pickling, Forging	N.C.A.

FIGURE 3-5. GARY PLANT DATA

Lorain-Cuyahoga Works

The Lorain-Cuyahoga Works consists of two plants in Lorain, Ohio. The Lorain plant produces both raw and finished steel while the Cuyahoga plant is solely a finishing plant. The combined capacity of these plants includes three million tons per year of raw steel and 923,200 tons per year of finished steel. Products include:

- Hot rolled steel bars and bar shapes
- Steel wire
- Cold rolled steel
- Sheet and strip.

The plant employs 1,950 workers. (See Figure 3-6.)

Edgar Thomson-Irwin Works

Like the Lorain-Cuyahoga Works, the Thomson-Irwin Works also consists of two separate plants. Both plants, however, are finishing plants whose primary products are hot rolled steel sheets and strip. The plants combined employ 4,825 people and have a capacity of 9,934 million tons per year of finished steel. (See Figure 3-7.)

Fairless Hills Works

Located in Fairless Hills, Pennsylvania, Fairless Hills produces steel ingots, semifinished steel shapes and forms, hot rolled steel sheet and strip, tin plate, black plate, and terne plate. The total plant capacity includes:

- 4.4 million tons per year of raw steel
- 14.185 million tons per year of finished steel.

The plant employs 8,450 workers. (See Figure 3-8.)

Company U.S. Steel Corp. County Cuyahoga Plant Size

Plant Lorain-Cuyahoga Works Congressional District

Address 1807 E. 29th St.
Lorain, Ohio
44055

Standard Metropolitan Statistical Area 35

No. of Employees 1,950

Telephone (216) 277-2000

Primary SIC Code(s) 331244, 331250, 331270

Products (Automotive)	Capacity	Processes Used	Consumed by (Automotive)
Hot rolled steel bars & bar shapes Steel wire Cold rolled steel Sheet & strip Activities: Mfg.	923,200 tons - rolled 3,000,000 tons - raw	Rolling and drawing mills Glass furnaces Blooming mills Bar mills and pipe	N.C.A.

FIGURE 3-6. LORAIN-CUYAHOGA WORKS DATA

Company U.S. Steel Corp.

County Allegheny (Plant 1)
Westmoreland (Plant 2)

Plant Size

Plant Edgar Thomson-Irwin Works

Congressional District

Address P.O. Box 878 (Plant 1)
Dravosburg, Pa. 15034
130 Lincoln Ave. (2)
Vandergrift, Pa. 15640

Standard Metropolitan Statistical Area 02, 129

No. of Employees 3,900 (Plant 1)
925 (Plant 2)
4,825 (total)

Telephone (412) 567-5611 (Plant 2)

Primary SIC Code(s)

Products (Automotive)	Capacity	Processes Used	Consumed by (Automotive)
Hot rolled steel Sheets & strip	9.934 million tons - rolled (total) 9.647 million tons - rolled (Plant 1) .287 million tons-rolled (Plant 2)	Rolling	NCA

FIGURE 3-7. EDGAR THOMSON-IRWIN WORKS DATA

Company U.S. Steel Corp. County Bucks Plant Size

Plant Fairless Works Congressional District

Address Fairless Hills, Pa. Standard Metropolitan Statistical Area 17 No. of Employees 8,450

Telephone (215) 295-0740 Primary SIC Code(s) 331221, 331222, 331231, 331232

Products (Automotive)	Capacity	Processes Used	Consumed by (Automotive)
Steel ingots semifinished steel shapes & forms Hot rolled steel sheet & strip Tin plate, black plate & terne plate Activities: Mfg.	4.4 million tons - raw 14.185 million tons - rolled	Casting, rolling, plating	N.C.A.

FIGURE 3-8. FAIRLESS WORKS DATA

3.3.2 Plant Improvements

Much of U.S. Steel's $979 million in capital expenditures in 1979 (up 50 percent from the preceding year) went into improvements at the Gary, South, Fairfield and Texas works. For example at Gary, the steelmaker's largest blast furnace was completely rebuilt before starting up again in January of 1980. Production from the rebuilt furnace is already up by 23 percent over year-ago performance, and is expected to go even higher, according to U.S. Steel. The steelmaker asked for and received assistance from Japanese blast furnace builders in the rebuild on the unit.

The steelmaker also began construction of iron desulphurization facilities at three locations to reduce coke consumption, increase productivity, and yield more prime grade steel.

3.4 FINANCIAL STATUS

Although sales increased in 1979, earnings declined due to plant closing writedowns.

3.4.1 Operating Analysis

U.S. Steel has faced declining margins over the last five years.

In 1978, U.S. Steel did not have the strong earnings performance that other steel companies did. (See Figure 3-9.) While sales were quite strong, operating margins did not advance as much as did the other steel companies. Steel operations had a particularly poor year, accounting for 14 percent of the operating profit and 73 percent of total sales.

Although U.S. Steel's steelmaking operations actually increased sales in 1979 to $9.6 billion (up from $8.8 billion in 1978), this was primarily the result of price increases, which only partially covered cost increases. Steelmaking operations actually had a loss of $102 million, principally due to operations at four unprofitable plants which have many new facilities that have not yet attained full profitability.

Year	Sales ($Millions)	Earnings ($Millions)	Return on Equity, Percent	Operating Income* / Sales, Percent
79	12,929	(293)	–	6.1
78	11,049	242	4.6	6.5
77	9,610	138	2.7	5.7
76	8,608	410	8.2	9.5
75	8,171	560	12.0	12.1
74	9,190	630	15.4	14.9

Year	Earnings / Total Assets, Percent	Sales / Assets	Earnings / Sales, Percent
79	–	1.2	–
78	2.4	1.1	2.2
77	1.4	1.0	1.4
76	4.5	0.94	4.8
75	6.9	1.0	6.9
74	8.2	1.2	6.9

* Operating Income = Sales – Cost of Goods Sold – Selling, General and Administrative Expenses.

FIGURE 3-9. OPERATING ANALYSIS OF U.S. STEEL

3.4.2 Capital Analysis

U.S. Steel decreased its capital expenditures in 1977 and 1978. (See Figure 3-10.) Even so, the company issued $250 million in preferred stock each year to fund its projects. The preferred stock was issued through Quebec Cartier Mining Company, a subsidiary of U.S. Steel. U.S. Steel has also borrowed in recent years and if preferred stock of the subsidiary is counted as debt (as is done by the company and by security analysts), debt to capitalization has increased to 26 percent in 1978. U.S. Steel also cut its dividend in 1978.

Although U.S. Steel wrote down more than $800 million in plant closings in 1979, the steelmaker at the same time increased its capital expenditures by more than $300 million to $979 million. In addition there was a $114 million increase in long-term debt, a $44 million increase in owner's equity other than retained earnings and a $318 million decrease in working capital.

3.5 RESEARCH AND DEVELOPMENT

The steelmaker's research and development budget expenditures in 1979 were $57 million, compared with $53 million the previous year. The principal thrust of R&D efforts continued to be aimed at improved productivity and product quality, plus long-range product development.

Immediate benefits of this effort, the steelmaker reports, include increased blast furnace efficiency through a computerized raw material and energy balance system installed on its five largest blast furnaces.

3.6 GOVERNMENT AND LABOR RELATIONS

In March of 1980, U.S. Steel filed antidumping complaints against steel producers in seven European countries. Armco, Bethlehem, Lukens and Republic immediately became "parties to the case." The U.S. Department of Commerce accepted the complaints and the International Trade Commission decided that sufficient evidence of injury exists to warrant further investigation. U.S. Steel management expressed confidence that the final ruling in these cases will be a positive one for the American steel industry—one that will mark an important first step toward the comprehensive national steel policy the United States so sorely needs.

Year	Sales	P/E Ratio[1]	Sources: Earnings	Sources: Depreciation	Sources: Changes in Long-Term Debt	Sources: Changes in Owners' Equity Other Than Retained Earnings
79	12,929	-	(293)	532	114	44
78	11,049	9.3	242	436	(106)	32
77	9,610	23.2	138	372	340	56
76	8,608	10.3	410	309	417	41
75	8,171	5.7	560	297	202	(12)
74	9,190	3.6	630	386	(97)	128

Year	Change in Working Capital	Uses: Capital Expenditures	Uses: Dividends	Long-Term Debt[3] / Capitalization %	Coverage[2]	Cap. Exp. / TOTAL ASSETS %	Current Ratio
79	(318)	929	138	29%	4.6	8.6	1.4
78	14	667	136	26	3.8	6.5	1.7
77	180	865	185	28	3.5	9.1	1.8
76	(55)	957	172	26	7.2	11.1	1.7
75	64	787	151	23	11.9	9.1	1.8
74	570	508	120	22	14.7	N.A.	1.7

Dollar figures are in millions

1 Average for the Year

2 Operating profit/interest

3 Capitalization Defined as Total Liabilities – Current Liabilities

FIGURE 3-10. CAPITAL ANALYSIS OF U.S. STEEL

In late April the company, along with other steelmakers, signed a new agreement with the United Steelworkers (USW). The agreement was a relatively moderate one, and was based on minimum wage increases guaranteed by the steelmakers under the Experimental Negotiating Agreement (ENA). In return for a union promise not to call a general strike, management committed itself to at least a 3 percent increase in each of the next three contract years.

4. BETHLEHEM STEEL CORPORATION

Bethlehem Steel Corporation is an integrated producer and distributor of steel and steel products, the second largest steel producer in this country and the fourth largest in the world. Bethlehem is one of the few steel producers to actually decrease overall capacity within the past few years. But while decreasing absolute capacity, it has modernized existing facilities with the latest technology and improved productivity and operating efficiency dramatically. Bethlehem is actually producing more steel with less capacity and a smaller work force.

Bethlehem is counting on its improved internal efficiency and strategic locations of its major plants to help the firm hold and improve its market penetration in the automotive as well as other markets.

4.1 COPRORATE SIZE AND STRUCTURE

4.1.1 Revenue, Profit and Employment Statistics

Bethlehem's sales in 1979 were $7.1 billion, up from $6.2 billion in 1978. Net income in 1979 was $275.7 million, up from $225.1 million in 1978. (See Table 4-1.)

TABLE 4-1. REVENUES, PROFIT AND EMPLOYMENT

Year	Revenues (Millions)	Profits (Millions)
1979	$7,137.2	$275.7
1978	$6,184.9	$225.1
Average Number of Employees: 97,700 (1979)		

Despite a sharp drop in fourth quarter 1979 profits Bethlehem earned a near-record $276 million for 1979, the second best year in the company's 75-year history. Per-share earnings for the year amounted to $6.31 per share on sales of $7.1 billion, up from $5.15 per share on $6.2 billion sales in 1978. But the first half of 1980 told a different story. The nation's second largest steelmaker reported a 58.2 percent plunge in second-quarter earnings, and the company chairman said the company expects a loss for the third quarter because of the recession's impact on its business.

4.1.2 Corporate Organization

Bethlehem has reorganized its top management utilizing a somewhat unique top-end organization, with the company chairman sitting alone above a five-man executive/operating group consisting of the company president, executive vice president and three vice chairmen. (See Figure 4-1.)

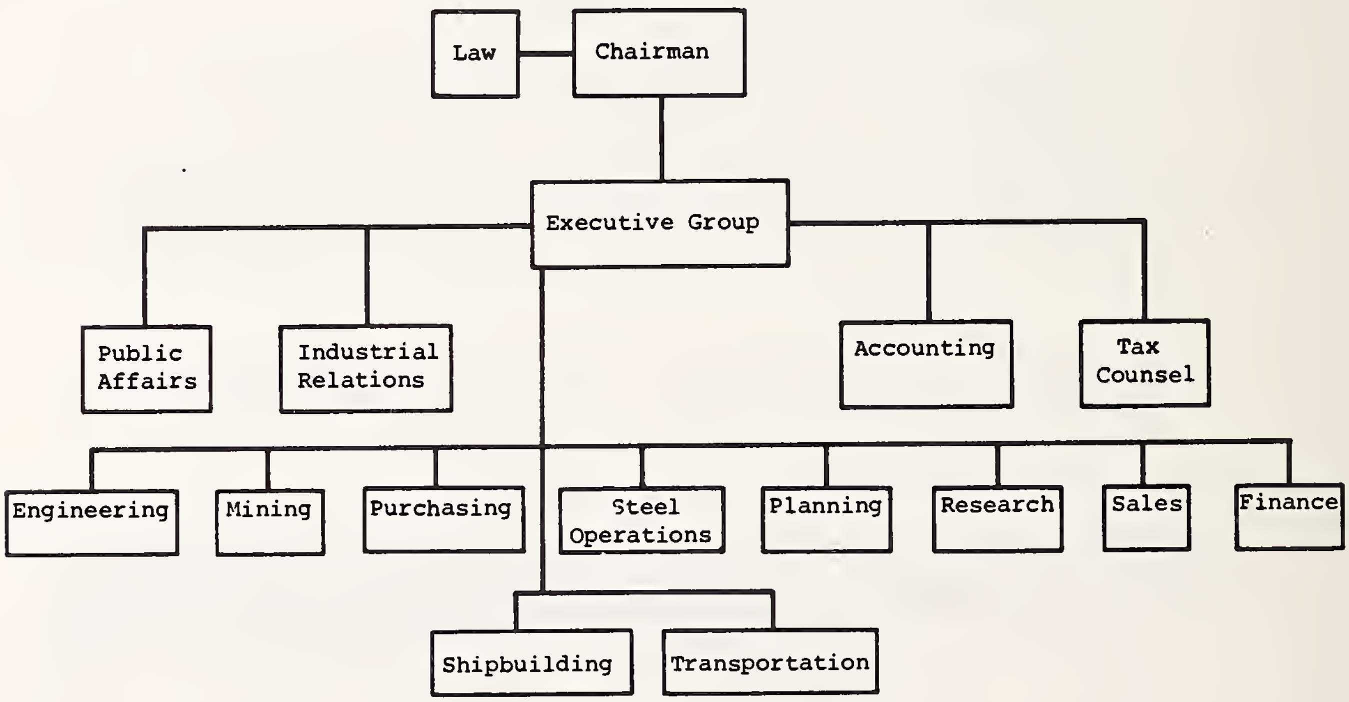

FIGURE 4-1. BETHLEHEM STEEL CORPORATION ORGANIZATION

While some other major steelmakers are decentralizing their operations, Bethlehem continues to centralize most decisionmaking within the executive group. This results, of course, in far less division and plant autonomy and Bethlehem feels less duplication of staff and efforts, as well as the elimination of different divisions and plants working at cross purposes.

Bethlehem's major divisions include:

- Public Affairs
- Industrial Relations
- Accounting
- Engineering
- Mining
- Purchasing
- Steel Operations
- Planning
- Research
- Sales
- Finance
- Shipbuilding
- Transportation.

Until 1975 there was a structural fabricating division, but after careful and painful evaluation of its unprofitable stance, Bethlehem shut the division down and withdrew entirely from structural fabricating. A similar evaluation is still underway on the company's extensive shipbuilding operations, which have reported unsatisfactory profits in recent years.

4.2 MAJOR MARKETS AND PRODUCTS

Bethlehem's major markets are detailed and summarized in Figure 4-2.

4.2.1 Major Markets

Bethlehem Steel's major markets include automobile and light truck, heavy truck and off-highway, railroad, building and construction, equipment and machinery, consumer durables, and marine transportation. Nearly 30 percent of Bethlehem's sales are to transportation equipment manufacturers, with automotive and light truck consuming more than two-thirds of that. In addition to GM, Ford, and Chrysler, Bethlehem ships to a myriad of independent automotive suppliers.

MARKET DATA

Major markets: Automotive, light truck, medium and heavy truck, railroad, building and construction, equipment and machinery, consumer durables, marine transportation

Percent of sales to the auto industry: Approximately 20 percent

Supplies to the following automotive companies: Ford, GM, Chrysler, various independent suppliers

Major products: Hot and cold rolled sheet and strip steel, galvanized sheet steel, structural steel, tool steel, ships, specialty steels, steel plates and bars

FIGURE 4-2.
BETHLEHEM STEEL MARKET DATA.

4.2.2 Products

Major automotive products made by Bethlehem include hot and cold rolled sheet steel and strip steel, high strength/low alloy (HSLA) steels, galvanized steel, aluminized steel (Galvalume) and steel bars.

Bethlehem is currently promoting and advertising to the automotive community a wide range of special-application steels such as corrosion-resistant Bethcon, Galvalume and Automotive Jet coat sheet steels, along with its "normal" range of carbon sheet steels and bars.

4.2.3 Marketing Strategy

Bethlehem's overall marketing strategy is to abandon or de-emphasize operations which are unsatisfactory from a profit standpoint, and to market and promote new and innovative products in their strong markets (such as Galvalume and Bethcon to the automotive sector).

Additionally, Bethlehem is concentrating heavily on upgrading, modernizing and improving productivity and efficiency at its well-situated facilities at Burns Harbor, Sparrows Point, Lackawanna and Johnstown. They feel this gives them a strong competitive position based on the ability to produce and ship the types of steels in greatest demand at highly favorable prices and quite rapidly.

Their long-range goals also include improved product quality and consistency, plus ongoing product development and refinement. The latter is especially true of HSLA steels, where Bethlehem, and the rest of the industry, is working to improve HSLA formability. Steel products are distributed by Bethlehem principally through its own sales organization, which has sales offices, mill depots or supply stores at 81 locations in the United States. Bethlehem sells significant amounts of steel products to jobbers, dealers and steel service centers. Export sales, which were less than two percent of total sales in 1978 and 1979, are made through its own sales organization and through foreign sales offices.

4.3 PRODUCTION AND OPERATIONS

Bethlehem operates eight steel producing plants: Bethlehem, PA; Johnstown, PA; Steelton, PA; Sparrows Point, MD; Lackawanna, NY; Burns Harbor, IN; Seattle, WA; and Los Angeles, CA. In addition to steel, the Bethlehem, Burns Harbor, Johnstown, Lackawanna and Sparrows Point plants also produce coke and pig iron.

4.3.1 Major Automotive Facilities

Four of Bethlehem's facilities—Burns Harbor, Sparrows Point, Johnstown and Lackawanna—are heavy shippers of automotive steels. All four have played a major role in Bethlehem's improved profit and capability utilization posture.

Burns Harbor, Indiana

The newest integrated steelmaking plant in the U.S., Burns Harbor is one of the most modern and productive. Equipped with the latest blast furnaces and basic oxygen furnaces (including one brand new one), Burns Harbor employs 6,400 and is strategically located astride the midwest automotive and industrial complex. Burns Harbor's 80-inch hot sheet mill has now been joined by expanded plate capacity. (See Figure 4-3.)

Company Bethlehem Steel Corp. County Porter Plant Size 84 buildings

Plant Burns Harbor Congressional District

Address Chesterton, IN 46304 Standard Metropolitan Statistical Area 127 No. of Employees 6,400

Telephone 219-787-2120 Primary SIC Code(s) 331241,331231,321270,331232

Products (Automotive)	Capacity/Year	Processes Used	Consumed by (Automotive)
Hot-and cold-rolled strip and steel sheet, tinplate steel plate and bars. Activity: Mfg.	5.3 million tons	Raw iron ore is smelted into molten iron in blast furnace; molten iron is mixed with ferrous scrap and fed to basic oxygen furnace, where it is refined to produce molten steel, which is poured into ingots. Ingots are soaked, then passed through slabbing mill to produce hot slab. Slab is passed through 80-inch hot sheet mills. If it is not shipped as is, it is pickled and run through the 80-inch cold sheet mill, then through an annealing line or batch furnace, then to a skin mill. It is then shipped as either coiled or cut sheet steel.	N.C.A.

FIGURE 4-3. BURNS HARBOR PLANT DATA

The new computer-controlled 110-inch sheared plate mill at the Burns Harbor plant became fully operational in the first half of 1978. The new mill, combined with the existing 160-inch mill, provides Burns Harbor with the largest capacity to produce plates of any plant in the United States. The new mill is capable of rolling plates ranging from 3/16 to 1 inch thick in lengths up to 120 feet, and is controlled by a highly sophisticated computer system. A new batch furnace was also added to the 160-inch plate mill at Burns Harbor, as were new slow cool facilities and additional facilities for flame cutting of plates.

A third basic oxygen furnace became fully operational at Burns Harbor in early 1978, adding approximately 700,000 tons to Bethlehem's annual raw steel capacity. This furnace is reportedly capable of producing about 300 tons of steel in 40 minutes and is equipped with a sophisticated and highly efficient air-pollution control system. This facility increased the raw steel capacity of the Burns Harbor plant to 5.3 million tons per year.

Sparrows Point, Maryland

Sparrows Points is one of Bethlehem's older plants, but the huge facility located in tidewater Maryland is a cornerstone of the number two steelmaker's capabilities. Employing more than 18,500 people, Sparrows Point has a rated capacity of seven million tons of raw steel annually. It is equipped with a highly efficient "L" type blast furnace, the first one in the U.S. Rated at 8,000 tons per day capacity, the "L" furnace replaced four older furnaces—and has already exceeded its rated capacity and produced 9,000 tons in one day. Sparrows Point's products include raw steel, hot and cold rolled sheet steel, precoated sheet steel, galvanized and Galvalume steel, steel plate and steel pipes and tubing. (See Figure 4-4.)

Lackawanna, New York

Lackawanna is Bethlehem's largest facility, employing 19,500. Although its raw steelmaking capacity was reduced from 4.8 to 2.8 million tons, Lackawanna produces an enormous amount of hot and cold rolled sheet, galvanized and Galvalume sheet, steel bars and plates, structural steel and steel forgings. (See Figure 4-5.)

Company Bethlehem Steel Corp. County Baltimore Plant Size

Plant Sparrows Point Congressional District

Address Sparrows Point, MD 21219 Standard Metropolitan Statistical Area 05 No. of Employees 18,600

Telephone 301-477-1020 Primary SIC Code(s) 331231, 331250, 331241, 331260

Products (Automotive)	Capacity/Year	Processes Used	Consumed by (Automotive)
Hot and cold-rolled sheet steel precoated; galvanized; and Galvalume sheet, steel wire, steel plate, steel pipes and tubing. Activity: Mfg.	7.0 million tons	"L"- type blast furnace produces molten iron; this is mixed with scrap steel in basic oxygen furnaces which produce molten iron, which is poured into ingots. Ingots are soaked, then passed through slabbing mill. Slabs then go through hot sheet mill, pickling line, cold reducing mill, and temper mill.	N.C.A.

FIGURE 4-4. SPARROWS POINT PLANT DATA

Company Bethlehem Steel Corp. County Erie Plant Size

Plant Lackawanna Congressional District

Address Lackawanna, NY 14219 Standard Metropolitan Statistical Area 29 No. of Employees 19,500

Telephone 716-821-1000 Primary SIC Code(s) 331221, 331231, 331244, 331243

Products (Automotive)	Capacity/Year	Processes Used	Consumed by (Automotive)
Hot and cold rolled sheet, galvanized sheet bars and billets, steel ingots, structural shapes Activity: Mfg.	2.8 million tons	Blast furnace produces molten iron; this is mixed with ferrous scrap in basic oxygen furnaces and open hearth furnaces, which produce molten iron, which is poured into ingots. Ingots are soaked, then passed through slabbing mill. Slabs then go through hot sheet mill, pickling line, cold sheet mill, then on to galvanizing line if sheet is to be galvanized. Bars and billets go from slabbing mill to billet mill to bar mill.	N.C.A.

FIGURE 4-5. LACKAWANNA PLANT DATA

Johnstown, Pennsylvania

As at Lackawanna, the Johnstown facility's capacity was reduced from 1.8 to 1.2 million tons annually. Most of Johnstown's production is in hot rolled steel bars and bar shapes, steel ingots, and steel wire. The plant employs nearly 13,000. (See Figure 4-6.)

4.3.2 Expansion and New Plants

Bethlehem spent about $420 million for capital improvements in 1979, and anticipated 1980 capital expenditures to be between $550 and $600 million. The steelmaker tentatively estimates 1981 figures to be somewhere in the neighborhood of $650 million. Approximately 15 to 20 percent of this is for environmental control improvement.

Much of 1980 expenditures will be directed toward the relining of several of the firm's blast furnaces for more efficient operation, including those at its Sparrows Point and Johnstown plants.

4.4 FINANCIAL STATUS

Bethlehem's financial status is healthy—or at least recovering—following a dismal performance in 1977.

4.4.1 Operating Analysis

Bethlehem did better in 1978 compared to 1976 and 1977 as did most of the steel companies. The large jump in sales to assets indicates Bethlehem's good performance came mostly through larger sales volume, and production was reportedly over 90 percent of capacity. The company continued to lose money at its Sparrows Point marine construction operations because it lacked major new bookings for tankers, barges, and containerships. Bethlehem also had a good year in 1979 with plants operating at about 87 percent of capacity.

Bethlehem's products, oriented toward business spendings, will reportedly give it an advantage over its competitors in the next few years if major capital spending increases as predicted. The stock is being recommended for long-term growth by some counselors. (See Figure 4-7.)

4.4.2 Capital Analysis

The closing of some steel facilities by Bethlehem in 1977 resulted in a substantial increase in debt and decrease

Company Bethlehem Steel Corp. **County** Cambria **Plant Size** ______

Plant Johnstown **Congressional District** ______

Address Johnstown, PA 15907 **Standard Metropolitan Statistical Area** 21 **No. of Employees** 12,800

Telephone 814-533-7441 **Primary SIC Code(s)** 331221, 331244, 331250, 331290

Products (Automotive)	Capacity/Day	Processes Used	Consumed by (Automotive)
Steel ingots, hot-rolled steel bars and bar shapes, steel wire, steel press and hammer forgings Activity: Mfg.	1.2 million tons	Blast furnaces and basic oxygen furnaces Blooming mills	N.C.A.

FIGURE 4-6. JOHNSTOWN PLANT DATA

Year	Sales ($Millions)	Earnings ($Millions)	Return on Equity, Percent	Operating Income* / Sales Percent
79	7,137	276	11.2	10.4
78	6,185	225	9.9	10.8
77	5,370	(448)	-	4.1
76	5,248	168	6.3	9.3
75	4,977	242	9.5	10.6
74	5,381	342	14.4	14.9

Year	Earnings / Total Assets Percent	Sales / Assets	Earnings / Sales Percent
79	5.5	1.41	3.9
78	4.6	1.28	3.6
77	-	1.00	-
76	3.4	1.06	3.2
75	5.3	1.08	4.9
74	7.6	1.19	6.4

*Operating Income = Sales – Cost of Goods Sold – Selling, General and Administrative Expenses, Before Depreciation, Interest, and Income Taxes.

FIGURE 4-7. OPERATING ANALYSIS OF BETHLEHEM STEEL in equity as a liability account was set up to cover future closedown costs (mostly pension expenses). To decrease its outstanding debt and build working capital, Bethlehem curtailed capital expenditures for 1978 and 1979. The good cash flow in 1978 and 1979 allowed Bethlehem to increase its working capital by $291 million and decrease long-term debt by $147 million. This let to a drop in debt to capitalization from 35 to 28 percent. (See Figure 4-8.) Capital expenditures are scheduled to increase to $550 - $600 million in 1980.

During 1978 Bethlehem fully repaid $150 million outstanding under its bank revolving credit agreement. Also in 1978 Bethlehem sold $64 million in bonds under three separate issues to finance environmental control facilities. In each case a local government was the issuer of the bonds and Bethlehem agreed to make all payments. The projects covered were a water treatment facility at the Johnstown plant, air control devices at the Burns Harbor plant, and air and water pollution control facilities at the Bethlehem plant.

4.5 RESEARCH AND DEVELOPMENT

Although Bethlehem's research and development efforts, as do those of all steelmakers, concentrate heavily on creating or discovering new steel products or new uses of existing products, the main thrust of their efforts is currently aimed at refining and improving the steelmaking process. Bethlehem R&D personnel are expending considerable effort on improving plant and equipment productivity, greatly increasing energy efficiency through new or altered processes, and in improving the quality of the raw materials that go into the making of steel.

R&D efforts in 1979 resulted in a new immersion technique for coating one side of a steel strip. The process is designed to reduce operating costs and capital investments in producing one-sided coating. R&D expenditures were about $41 million in 1979, up slightly from $37 million in 1978.

4.6 GOVERNMENT AND LABOR RELATIONS

During 1979, a consent decree and agreement on air quality compliance for steelmaking facilities at the Johnstown plant was signed by Bethlehem, the U.S. Environmental Protection Agency, the U.S. Department of Justice and the Pennsylvania Department of Environmental Resources,

			Sources			
Year	Sales	P/E Ratio[1]	Earnings	Depreciation	Changes in Long-Term Debt	Changes in Owners' Equity Other Than Retained Earnings
79	7,137	3.1	276	351	8	0
78	6,185	4.5	225	322	(155)	0
77	5,370	5.2	(448)	300	131	0
76	5,248	4.9	168	276	166	0
75	4,977	8.1	242	234	209	0
74	5,381	7.1	342	211	(15)	0

		Uses					
Year	Change in Working Capital	Capital Expenditures	Dividends	$\frac{\text{Long-Term Debt}^2}{\text{Capitalization}}$ %	Coverage[3]	$\frac{\text{Cap. Exp.}}{\text{Total Assets}}$ %	Current Ratio
79	210	419	66	28.0	9.3	8.3	1.8
78	81	399	44	29.8	7.8	8.1	1.6
77	(356)	532	66	34.6	2.7	10.8	1.5
76	204	396	87	25.5	6.3	8.3	2.1
75	18	674	120	23.0	8.4	14.8	1.9
74	(13)	524	100	19.3	18.2	12.6	1.6

Dollar figures are in millions

[1]Average for the Year

[2]Capitalization Defined as Total Liabilities – Current Liabilities

[3]Operating Profit/Interest

FIGURE 4-8. CAPITAL ANALYSIS OF BETHLEHEM STEEL and approved by the United States District Court for the Western District of Pennsylvania. The compliance plan calls for Bethlehem to install an electric melt shop with two furnaces to replace the Johnstown plant's existing coke oven battery, blast furnace, open hearth furnaces and sinter plant. This new facility is expected to cost about $110 million, of which approximately $18 million will be for environmental quality controls designed to comply with state and Federal air emission standards. Under the terms of the agreement, shutdown of the existing facilities is to take place within six months of the date of start-up of the electric furnace melt shop,but no later than Dec. 31, 1982. Under a separate settlement agreement with the Pennsylvania Department of Environmental Resources, Bethlehem paid $100,000 to Pennsylvania's Clean Air Fund in January 1980 in settlement of all claims by the Department of Environmental Resources under previous orders pertaining to the facilities that will be shut down.

Bethlehem's steelworkers and non-exempt salaried employees received wage increases, together with cost-of-living adjustments and increased costs of employee benefits. This resulted in a total increase in average hourly employment costs for the year 1979 of approximately $1.40 over the average for 1978. And Bethlehem, as one of a group of nine steel companies, reached a new collective bargaining agreement with the United Steelworkers of America in April of 1980 to replace the agreement that would have expired on August 1, 1980. Negotiations on local issues continued after settlement of the basic agreement, although all local issues were eventually resolved at the last of Bethlehem's 23 operations covered by the basic collective bargaining agreement.

5. JONES & LAUGHLIN STEEL

The acquisition of Lykes Corporation by LTV Corporation, two multi-industry conglomerates, brought together the steelmaking operations of Jones & Laughlin Steel (LTV) and Youngstown Sheet and Tube (Lykes) on December 8, 1978. With a combined capacity of 12 million tons of steel per year, Jones & Laughlin (the YS&T identification has been dropped) became the third largest steel producer in the U.S.

Jones & Laughlin (J&L) is now far and away the largest subsidiary operation of Dallas-headquartered LTV, which is also parent to a number of other subsidiary companies engaged in meat and food products, aerospace, ocean transportation and oilfield equipment and supply. LTV executives say the J&L/YS&T combination was sought to strengthen LTV's position in the steel industry. LTV management feels the merger was the best means available to achieve the production and other efficiencies LTV needed to improve its steel profit margins. The merger also equips the company to compete more successfully within the domestic steel industry, and to compete with the continuing record flow of imported steel.

5.1 CORPORATE SIZE AND STRUCTURE

With the merger of the two former competitors, J&L and Youngstown, consolidation pared the combined work force considerably. Further consolidation will include cooperation and interchange between plants which were former competitors.

5.1.1 Revenue, Profit and Employment Statistics

J&L and Youngstown were merged officially the beginning of 1979. The combined J&L and Youngstown steelmaking operations recorded net income of $170.7 million on sales of $4.2 billion in 1979. This is a considerable improvement over 1978, when the two steelmakers operating separately recorded an aggregate net loss of $93 million on gross sales of $4.3 billion. (See Table 5-1.)

TABLE 5-1. JONES & LAUGHLIN STEEL AND YOUNGSTOWN SHEET & TUBE REVENUES, PROFIT AND EMPLOYMENT

Revenues (000)		Profits (000)	
Combined			
1979:	$4,174,700	1979:	$ 170,700
Jones & Laughlin Steel			
1978:	$2,573,577	1978:	$ 67,300
Youngstown Sheet & Tube			
1978:	$1,700,000	1978:	$(160,600)
Average Employment: 26,200 (1979)			

5.1.2 Corporate Organization

Headed by Thomas C. Graham, president and chief executive of J&L, LTV's basic steelmaking operations are structured into three divisions: Eastern, Central and Western (see Figure 5-1). The Eastern Division encompasses the Aliquippa works and the Pittsburgh works in western Pennsylvania. The Central Division includes the Cleveland works in Ohio. The Indiana Harbor works in East Chicago, Indiana, and the Hennepin, Illinois, works comprise the Western Division.

Each division has its own president and, according to J&L's 1978 annual report, "This decentralized operating structure is designed to assure maximum efficiency and flexibility, stringent quality control, high productivity, quick responsiveness, and optimum customer service." J&L officials, however, also stress the need for coordination of multiple operations, and this has led to considerable criss-crossing of lines of command. The distribution of flat rolled products, for example, is centrally controlled since hot rolled sheets, cold rolled sheets and galvanized sheets are produced in many different locations.

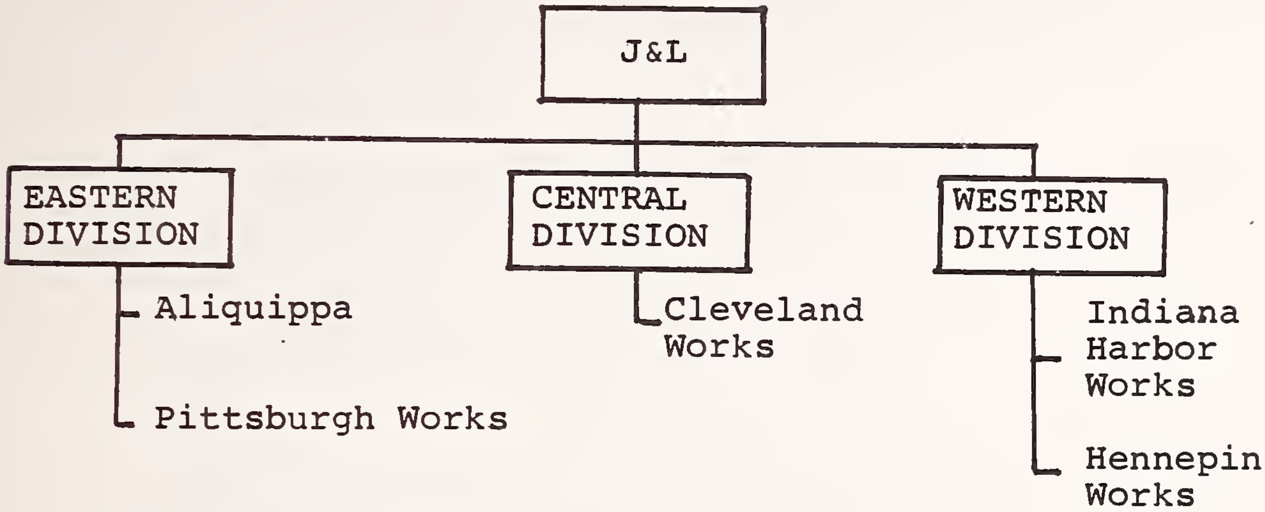

FIGURE 5-1. JONES & LAUGHLIN CORPORATE STRUCTURE

5.2 MAJOR MARKET AND PRODUCTS

J&L and Youngstown steel operations produced 11.5 million tons of raw steel in 1979, and shipped 8.5 million tons. The steelmaker's largest customer, General Motors, accounted for 9 percent of J&L's gross sales in dollars. In 1975, 1976, 1977 and 1978, GM absorbed 8, 11, 10 and 10 percent respectively.

5.2.1 Major Markets

The automotive industry is a primary market for J&L products. During 1979, sales to the automotive industry accounted for 24 percent of J&L product distribution (in tons). The automotive market, again in terms of product distribution, remains the largest single market for J&L products. Other major markets include appliance manufacturers, building and construction, medium and heavy trucks, railroads, tool and equipment manufacturers, and oil field operators. The oil field sales market segment has proven particularly important within the past year, as domestic drilling activity has accelerated to record levels. Sales in this area have taken up much of the slack within the company's steelmaking operations resulting from the decline in automotive sales. (See Figure 5-2 for market summary.)

MARKET DATA	
Major markets:	Automotive, light, medium and heavy truck, building and construction, railroad, appliances, tools and equipment
Percent of sales to the automotive industry:	Approximately 24 percent
Supplies to the following automotive companies:	Ford, GM, Chrysler, Kelsey-Hayes, various other automotive manufacturers
Major products:	Hot and cold rolled steel sheet, steel slab, HSLA steels, steel bars and plates, pipes and tubing, structural steel

FIGURE 5-2. JONES & LAUGHLIN MARKET DATA

5.2.2 Products

Major automotive products produced by J&L include hot and cold rolled carbon sheet steels, steel bars, high strength/low alloy steels, and galvanized carbon steels. The major product purchased by the automakers was, and continues to be, flat rolled sheet produced at J&L's Cleveland, Hennepin and Indiana Harbor plants. Demand for flat rolled products (which now constitute 65 percent of all J&L production), particularly from the automotive market, enabled J&L's Cleveland and Hennepin plants to operate at full capacity throughout 1978.

Sales Strategy

With the merger of the two companies, J&L developed a whole new sales strategy. Built around a theme proclaiming "J&L—The New Strength in Steel," the strategy stresses "Stronger Steels So That Cars Can Weigh Less."

Stressing that Jones & Laughlin's and Youngstown's "experience...in supplying automotive steels pre-dates the Winton," J&L asserts that the two now operating as a single business is a new strength for Detroit.

"Of special significance to car and truck makers is the location and complementary product mix of the Cleveland, Hennepin and Indiana Harbor plants, each less than a day's shipping time away from most automotive manufacturers," J&L states in its advertising to the automotive community.

But J&L also stresses the wide variety of its steels and what they can do for Detroit. "Perhaps the most important advantage J&L offers Detroit is its innovative technology, particularly its leadership in producing stronger steels, so that American cars can weigh less while remaining price competitive," J&L ads proclaim.

Adding that it is dedicated to achieving the number one position in quality and service, J&L offers Detroit "easy access to a broad range of products from a single, reliable new source, drawing upon an annual capacity in excess of 12 million ingot tons, 71 percent of it in flat-rolled steel products."

New Product Plans

J&L is concentrating on strong, lightweight steels for new product development. They recently introduced Van QN steel, a dual-phase steel designed to fit into Detroit's lightweight requirements. They also recently introduced a new line of high strength,cold finished bars.

Another HSLA steel, Van Q80, was introduced in early 1980. This configuration is even stronger than their Van QN, J&L claims.

5.2.3 Marketing Strategy

J&L's marketing strategy is to take full advantage of the combined strengths and efficiencies the merger has given them. Statements by J&L executives and J&L advertisements tout the benefits of the tandem operation of the Indiana Harbor and East Chicago plants and the Hennepin, Illinois,finishing plant, made possible by the J&L/YS&T merger. J&L president Graham feels* that the operation of the two midwest plants in tandem (Indiana Harbor feeding hot bands to Hennepin) will enable J&L's Cleveland plant to devote its entire output of about 200,000 tons per month to Detroit and the East. Previously, Cleveland supplied Hennepin with hot bands at the rate of 60,000 to 80,000 tons per month. Now the Indiana Harbor plant (a former YS&T operation) will supply Hennepin with the hot bands formerly furnished by Cleveland, saving an estimated $5 to $6 a ton in shipment costs. Another benefit of the merger, according to Graham, was the acquisition of "a 72-inch galvanizing line at Indiana Harbor which gives us better access to the automotive market for galvanized sheet."

"With the combined capabilities of the two companies, we will be among the leading producers of hot and cold rolled sheet, galvanized sheet, tin mill products, seamless and continuous weld pipe, cold finished bars, and stainless sheet and strip. With competitive ingot costs, with our facilities effectively rationalized, and with our increased marketing power, we will be a vigorous competitor in all these product lines in the marketing areas we are geared to serve," Graham said.*

5.3 PRODUCTION AND OPERATIONS

The principal operating activity since the J&L/YS&T merger has been a concerted effort to mesh the combined operations under one management. J&L is rearranging supply routes, reducing mining operations in Minnesota, shutting down the sinter plant at its Aliquippa facilities, and otherwise offsetting one firm's weaknesses by the other's strengths.

5.3.1 Major Automotive Facilities

Three of J&L's facilities are heavily involved in automotive steels. These are the Cleveland plant, the Indiana Harbor works, and the finishing plant at Hennepin. Data on these plants is provided below and in Figures 5-3, 5-4 and 5-5.

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* Presentation to New York Society of Securities Analysts, March 30, 1979.

Cleveland Works

J&L's Cleveland works employs 4,600 and ships well over 50 percent of its production to automotive consumers. Utilizing basic oxygen and electric furnaces, Cleveland can produce 3.1 million tons of steel annually. Finishing operations include hot and cold rolling mills, slabbing mills and blooming mills. Principal products are hot and cold rolled sheet and strip, steel plate, and high strength/low alloy steels.

Indiana Harbor

Indiana Harbor employs a work force of 8,000 and is equipped with basic oxygen and electric furnaces, blooming mills and slabbing mills, hot and cold rolling mills, a strip mill, tin mills and a 72-inch galvanizing line. Its principal products are hot rolled sheet and strip, galvanized sheet, steel pipes and tubes. Its rated capacity is four million tons of steel annually.

Hennepin Works

Hennepin is strictly a finishing plant and produces no raw steel. Employing a work force of 800, Hennepin's equipment includes a pickling line, rolling mills, temper mill, galvanizing line, slitting line and corrugating equipment. Principal products are hot and cold rolled sheet and strip, and galvanized sheet steel.

5.3.2 New Plants and Expansions

Capital spending for steel operations during 1979 totaled $279.6 million.

Part of the expenditure went to the completion of the electric furnace shops at the Pittsburgh Works. The new units can provide 1.8 million tons of raw steel per year, all of it from scrap.

Another major project was the modification of the billet mill at the Aliquippa Works which will enable that unit to provide rounds for operations throughout the corporation making seamless tubular products for the oil and gas industry. By producing all of the company's rounds at Aliquippa, J&L feels it will be able to more fully utilize raw steelmaking capabilities in the Eastern Division and take advantage of the higher quality steel produced in the new electric furnaces.

Company Jones and Laughlin

County Cuyahoga

Plant Size ______ (Also Central Div. Hqtrs.)

Plant Cleveland

Congressional District ______

Address 3341 Jennings Road
Cleveland, Ohio 44101

Standard Metropolitan Statistical Area 35

No. of Employees 4,590

Telephone ______

Primary SIC Code(s) 331270, 331231, 331241

Products (Automotive)	Capacity	Processes Used	Consumed by (Automotive)
Cold rolled sheet & strip Hot rolled sheet & strip Steel plate {carbon grades {high strength {alloy	3.1 million tons/yr.	Basic oxygen furnaces Electric furnaces Slabbing mill Strip mill Cold mills	Cold rolled sheet & strip Hot rolled sheet & strip (50-65% of this goes to automotive)

FIGURE 5-3. CLEVELAND PLANT DATA

Company Jones and Laughlin | County Lake | Plant Size

(Also Western Div. Hqtrs.)

Plant Indiana Harbor | Congressional District

Address 3001 Dickey Road, East Chicago, IN 46312 | Standard Metropolitan Statistical Area 89 | No. of Employees 8,000

Telephone (219) 398-2000 | Primary SIC Code(s) 331231, 331260

Products (Automotive)	Capacity	Processes Used	Consumed by (Automotive)
Hot rolled sheet & strip Galvanized sheet Steel pipes and tubes	4.5 millions tons/yr.	72" galvanized line Slabbing mill Strip mill Cold mills Seamless tube mill Basic oxygen furnaces Blast furnaces Coke plant Tin mills Blooming mill	Hot rolled sheet & strip Galvanized sheet

FIGURE 5-4. INDIANA HARBOR PLANT DATA

Company Jones and Laughlin

County Putnam

Plant Size

Plant Hennepin

Congressional District

Address Box 325
Hennepin, IL 61327

Standard Metropolitan Statistical Area 155

No. of Employees 800

Telephone (815) 925-2311

Primary SIC Code(s) 331270, 331231

Products (Automotive)	Capacity	Processes Used	Consumed by (Automotive)
Cold rolled sheet & strip Hot rolled sheet & strip Galvanized sheet	Finishing plant - does not produce raw steel - presently supplied hot bands by Indiana Harbor and Cleveland plants.	Pickle line Tandem mill Temper mill Batch anneal Galvanized line Shear line Slitting line Corrugator Rolling mills	Cold rolled sheet & strip Hot rolled sheet & strip Galvanized sheet

FIGURE 5-5. HENNEPIN PLANT DATA

In the Specialty Steels Division, a new anneal and pickle line was brought on stream at Louisville, Ohio, and has increased shipping capacity for stainless steel at that plant by 10 percent. A new oscillator, the second of its kind in the country, was installed at the Youngstown strip plant.

5.4 FINANCIAL STATUS

The merger between LTV and Lykes has not fundamentally altered the financial situation of LTV. The company will not be able to easily sustain large losses.

5.4.1 Operating Analysis

Before the acquisition of Lykes, LTV was having fluctuating earnings and a low return on sales compared to most of the steel industry. (See Figure 5-6.) Youngstown had large losses in 1977 and 1978. In 1979, earnings for the combined corporation were $147 million indicating that the merger was a success. Results for the year reflected favorable demands and pricing trends for domestic steel as well as efficiencies from the merger of J&L and Youngstown.

5.4.2 Capital Analysis

LTV increased its long-term debt in 1976 and did not increase retained earnings considerably from 1976-1978. Thus the company did not significantly change its debt to capitalization ratio from 70 percent which is high for the steel industry. (See Figure 5-7.)

The acquisition of Lykes was done through the issuance of $168 million in stock. This increased the company's stockholders' equity by almost 50 percent. The company also assumed $865 million in long-term debt obligations. About $200 million of this is an estimated liability for plant closings by Lykes in 1977 and 1978. The increase in debt and equity has left LTV in about the same position in its debt to capitalization ratio as before the merger. The merger with Lykes also increased LTV's property by about 60 percent and increased working capital by $398 million or 20 percent. The current ratio has not been significantly changed.

Thus the merger has enlarged LTV but has not fundamentally changed its current financial situation. The company does not have a lot of financial flexibility and large capital expenditures have not been announced for 1979. The company is instead concentrating on consolidating its present operations. A rapid success from the merger is important to the long-run health of this company.

Year	Sales ($Millions)	Earnings ($Millions)	Return on Equity, Percent	Operating Income* / Sales, Percent
79**	7,997	147	39.3	5.2
78**	5,278	39.6	4.1	3.4
77	4,703	(22.9)	-	2.1
76	4,497	30.7	7.6	3.5
75	4,312	13.1	3.3	3.0
74	4,768	85.7	35.3	7.4

Year	Earnings / Total Assets, Percent	Sales / Assets	Earnings / Sales, Percent
79**	3.8	2.1	1.8
78**	0.6	1.5	0.4
77	-	2.3	-
76	1.4	2.1	0.7
75	0.6	2.2	0.3
74	4.3	2.3	1.8

*Operating Income = Sales – Cost of Goods Sold – Selling, General and Administrative Expenses, Before Depreciation, Interest, and Income Taxes.

** Reflects merger.

FIGURE 5-6. OPERATING ANALYSIS OF LTV

			Sources			
Year	Sales	P/E Ratio[1]	Earnings	Depreciation	Changes in Long-Term Debt	Changes in Owners' Equity Other Than Retained Earnings
79[4]	7,997	2-1	147	132.4	(30)	4
78[4]	5,278	13-5	39.6	83.2	27	1
77	4,703	-	(22.9)	65.1	(125)	(6)
76	4,497	8-4	30.7	64.6	216	21
75	4,312	19-8	13.1	56.7	(3)	14
74	4,768	2-1	85.7	84.8	35	24

		Uses					
Year	Change in Working Capital	Capital Expenditures	Dividends	Long-Term Debt[2] / Capitalization %	Coverage[3]	Cap. Exp. / Total Assets %	Current Ratio
79[4]	95	326	12.6	68	2.3	8.6	1.7
78[4]	66	625	5	74**	1.8	21.6	1.6
77	(143)	80	2.5	72	1.05	3.8	1.5
76	149	141	0*	72	1.7	6.9	1.8
75	(187)	238	0*	69	1.4	11.9	1.4
74	94	126	0*	70	4.0	6.5	1.7

Dollar figures are in millions

[1] Range for the Year

[2] Capitalization Defined as Total Liabilities – Current Liabilities

[3] Operating Profit/Interest

[4] Post-merger

* Common only

** Includes plant closing and employee compensation in long-term debt

FIGURE 5-7. CAPITAL ANALYSIS OF LTV

5.5 RESEARCH AND DEVELOPMENT

J&L reports its direct expenditures for research and development as "nominal" in 1979, and concentrated primarily on improving current steelmaking operating and quality control problems, plus the development, testing, refinement and marketing of new grades, qualities and characteristics of its steel products. Overall, LTV spent nearly $30 million on R&D in 1979.

5.6 GOVERNMENT AND LABOR RELATIONS

Jones & Laughlin and LTV have negotiated a broad cleanup agreement for five of its facilities with the Environmental Protection Agency. Covering plants in Pennsylvania, Ohio and Indiana, the new agreement has been valued at anywhere from $80 million to $175 million. When current or recent projects are added, the total pollution bill for Jones & Laughlin will be on the order of $250 to $300 million. Part of the broad program is a separate agreement with the Pennsylvania Department of Environmental Resources. This calls for additional water controls at J&L's Pittsburgh and Aliquippa plants. It also called for the payment of $934,000 in fines for water pollution. The actual control technology to be used and the exact cost are still under study, J&L reports.

Jones & Laughlin, as did other major steelmakers, negotiated another long-term contract with the United Steelworkers (USW) in the spring of 1980. The steel industry's Experimental Negotiating Agreement (the "ENA") was applicable to the 1980 contract negotiations. Under the ENA, the parties agreed that there would be final and binding arbitration for unresolved collective bargaining issues and that there would be no industry-wide strike or lockout in support of their respective bargaining positions. However, the USW retained the right to strike and the companies retained the right to lockout on an individual plant basis with respect to local issues. The purpose of the ENA is to eliminate the cyclical changes in shipments and production which normally occurred in contract negotiating years as a result of foreign and domestic hedge buying by steel users in anticipation of a possible strike. Although 1980 contract negotiations were conducted within the ENA guidelines, no decision was reached immediately on continuance of the ENA agreement.

6. ARMCO INCORPORATED

Armco Inc. is a fully integrated producer of steel and related products and a major supplier to the automotive community. Armco has made technical innovation a hallmark of its operations, and recently developed a process to coat steel with zinc on one side only, a real plus for automotive use.

Armco is continually strengthening its nonsteel operations more rapidly while keeping steel production growth strong, but not spectacular, and improving internal operating procedures to improve operating margins.

6.1 CORPORATE SIZE AND STRUCTURE

Armco is one of the ten largest steelmakers in the U.S., with shipments of eight million net tons in 1979.

6.1.1 Revenue, Profit, and Employment Statistics

Armco's sales in 1979 were $5.0 billion, up from $4.4 billion in 1978. Profits were $221 million, up from $198 million in 1978. The firm employed about 54,800 persons in 1979. (See Table 6-1.)

TABLE 6-1. ARMCO INC.
REVENUES, PROFIT, AND EMPLOYMENT

Year	Revenues (Millions)	Profits (Millions)
1979	$5,035.1	$221.0
1978	$4,357.3	$198.3
Average Number of Employees: 54,822 (1979)		

6.1.2 Corporate Organization

Armco's corporate structure is decentralized. At the top is a four-man corporate executive office. Group vice presidents report directly to the president, who is chief operating officer. Directly above the president is the chief executive officer, who reports to the chairman of the board. Below this level are Armco's seven operating divisions (Armco calls them companies). Each of these is a self-contained business, fully capable of running by itself.

The divisions are:

- <u>Oilfield Equipment and Production</u>, which makes oil and gas drilling rigs and equipment
- <u>Fabricated Metal Products</u>, which manufactures building systems and drainage pipe
- <u>Industrial Products and Services</u>, whose products include fiberglass-reinforced plastic products
- <u>Financial Services</u>, including property and casualty insurance
- <u>Carbon Steel Products</u>, which makes flat-rolled carbon steels, high strength/low alloy (HSLA) steels and structural products
- <u>Specialty Steel Products</u>, including stainless and electrical steels
- <u>Material Resources</u>, which mines coal and iron ore and quarries limestone.

In March of 1980 the diversified steelmaker sold Bathey Manufacturing Co., a subsidiary producing welded wire containers used in automotive parts storage, for an undisclosed price to an unnamed buyer.

6.2 MAJOR MARKETS AND PRODUCTS

Armco's single largest market in 1979 was the construction industry, replacing the automotive community for the first time in many years. And Armco also shipped more steel to steel service centers in 1979 than it did to either automotive or construction. Other markets are detailed below. (See Figure 6-1.)

6.2.1 Major Markets

Armco's major markets include: automobile and light truck, medium and heavy truck, consumer durables, building and construction, railroads, oil drilling and oilfield operation, agricultural and off-highway equipment. The automotive community accounts for more than 20 percent of Armco's steel sales. Major automotive customers are the "Big 3" automakers plus innumerable independent automotive suppliers.

MARKET DATA

Major markets:	Automotive, building and construction, consumer durables, railroad, oil drilling, off-highway, other transportation such as light and heavy truck
Percent of sales to the auto industry:	20 percent
Supplies to the following automotive companies:	GM, Ford, Chrysler, independent suppliers
Major products:	Hot and cold rolled sheet steel, structural steel, oilfield equipment; specialty steels, industrial plastics

FIGURE 6-1. ARMCO MARKET DATA

6.2.2 Products

Major automotive products made by Armco include hot and cold rolled sheet carbon steel, HSLA steel, and carbon steel galvanized on one side (Zincgrip).

Armco's Zincgrip is a major technological breakthrough and gives Detroit a steel that is corrosion-resistant on the inside but highly paintable on the outside. The automotive demand for the product is greater than Armco can supply, and the company is currently licensing the process to other steelmakers.

6.2.3 Marketing Strategy

Ten years ago Armco (originally the American Rolling Mill Company) began a major diversification program designed to take the company into business areas other than steel, which has been virtually its only product since the company's founding at the turn of the century. Today Armco is still primarily a producer of carbon and specialty steels, but is even more vigorously pursuing a strategy of building up its nonsteel-producing operations more rapidly than its steelmaking operations. Armco stresses that this is not a pullback from steel, but rather a strengthening of its other markets. Overall corporate strategy is to shift its product mix toward its most profitable businesses while working to improve individual segment performances as well. Specifically, the firm intends to reduce carbon steel from 63 percent of Armco's asset mix to 45 percent, while increasing specialty steels to 12 percent. Other nonsteel divisions are expected to grow as well.

6.3 PRODUCTION AND OPERATIONS

Virtually all of Armco's sales to the automotive market are from the carbon steel division, and this firm operates major carbon steel plants in the U.S.: Ashland, Kentucky; Ambridge, Pennsylvania; Houston, Texas; Ishpeming, Michigan; Kansas City, Missouri; Marion, Ohio; Middletown, Ohio; and Sand Springs, Oklahoma.

6.3.1 Major Automotive Facilities

Two of these plants, Ashland, Kentucky, and Middletown, Ohio, produce and ship nearly all of Armco's automotive steels. Roughly 40 percent of each of these plants' shipments are to automotive customers. Information on the plants is given in Figures 6-2 and 6-3.

Ashland Works

Armco's huge plant at Ashland, Kentucky, employs 4,800. Its primary products are raw steel from blast furnaces and basic oxygen vessels, steel ingot, hot and cold rolled steel sheet and strip and steel plate. The facility produces 2.2 million tons of raw steel annually, and is capable of producing 5.8 million tons of finished steel annually.

Company Armco Steel Co. | County Boyd | Plant Size

Plant Ashland Works | Congressional District

Address Winchester Avenue, Ashland, KY 41101 | Standard Metropolitan Statistical Area 19 | No. of Employees 4,800

Telephone (606) 329-7111 | Primary SIC Code(s) 331231,331270,331241,331221

Products (Automotive)	Capacity /year	Processes Used	Consumed by (Automotive)
Hot-rolled steel sheet, and strip Cold-rolled steel sheet, and strip Steel plate Steel ingots Activity: Mfg.	2,200,000 tons - raw 5,750,000 tons - rolled	Raw steel is produced by blast furnaces or basic oxygen furnaces. This steel (and raw steel from other facilities) is then hot and cold rolled into steel sheet, strip and plate.	N.C.A.

FIGURE 6-2. ASHLAND, KY, PLANT DATA

Company Armco Steel Co. County Butler Plant Size 2,600 acres

Plant Middletown Works Congressional District

Address P.O. Box 600
Middletown, OH 45042 Standard Metropolitan Statistical Area 17 No. of Employees 7,000

Telephone (513) 425-6541 Primary SIC Code(s) 331231,331232

Products (Automotive)	Capacity/year	Processes Used	Consumed by (Automotive)
Hot-rolled steel, sheet and strip Galvanized pipe and tubing Cold-rolled steel, sheet and strip Activity: Mfg.	3,500,000 tons-raw 11,075,000 tons - rolled	Raw steel is produced in blast furnaces or basic oxygen furnaces, is continuous cast and then hot and cold rolled (along with steel from other facilities) into sheet and strip. Some steel is galvanized.	N.C.A.

FIGURE 6-3. MIDDLETOWN, OH, PLANT DATA

Middletown Works

Armco's sprawling Middletown, Ohio, works is the firm's major shipper to the automotive community. Capable of producing 3.5 million tons of raw steel and 11 million tons of finished steel annually, the plant employs 7,000. Its major processes include blast and open hearth furnaces, basic oxygen vessels, continuous casting, hot and cold rolling of sheet, and galvanizing.

6.3.2 Plant Expenditures

Armco's overall capital expenditures in 1979 were $162 million. Much of this is being devoted to improving plant efficiency. Armco has installed two large new coke batteries at the Middletown plant, greatly increasing its capacity and efficiency.

During 1980, major work will be performed on the new continuous caster complex at Armco's Butler, Pennsylvania, works. This project is destined to go on line in 1982. Then all of Butler's output will be created by continuous casting, considered by Armco the most efficient means of producing steel. Other 1980 capital projects include a new top-charge electric furnace, due around mid-year, for Armco's Baltimore works, plus an additional vacuum remelt furnace at Baltimore.

6.4 FINANCIAL STATUS

Armco has had fairly steady performance over the last five years.

6.4.1 Operating Analysis (See Figure 6-4.)

Armco's diversification has allowed it to have smaller fluctuations in earnings in the last five years than did the other steel companies. The increase in earnings in 1979 was due largely to good steel performance. Steel orders have so far continued strong in 1979. The other strong performing group for Armco in 1978 was oilfield equipment and supplies.

Armco states that its financial goals include a return on equity of 15 percent. To do this, the company plans to emphasize its nonsteel businesses in future growth plans.

Year	Sales ($Millions)	Earnings ($Millions)	Return on Equity, Percent	Operating Income* / Sales Percent
79	5,035	221	13.5	10.2
78	4,357	198	13.1	11.5
77	3,549	120	8.1	7.5
76	3,151	120	8.5	7.6
75	3,047	117	8.7	9.8
74	3,190	204	17.0	14.2

Year	Earnings / Total Assets Percent	Sales / Assets	Earnings / Sales Percent
79	7.0	1.59	4.4
78	6.7	1.45	4.6
77	4.18	1.23	3.4
76	4.22	1.11	3.8
75	4.45	1.17	3.8
74	8.06	1.26	6.4

*Operating Income = Sales – Cost of Goods Sold – Selling, General and Administrative Expenses, Before Depreciation, Interest, and Income Taxes.

FIGURE 6-4. OPERATING ANALYSIS OF ARMCO

6.4.2 <u>Capital Analysis</u> (See Figure 6-5.)

Armco has had relatively low capital expenditures in recent years compared to earlier levels. The company has not had a major stock offering in the last five years, but increased its long-term debt in 1975 and 1976. The debt-to-capitalization ratio has gone from a high of 30 percent in 1976 to 23 percent in 1979, and dividends have been virtually constant. Armco is expected to increase its capital expenditures in the next few years, especially in its nonsteel businesses.

6.5 RESEARCH AND DEVELOPMENT

Research and development expenditures in 1979 were $26.2 million. R&D is closely related to the marketing of new products such as Zincgrip and refined HSLA steels. But R&D is also directed increasingly at helping this steelmaker to meet energy constraints and stringent government environmental and safety restrictions, and to boost quality control. Armco is stressing better measurement techniques for environmental and safety hazards. The firm is also attempting to develop a new strain of bacteria to consume this waste. In addition, Armco has spent $310.7 million to install pollution control systems, and has been labeled by some observers as the "cleanest steelmaker in the U.S."

Continuing at Armco is research on new refractories. A chemically bonded brick has been developed for open hearth endwalls and electric furnaces. This can be installed and then fired in the furnace. A big effort is directed toward improving iron ore quality. "We are working with all of our suppliers to improve the quality of the pellets. We are looking particularly to going to prefluxed pellets," reported an Armco official. Through simulations in the laboratory and live tests at Armco's Ashland, Kentucky, plant, the company is studying the behavior of charge materials in the blast furnace. It is also evaluating the concept of injection steelmaking.

Armco is also attempting to develop extra-clean uncoated carbon sheet, primarily for automotive consumption.

6.6 GOVERNMENT AND LABOR RELATIONS

Armco, as did other major steelmakers, signed a new contract with the United Steelworkers of America in April of 1980, averting a strike and securing a settlement over

			Sources			
Year	Sales	P/E Ratio[1]	Earnings	Depreciation	Changes in Long-Term Debt	Changes in Owners' Equity Other Than Retained Earnings
79	5,035	5.1	221	141	(38)	7
78	4,357	4.6	198	131	(27)	(25)
77	3,549	7.1	120	111	(24)	(3)
76	3,151	8.3	120	108	81	13
75	3,047	7.5	117	107	117	(7)
74	3,190	3.3	204	102	(74)	(8)

		Uses					
Year	Change in Working Capital	Capital Expenditures	Dividends	Long-Term Debt[3] / Capitalization %	Coverage[2]	Cap. Exp. / Total Assets %	Current Ratio
79	73	162	70	23	9.2	5.1	2.1
78	155	110	64	26	8.6	3.7	2.0
77	(54)	146	60	29	4.0	5.1	1.8
76	(58)	272	60	30	4.4	10.0	2.0
75	19	264	54	28	6.3	10.3	2.4
74	90	105	66	25	10.5	4.2	2.0

Dollar figures are in millions

1 Average for the Year

2 Operating profit/interest

3 Capitalization Defined as Total Liabilities – Current Liabilities

FIGURE 6-5. CAPITAL ANALYSIS OF ARMCO

the next three years. Armco spent $6.3 million in 1979 on Environmental Protection Agency mandated pollution abatement projects. Environmental control projects costing an estimated $10.6 million are slated for 1980.

7. NATIONAL STEEL CORPORATION

One of the top five largest steel producers in the U.S., National Steel has for many years been the steelmaker with the largest percentage of its sales shipped to the automotive community—as much as 30 percent. But National has made a concerted effort to lessen its dependence on automotive sales, and increase its strengths in other areas.

Founded in the Depression and fifty years old in 1979, National is the only major steel producer to earn a profit and pay a dividend throughout the Depression and every year since. This firm, which was formed by the merger of the Weirton Steel Company, Great Lakes Steel Corporation and the M. A. Hanna Company, has historically stressed the latest technology in its steelmaking facilities.

7.1 CORPORATE SIZE AND STRUCTURE

National shipped 8.3 million tons of steel in 1979, a slight increase from 1978's 8.2 million tons.

7.1.1 Revenue, Profits and Employment Statistics

National, traditionally the most automotive-intensive of the nation's major steelmakers, recorded excellent profits in 1979 ($126 million) on sales of $4.2 billion. Profits were up $14 million from 1978, while sales rose $500 million. This was the fourth straight year of rising sales and profits, and National went into 1980 predicting another strong year. But, like most other steelmakers, National was hit hard by the automotive slump. In the first quarter of 1980, National laid off 3,000 steelworkers, two-thirds of them from the Great Lakes Division near Detroit. National shut down three of its ten blast furnaces and began operating the rest at reduced rates. (See Table 7-1.)

Despite this, the company's management is highly positive about the future for their company and the steel industry as a whole. National executives, while conceding that the world steel industry is currently experiencing a glut of capacity, feel the situation will move to a seller's market within a few years, and carry the industry back up with it.

TABLE 7-1. NATIONAL STEEL
REVENUES, PROFIT AND EMPLOYMENT

Year	Revenues (Millions)	Profits (Millions)
1979	$4,234.5	$126.5
1978	$3,750.4	$112.4
Average Number of Employees: 38,755 (1979)		

7.1.2 Corporate Organization

Fifty years after its inception, National still retains the flavor of having been formed from three separate and existing steel companies. Each of its four steel divisions has strong operational autonomy, and its headquarters staff in Pittsburgh is small and specialized.

National's steelmaking divisions are the:

- Weirton Steel Division
- Great Lakes Steel Division
- Midwest Steel Division
- Granite City Steel Division

The midwest facilities are rolling and finishing only, while the other three are fully integrated steelmaking and finishing plants.

Other National operations include:

- National Steel Service Centers which maintains 20 service centers in the Midwest, East and South
- American Steel Corporation which operates a steel finishing and processing plant in Detroit
- Transportation Productions Division which manufactures and distributes flooring for railroad cars and truck bodies

- <u>National Aluminum Corporation</u> which operates aluminum producing and fabricating facilities.

National also owns raw materials mining and transportation operations. An overview of National's corporate organization and structure is given in Figure 7-1.

7.2 MAJOR MARKETS AND PRODUCTS

National's major markets and products are discussed below and summarized in Figure 7-2.

7.2.1 Major Markets

National's major markets are the automotive and container industries. These two markets account for about 22 percent and 20 percent, respectively, of National's total steel shipments. (Ten years ago figures were 31 percent and 25 percent.) Automotive-related customers include the Big Three, as OEMs, plus an array of after-market and component manufacturers. Other outside markets include the tubing industry, appliance manufacturers, the metal building and construction industries, and various others. Additionally, approximately 10 percent of its products are consumed by wholly-owned subsidiaries. National is also engaged in the manufacture and sale of aluminum products, this market accounting for 6 percent of the company's total shipments.

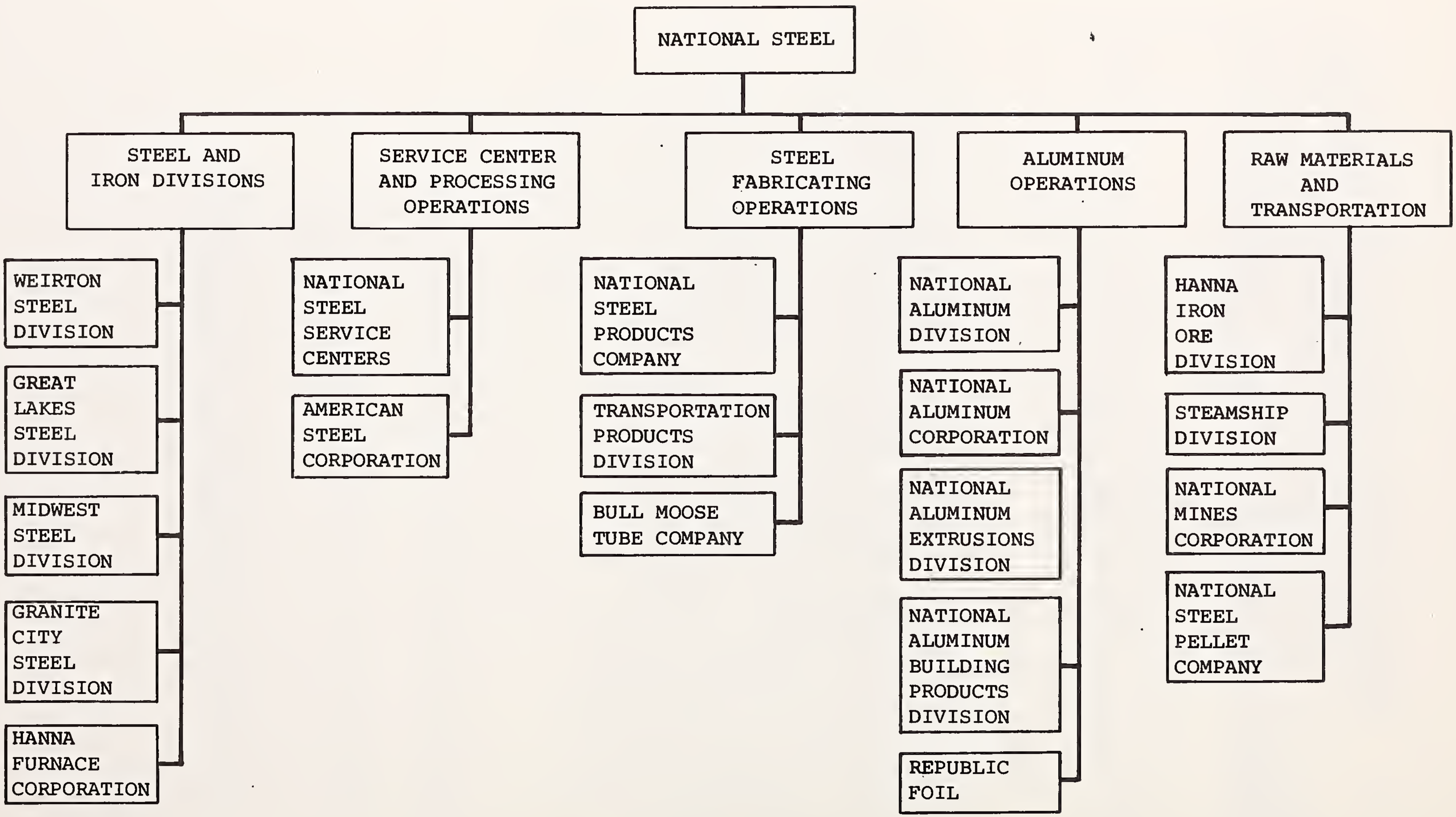

FIGURE 7-1. CORPORATE ORGANIZATION

MARKET DATA	
Major markets:	Automobile, light and heavy truck, containers and packaging, building and construction, appliances, consumer durables, railroad
Percent of sales to the auto industry: 22 percent	
Supplies to the following automotive companies:	Ford, Chrysler, GM, various independent suppliers
Major products:	Hot and cold rolled sheet and strip steel, galvanized sheet steel, hot rolled carbon steel plates, structural steel, high strength/low alloy steels, primary and finished aluminum products

FIGURE 7-2. NATIONAL STEEL MARKET DATA

7.2.2 Products

National's primary products aimed at the automotive community are hot and cold rolled carbon steel sheet and strip, galvanized sheet, steel bar stock and high strength/low alloy (HSLA) steels , plus aluminum products.

Sales Strategy

National markets its steels to the automotive community by promoting their ability to solve the automakers' or auto suppliers' weight and corrosion problems. Billing them as "Diet Steels," or "The Answer Steels," National touts the qualities of its various types of HSLA and specially treated low carbon steels.

National has also developed a hot dip galvanizing process that lays a heavy zinc coating on one side of carbon steel sheet, while laying a much lighter coating on the other side. The steel is then run through the "Unikote" line, where the light coating is electrolytically removed from the steel and deposited on top of the hot-dipped coating. National asserts that this double-coated "Unikote" steel is highly corrosion-resistant while also highly paintable.

New Product Plans

In moves aimed directly at the automotive market, National has become the first domestic licensee of Bethlehem Steel's "Galvalume," a rust-resistant, aluminized sheet steel. And, the firm is experimenting quite seriously with body components made of plastic sandwiched between two thin layers of steel. The intent is to provide superior strength with lighter weight. Once again, National is aiming this directly at the automotive market.

7.2.3 Marketing Strategy

National, more than any other steelmaker, is acutely aware of the cyclical nature of the automobile industry. With more than 30 percent of their shipments going to automotive customers as recently as ten years ago, National felt an urgent need to build up other markets. They have done so, and are continuing their efforts to insulate themselves from the ups and downs of the steel business by diversifying into non-metal areas (such as buying up a major California savings and loan association) and non-steel areas (such as building up the operations of their National Steel Division and National Steel Corporation).

National's chairman, Howard M. Love, emphasized in an address before the New York Society of Security Analysts,* that "National's aim is to maintain a strong position in the automobile and can markets, while decreasing our overall dependence on both." Love indicated that National has made substantial inroads into the tubing industry, the metal building industry, the construction market, and the service center market.

National's overall strategy continues to be diversification into a broader range of businesses and away from excessive dependence on the automotive market. The firm continues to stress the importance—and success—of its National Aluminum subsidiary, especially as automotive use of steel declines while its use of aluminum grows.

* New York, May 31, 1979.

National is attempting to make its raw materials operation virtually self-sufficient. The firm also continues heavy emphasis on its steel service center operations. The firm's largest service center became operational in the spring of 1980.

7.3 PRODUCTION AND OPERATIONS

National's four major steelmaking and steel finishing divisions are the firm's major suppliers to the automotive community. These are the Great Lakes Division facilities at Ecorse and River Rouge, Michigan; the Weirton Steel Division facilities at Weirton, West Virginia; Granite City Steel Division facilities at Granite City, Illinois; and Midwest Steel Division facilities at Portage, Indiana.

With the exception of the midwest facilities, these are basically the three companies that originally banded together to form National Steel, and each still maintains considerable managerial leeway and autonomy.

7.3.1 Major Automotive Facilities

Essentially, each of the divisions is a plant or combination of plants. A description of each follows. Tabular data on each is presented in Figures 7-3 through 7-6.

Weirton Steel Division

The 350-acre Weirton facilities encompass the main plant at Weirton, West Virginia, and a small electrolytic tinning and chrome-plating line at Steubenville, Ohio. Weirton employs 12,500 and utilizes basic oxygen furnaces, blast furnaces, a coke plant, slab casting facilities, hot and cold sheet and strip mills, and heat-treating furnaces.

Its raw steel capacity is 9.8 million tons annually, and its annual rolling capacity is 3.5 million tons. Principal products include hot and cold rolled sheet and strip carbon steel, HSLA steels, coke, steel ingots, tinplate, steel slabs and billets, and structural steels.

Company National Steel **County** Hancock **Plant Size** 350 acres

Plant Weirton (Division) **Congressional District** ______

Address Weirton, W. Va. 26062 **Standard Metropolitan Statistical Area** ______ **No. of Employees** 12,500

Telephone (304) 797-2000 **Primary SIC Code(s)** 331232, 331231, 331270, 331243

Products (Automotive)	Capacity /year	Processes Used	Consumed by (Automotive)
Coke, pig iron, steel ingots Blooms, slabs, billets, finished steel products in carbon and high strength low alloy: Sheets and strip- hot rolled cold rolled Tin-plate Black plate Terne plate Structural shapes	9.8 million raw tons/ year 3.5 million tons rolled	Coke plant Ore treatment Blast furnaces Basic oxygen furnaces Slab caster Sheet and strip mills Heating and heat treating furnaces	N.C.A.

FIGURE 7-3. WEIRTON DIVISION PLANT DATA

Company National Steel | **County** Wayne | **Plant Size** 1000+ acres

Plant Great Lakes (Division) | **Congressional District** ______

Address Ecorse, Detroit, Michigan 48229 | **Standard Metropolitan Statistical Area** ______ | **No. of Employees** 10,700

Telephone (313) 297-2100 | **Primary SIC Code(s)** 331670, 331270

Products (Automotive)	Capacity /year	Processes Used	Consumed by (Automotive)
Coke, pig iron, steel ingots Blooms, slabs, finished steel products in carbon, full alloy, and high strength low alloy: Sheets and strip- hot rolled cold rolled plates—sheared	6.2 million net tons/year - raw 13.9 million tons - rolled	Coke plant Ore treatment Blast furnaces (at River Rouge) Basic oxygen and electric arc furnaces Continuous slab caster Blooming and slabbing mills Sheet and strip mills Heating furnaces	65% of Great Lakes' external sales are to the auto industry.

FIGURE 7-4. GREAT LAKES DIVISION PLANT DATA

Company National Steel

County Madison

Plant Size 1300 acres

Plant Granite City (Division)

Congressional District

Address 20th & State Sts.
Granite City, IL 62040

Standard Metropolitan Statistical Area

No. of Employees 4,500

Telephone (618) 451-3456

Primary SIC Code(s) 331231, 331219, 331213

Products (Automotive)	Capacity/year	Processes Used	Consumed by (Automotive)
Coke, pig iron, steel ingots Slabs, finished steel products in carbon and high strength grades: plates-sheared sheets-hot rolled cold rolled Activities: Divisional Hqs., Mfg. and R&D	2.5 million net tons/year 2.1 million tons rolled	Coke plant Ore treatment Blast furnaces Basic oxygen furnaces Slabbing mill Sheet mills Heating and reheating furnaces	N.C.A.

FIGURE 7-5. GRANITE CITY DIVISION PLANT DATA

Company National Steel

County Porter

Plant Size 1100 acres

Plant Midwest (Division)

Congressional District ____

Address Portage, IN 46368

Standard Metropolitan Statistical Area ____

No. of Employees 1,800

Telephone (219) 762-3131

Primary SIC Code(s) 331222, 331231, 331270

Products (Automotive)	Capacity /year	Processes Used	Consumed by (Automotive)
Sheets and strip (hot rolled and cold rolled) Paintable galvanized Semi-finished steel shapes and forms	3.6 million tons rolled	Sheet mills, cold reduction and cold finishing (Tin mill equipment) Treating furnaces Galvanizing equipment	About 10% of Midwest's output is consumed by the auto industry.

FIGURE 7-6. MIDWEST DIVISION PLANT DATA

Great Lakes Steel Division

The 1000-acre Great Lakes facilities encompass blast furnaces at River Rouge, Michigan and the integrated mills at nearby Ecorse, Michigan. With a work force in excess of 10,500, Great Lakes' capacity is 6.2 million tons of raw steel annually, and 13.9 million tons of rolled steel products. In addition to the blast furnaces at River Rouge, equipment includes basic oxygen and electric furnaces, National's huge 104-inch continuous slab caster, blooming and slabbing mills, hot rolling sheet and cold rolling strip mills.

Principal products are steel ingots, blooms and slabs, hot rolled steel sheet and cold rolled steel strip, and HSLA sheet steels. Nearly 65 percent of Great Lakes' external shipments are to automotive customers.

Granite City Steel Division

National's Granite City facilities employ 4500 and sprawl over 1300 acres. The plant's raw steel capacity is 2.5 million tons annually, and its rolled steel capacity is 2.1 million tons annually. Equipped with both blast furnaces and basic oxygen furnaces, Granite City also utilizes slabbing mills, an 80-inch hot strip sheet mill, cold rolling sheet mills and cold tempering mills.

Midwest Steel Division

National built the Midwest Steel facilities in 1959 on property near Chicago that it had held since 1929. This division produces no raw steel, but finishes hot-rolled and cold-rolled sheets, electrolytic tinplate, tin-free can steel and galvanized steel.

With a work force of 1800, Midwest occupies 1100 acres and has a rated capacity of 3.6 million tons of finished steel annually.

7.3.2 Expansions and New Plants

National's capital expenditures budget for 1979 was $200 million, up from $123 million the previous year. Much of this went into improvements at the Granite City division, and included the installation of a continuous slab-casting machine to produce more than one million tons of steel slabs annually. In another major Granite City project, the plant's two, 235-ton top blown basic oxygen furnaces are being converted into more modern top and bottom blown basic oxygen furnaces. This will permit the use of 10 to 15 percent more scrap steel.

Other capital expenditures went toward environmental control requirements and blast furnace relining at Granite City and Great Lakes, and rebuilding of coke ovens at Granite City, Weirton, and Great Lakes. Also, the Weirton plant received additional galvanizing lines to produce the newly licensed "Galvalume."

7.4 FINANCIAL STATUS

National's financial health is strong, and the firm appears to be in a good position to stay that way.

7.4.1 Operating Analysis (See Figure 7-7.)

Increased shipments and higher prices led to higher sales and earnings for National Steel in 1978. Sales as a percent of assets and return on sales both increased indicating both larger sales volume and better margins. National's performance, however, is reputed to be quite variable due to its heavy reliance on consumer markets including automobiles. Although National's sales rose by more than 30 percent in 1979, net earnings rose by only 13 percent.

Like other steel companies, National's earnings continue to be low by several measures, such as return on equity or return on sales. An even more revealing measure is the dramatic decline in capital expenditures both in absolute terms and as a percent of total assets. Analysts have pointed out that the low expenditure level may not be sufficient to sustain the company's assets. National, however, is predicting that its better performance in 1979 is the beginning of strong growth in steel sales and earnings.

Year	Sales ($Millions)	Earnings ($Millions)	Return on Equity, Percent	Operating Income*/Sales Percent
79	4,234	126	9.2	8.0
78	3,150	112	8.6	10.0
77	3,164	60	4.7	7.4
76	2,873	86	6.9	8.4
75	2,270	58	4.8	7.8
74	2,743	175	15.5	15.7

Year	Earnings/Total Assets Percent	Sales/Assets	Earnings/Sales Percent
79	4.0	1.33	3.0
78	3.9	1.25	3.0
77	2.1	1.11	1.9
76	3.1	1.01	3.0
75	2.4	.92	2.6
74	7.7	1.19	6.4

*Operating Income = Sales – Cost of Goods Sold – Selling, General and Administrative Expenses, Before Depreciation, Interest, and Income Taxes.

FIGURE 7-7. OPERATING ANALYSIS OF NATIONAL STEEL

7.4.2 Capital Analysis (See Figure 7-8.)

National's sales have fluctuated, and cash flow was supplemented by an increase in long-term debt in 1975 and 1976 to help fund large capital expenditures. In 1977 and 1978 capital expenditures were cut. National's debt to capitalization decreased and the company increased its holdings of cash and marketable securities. Capital expenditures were about $200 million in 1979 and did not cause any financing problems. National's recent agreement with United Financial, the savings and loan association, indicates the company is attempting diversification and may use some of its cash for that purpose.

National's president, H. M. Love, has said the company is demanding a 20 percent return on any projects the company undertakes. Unfortunately, he says, the company is having difficulty obtaining the capital to undertake these projects. The company has not had a significant stock offering in the last 5 years.

7.5 RESEARCH AND DEVELOPMENT

National's research and development department completed major expansion plans in early 1980 centering on production and process development areas. The expansion provides a 35 percent increase in efforts to develop new steels, and in efforts to improve manufacturing processes and cost ratios, and to meet environmental requirements.

Major product development programs over the past year concentrated on:

- A new lightweight sheet product (mentioned above) consisting of two thin sheets of steel laminated over a polypropylene core (developed in concert with Hercules)

- Higher-strength galvanized steels

- Nickel plated steels for beverage cans.

National reported that work also continued on techniques for biological treatment of coke plant ammonia wastes to make them environmentally acceptable.

Year	Sales	P/E Ratio[1]	Sources: Earnings	Depreciation	Changes in Long-Term Debt	Changes in Owners' Equity Other Than Retained Earnings
79	4,234	4.5	126	156	(28)	(5)
78	3,750	5.3	112	148	(23)	3
77	3,164	11.9	60	138	(22)	6
76	2,873	10.3	86	129	210	16
75	2,270	12.3	58	114	130	5
74	2,743	3.6	175	112	(23)	6

Year	Change in Working Capital	Uses: Capital Expenditures	Dividends	Long-Term Debt[2] / Capitalization %	Coverage[3]	Cap. Exp. / Total Assets %	Current Ratio
79	0	200	50	28.1	6.5	6.4	1.7
78	102	123	48	30.0	6.9	4.1	1.78
77	16	164	48	32.0	4.1	5.7	1.73
76	160	273	47	33.6	5.0	10.5	1.52
75	(15)	314	47	28.2	5.9	13.1	1.48
74	(28)	183	56	13.8	18.7	7.9	1.58

Dollar figures are in millions

[1] Average for the Year

[2] Capitalization Defined as Total Liabilities – Current Liabilities

[3] Operating Profit/Interest

FIGURE 7-8. CAPITAL ANALYSIS OF NATIONAL STEEL

National has traditionally expended great effort to keep its internal procedures and plant technology at the forefront of manufacturing technology, and a great deal of its research and development effort still goes to that end. National is currently refining techniques to introduce argon gas into basic oxygen furnaces, a process which precipitates a cleansing process with favorable effects on product quality and costs. Programs related to raw material utilization, increasing productivity of existing steel facilities, and the recycling of in-plant wastes are receiving special attention. One area under careful study is more precise measurement of the oil film on strip steel, permitting increased cold rolling speeds. Energy-management efforts center around improving the fuel efficiencies of individual processing units while still meeting production requirements.

As are all steelmakers, National is, of course, constantly attempting to improve its current steels, develop new ones (especially for rapidly changing automotive requirements), and develop new ways of utilizing its current products.

7.6 GOVERNMENT AND LABOR RELATIONS

National, in concert with other major steelmakers, signed a new long-term contract with the United Steelworkers of America in the spring of 1980. The contracts replaced those expiring in May of 1980.

8. REPUBLIC STEEL

Republic is the largest producer of alloy steel in the world, and the U.S. steelmaker most dependent on the automotive industry—more than 23 percent of its shipments are to the automotive community.

Seventy-five percent of Republic's shipments are in flat rolled and bar steels, and all of the company's business is steel or steel related. Republic continues to express no interest in diversifying into nonsteel areas.

8.1 CORPORATE SIZE AND STRUCTURE

The fifth largest steelmaker in the U.S., Republic produced 10.0 million tons of raw steel and shipped 10.0 million tons of finished steel in 1979. Although somewhat diversified into various metals-related areas, Republic's principal business is manufacturing raw steel, finishing it and shipping it.

8.1.1 Revenue, Profit and Employment Statistics

Republic recorded a reasonable profit on record sales in 1979. Revenues for the year were $3.98 billion, with profits of $121 million, up from sales of $3.48 billion with $111 million in profits in 1978. Republic employed about 42,700 persons in 1979. (See Table 8-1.)

TABLE 8-1. REPUBLIC STEEL
REVENUES, PROFIT AND EMPLOYMENT

Year	Revenues (Millions)	Profits (Millions)
1979	$3,987.4	$121.2
1978	$3,479.5	$111.1
Average Number of Employees: 42,690 (1979)		

But Republic's second quarter 1980 earnings plunged 79 percent from a year ago on an 11 percent decline in sales. The steelmaker earned $8.8 million in the second quarter this year compared to $42.2 million last year while revenue fell to $893.8 million from $1 billion. Shipments in the quarter fell nearly 23 percent to 1.5 million tons from 1.9 million last year. The drop in auto sales particularly hurt Republic because the auto industry is its largest single customer, accounting for 25 percent of shipments. Republic downgraded its estimates for 1980 domestic steel production to within the 85-million tons range, the company's fourth downward revision in the year.

8.2 CORPORATE ORGANIZATION

As shown in Figure 8-1, Republic divides its operations into two basic groups:

- The steel producing districts group
- The steel divisions and manufacturing group.

In addition to these two basic groups there also exist finance, corporate development, engineering, product development, and research divisions of the firm.

The steel producing districts (plants) include the Cleveland District, Chicago District, Mahoning Valley District, Central Alloy District, and the Buffalo District. The steel divisions and manufacturing group consists of the Steel Tubes Division, Union Drawn Division, Enduro Division, and the Manufacturing Group.

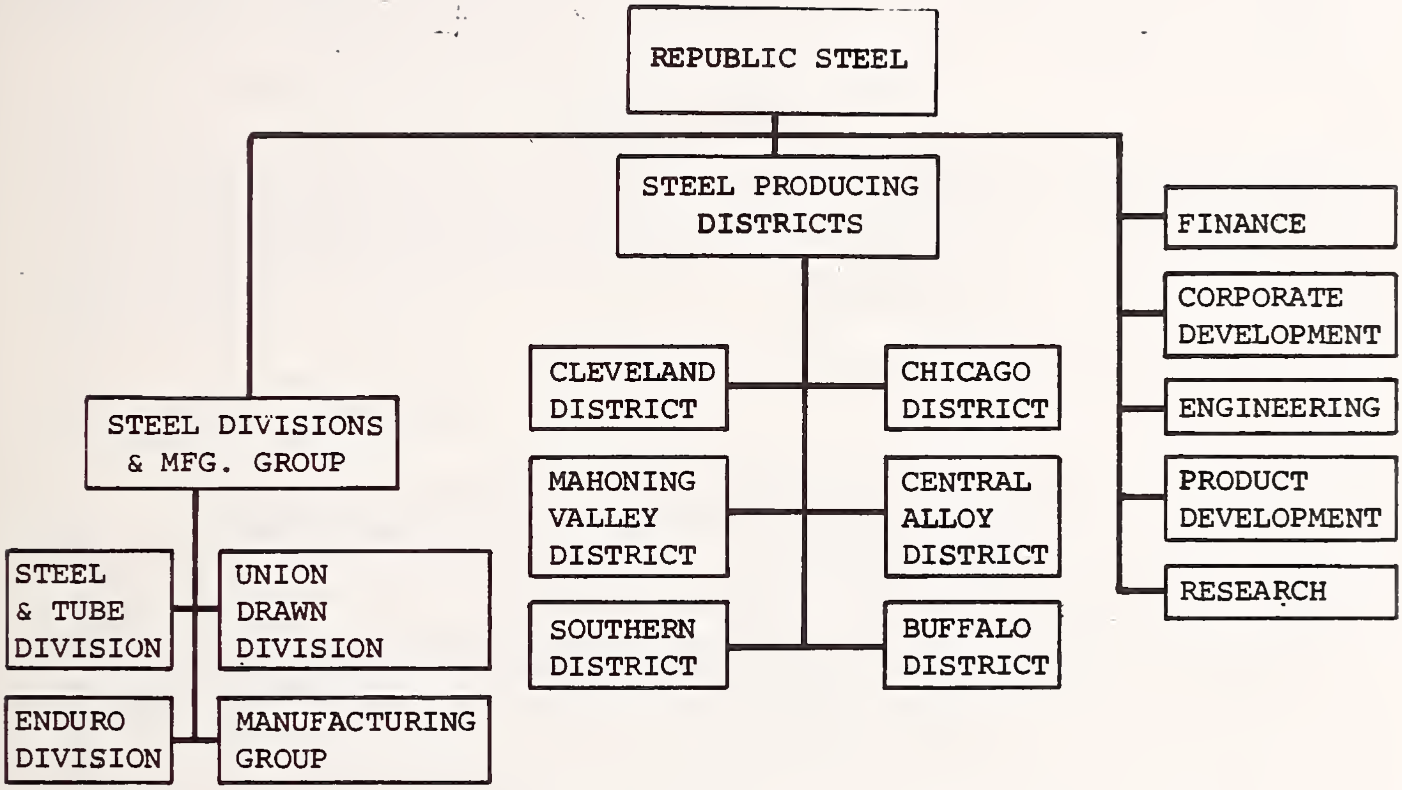

FIGURE 8-1. REPUBLIC STEEL CORPORATE ORGANIZATION

8.3 MAJOR MARKETS AND PRODUCTS

More than 27 percent of Republic's total shipments were to automotive customers in 1978, making Republic more dependent on automotive sales than any other major steel company. Other major markets include steel service centers, machinery and equipment manufacturers, independent forging establishments, building and construction, and oil and gas producers. Republic's sales to Ford, GM and Chrysler have averaged 15.5 percent of total sales for the past five years, with GM accounting for the major portion of this. Various independent suppliers consume the remainder. (See Figure 8-2—Republic's Market Data.)

MARKET DATA	
Major markets:	Automotive and light truck, machinery and equipment, independent forgers, building and construction, oil and gas suppliers
Percent of sales to the auto industry:	More than 23 percent
Supplies to the following automotive companies:	GM, Ford, Chrysler, various independent suppliers
Major products:	Hot and cold rolled carbon and HSLA steel sheet and plate; carbon steel bars; galvanized and stainless steels; tool steels

FIGURE 8-2. REPUBLIC STEEL MARKET DATA

8.3.1 Products

Major automotive products supplied by Republic are hot and cold rolled carbon steels, high strength/low alloy steel sheet, carbon steel bar mill products, electro-zinc plated steel sheet, galvanized steel sheet and carbon and alloy wire.

Sales Strategy

Republic's sales strategy for its automotive steels is to stress "Republic Steel leadership. Republic Steel products are meeting the critical needs of America's transport industry," the firm asserts in its automotive advertising.

Stressing "the products you require and the service that backs them up," Republic adds that it supplies "the total package" to meet critical needs:

- Quality products
- Pioneering technology
- Flexible inventory programs
- Dependable delivery
- In-depth technical service
- More than 45 years experience.

Stressing "exceptionally formable" HSLA steels and various corrosion-resistant products, Republic reminds automotive industry consumers that "advanced processes such as strand casting...contribute to outstanding hot rolled and cold finished bar quality, strength, and durability."

New Product Plans

Republic's newest automotive products are X-80-W HSLA steel bars and sheets. Highly formable, lightweight and strong, the new steel is expecially designed for automotive use. Republic currently has more than 30 new product programs underway, and several of these projects deal with specific requests for flat rolled HSLA steels.

8.3.2 Marketing Strategy

Republic offers a broad product line that involves both geographic and market diversity and many product line strengths. To the degree that their facility investments permit, their strategy has been directed toward:

- Improving product mix by optimizing their strong position in alloy and high grade carbon bar products, special metals, stainless steel, specialty flat-rolled products and pipe

- Maintaining a competitive cost posture in the other product areas where they choose to compete.

While volume is an important aspect of steel economics, the firm does not seek volume for volume's sake and regards market share as a guide rather than a priority.

Improving Product Mix

The automotive industry continues to be Republic's largest customer—accounting for 23 percent of total production. Republic forecasts zero growth for automotive steel consumption through 1985. However, it will continue to be a large customer and offers the firm good opportunity to implement its product mix strategy, particularly in high-strength/low alloy steel sheets and special quality bars. Republic's Cleveland District is well positioned to serve the automotive industry, and the bulk of Cleveland's 3.2 million ton ingot capability winds up in stamping plants in Northern Ohio and Southern Michigan.

Maintaining a Competitive Cost Posture

Republic has chosen not to enter the steel service center industry as an owner of service center outlets. Although service centers are a fast growing segment of the steel consuming market, Republic feels it is in their best interests to direct capital investment toward reducing costs of steelmaking operations rather than to expand into the distribution end of the business. They feel they have done well to date with this strategy and that their relationships with the steel service center industry continue to be excellent, due primarily to the firm's facilities, locations, and broad product mix.

Republic has a larger than average share in the markets for machinery and equipment, forgings, and oil and gas, and is optimistic about the growth potential of the markets, and is well positioned to serve them. Republic feels that it makes steel where steel is used.

8.4 PRODUCTION AND OPERATIONS

Eighty-seven percent of Republic's raw steelmaking capacity is located in the Great Lakes area. Five Great Lakes states account for 45 percent of all steel consumed in the U.S., and the adjacent middle Atlantic states consume another 12 percent. Republic's Alabama facilities are additionally well positioned for the growing southeast industrial sector. Republic's five steel districts are within economical reach of 82 percent of the American steel market.

8.4.1 Major Automotive Facilities

Four of Republic's steel district facilities—Mahoning Valley, Cleveland, Chicago, and the Central Alloy District—serve the automotive community. Data on these facilities is given in Figures 8-3, -4, -5 and -6.

Mahoning Valley District

Republic's Mahoning Valley facilities encompass Youngstown, Warren and Niles, Ohio, plants under one administration. Occupying 471 acres and employing 5,000, Mahoning Valley has a rated capacity of 2.7 million tons of raw steel annually, and 5.6 million tons of finished steel. Utilizing blast and basic oxygen furnaces, the facility is also equipped with hot and cold rolling mills, blooming mills, and a galvanizing line. Principal products include hot rolled carbon steel sheet, strip and plate, cold rolled sheet and strip, galvanized sheet, and carbon steel bars.

Cleveland District

The Cleveland plant is rated at 4.4 million tons of raw steel annually and 11.8 million tons of finished steel. Occupying 776 acres, the Cleveland facilities employ a work force of 7,000. Utilizing an 84" hot rolling mill, cold rolling mills, cold finishing and galvanizing equipment, Cleveland will have by 1981 a new two-strand casting facility with capacity exceeding one million tons annually.

Chicago District

With a work force of 5,500, the Chicago plant occupies 650 acres and utilizes electric furnaces, blast furnaces, open hearth furnaces, and a bottom-blown basic oxygen furnace currently coming on stream. When operational, the BOF will replace the open hearth furnaces. Principal products are hot-rolled steel bars, semi-finished steel shapes and forms, steel wire and rod.

Chicago's annual raw steel capacity is 2 million tons; annual finished steel capacity is 4.9 million tons.

Company Republic Steel Corp. Mahoning Valley District County Trumbull Plant Size 471 acres

Plant Youngstown, Warren and Niles Plants Congressional District

Address 1040 Pine Ave. Warren, OH 44481 Standard Metropolitan Statistical Area 155 No. of Employees 5000

Telephone (216) 841-8000 Primary SIC Code(s) 331231, 331270, 331241

Products (Automotive)	Capacity/year	Processes Used	Consumed by (Automotive)
Hot-rolled steel sheet & strip, steel plate Cold-rolled steel sheet & strip Galvanized sheet Carbon bar Semi-finished steel	2,700,000 Tons - raw 5,580,000 Tons - rolled	Blast furnaces BOF Hot rolling mills Cold rolling mills Galvanizing line Blooming mill	N.C.A.
Activities: Div. Hq., Eng., Mfg.			

FIGURE 8-3. MAHONING VALLEY DISTRICT PLANT DATA

Company Republic Steel Corp. Cleveland District | **County** Cuyahoga | **Plant Size** 776 acres

Plant Cleveland Plant | **Congressional District**

Address 3100 E. 45th St. Cleveland, OH 44127 | **Standard Metropolitan Statistical Area** 35 | **No. of Employees** 7000

Telephone 216-574-7100 | **Primary SIC Code(s)** 331231, 331241, 331270, 331280

Products (Automotive)	Capacity /Year	Processes Used	Consumed by (Automotive)
Hot-rolled steel sheet and strip, steel plate Cold-rolled steel sheet and strip Cold-finished steel bars and shapes Galvanized plate Activities: Mfg.	4,400,000 tons- raw 11,821,000 tons- rolled	Hot and cold rolling Cold finishing Galvanizing	N.C.A.

FIGURE 8-4. CLEVELAND PLANT DATA

Company Republic Steel Corp. Chicago District
County Cook
Plant Size 650 acres

Plant Chicago Plant
Congressional District

Address 11600 Burley Ave. Chicago, IL 60617
Standard Metropolitan Statistical Area 31
No. of Employees 5500

Telephone (312) 221-2000
Primary SIC Code(s) 331244, 331222, 331250

Products (Automotive)	Capacity/year	Processes Used	Consumed by (Automotive)
Hot-rolled steel bars & bar shapes Semi-finished steel shapes & forms Steel wire & rod Activities: Eng., Mfg.	2,000,000 tons - raw 4,950,000 tons - rolled	Electric furnaces Blast furnaces Open hearth (Bottom blown BOF replacing open hearth) Hot & cold rolling mills	N.C.A.

FIGURE 8-5. CHICAGO PLANT DATA

Company: Republic Steel Corp. Central Alloy District

County: Stark

Plant Size: 1000 acres

Plant: Canton and Massillion Facilities

Congressional District:

Address: 8th St., N.E. Canton, OH 44704

Standard Metropolitan Statistical Area: 151

No. of Employees: 6700

Telephone: (216) 493-2000

Primary SIC Code(s): 331244

Products (Automotive)	Capacity /year	Processes Used	Consumed by (Automotive)
Hot-rolled steel bars & bar shapes Cold-rolled steel sheet & strip HSLA steels Activities: Mfg.	1,500,000 tons	Electric furnaces Hot & cold rolling mills Blooming mills	N.C.A.

FIGURE 8-6. CENTRAL ALLOY DISTRICT PLANT DATA

Central Alloy District

Employing a work force of 6,700 and occupying 1,000 acres, the Central Alloy facilities have a raw and finished capacity of 1.5 million tons annually. Utilizing electric furnaces, hot and cold rolling mills and blooming mills, Central Alloy's major products are hot rolled carbon steel bars, cold rolled stainless steel sheet and strip, and various types of high strength/low alloy steels.

8.4.2 Expansions and New Plants

The steelmaker's capital expenditures budget for 1979 was $341 million. Much of this was directed at Republic's Mahoning Valley district, undergoing a major modernization program that will eventually phase out blast furnace operations in Youngstown and concentrate the district's primary operations in Warren. The program involves a 1,320 ton-per-day coke oven battery which began operations last July at the Warren plant, construction of an electric furnace shop, and modifications of the Warren blast furnace which will increase iron production from 2,750 to 3,400 tons per day. The Mahoning Valley improvement program is intended to utilize the latest proven technology in electric furnace steelmaking.

At the Chicago district, work continues on a 1,600 ton-per-day coke battery scheduled for completion in 1981, which together with the new Warren coke plant will help assure the company self-sufficiency in coke supply during the rest of the decade.

Construction of several other modernization projects was commenced at the Cleveland district over the past year, including a billet grinding and inspection facility, materials handling facilities for the melt shop, upgrading of the steel plant's main chemical laboratory, a freestanding tension leveling line and improvements to coke plant facilities. These projects are expected to be completed in 1980 or early 1981. Since 1950 Republic has spent more than $1 billion for improvements and additions in Cleveland district facilities.

Engineering plans also are underway for a continuous slab caster at the Cleveland district which would improve the plant's flat rolled steelmaking capability. The two-strand casting facility, with an average annual rated capacity of more than a million tons, would provide considerable energy savings coupled with reduced costs of producing killed slabs through improved yields.

Major improvements were begun in 1979 to manufacturing capabilities at the company's Buffalo and Southern districts. The Gadsden, Alabama, steel complex this year began the engineering phase of a sixth hot strip mill stand, which will increase the district's flat rolled steel capability. At Buffalo, improvements were made to the 38-inch blooming mill, and expansion of water pollution control facilities will be operational in 1980.

8.5 FINANCIAL STATUS

Republic's operating and capital position is described below.

Operating Analysis

Republic's 1978 earnings were the second highest in the company's history (the highest earnings were in 1974). As with other steel companies, the gains came from both higher sales and higher profit margins. Dividends were increased by a 150 percent year-end bonus. Earnings in 1979 were very strong and indicated record year sales and the second highest recorded earnings. However, earnings were still only 3 percent of sales. (See Figure 8-7.)

8.5.1 Capital Analysis

Republic raised approximately $100 million in 1977 on 8.45 percent notes due in 2002. Borrowing in the last five years has increased Republic's debt to capitalization ratio from 16 percent in 1974 to 20 percent in 1979. There has been no stock change and working capital has increased gradually over the period (although declining in 1979).

Republic's modernization program resulted in an increase in capital spending to $341 million in 1979. In addition, Republic has raised its base dividend slightly. Republic has a 200 million dollar credit agreement through 1983 which it can use to cover any cash shortfall. (See Figure 8-8 for data.)

8.6 RESEARCH AND DEVELOPMENT

Republic's R&D philosophy is "get new products and processes out of the lab and into the mills." Their R&D efforts center on three main areas: basic research, process research, and product research. The latter is aimed at retention of existing markets, improving existing market share, and developing new products. It is process research, however, that is coming to the fore today, as

Year	Sales ($Millions)	Earnings ($Millions)	Return on Equity, Percent	Operating Income* / Sales Percent
79	3,987	121	8.4	6.2
78	3,480	111	8.1	7.8
77	2,909	41	3.1	5.1
76	2,546	66	5.1	5.2
75	2,333	72	5.7	7.5
74	2,741	171	14.6	13.2

Year	Earnings / Total Assets Percent	Sales / Assets	Earnings / Sales Percent
79	4.5	1.5	3.0
78	4.5	1.4	3.2
77	1.7	1.21	1.4
76	3.0	1.15	2.6
75	3.5	1.13	3.1
74	8.7	1.4	6.2

*Operating Income = Sales – Cost of Goods Sold – Selling, General and Administrative Expenses, Before Depreciation, Interest, and Income Taxes.

FIGURE 8-7. OPERATING ANALYSIS OF REPUBLIC STEEL

			Sources			
Year	Sales	P/E Ratio[1]	Earnings	Depreciation	Changes in Long-Term Debt	Changes in Owners' Equity Other Than Retained Earnings
79	3,987	3.3	121	111	(15)	0
78	3,480	3.6	111	101	(5)	0
77	2,909	10.9	41	94	80	0
76	2,546	8.6	66	88	10	0
75	2,333	6.7	72	85	97	0
74	2,741	2.3	171	81	(36)	0

		Uses					
Year	Change in Working Capital	Capital Expenditures	Dividends	Long-Term Debt[2] / Capitalization %	Coverage[3]	Cap. Exp. / Total Assets %	Current Ratio
79	(117)	341	36	20.1	7.2	12.8	1.6
78	15	211	36	21.4	7.4	6.8	2.0
77	98	156	26	22.7	4.4	6.4	2.2
76	13	249	26	19.8	4.8	11.0	1.8
75	(5)	200	26	20.4	7.5	9.6	2.3
74	70	125	45	16.4	17.7	N.A.	1.9

Dollar figures are in millions

[1] Average for the Year

[2] Capitalization Defined as Total Liabilities – Current Liabilities

[3] Operating Profit/Interest

FIGURE 8-8. CAPITAL ANALYSIS OF REPUBLIC STEEL this steelmaker, like all the others, struggles to improve internal performance with a minimal capital expenditure. R&D expenses were $18.9 million in 1979, $15 million in 1978.

8.7 GOVERNMENT AND LABOR RELATIONS

Substantially all of Republic's hourly employees are represented by various labor unions, primarily the United Steelworkers of America and the United Mineworkers of America. Republic's contract with the Steelworkers was renewed in April of 1980, following joint bargaining along with other major steelmakers.

Republic's management notes that "compliance with environmental laws, regulations, standards or policies will require substantial additional capital expenditures in the near future and increased annual operating expenses" although they will not predict what these expenditures will be. As of December 31, 1979, Republic had made capital expenditures of approximately $428 million for equipment installations and facility modifications (mandated by the Environmental Protection Agency) to control air and water pollution.

9. INLAND STEEL COMPANY

Inland Steel Company is a major fully-integrated steelmaker with a unique situation: this company has only one plant, but it is the largest one in the country. Inland's huge and sprawling Indiana Harbor Works is a highly efficient, computerized, modern facility, and Inland takes full advantage of its efficiency, and strategic midwest location to market carbon sheet steel and high strength/low alloy steels (HSLA) to automotive and other customers throughout the Midwest.

9.1 CORPORATE SIZE AND STRUCTURE

9.1.1 Revenue, Profit and Employment Statistics

Sales in 1979 were $3.6 billion, up 12.5 percent from 1978's $3.2 billion. Profits were $131 million, down from $158 million in 1978. (See Table 9-1.)

TABLE 9-1. INLAND STEEL COMPANY
REVENUES, PROFIT AND EMPLOYMENT

Year	Revenues (Millions)	Profits (Millions)
1979	$3,635.2	$131.1
1978	$3,248.0	$158.3
Average Number of Employees: 37,341 (1979)		

But in 1980 Inland reported a second quarter loss of $22,446,000, or $1.09 per common share, contrasted with record second quarter earnings of $49,148,000, or $2.34 per common share, in the year-earlier period. This was the first quarterly loss sustained by Inland since the third quarter of 1971, a period of customer inventory liquidation following a labor contract decline, the company reported. Contributing to the loss were the severe decline in second quarter steel demand, Inland's conservative method of accounting for substantially higher iron ore costs associated with cutbacks in production, and carrying costs attributable to the company's $1 billion expansion program, according to Inland.

9.1.2 Corporate Organization

Inland, with all its steelmaking eggs in one basket, is vertically organized along traditional lines. Below the company's chairman, vice chairman and president, Inland's operations are divided into four major operating areas:

- Integrated Steel Operations which include the manufacturing and distribution of steel mill products and mining, quarrying and processing of iron ore, coal and limestone
- Steel Service Center Operations which is primarily Joseph P. Ryerson & Son, Inc.
- Steel-Related Operations which include construction products and metal forming machinery
- Shelter Operations which is basically a builder/ developer of homes.

An overview of Inland corporate structure is shown in Figure 9-1. As shown, other divisions of the firm include engineering and corporate planning, industrial relations, research, finance and sales.

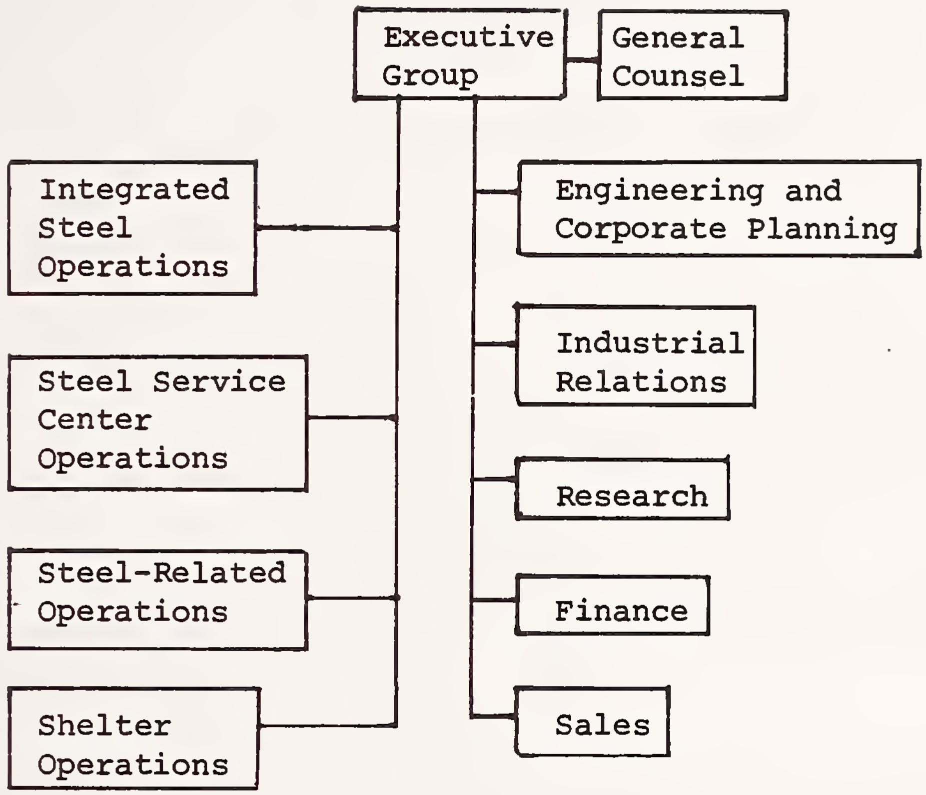

FIGURE 9-1. INLAND STEEL CORPORATE STRUCTURE

9.2 MAJOR MARKETS AND PRODUCTS

Inland's major markets and products are detailed below, and summarized in Figure 9-2.

9.2.1 Major Markets

Inland Steel ships approximately one-third of its output to the transportation industry (20 percent automotive). Other principal markets include steel service centers; manufacturers of industrial, electrical and farm machinery; steel converters, and the construction industry. In addition to primary steelmaking and finishing, Inland is also engaged in three other basic activities: marketing steel and other materials through service centers, manufacturing and fabricating other steel products, and the development and manufacture of family housing. Although not restricted to midwest sales, Inland's lone plant located in the midst of the Detroit-Chicago industrial base creates a strong preponderance of midwest customers.

MARKET DATA

Major markets: Automotive, light, medium and heavy truck, building and construction, machinery and equipment, industrial, electrical and farm machinery

Percent of sales to the auto industry: Approximately 20 percent

Supplies to: General Motors, Ford, Chrysler, various independent automotive suppliers

Major products: Raw steel, hot and cold rolled steel sheet and strip, steel plates and bars, HSLA steels, fabricated structural steel

FIGURE 9-2. INLAND STEEL MARKET DATA

9.2.2 Products

More than 95 percent of Inland's product mix is either carbon or HSLA steel. Principal products shipped to the automotive community include hot and cold rolled steel sheet, several varieties of HSLA steel, anti-corrosion body steels, and carbon steel bars.

Inland stresses special carbon and HSLA steels in its sales approach to the automotive community and offers HSLA steels especially formulated for ease of formability. Inland also is offering a highly paintable corrosion-resistant steel, Paint-Tite B, for automotive body stampings.

9.2.3 New Product Plans

In new product development, Inland continues to focus on automotive weight reduction, and extension of HI-FORM series of cold-rolled steels. Extensive process evaluation by Inland's R&D staff concluded that continuous annealing with water quenching offers the greatest potential in the manufacture of high-strength steels with improved formability for fabricating automotive and other parts. Currently, the steelmaker is designing facilities required for the production of these higher quality steels.

9.2.4 Marketing Strategy

Inland's overall marketing strategy is to stress the advantages of its single, highly efficient mill and the speed with which its highly trained sales representatives can call forth shipments from Indiana Harbor. Additionally, Inland stresses a wide variety of high quality carbon and HSLA steels tailored to the specific needs of its customers. Unlike many other steelmakers, Inland has remained primarily a steelmaker, with some diversification into homebuilding.

Although capacity utilization slipped to 91 percent in 1979, in 1978 Inland's steelmaking operations ran flat out, at 100 percent of rated capacity. Their strategy for the future is the same as it has been for some time: operate with high efficiency at maximum practical capacity, develop the right steel to meet customers' needs, promote it aggressively, price it competitively and get it to the customer when he wants it.

9.3 PRODUCTION AND OPERATIONS

Inland's only plant, Indiana Harbor, is one of the most modern and efficient in the country. All steel that Inland ships emanates from this facility. Information on this plant is summarized in Figure 9-3.

9.3.1 Major Automotive Facilities

Indiana Harbor's location and preponderance of carbon and HSLA sheet production make it a major supplier to the automotive community. Inland is spending $1 billion to increase Indiana Harbor's raw steel capacity from 8.2 million net tons annually to 9.3 million tons, and to increase annual steel mill capacity from 6.1 million net tons to 6.9 million net tons. Begun in 1974, the expansion program includes the addition of a new blast furnace, coke oven battery, boiler-flowerhouse, raw materials dock and storage area, and improved environmental control facilities.

Indiana Harbor employs approximately 25,000 people, and utilizes both open hearth and basic oxygen furnaces to produce raw steel for the rolling and blooming mills.

9.3.2 Expansion and New Plants

Inland's major expansion program at Indiana Harbor, which absorbed a good portion of 1979's $284 million in capital expenditures, will be completed this fall. At that time, the plant's new No. 7 blast furnace will be the equal in size and production capability of any furnace in North America, according to Inland. The five year, $1 billion expansion program includes major additions to raw materials production and transportation capabilities, as well as to the materials handling, cokemaking, and ironmaking units at the Indiana Harbor works. When completed, it will increase Inland's steelmaking capability to 9.3 million tons —1.1 million tons more than the 1974 level.

9.4 FINANCIAL STATUS

Inland has enjoyed healthy, though somewhat variable profits for several years.

9.4.1 Operating Analysis

Inland had an even better year in 1978 than other steel companies with a 12 percent increase in shipments against 8 percent for the industry. Inland's return on

Company Inland Steel Company **County** ______ **Plant Size** 1,900 Acres

Plant Indiana Harbor Works **Congressional District** ______

Address 3210 Watling Street East Chicago, IL **Standard Metropolitan Statistical Area** ______ **No. of Employees** 25,000

Telephone (219) 392-1200 **Primary SIC Code(s)** ______

Products (Automotive)	Capacity	Processes Used	Consumed by (Automotive)
Hot and cold rolled carbon steel sheet products Bar products High-strength/low alloy steel Corrosion-resistant steels	Raw-8,553,000 -1978 Finished-6,243,690-1978	Basic oxygen furnace (BOF) 69 percent or 5,942,000 tons of raw steel production Open hearth-25 percent or 2,125,000 tons of raw steel production Electric furnace-6 percent or 486,000 tons of raw steel production Hot and cold rolling mills Blooming mills Galvanizing lines	In 1978, 32 percent of the total tonnage, or 2,736,960 tons, of steel produced at Indiana Harbor Works was shipped for use in the transportation area. Roughly 20-25 percent was to automotive customers.

FIGURE 9-3. INLAND STEEL PLANT DATA

sales was particularly strong reflecting the company's good cost structure and high volume operations. (Production was at 100 percent capacity for the year.) During 1978 Inland was also subject to a coal strike and a severe winter in Chicago.

Inland has increased its market share to 6.5 percent of the steel market. Income was somewhat lower in 1979 due to reduced demand for steel products. (See Figure 9-4.)

9.4.2 Capital Analysis

Capital spending is continuing at a constant and relatively high level at Inland. The company is planning to spend $2 billion through the 1980's to increase its steelmaking capacity by 2.5 million tons. Inland has increased its debt recently but seems to be maintaining its debt/capitalization near historic levels. The company is not expected to have any difficulty financing its expansion. (See Figure 9-5.)

9.5 RESEARCH AND DEVELOPMENT

In recent years substantial activity was directed toward supporting the automotive industry's efforts to downsize and lighten its products. Among Inland's accomplishments were:

- The development of an aluminum coated steel possessing special high temperature corrosion resistant properties. The steel was certified for use by a major auto manufacturer for use in automotive exhaust systems.

- The development of new pre-painted steel products. Painted in coil form and later formed into parts, one new sheet product developed by Inland eliminates the necessity for appliance manufacturers to install their own paint lines.

In the area of new process development, effort was directed at increasing the effective utilization of steelmaking raw materials. One endeavor centered on the development of new technology for the upgrading of solid waste materials generated in the various ironmaking, steelmaking and tooling operations for recycling in the production of iron and steel. A computer control system

Year	Sales ($Millions)	Earnings ($Millions)	Return on Equity, Percent	Operating Income* / Sales Percent
79	3,635	131	10.3	8.8
78	3,248	158	13.2	11.7
77	2,682	88	7.8	8.4
76	2,388	104	9.7	11.3
75	2,107	83	8.9	10.5
74	2,450	148	17.2	14.5

Year	Earnings / Total Assets Percent	Sales / Assets	Earnings / Sales Percent
79	4.9	1.29	3.8
78	6.4	1.10	4.9
77	4.0	1.02	3.3
76	5.0	1.15	4.4
75	4.6	1.13	4.0
74	8.9	1.39	6.0

*Operating Income = Sales – Cost of Goods Sold – Selling, General and Administrative Expenses, Before Depreciation, Interest, and Income Taxes.

FIGURE 9-4. OPERATING ANALYSIS OF INLAND STEEL

Year	Sales	P/E Ratio[1]	Sources: Earnings	Depreciation	Changes in Long-Term Debt	Changes in Owners' Equity Other Than Retained Earnings
79	3,635	5.5	131	129	(19)	(5)
78	3,248	4.9	158	115	38	9
77	2,682	9.8	88	99	134	9
76	2,388	9.8	104	89	(26)	81
75	2,107	8.8	83	81	117	(6)
74	2,450	3.9	148	74	43	(6)

Year	Change in Working Capital	Uses: Capital Expenditures	Dividends	Long-Term Debt[2] / Capitalization %	Coverage[3]	Cap. Exp. / Total Assets %	Current Ratio
79	(79)	285	58	30.1	6.1	10.7	1.4
78	0	270	60	31.5	7.6	12.9	1.7
77	23	282	55	32.3	4.8	12.5	1.9
76	81	303	51	28.1	7.1	15.1	1.9
75	22	223	46	31.9	7.1	11.5	2.6
74	90	101	52	27.3	14.2	5.9	2.2

Dollar figures are in millions

[1] Average for the Year

[2] Capitalization Defined as Total Liabilities – Current Liabilities

[3] Operating Profit/Interest

FIGURE 9-5. CAPITAL ANALYSIS OF INLAND STEEL was developed for the efficient distribution of raw materials into the No. 7 blast furnace now going into Indiana Harbor. This will conserve raw materials, notably coke, and will improve the quality of iron produced. Computerized materials-charging models also were developed for the purpose of enhancing productivity, minimizing energy consumption, and increasing the potential lining life of the new blast furnace.

9.6 GOVERNMENT AND LABOR RELATIONS

Inland's expenditures for pollution control to meet Environmental Protection Agency mandated standards continued to rise during 1979. These outlays represented 20 percent of the company's total capital budget, compared with 19 percent in 1978. Inland spent $39.7 million for air quality control facilities and equipment, and $18.4 million for water quality controls, compared with $35.5 million and $15.5 million, respectively, in 1978. The total hardware expenditures of $58.1 million exceeded those of the previous year by 14 percent.

Since 1950, Inland reports it has spent $335.9 million for environmental hardware. For the five-year period 1975-1979, the company expended $224.7 million, which was 17 percent of total capital expenditures and investments in raw material ventures which aggregate more than $1.3 billion. The annual cost for operating and maintaining environmental equipment was $30.0 million, an 18 percent boost from $25.5 million in 1978, the steelmaker reported. Inland projects additional outlays of approximately $82 million to complete the authorized environmental programs at its steel mill, mines, quarries and vessels.

As did other major steelmakers, Inland and the United Steelworkers signed a new three year contract in April of 1980.

10. ALUMINUM INDUSTRY

Since 1966 the motor vehicle manufacturing industry has typically consumed from 9 to 15 percent of all domestic aluminum production. Recently, this amount has been increasing. Compared with the typical car of today, which weighs approximately 3,600 pounds and contains about 112 pounds of aluminum, the typical car of 1985 is expected to weigh 2,700 pounds and contain from 200 to 240 pounds of aluminum.

10.1 ALUMINUM MANUFACTURING PROCESS

Bauxite is the raw material for aluminum production and it is refined in "alumina plants" into alumina, an oxide of aluminum. (See Figure 10-1.) In a separate smelting plant, or primary aluminum plant, the alumina is converted into aluminum. This process requires a powerful electric current to wrest the aluminum from the oxygen.

Molten aluminum is usually cast into ingots which are shipped to fabricating plants for further processing. The most important aluminum products for the auto industry are sheet products and castings. To make sheet products, the ingots are sent to rolling mills where they are rolled into flat sheets or coils. For castings, the primary ingots are sent to aluminum foundries where they are remelted and cast into new products.

Much of the metal used in aluminum foundries comes from secondary or recycled ingot. Most of this metal comes from remelting aluminum cans collected throughout the country. The remelting process uses only about five percent of the energy originally required to make aluminum.

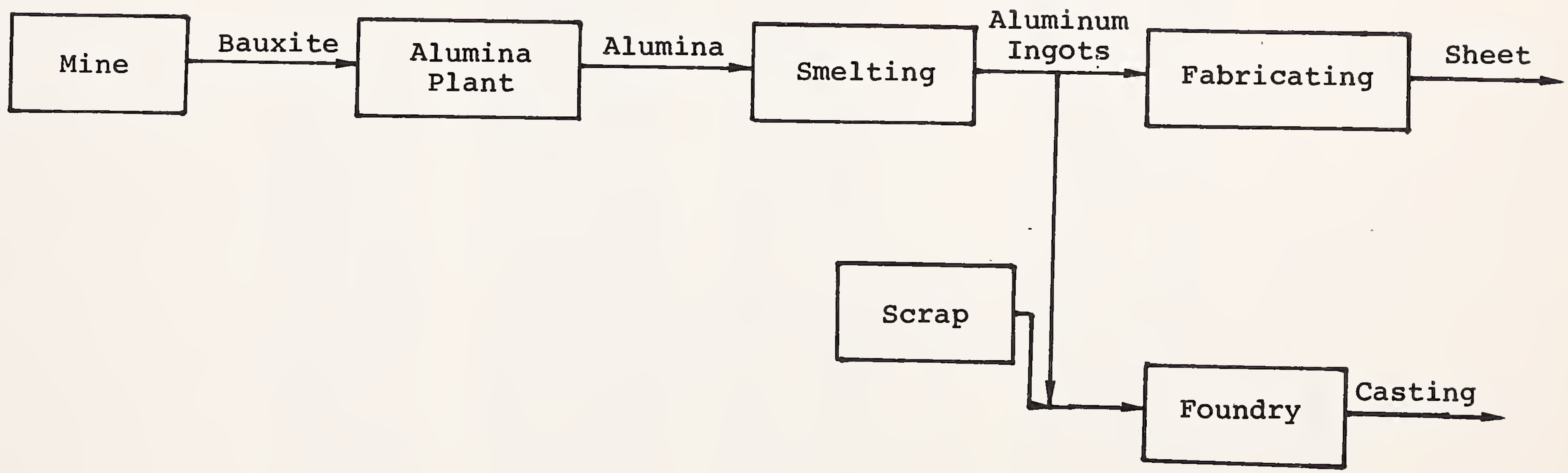

FIGURE 10-1. THE MANUFACTURE OF ALUMINUM

10.2 SIZE AND STRUCTURE OF THE INDUSTRY

The aluminum industry is dominated by six major companies, three of which are headquartered in the United States. Many of the aluminum companies are vertically integrated and participate in all stages of aluminum production from mining to fabrication.

10.2.1 Size of Industry

In 1979, the American aluminum industry shipped about 14.6 million pounds of primary and secondary ingot and mill products such as sheet, plate, strip, etc., having a value of about $14 billion. An estimated 200,000 to 250,000 people are employed by the aluminum industry in the United States. Domestic aluminum use is expected to more than double in the next 25 years.

10.2.2 Industry Structure

The world aluminum industry consists of six large integrated firms, which own or have equity interests in about half of world aluminum productive capacity, and about 50 other companies, which own a quarter of aluminum productive capacity, frequently in association with one or more of the six large firms.

Three of the six large aluminum companies are in the United States. These are ALCOA, Reynolds, and Kaiser, who together account for 65 percent of domestic primary aluminum capacity. The fourth, fifth, and sixth largest aluminum companies in the United States, in terms of capacity, are Consolidated Aluminum, Anaconda, and Alumax. (See Table 10-1.) This report covers the three largest U.S. producers plus Alumax. Alumax is included because it is the only company undertaking major primary aluminum expansion in the United States. In addition, this report covers Alcan Aluminum, Ltd., a Canadian company with the largest primary aluminum capacity in the world. Alcan has a substantial market in the United States.

TABLE 10-1. MAJOR ALUMINUM COMPANIES

COMPANY	1979 SALES ($ Millions)	PRIMARY CAPACITY (Thousands of Tons)
ALCOA	4,786	1,770
Alcan	4,441	1,722
Reynolds	3,305	975
Kaiser	2,927	724
Alumax	873	219

10.3 MAJOR MARKETS

In the United States the aluminum industry has identified its major markets as building and construction, transportation, consumer durables, electrical, machinery and equipment, containers and packaging, exports and other end uses. Table 10-2 shows the distribution of sales to these markets.

TABLE 10-2. SHIPMENTS BY MAJOR MARKET, 1979

MAJOR MARKET	PRODUCT SHIPMENTS (Millions of Pounds)	PERCENT OF TOTAL
Building and Construction	3,052	20.1
Transportation	3,024	20.1
Consumer Durables	1,009	7.0
Electrical	1,559	10.7
Machinery and Equipment	934	6.4
Containers and Packaging	3,223	22.0
Other	810	5.5
Total Domestic	13,611	93.0
Exports	1,023	7.0
TOTAL INDUSTRY	14,634	100.0

Source: Aluminum Association estimates.

As shown in Table 10-2, the most important markets are building and construction, containers and packaging, and transportation. The major aluminum products used in the manufacture of passenger cars are sheet and ingots. Table 10-3 gives the complete breakdown of aluminum use in cars by product type from the aluminum industry.

TABLE 10-3. TOTAL ALUMINUM USE IN PASSENGER CARS, 1978

(MILLIONS OF POUNDS)

PRODUCT	QUANTITY	PERCENT OF TOTAL
Ingot	961	64.4
Sheet	394	25.5
Foil	41	2.4
Rolled and Continuous Cast Rod and Bar	11	0.7
Extruded Shapes	77	3.9
Extruded Pipe and Tube	14	0.9
Drawn Tube	13	0.9
Bare Wire	1	0.1
Forgings	14	1.0
Impacts	3	0.2
TOTAL	1,529	100.0

10.4 MAJOR ISSUES AFFECTING THE ALUMINUM INDUSTRY

The principal issues affecting suppliers of aluminum to the auto industry include:

- Rising energy costs
- Inadequate returns
- Increased sales of sheet.

Rising Energy Costs

Aluminum requires large amounts of electrical energy for its production, and the problems of the power industries in the United States have been partly responsible for the lack of new domestic primary aluminum smelters. Besides ALCOA's Anderson County, Texas, experimental smelter, only one new smelter is under construction in the United States—Alumax's new South Carolina plant. Reynolds is considering expanding its primary capacity through modernization of existing facilities. Kaiser claims to be examining greenfield sites carefully but has announced no plans for new construction. ALCOA feels expansion of supply is vital, but feels problems with assured supplies of energy in the United States are preventing the company from expanding primary capacity.

Only Alcan is undertaking a major primary plant construction. The plant is being built in Quebec. Hydroelectric power to support the facility is available from Alcan's own power plants. Thus, some industry leaders foresee a shortage of domestic primary aluminum capacity in the 80's. Smelters are being located in parts of the world where energy costs are relatively low. Alcan is expanding smelting capacity in Brazil. Alcoa is expanding capacity in Australia through its subsidiary Alcoa of Australia. Kaiser is also considering expansion in Australia through its affiliate Comalco. Only Alumax is expanding capacity in the United States. Alumax is 45 percent owned by Mitsui of Japan, and 25 percent of the output of the new plant will be bought by Mitsui.

Inadequate Returns

Part of the reason aluminum companies are not expanding primary production is the over-capacity that has existed in the industry in the past. The aluminum industry entered the 1970's with a major expansion program underway, coincidental with a downturn in the economy. The marketplace drove prices down and the aluminum industry had poor years in 1973 and 1975. Companies are determined not to invest in new plants on speculation.

Kaiser Aluminum feels that it must make 12 to 13 percent on invested capital in order to justify new investment. With very strong sales and earnings recently, Kaiser calculates that current returns are now adequate. Thus it can be expected that over time higher prices and greater returns will lead to new investment—but companies will not invest in so much capacity that the low-priced aluminum that existed in the 70's will be available again.

Increased Sales of Sheet

Domestic demand for aluminum was increasing markedly for sheet products but the 1979-1980 recession adversely affected this trend. The growth, which presumably will resume as the economy regains momentum, is largely due to high demand from the automobile, the can and aerospace industries. As a result, the sheet facilities in America's aluminum sheet plants have been working near capacity. Thus expansions in sheet capacity are under way at U.S. plants run by Alcan, ALCOA, Kaiser, and Reynolds.

In addition, the high volume production facilities required by the aluminum industry are allowing some aluminum companies to install high-volume, efficient facilities for the first time. This may increase the competitiveness of aluminum.

Much of the capital spending taking place now in the aluminum industry can be traced to the automobile. Increases in sheet purchases has caused strains in various parts of the aluminum manufacturing process. Therefore, for specific companies one can identify a new foil feedstock plant or a new continuous casting line as indirect results of increased aluminum shipments to the auto industry.

11. ALUMINUM COMPANY OF AMERICA (ALCOA)

The Aluminum Company of America (ALCOA) is a major producer and fabricator of aluminum. The company has particular strengths in high technology, high volume aluminum products and has a strong research and development staff. ALCOA feels that it is a strong contender for the aluminum automobile and aerospace markets and has decided to concentrate on these markets. It has also decided to maintain its position in the container and packaging market and to reduce company emphasis in the residential product market.

ALCOA is expanding its sheet facilities to pursue the automotive market and is expanding primary continuous casting to feed the rolling mills. The company is engaged in considerable research and development in new uses for aluminum in automobiles.

11.1 CORPORATE SIZE AND STRUCTURE

ALCOA is the largest aluminum producer in the U.S. (second largest in the world) and the world's leading integrated producer of aluminum products. ALCOA's highly diversified operations include:

- The mining and processing of bauxite
- The refining of alumina from bauxite
- Smelting of aluminum from alumina
- Production of milled and other finished aluminum products
- Recycling of scrap aluminum.

11.1.1 Revenue, Profit and Employment Statistics

ALCOA registered record sales and earnings in 1979 of $4.8 billion and $505 million respectively. Sales were up from $4.1 billion in 1978. The company employed about 46,800 workers in 1979. (See Table 11-1.)

TABLE 11-1. ALCOA REVENUES, PROFITS, AND EMPLOYMENT.

Year	Revenues (Millions)	Profits (Millions)
1979	$4,847.0	$504.6
1978	$4,072.5	$312.7
Average Number of Employees: 46,800 (1979)		

11.1.2 Corporate Organization

ALCOA's organization is set up by functions and product lines. (See Figure 11-2.) Finance and public relations report directly to the chairman. Personnel, Construction, Research and Development, and Environment and Energy Resources report to the president. The company's operations are divided into Mill Products, Primary Products, Allied Products, and International.

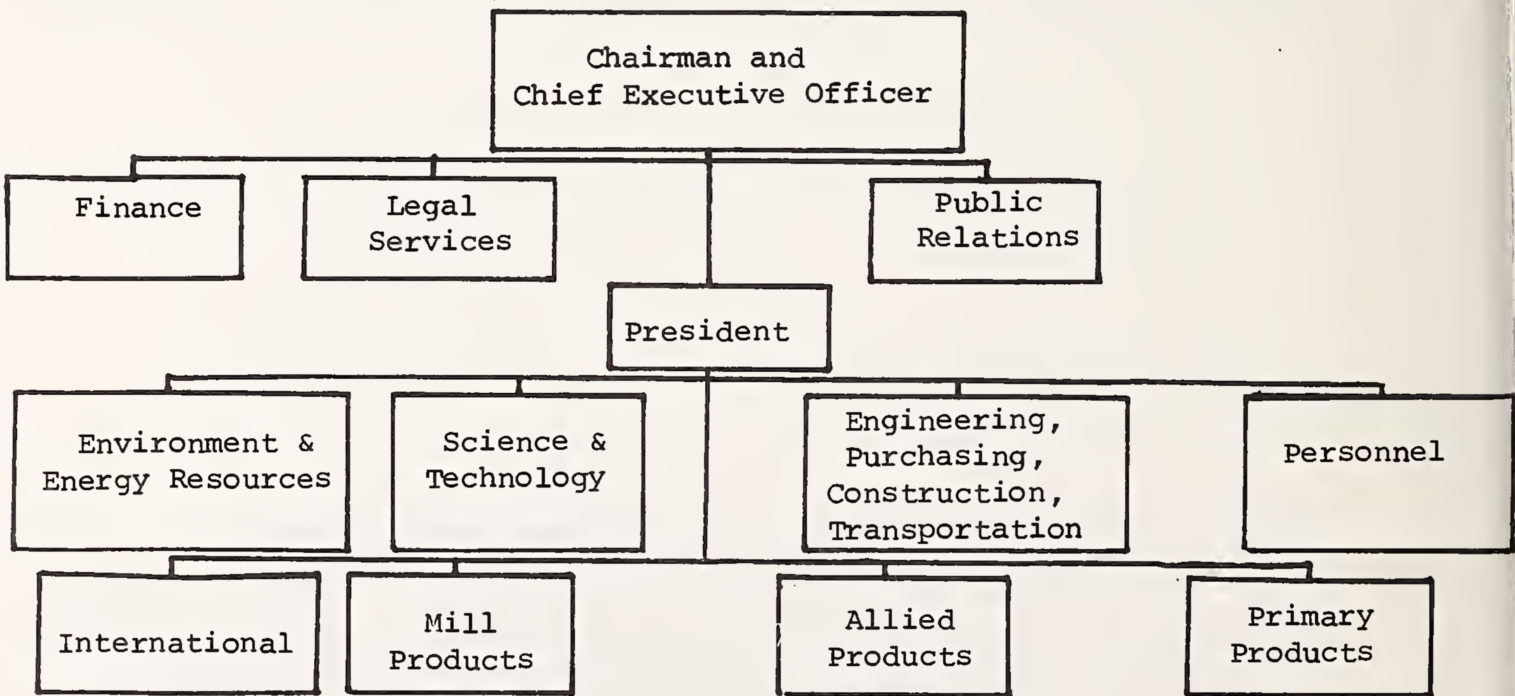

FIGURE 11-2. ALCOA ORGANIZATION

11.2 MAJOR MARKETS AND PRODUCTS

Figure 11-3 presents the major market information for ALCOA.

11.2.1 Major Markets

ALCOA's major markets are:

- Packaging and containers
- Building and construction
- Transportation
- Electrical
- Finished aluminum products.

In 1979,15 percent of sales went to transportation and approximately one-third of this went to the auto industry. Packaging and containers accounted for 27 percent of sales, the electrical industry accounted for 6 percent of sales, and building and construction accounted for 4 percent of sales. Table 11-2 presents major market revenue for ALCOA.

MARKET DATA

Major markets: Packaging, container, construction, transportation, electrical

Percent of sales to the auto industry: 5 percent

Supplies to the following automotive companies: Chrysler, other auto manufacturers

Major automotive products: Sheet, forged wheels, bumpers, trim sheet, fasteners, fin stock, ingot

FIGURE 11-3. ALCOA MARKET DATA

TABLE 11-2. ALCOA MARKET REVENUES.

Major Market	1978	1979
Aluminum processing segment		
Packaging and containers	$1,157.7	$1,287.3
Transportation (including ordnance)	602.3	701.3
Electrical	205.8	275.5
Building and construction	173.6	199.1
Other	1,269.3	1,598.1
	$3,408.7	$4,061.3
Finished products and other segments	643.1	724.3
Total sales and operating revenues	$4,501.8	$4,785.6

11.2.2 Products

ALCOA's principal products are:

- Primary aluminum in hot or cold ingot form
- Light and heavy gauge aluminum sheet and strip
- Flat-rolled aluminum plate
- Aluminum foils
- Aluminum tubes, extrusions, rods, wires and bars
- Electrical conductors
- Aluminum forgings
- Closures, fasteners, rivets, screw machine products
- Residential siding and other building products.

The principal automotive products include aluminum sheet and bar stock, forged wheels, bumpers, trim sheet, fasteners, fin stock, and ingot. In addition to raw and finished aluminum, ALCOA produces cast and forged aluminum products for the automotive community.

Sales Strategy

According to ALCOA, price, quality and service are the principal competitive factors in most of its markets, although in many markets where aluminum products compete with other materials, the diverse qualities of aluminum are also a significant factor. The company believes that its competitive position is enhanced by its "diversified raw materials resources, its strong energy position, its extensive plant facilities..., and its extensive research and development techniques which help control its product costs and aid in development of new products and production techniques."[1]

New Products

ALCOA's 7,000 series (X-7021 and X-7146) is now being used for automobile bumpers and bumper back-up bars. The 7,000 series of aluminum contains zinc, magnesium, and copper as alloys and is the highest strength series. This product is already accepted and competitive, but ALCOA is working to improve its strength, formability and plateability by experimenting with various combinations of alloys.

ALCOA recently introduced a new aluminum body sheet, its 6XXX series. This alloy series is supposed to provide significant cost reductions over previous aluminum body sheet alloys because of increased dent resistance, subsequent thinner gauges allowable, and the higher scrap value of the compatible 6XXX alloys. In some cases, ALCOA claims, lighter aluminum pieces will cost even less than heavier steel counterparts. The company also emphasizes the product's improved weldability, formability and corrosion resistance.

11.2.3 Marketing Strategy

ALCOA emphasizes its company's strong capability in strategic planning. It has formulated a rather specific marketing strategy. ALCOA has been changing its product mix to focus on those markets that play to ALCOA's strengths—where high volume, high technology, and energy conserving products are vital. The key points in its strategy include:

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1. 10-K Report.

- Leave the residential products market
- Maintain ALCOA's position in the beverage market
- Pursue automotive and aerospace markets.

Leave Residential Products Market

William B. Renner, ALCOA's president, stated that ALCOA has decided to "phase down to virtually no participation" its sales of aluminum grades used in residential products. "In the past we tried to be all things to all people, but we've taken a good hard look at ourselves and decided to do only what we do best."[2] Further, Chairman W. H. Krome George has stated, "We will invest only in markets where the real value of aluminum is reflected in the marketplace. We will not pursue markets where the prices for our products do not yield adequate returns. And we will not hesitate to give up a traditional market where we can no longer compete effectively and profitably."[3]

Maintain Position in Container Market

According to ALCOA, the container market is large but future growth for aluminum is marginal. ALCOA is thus not planning to expand its capacity in this area and will concentrate on improvements to cut costs.

Pursue Automotive and Aerospace Markets

ALCOA sees the biggest growth potential in the automotive market. According to Renner (in 1979) "Each year... more aluminum is going into the average car. We believe that the pace will continue as the automakers recognize aluminum as a practical way to reduce the energy requirements of America's automobiles."[4] But Renner later conceded that "the total automotive market for aluminum was

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2. American Metal Market, April 24, 1979.

3. Remarks before the Shareholders' Annual Meeting, Pittsburgh, Pennsylvania, April 19, 1979.

4. Remarks before the Shareholders' Annual Meeting, Pittsburgh, Pennsylvania, April 19, 1979.

not as good as we had hoped it would be (in 1979), although orders for forged wheels exceeded our expectations." ALCOA was "not seriously affected by the slowdown in the automobile industry because we had not committed large new capacity," Renner noted.[5] Forged aluminum wheels, aluminum castings and electrical wire harness production continued to sell well in 1979. In addition, the aerospace market is so strong now, especially for heat-treated grades, that according to ALCOA, delivery times already stretch out into 1980.

11.3 PRODUCTION AND OPERATIONS

ALCOA mines bauxite from property it owns in Arkansas and from reserves held under mining rights in Suriname, the Dominican Republic, and Jamaica. The company has also contracted to purchase substantial quantities of bauxite from Guinea.

Alumina is produced by ALCOA at its plants in Paranam, Suriname; Mobile, Alabama; Point Comfort, Texas; and Clarendon Parish, Jamaica. Alumina chemicals are produced in Bauxite, Arkansas; Mobile, Alabama; Point Comfort, Texas; and Rotterdam, The Netherlands.

Primary aluminum is produced from alumina by the company at its domestic smelting plants at Warrick, Indiana; Massena, New York; Badin, North Carolina; Alcoa, Tennessee; Anderson County, Point Comfort and Rockdale, Texas; and Vancouver and Wenatchee, Washington.

ALCOA also has extensive mining, alumina and primary aluminum facilities in Australia. Mill products are made by ALCOA at plants throughout the United States. These are listed in Figure 11-4.

11.3.1 Major Automotive Facilities

ALCOA has ten plants that provide parts to the auto industry. Three of these make small aluminum parts like fasteners and powdered metal parts. The other seven make sheet, extrusions, forgings, and primary aluminum. Information on these seven plants is given below. Information on all the plants is given in Figures 11-5 through 11-14.

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5. 1979 Annual Report.

ALCOA restarted four of the seven potlines at Point Comfort (TX) operations, and the final line at Warrick (IN) operations in 1979. The potlines at Point Comfort had been idled in two steps, in 1975 and 1978, because of high gas costs.

Davenport Plant

ALCOA's Davenport plant is the company's major supplier of sheet to the auto industry. The plant is in Davenport, Iowa, and employs 3,000 people. ALCOA is spending $100 million to expand heat-treated aluminum sheet production. The project will add 11 acres to the plant, provide about 350 new jobs, and add substantially to ALCOA's capacity to produce heat-treated sheet and plate.

Products	Plants
Flat rolled products	Warrick, Indiana Davenport, Iowa Alcoa, Tennessee Lebanon, Pennsylvania
Extrusions, rolled, and drawn aluminum	Lafayette, Indiana Massena, New York Vancouver, Washington Vernon, California Tifton, Georgia Marshall, Texas
Forgings	Cleveland, Ohio Vernon, California
Powders and pigments	Rockdale, Texas New Kensington, Pennsylvania Alcoa, Tennessee
Castings	Cleveland, Ohio Corona, California
Fasteners, machined products	Lancaster, Pennsylvania

FIGURE 11-4. ALCOA MILL PRODUCT PLANTS

Company Alcoa

County Scott

Plant Size

Plant Davenport IA Plant

Congressional District

Address U.S. Hwy. 67
Bettendorf IA 52722

Standard Metropolitan Statistical Area 163

No. of Employees 3300

Telephone 319-359-2000

Primary SIC Code(s) 335302, 335303, 335301

Products (Automotive)	Capacity	Processes Used	Consumed by (Automotive)
Aluminum sheet, strip, plate Activity: Mfg., Div. Hq.	N.C.A.	Rolling	N.C.A.

FIGURE 11-5. DAVENPORT PLANT DATA

Company Alcoa

County Blount

Plant Size

Plant Tennessee Operations

Congressional District

Address Box 9158, State Rte & 73
Alcoa, TN 37701

Standard Metropolitan Statistical Area 09

No. of Employees 4400

Telephone 615-977-3490

Primary SIC Code(s) 335301, 335303

Products (Automotive)	Capacity	Processes Used	Consumed by (Automotive)
Automotive trim, sheet and strip Activity: Mfg.	N.C.A.	Rolling	N.C.A.

FIGURE 11-6. TENNESSEE PLANT DATA

Company Alcoa
County Lebanon
Plant Size

Plant Lebanon PA Plant
Congressional District

Address State Drive, Lebanon, PA 17042
Standard Metropolitan Statistical Area 75
No. of Employees 208

Telephone 717-273-7661
Primary SIC Code(s) 335303

Products (Automotive)	Capacity	Processes Used	Consumed by (Automotive)
Fin stock for auto air conditioning	N.C.A.	Rolling	N.C.A.
Activities: Corp. Hq., Div. Hq., Mfg.			

FIGURE 11-7. LEBANON PLANT DATA

Company Alcoa | County Tippecanoe | Plant Size

Plant Lafayette, IN Plant | Congressional District

Address E. Main St.
Lafayette, IN 47901

Standard Metropolitan Statistical Area 157

No. of Employees 2215

Telephone 317-447-4141

Primary SIC Code(s) 335401, 335505

Products (Automotive)	Capacity	Processes Used	Consumed by (Automotive)
Air Cond. Tubing Bumpers Activity: Mfg.	N.C.A.	Aluminum extruding, rolling and drawing	N.C.A.

FIGURE 11-8. LAFAYETTE PLANT DATA

Company Alcoa | County Cuyahoga | Plant Size

Plant Cleveland, OH Plant | Congressional District

Address 2210 Harvard Ave.
Cleveland, OH 44105 | Standard Metropolitan Statistical Area 35 | No. of Employees 1850

Telephone 216-641-3600 | Primary SIC Code(s) 346302, 336101

Products (Automotive)	Capacity	Processes Used	Consumed by (Automotive)
Forged wheels Aluminum castings Activity: Mfg.	N.C.A.	Aluminum casting Aluminum forging	N.C.A.

FIGURE 11-9. CLEVELAND PLANT DATA

Company Alcoa

County Warrick

Plant Size

Plant Warrick, IN Operations

Congressional District

Address Highway 66
Newburgh, IN 47630

Standard Metropolitan Statistical Area 173

No. of Employees 3100

Telephone 812-853-6111

Primary SIC Code(s) 333411

Products (Automotive)	Capacity	Processes Used	Consumed by (Automotive)
Aluminum ingots	N.C.A.	Smelting	N.C.A.
Activities: Div. Hq., Eng., Mfg.			

FIGURE 11-10. WARRICK PLANT DATA

Company Alcoa

County Chelan

Plant Size

Plant Wenatchee, WA Plant

Congressional District

Address Box 221
Wenatchee, WA 98801

Standard Metropolitan Statistical Area 07

No. of Employees 950

Telephone 509-663-5111

Primary SIC Code(s) 333411

Products (Automotive)	Capacity	Processes Used	Consumed by (Automotive)
Primary aluminum Activity: Mfg.	N.C.A.	Smelting	N.C.A.

FIGURE 11-11. WENATCHEE PLANT DATA

Company Alcoa

County Lancaster

Plant Size

Plant Lancaster, PA Plant

Congressional District

Address Fruitville Pike & Rte 230
Lancaster, PA 17604

Standard Metropolitan Statistical Area 71

No. of Employees 500

Telephone 717-394-5651

Primary SIC Code(s) 345215, 345220, 345109

Products (Automotive)	Capacity	Processes Used	Consumed by (Automotive)
Fasteners and screws Machine products Activity: Mfg.	N.C.A.	Machining	N.C.A.

FIGURE 11-12. LANCASTER PLANT DATA

Company Alcoa

County St. Lawrence

Plant Size

Plant Massena, NY Plant

Congressional District

Address Park Avenue
~~Massena, NY 13662~~

Standard Metropolitan Statistical Area 89

No. of Employees 2200

Telephone 315-764-4011

Primary SIC Code(s) 333411, 335503, 335501

Products (Automotive)	Capacity	Processes Used	Consumed by (Automotive)
Rod stock for screw machine products Activities: Mfg.	N.C.A.	Aluminum rolling & drawing	N.C.A.

FIGURE 11-13. MASSENA PLANT DATA

Company Alcoa

County New Haven

Plant Size

Plant American Powdered Metals

Congressional District

Address Powder Road
North Haven, CT 06473

Standard Metropolitan Statistical Area 09

No. of Employees 200

Telephone (203) 239-2533

Primary SIC Code(s) 349930

Products (Automotive)	Capacity	Processes Used	Consumed by (Automotive)
Precision aluminum powdered metal parts	N.C.A.	N.C.A.	N.C.A.

FIGURE 11-14. AMERICAN POWDERED METALS PLANT DATA

Alcoa Plant

The Alcoa, Tennessee, plant is a major producer of aluminum sheet and foil. The major automotive product is aluminum trim sheet. Tennessee Operations also house one of ALCOA's primary production facilities, and employ 4,000 people. In 1978 Tennessee Operations continued a program begun in 1977 to rebuild and expand its ingot casting operation, add new finishing equipment, and modernize hot and cold rolling facilities.

Lebanon Plant

The Lebanon, Pennsylvania, plant employs 325 people and produces light-gauge sheet and foil. The major automotive product is fin stock used in automotive air conditioning systems. Heat exchangers made of aluminum are now being used in automobile air conditioners. A new cold rolling mill is being installed at this plant.

Lafayette Plant

The Lafayette, Indiana, plant produces extrusions and tubing. The plant employs 1,700 people and the major automotive products are bumpers and air conditioning tubing. Two front-wheel drive cars introduced in 1979 use lightweight bumpers extruded at Lafayette.

Cleveland Plant

ALCOA's Cleveland, Ohio, plant does permanent mold casting and forging. In 1978 the forging division added a 3,000 ton press to its automated line for production of car wheels. The plant, which employs 1,700 people, is a major supplier of forged aluminum wheels for automobiles and trucks.

Warrick and Wenatchee Plants

Both these plants supply ingot to the auto industry. The Wenatchee, Washington, plant is a primary aluminum plant that employs 900 people. Construction has recently begun at Wenatchee on a facility to cast sheet ingots for ALCOA's expanding rolling mills. The Warrick, Indiana, plant produces large quantities of light gauge sheet and also has can recycling facilities.

11.3.2 New Plants and Expansions

Capital expenditures were $420 million in 1979, and ALCOA undertook several automotive-relevant plant expansions or modifications in 1979. Strip-casting facilities installed at Badin, NC, will increase metal availability for cold-rolling operations throughout the ALCOA system. New strip-casting and cold-rolling facilities at Lebanon, PA, will further increase capacity to produce flat-rolled products. An expansion program completed late in the year at Alcoa, TN, doubled the plant's capacity.

An expansion project completed in mid-1979 at ALCOA's Davenport Works included heat-treating facilities and equipment improvements to increase productivity and capacity, primarily for aerospace. A second expansion of heat-treating facilities was begun while the earlier program was being completed. The new project, which includes plate and sheet heat-treating units and related processing, finishing and handling equipment, will be completed in about three years.

Production of aluminum automobile bumpers was expanded at The Stolle Corp., a diversified ALCOA subsidiary located in Sidney, OH. The company manufactured the front bumpers for two of General Motors' new front-wheel-drive, X-model cars. In mid-1980, Stolle will begin producing bumpers for the 1981 Volkswagen Rabbits.

Robots that manipulate aluminum during the forging operation were installed at ALCOA's Cleveland Works. Designed at ALCOA laboratories in close cooperation with engineering and operating personnel, these robots boosted production of forged aluminum wheels at the Cleveland plant from 600 to 1500 units per shift, without changing the number of employees.

Construction of a new powder and pigment plant began at Rockdale, TX, following an explosion that destroyed the existing plant in December 1978. The new plant will be computer-operated and has been redesigned for maximum safety and more efficient operation. At Logans Ferry, PA, the atomizer was damaged in July and will not be replaced. The plant will continue as a source of aluminum pigments.

Another important 1979 capital expenditure converted the Vernon, CA, plant from the production of soft alloy to hard alloy extrusions. This was intended to better equip the plant to serve the aerospace and automotive industries on the West Coast. Hard alloys are used extensively in aircraft and commercial vehicles. Emphasis on productivity, capacity sustaining and environmental programs continued at most locations, as well as on the company's aluminum-can recycling facilities expansion.

11.4 FINANCIAL STATUS

Presented below are an operating analysis and capital analysis of ALCOA.

11.4.1 Operating Analysis

ALCOA is in good position for its announced $3.3 billion, five-year expansion program. Earnings for ALCOA in 1978 were significantly higher than in previous years. (See Figure 11-15.) Although both sales to assets and return on sales were higher, the major growth has occurred in return on sales. This was the result of the very good prices for ALCOA's fabricated aluminum products and the hgih production levels that existed throughout the year. The company also points out that improved product mix toward more valuable fabricated products was partly responsible for the earnings increase. Earnings in 1979 continued a strong trend upward and ALCOA has stated it is now earning at a level sufficient for growth.

11.4.2 Capital Analysis

ALCOA has not had a major common or preferred stock offering in the last five years and analysts feel such an offering will not take place in the future unless the company's stock is selling well above book value. (See Figure 11-16.) By decreasing its long-term debt over the past three years, ALCOA has decreased its debt to capitalization from 44 percent in 1975 to 26 percent in 1979. In addition the company increased capital expenditures and dividends in 1979 and met its cash needs through internal funds.

In 1980 capital expenditures are set to increase to $630 million. The company has also announced a capital expenditure program of $3.3 billion over the next five years. To finance these expenditures stock analysts predict a need to seek external financing, probably through increases in long-term debts.

Year	Sales ($Millions)	Earnings ($Millions)	Return on Equity, Percent	$\frac{\text{Operating Income*}}{\text{Sales}}$ Percent
79	4,847	504	22.2	19.9
78	4,052	313	16.1	18.2
77	3,417	195	11.2	15.5
76	2,924	144	9.0	15.6
75	2,306	65	4.1	12.4
74	2,727	173	12.0	17.8

Year	$\frac{\text{Earnings}}{\text{Total Assets}}$ Percent	$\frac{\text{Sales}}{\text{Assets}}$	$\frac{\text{Earnings}}{\text{Sales}}$ Percent
79	11.3	1.08	10.5
78	7.8	1.01	7.7
77	5.3	.93	5.7
76	4.1	.84	4.9
75	1.9	.68	2.8
74	5.7	.89	6.4

*Operating Income = Sales – Cost of Goods Sold – Selling, General and Administrative Expenses, Before Depreciation, Interest, and Income Taxes.

FIGURE 11-15. OPERATING ANALYSIS OF ALCOA

			Sources			
Year	Sales	P/E Ratio[1]	Earnings	Depreciation	Changes in Long-Term Debt	Changes in Owners' Equity Other Than Retained Earnings
79	4,786	3.5	505	247	(110)	5
78	4,052	5.0	313	228	(36)	16
77	3,417	9.1	195	204	8	18
76	2,924	12.7	144	191	(96)	20
75	2,306	21.8	65	171	322	18
74	2,727	8.2	173	165	48	12

		Uses					
Year	Change in Working Capital	Capital Expenditures	Dividends	$\frac{\text{Long-Term Debt}^2}{\text{Capitalization}}$ %	Coverage[3]	$\frac{\text{Cap. Exp.}}{\text{Total Assets}}$ %	Current Ratio
79	123	420	93.8	26	11.1	9.5	2.0
78	69	350	68.8	35	9.1	8.8	2.1
77	86	282	48.5	39	5.9	7.7	2.2
76	(63)	244	49.8	41	5.0	7.0	2.2
75	76	382	47.7	44	3.4	11.5	2.7
74	(28)	356	47.1	38	8.4	11.8	2.2

Dollar figures are in millions

[1] Average for the Year

[2] Capitalization Defined as Total Liabilities – Current Liabilities

[3] Operating Profit/Interest

FIGURE 11-16. CAPITAL ANALYSIS OF ALCOA

11.5 RESEARCH AND DEVELOPMENT

ALCOA's research and development expenditures were $57 million in 1978 and $58 million in 1979. The firm's Technical Center in Pittsburgh is the R&D headquarters for the corporation, with additional laboratory facilities at Marshall, Texas; Massena, New York; New Kensington, Pennsylvania; Richmond, Indiana; and Fort Wayne, Indiana.

The main thrust of ALCOA R&D efforts is toward reducing energy needs for producing aluminum, increasing productivity, and developing new product possibilities for aluminum (such as stamped and cast aluminum automotive components).

Current research is being done on technology that could lead to additional applications for aluminum in automobiles and aircraft. Underway are projects aimed at:

- Reducing the Cost of High Silicon Casting Alloys. This is accomplished by smelting silicon-bearing ores directly into alloy. With current methods in the industry, silicon removed during smelting must be added to the aluminum later. The automotive market is the main target of this work. ALCOA believes that the use of aluminum castings in cars can be increased, especially in engine blocks, if material costs can be reduced.[6]

- Creating a New Generation of High Strength, Greater Stiffness, Fatigue and Corrosion Resistant Aluminum Alloys. This will be accomplished through the use of rapid solidification of molten alloy into powder. This technique permits the aluminum to accept far greater proportions of alloying elements than current methods.

- Developing New Brazing Techniques to Broaden the Use of Aluminum in Heat Exchangers. ALCOA is working on the problems encountered in the joining of parts for automotive radiators.

In addition to the above, ALCOA is also working on increasing aluminum's competitiveness with high strength/low-alloy steel in automotive bumpers.

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6. American Metal Market, April 9, 1979, p.8.

11.6 GOVERNMENT AND LABOR RELATIONS

In May of 1980 ALCOA signed new three-year labor agreements with the United Steelworkers of America and the Aluminum Workers International union. These unions represent most of ALCOA's hourly-paid employees. Although the stipulations of the contract meet the Federal Government's wage and price guidelines, ALCOA feels they will have to step up productivity to support the increases while keeping the company profitable.

During 1979 the company employed an average of 46,800 persons, an increase of 800 over 1978. Basic and applied research and development facilities employed 1,208 persons including 411 full-time professional employees.

ALCOA spent approximately $36 million during 1979 for facilities to control pollution. Expenditures for such facilities are projected at $50-60 million in today's dollars for each of the years 1980-84. The costs of operating the facilities are not included in these figures, ALCOA reports.

12. ALCAN ALUMINUM CORPORATION

Alcan Aluminum Corporation is the American subsidiary of Alcan Aluminum, Ltd. This subsidiary sells primary aluminum and extruded aluminum manufactured in Canada to customers in the United States. The company also operates over 15 fabricating plants in the United States and manufactures aluminum sheet used by the auto industry.

Alcan has considerable expansion plans worldwide. Most of the projects involve new aluminum plants and primary smelters where Alcan feels it has the greatest opportunities. None of these projects is being planned in the United States. In the U.S., Alcan is modernizing and expanding its sheet plants to serve the needs of the automotive and can industries.

12.1 CORPORATE SIZE AND STRUCTURE

Alcan Aluminum Corporation is the largest national fabricating member of the Canadian-based Alcan group of over 90 companies and is the fourth largest aluminum fabricator in the U.S. The parent Alcan Aluminum, Ltd., is engaged in all phases of the aluminum business on an international scale and is the world's largest producer of aluminum.

In addition to its own aluminum production facilities, Alcan subsidiaries operate:

- Bauxite holdings in seven countries
- Primary aluminum smelters in nine countries
- Fabricating facilities in 32 countries
- Sales outlets in more than 100 countries.

They employ 65,400 worldwide.

12.1.1 Revenue, Profit, and Employment Statistics

In 1979 Alcan Aluminum, Ltd., the parent organization, had sales of $4,381 million and a profit of $427 million. (See Table 12-1.) The U.S. subsidiary, Alcan Aluminum Corporation, had sales of $1,135 million (26 percent of world sales), and a profit of $48 million (11 percent of company profits). (See Table 12-2.) Canada, the U.S. and the Caribbean accounted for 71 percent of the corporate profit in 1979.

TABLE 12-1. ALCAN ALUMINUM, LTD.
(INTERNATIONAL PARENT ORGANIZATION)
REVENUES, PROFIT AND EMPLOYMENT

Year	Revenues (Millions)	Profits (Millions)
1979	$4,381.2	$427.5
1978	$3,711.0	$297.0
Average Number of Employees: 65,400 (1979)		

TABLE 12-2. ALCAN ALUMINUM CORP.
(U.S. SUBSIDIARY OF ALCAN ALUMINUM, LTD.)
REVENUES, PROFIT AND EMPLOYMENT

Year	Revenues (Millions)	Profits (Millions)
1979	$1,135.0	$48.0
1978	$1,071.0	$34.0
Average Number of Employees: 4,800 (1978)		

12.1.2 Corporate Organization

Alcan's American subsidiary is organized into divisions according to products as shown in Figure 12-1. Alcan Ingot and Powders is a leading supplier of aluminum ingots and metal powders in the United States. The aluminum ingots are made outside the United States. Alcan Sheet and Plate produces aluminum mill products, while the Metal Goods Division has 25 centers that form a major distribution system for non-carbon metals. Alcan Cable manufactures cable for the electrical power industry, and Alcan Building Products manufactures aluminum siding, windows, and roofing. Intercontinental Alloys Corporation, the firm's subsidiary division, produces secondary aluminum alloys. The secondary aluminum is produced in the United States.

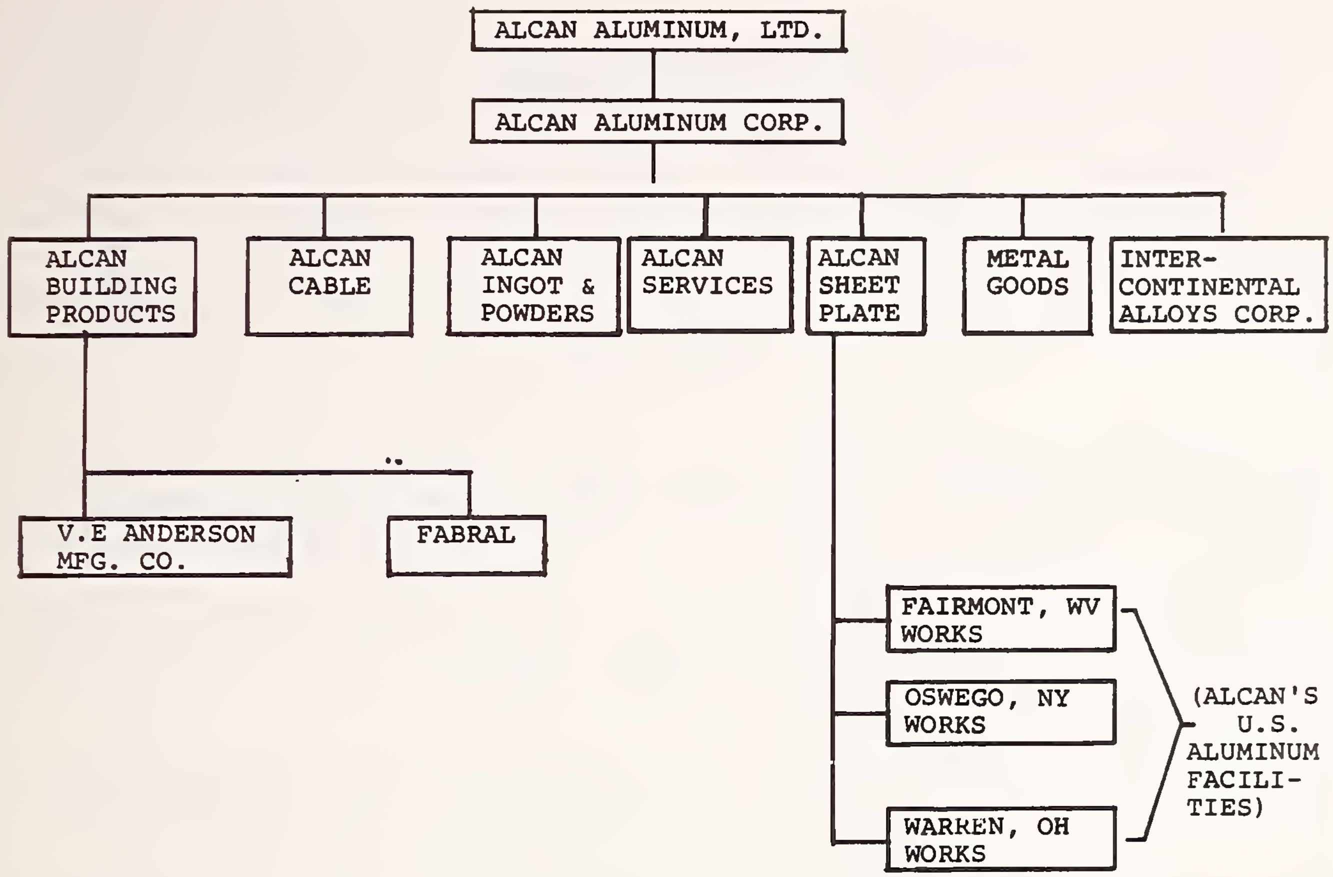

FIGURE 12-1. ALCAN ALUMINUM CORPORATION ORGANIZATION

12.2 MAJOR MARKETS AND PRODUCTS

Figure 12-2 summarizes the major market information for Alcan.

12.2.1 Major Markets

The major markets for Alcan's products include the building and construction industries, packaging and container industries, automotive industry, appliance industry, and the farm equipment industry. Alcan supplied autobody sheet to the automotive industry for weight reduction purposes for the first time in 1977. Alcan has also been a significant supplier of aluminum ingot to aluminum automotive foundries for a number of years. Worldwide Alcan's fabricated products now generate more sales than primary products.

MARKET DATA

Major markets: Building and construction, packaging and container industries, automobiles, appliances, farm equipment

Percent of sales to the auto industry: Not available

Supplies to: Major auto companies

Major automotive products: Coiled and flat sheet aluminum, aluminum plate, primary aluminum

FIGURE 12-2. ALCAN MARKET DATA

12.2.2 Automotive Products

The major automotive products supplied by Alcan include autobody sheet, supplied by the Sheet and Plate Division, and primary and secondary aluminum, supplied by the Ingot and Powders Division. Alcan Sheet and Plate Division is currently involved in development programs with automotive and component manufacturers to reduce the weight of automotive radiators by a patented manufacturing process. Alcan is also supplying extruded bumper stock made in Canada for various automobiles and is working with truck manufacturers to lighten overall weights of specialized heavy-duty motor vehicles. Alcan supplies metal powders through its Ingot and Powder Division that are used in automotive top-coatings.

12.2.3 New Product Plans

Alcan introduced in 1980 a new alloy, Superplastic Aluminum Alloy, for automotive and truck body construction. The new material blends lightness, strength, and corrosion resistance and is intended to permit economical thermoforming of parts too costly to make in cast or stamped aluminum.

12.2.4 Marketing Strategy

Worldwide, Alcan feels that it has a special advantage over its competitors in its ability to expand its smelting and raw material operations. It is thus working to expand its primary markets. In the United States, though, the company is concentrating on increasing its sales of sheet and plate. The growth in this market is being led by automotive, building, and can sales.

12.3 PRODUCTION AND OPERATIONS

Alcan operates three sheet and plate plants in the United States and over eight other plants that make various aluminum products. (See Figure 12-3.) In addition, Alcan has a 50 percent interest in International Alloys Corporation, a secondary smelter. The major American plants that supply the auto industry are the three sheet plants and the secondary smelter.

12.3.1 Major Automotive Facilities

Information on the Fairmont Plant, Oswego Plant, Warren Plant, and Intercontinental Alloys' Joliet plant is presented in Figures 12-4, -5, -6, and -7.

Oswego Plant

The Oswego, New York, plant has 100,000-ton and 150,000-ton cold rolling mills, and a 450,000-ton hot rolling mill which supplies reroll coil to other Alcan sheet plants in the United States. There is also a 40,000-ton recycling center. The plant employs 1,000 people and supplies the auto industry with aluminum sheet and strip products. The sheet and plate division of which Oswego is a part is spending $34 million to strengthen the performance and round out the capacity of the hot and cold mills at Oswego.

Division	Plants
Alcan Ingot and Powders	Berkeley, California Union, New Jersey
Intercontinental Alloys Corp.	Joliet, Illinois
Alcan Sheet and Plate	Fairmont, West Virginia Oswego, New York Warren, Ohio
Alcan Cable	Bay St. Louis, Mississippi Rocklin, California Tucker, Georgia Williamsport, Pennsylvania
Alcan Building Products	Bradenton, Florida Buena Park, California Charlotte, North Carolina Gridley, Illinois Jackson, Georgia Lancaster, Pennsylvania Owensboro, Kentucky Rome, Georgia Warsaw, Indiana Woodbridge, New Jersey Woodbury, Tennessee

FIGURE 12-3. ALCAN ALUMINUM CORP. AMERICAN PLANTS

Fairmont Plant

The Fairmont Plant is located in Fairmont, West Virginia, and supplies aluminum sheet products used in automotive heat exchangers, blanks, and brazing sheet. The plant employs 300 people. Alcan is currently spending $5 million to upgrade this plant.

Warren Plant

The Warren, Ohio, Plant specializes in coated and embossed sheet for the building industry, and bright sheet for appliances and automotive trim. The plant employs 300 people.

Company Alcan Sheet and Plate Div. County Oswego Plant Size 1.2 million sq. ft.

Plant Oswego, NY Plant Congressional District

Address Lake Road North 13126 Standard Metropolitan Statistical Area 75 No. of Employees 1000

Telephone 315-342-0121 Primary SIC Code(s) 335301, 335302

Products (Automotive)	Capacity	Processes Used	Consumed by (Automotive)
Aluminum sheet and strip products used in body Sheet and trim applications Activity: Mfg.	2 cold rolling mills: one 100,000-ton and one 150,000-ton 450,000-ton hot rolling mill 40,000-ton recycling center	Hot rolling Cold rolling Remelt and casting Recycling Finishing Annealing	N.C.A.

FIGURE 12-4. OSWEGO PLANT DATA

Company Alcan Sheet and Plate Div.

County Marion

Plant Size 300,000 sq. ft.

Plant Fairmont WV Plant

Congressional District

Address Speedway 26554

Standard Metropolitan Statistical Area 49

No. of Employees 300

Telephone 304-367-1000

Primary SIC Code(s) 335504

Products (Automotive)	Capacity	Processes Used	Consumed by (Automotive)
Aluminum sheet products used in automotive heat exchangers, blanks, brazing sheet Activity: Mfg.	not available	Cold rolling Finishing Slitting Forming Drawing	N.C.A.

FIGURE 12-5. FAIRMONT PLANT DATA

Company Alcan Sheet and Plate Div.

County Trumbull

Plant Size 350,000 sq. ft.

Plant Warren,OH Plant

Congressional District

Address 390 Griswold Ave., N.E 44483

Standard Metropolitan Statistical Area 155

No. of Employees 300

Telephone 216-841-3331

Primary SIC Code(s) 335301

Products (Automotive)	Capacity	Processes Used	Consumed by (Automotive)
Aluminum sheet for trim applications Aluminum strip Activity: Mfg.	not available	Cold rolling Finishing Coating	N.C.A.

FIGURE 12-6. WARREN PLANT DATA

Company Intercontinental Alloys Corp. (50% Alcan)

County

Plant Size

Plant Joliet, Illinois

Congressional District

Address P.O. Box 920
N. Broadway
Joliet, Illinois 60434

Plant: Lockport, IL

Standard Metropolitan Statistical Area

No. of Employees

Telephone 815-727-5555

Primary SIC Code(s)

Products (Automotive)	Capacity	Processes Used	Consumed by (Automotive)
Secondary aluminum for automotive foundries	N.C.A.	N.C.A.	N.C.A.

FIGURE 12-7. JOLIET PLANT DATA

Company Kaiser Aluminum & Chemical Corp.

County Erie

Plant Size

Plant Erie

Congressional District

Address 1015 E. 12th St. Erie, PA 16512

Standard Metropolitan Statistical Area 49

No. of Employees 570

Telephone 814-454-4571

Primary SIC Code(s) 346302, 335401

Products (Automotive)	Capacity	Processes Used	Consumed by (Automotive)
Aluminum forgings Extrusions Activities: Mfg., Eng.	N.C.A.	Aluminum forging	N.C.A.

FIGURE 14-7. ERIE PLANT DATA

Company Kaiser Aluminum & Chemical Corp.

County Ventura

Plant Size

Plant Oxnard

Congressional District

Address 1001 McWane Blvd. Oxnard, CA 93030

Standard Metropolitan Statistical Area 111

No. of Employees 170

Telephone 805-488-4401

Primary SIC Code(s) 346302

Products (Automotive)	Capacity	Processes Used	Consumed by (Automotive)
Forgings Activities: Mfg.	N.C.A.	Aluminum forging	N.C.A.

FIGURE 14-8. OXNARD PLANT DATA

Ravenswood Plant

The Ravenswood, West Virginia, plant is one of Kaiser's largest plants and supplies sheet to the auto industry. Roughly 50 percent of Kaiser's total aluminum shipments are flat-rolled fabricated products manufactured at either the Ravenswood Plant or the Trentwood, Washington, Plant. The Ravenswood plant employs 3,750 people and operated at 100 percent of capacity throughout most of 1979. In 1979 Kaiser expanded the rolling mill capabilities at Ravenswood considerably. A second phase to the Ravenswood expansion has been planned and may be instituted later. Kaiser completed a $71 million program in 1976 that increased the dimensions of Ravenswood's sheet and plate capability.

Trentwood Plant

The Trentwood, Washington, plant is Kaiser's other large rolling mill. This mill also worked close to capacity in 1978. The plant employs 2,630 and manufactures sheet, some of which goes to the auto industry. A modernization program costing $42 million was completed at Trentwood in 1978. The Trentwood program included modernization of the 120-inch reversing mill, (a part of the hot rolling line) along with improvements in the casting and preheating facilities to fully utilize the increased rolling capacity.

Dolton Plant

The Dolton plant is an extrusion plant near Chicago, Illinois, which makes bumpers for the auto industry. The Plymouth Horizon bumpers are extruded at this plant. The plant employs 250 people.

Halethorpe Plant

The Halethorpe Plant, near Baltimore, Maryland, is also an extrusion facility and employs 190 people.

Erie and Oxnard Plants

These two plants provide forged aluminum components to the auto industry. The Erie, Pennsylvania, Plant employs 570 people and the Oxnard, California, Plant employs 170 people.

14.3.2 New Plants and Expansions

Kaiser's capital expenditures during 1979 amounted to $197.7 million, up from the prior year's $185.8 million. The largest projects started during the year were initial phases of long-term modernization programs at the Tacoma, WA, and Chalmette, LA, reduction plants. The projects involve spending a total of $30 million, $19 million at Tacoma and $11 million at Chalmette. They are intended to result in the introduction of technologically advanced prototype reduction cells at the plants. If the new cells meet performance expectations, production efficiency would be improved considerably, Kaiser feels.

A project to install bauxite grinding facilities at the Baton Rouge Works was nearly completed during 1979. The new facilities will allow the plant to process any bauxitic ore which requires grinding.

At Chalmette, work has begun on the construction of a new 200-megawatt substation which will allow the plant to receive electricity under a new contract with an electric utility company.

14.4 FINANCIAL STATUS

Because of record earnings, Kaiser feels returns are now sufficient to justify major expansions.

14.4.1 Operating Analysis (See Figure 14-9.)

The highest earnings year in Kaiser's history was 1978. This was due to the company's aluminum operations. Sales over total assets was virtually unchanged, but operating margin and return on sales increased significantly in 1978 as they did in 1977. This reflects the strong prices for aluminum products. Earnings in 1979 were up more than 50 percent over the same period in 1978. Further improvements in margins were realized.

Year	Sales ($Millions)	Earnings ($Millions)	Return on Equity, Percent	$\frac{\text{Operating Income*}}{\text{Sales}}$ Percent
79	2,927	232	21.3	12.9
78	2,466	146	15.7	12.0
77	2,180	112	13.5	10.6
76	1,852	45	7.9	11.4
75	1,578	45	12.9	14.3
74	1,736	104	15.7	15.2

Year	$\frac{\text{Earnings}}{\text{Total Assets}}$ Percent	$\frac{\text{Sales}}{\text{Assets}}$	$\frac{\text{Earnings}}{\text{Sales}}$ Percent
79	8.1	1.03	7.9
78	5.7	.97	5.9
77	4.9	.96	5.1
76	2.9	1.2	2.4
75	4.5	.75	6.0
74	5.4	.9	6.0

*Operating Income = Sales – Cost of Goods Sold – Selling, General and Administrative Expenses, Before Depreciation, Interest, and Income Taxes.

FIGURE 14-9. OPERATING ANALYSIS OF KAISER

14.4.2 <u>Capital Analysis</u> (See Figure 14-10.)

Kaiser stated that despite its strong earnings performance in 1978, the returns to stockholders were still below what it sees as necessary to justify major expansion. The corporation had determined that its cost of capital was 11 to 12 percent. Its return on invested capital in 1978 was 9.9 percent. However, 1979 earnings were sufficient, according to the company, to provide the funds for profitable growth in the future.

Kaiser has not had a major stock offering in the last five years. Debt to capitalization has decreased from 44 percent in 1974 to 34 percent in 1979 principally due to increased retained earnings without commensurate increases in long-term debt. According to the company, it has achieved its goal for reducing its debt/equity ratio. The company feels this is critical to overall financial flexibility.

14.5 RESEARCH AND DEVELOPMENT

Kaiser Aluminum's Center for Technology at Pleasanton, California, with a staff of 350, is the focal point for the corporation's R&D work. Total R&D expenditures in 1979 were $15.7 million, an increase of 5 percent from 1978. This work generally covers efforts to:

- Boost productivity
- Lower manufacturing costs
- Reduce energy usage
- Improve product quality
- Control the environment
- Recycle wastes
- Identify alternate raw materials.

Major R&D programs underway include:

- An ingot casting process which contains the molten metal in an electromagnetic field rather than a conventional mold. This is currently being tested.

- Mathematical modeling of metallurgical characteristics and rolling mill variables, to better predict rollability of aluminum alloys.

- Modifying aluminum production processes to lower energy use and boost product field.

			Sources			
Year	Sales	P/E Ratio[1]	Earnings	Depreciation	Changes in Long-Term Debt	Changes in Owners' Equity Other Than Retained Earnings
79	2,927	3.5	232	73	(32)	14.6
78	2,466	4.6	146	73	89	(4)
77	2,180	6.1	112	62	(10)	3
76	1,852	16.0	45	59	(8)	7
75	1,578	5.3	45	54	(14)	2
74	1,736	3.5	104	53	83	0

		Uses					
Year	Change in Working Capital	Capital Expenditures	Dividends	$\frac{\text{Long-Term Debt}^2}{\text{Capitalization}}$ %	Coverage[3]	$\frac{\text{Cap. Exp.}}{\text{Total Assets}}$ %	Current Ratio
79	14	157	47	33.6	7.0	5.6	1.6
78	46	162	37	38.4	4.5	6.4	1.6
77	9	120	29	38.0	4.0	5.3	1.7
76	(1)	118	25	40.7	3.7	5.5	1.8
75	32	100	24	42.0	3.9	4.8	1.9
74	124	111	20	44.2	4.4	5.7	1.8

Dollar figures are in millions

[1] Average for the Year

[2] Capitalization Defined as Total Liabilities – Current Liabilities

[3] Operating Profit/Interest

FIGURE 14-10. CAPITAL ANALYSIS OF KAISER

- Evaluating a new lightweight refractory product, Krilite TM, for energy savings in such refractories-consuming sectors as the aluminum, steel and cement industries.

- Developing new specialty aluminum gels for catalyst applications for cars and refineries.

14.6 GOVERNMENT AND LABOR RELATIONS

Kaiser has taken an active part in the public process by establishing a political action committee which encourages employees to support candidates for Federal office (below the level of the presidency and vice presidency). In addition, the company has sponsored "aditorials," or commercials on television promoting free enterprise. The corporation publicly protested when television stations refused to run the commercials.

The Federal Trade Commission has issued an initial decision that Kaiser Refractories must divest itself of the Gary, Indiana, and Plymouth Meeting, Pennsylvania, refractories plants acquired in 1974. The corporation has appealed this decision, but no decision had been reached by the end of 1979.

Kaiser reports that it spent some $31 million in 1979 toward meeting federal and state laws and "substantial sums" to develop environmental control systems for clean water and air.

Most of the 1979 activity resulted from federally mandated schedules for implementing the 1977 Resource Conservation and Recovery Act, and amendments to the 1970 Clean Air Act and the Federal Water Pollution Control Act of 1972, which impose new regulations and enforcement mechanisms.

Kaiser reports it expects to spend approximately $25 million for environmental control projects in 1980 and $25 million to $30 million annually in later years.

During 1978, Kaiser formed a new energy department, headed by a vice president for energy, that consolidates all energy purchasing, planning and conservation activities previously handled in separate company groups. This was done to better fulfill the corporation's overall energy management objectives.

In 1979, the Supreme Court upheld an agreement between Kaiser and the United Steelworkers providing preferential seniority admission for minorities and women to craft training programs from which they had formerly been excluded at the Grammercy, Louisiana works. The program is also operating at 19 of Kaiser's other plants and facilities.

15. ALUMAX INCORPORATED

Alumax Incorporated is an integrated producer of primary aluminum and fabricated aluminum products, and is a wholly owned susidiary of Amax Incorporated (50 percent), Mitsui Company (45 percent), and Nippon Steel Corporation (5 percent). Alumax, with roughly 8 percent of total U.S. primary aluminum capacity, is the only U.S. aluminum producer who is currently building new, greenfield facilities to expand capacity. Their new facilities will give them 6.5 percent of total U.S. primary aluminum capacity.

Although Alumax ships little of its aluminum production to the automotive community, the firm is intent on capitalizing on the surging worldwide demand for aluminum—which is enhanced considerably by automotive aluminum consumption.

15.1 CORPORATE SIZE AND STRUCTURE

Alumax is one of the ten largest aluminum producers in this country, with business interests and sales both here and abroad. Its operations are divided into either the production of primary aluminum or the production of a wide variety of fabricated aluminum products. Alumax operates 56 plants and fabricating warehouses in 27 states.

15.1.1 Revenue, Profit and Employment Statistics

Alumax sales in 1979 were $873 million, up from $718 million the previous year. Profits were $97 million, also up from $52 million in 1978. Interestingly, while the firm's sales rose 22 percent, its profits grew by 85 percent from 1978 to 1979. (See Table 15-1.)

TABLE 15-1. ALUMAX INCORPORATED
REVENUES, PROFIT AND EMPLOYMENT

Year	Revenues (Millions)	Profits (Millions)
1979	$872.8	$97.0
1978	$717.6	$52.4
Average Number of Employees: 6,800 (1979)		

15.1.2 Corporate Organization

As shown in Figure 15-1, Alumax divides its operations into seven major divisions.

- Primary Aluminum Division, primary aluminum and secondary aluminum
- Mill Products Division, aluminum sheet and plate
- Architectural Products Divisions, building fascia and similar products such as swing entrances and sliding mall fronts
- Extruded Products Division, aluminum extrusions such as thermal barrier windows
- Foil Products Division, aluminum foil and other packaging products
- Fabricated Products Division, lightweight aluminum siding and prepainted recreational vehicle structure and body panels
- Kawneer Company, the firm's subsidiary division, distributes Alumax's architectural products.

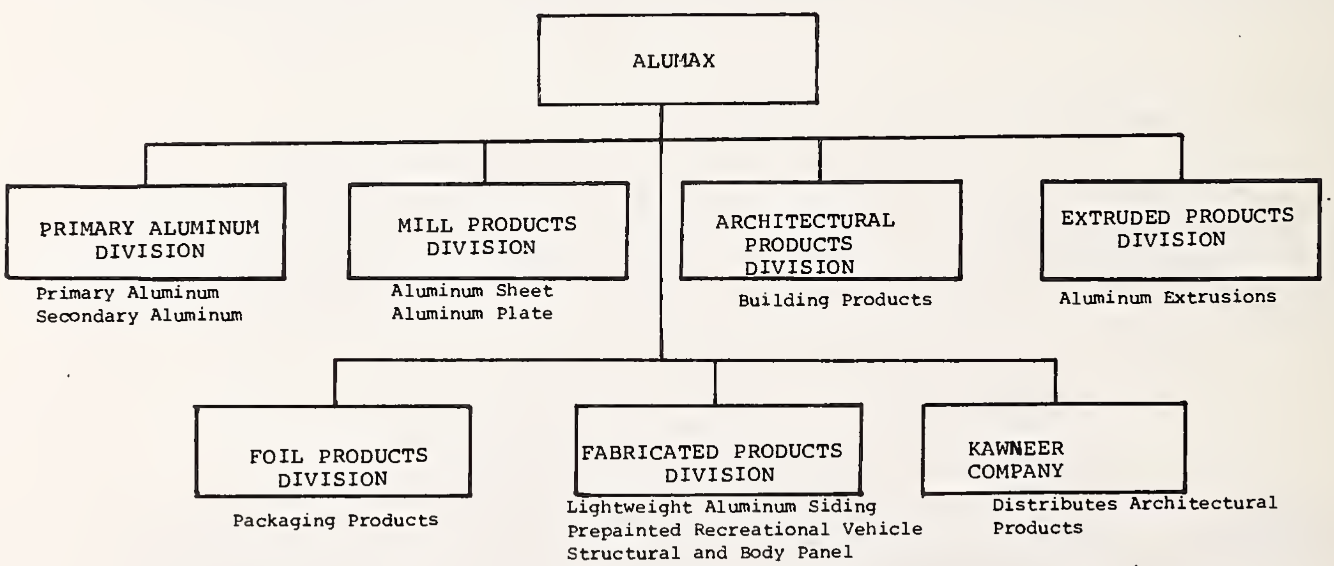

FIGURE 15-1.
ALUMAX CORPORATION STRUCTURE.

15.2 MAJOR MARKETS AND PRODUCTS

Alumax's major markets and products are detailed below. A summary of Alumax's markets and products is provided in Figure 15-2.

MARKET DATA

Major markets: Building and construction, packaging, transportation (recreational vehicles)

Percent of sales to the auto industry: Less than 1 percent

Supplies to the following automobile companies: No known direct automobile sales

Major products: Aluminum windows, doors, and commercial building fascia, aluminum foil, primary aluminum in ingot form, aluminum sheet and plate

FIGURE 15-2. ALUMAX MARKET DATA

15.2.1 Major Markets

The major markets for Alumax products include: captive and independent die casters and foundries, building and construction, manufactured housing, and recreational vehicle manufacturers. Very little of Alumax's sales, probably less than one percent, is to the automotive community, and the firm's own fabricating and finishing divisions consume most of its primary aluminum production.

15.2.2 Products

Alumax reports that it makes no significant shipments to the automotive community, although a small portion of its primary production and sheet products no doubt find their way into automotive products. Anodized quality sheet will soon be produced at the Joliet, Illinois, sheet mill, and this will be marketable to the automotive industry.

15.2.3 Marketing Strategy

Alumax's primary marketing strategy is to take full advantage of the surging worldwide demand for aluminum and aluminum products by positioning its products where the demand is greatest, producing the products that are most profitable, and expanding its production capacity to maximize its ability to meet the demand it anticipates. Alumax's management indicated in 1977 that they "perceive a strong future for aluminum in the next decade as increasing demand will exceed the supply available from existing and potential new capacity."

To implement the strategy, the firm is enacting several significant programs. Each of these programsis described below.

Increase Primary and Fabricating Capacity

The most significant program to implement their marketing strategy is the 68 percent expansion of primary aluminum capacity recently completed, coupled with extensive growth and modernization of finishing and fabricating capacity. Fabricating is far more profitable than primary production, so by expanding its fabricating operations to consume the increased primary production, Alumax is maximizing the advantages of its increased production. Alumax is also contracted to ship 25 percent of its expanded primary capacity to Mitsui, one of its Japanese parents.

Develop New Products

Through its Kawneer Company division, Alumax is developing new markets for its products in the architectural field. For instance, a new, non-metallic insulating material for use with thermal barrier doors and windows has recently been introduced.

Alumax also reports increased shipments to the recreational vehicle market as a result of its development of a prepainted, striped RV panelling material to help manufacturers achieve economical brand identification. Other new products are also being developed.

15.3 PRODUCTION AND OPERATIONS

None of Alumax's plants serve the auto industry directly The following briefly describes Alumax's plants. (See Figures 15-3 to 15-5.)

Mt. Holly Reduction Plant

Alumax completed construction of its new primary aluminum plant at Mt. Holly in late 1979. The only greenfield aluminum plant built or planned in this country for many years, the facility will utilize two potlines and have a production capacity of 197,000 tons annually. It cost $340 million, $60 million under budget. It boosts the firm's primary capacity by 68 percent, and will be fully operational in mid-1981.

In 1978, Alumax spent $26 million on the early stages of construction at Mt. Holly. In 1979, $86 million was earmarked for further work at Mt. Holly, along with the construction of an extrusion plant at Yankton, South Dakota.

Ferndale Reduction Plant

Alumax owns 50 percent of the Intalco plant at Ferndale, Washington. This reduction plant operated at 100 percent of rated capacity in 1978, and produced 270,000 tons of primary aluminum. The plant employs 1,200 people.

Eastalco Reduction Plant

Alumax also owns 50 percent of the Eastalco primary aluminum plant in Frederick, Maryland. This plant produced 160,000 tons in 1978, 91 percent of its capacity. Production was affected by the 1978 coal strike which caused a significant reduction in electric power available. This facility operates with a work force of 900.

15.3.1 New Plants and Expansions

In addition to the $340 million spent for its greenfield reduction plant at Mt. Holly, the firm has spent $11 million for expansion of the Riverside, California, sheet mill, and $13 million for improvements and additions

Company Alumax, Inc. County Berkeley Plant Size

Plant Mt. Holly Plant Congressional District

Address P. O. Box 1000
Goose Creek
Mt. Holly, SC 29445

Standard Metropolitan Statistical Area

No. of Employees

Telephone 803-572-0550 Primary SIC Code(s)

Products (Automotive)	Capacity	Processes Used	Consumed by (Automotive)
Primary aluminum	197,000 tons/year	Primary aluminum reduction by smelting, pouring into ingot molds. Two potlines will be utilized.	N.C.A.

FIGURE 15-3. MT. HOLLY PLANT DATA

Company Alumax, Inc. County Whatcom Plant Size

(Amax has a 50% interest in Alumax, Inc.)

Plant Ferndale Plant Congressional District

(Intalco Aluminum Corp. - Part of Amax)

Address Mountain View Road
Ferndale, WA 98248

Standard Metropolitan Statistical Area 73

No. of Employees 1200

Telephone 206-384-7061 Primary SIC Code(s) 333411

Products (Automotive)	Capacity	Processes Used	Consumed by (Automotive)
Primary ingots Activities: Mfg.	270,000 / year	Primary aluminum reduction	N.C.A.

FIGURE 15-4. FERNDALE PLANT DATA

Company Alumax, Inc. County Frederick Plant Size

(Amax has 50% interest in Alumax)

Plant Frederick Plant Congressional District

(Eastalco Aluminum Corp. - Part of Amax)

Address Manor Woods Rd.
Frederick, MD 21717

Standard Metropolitan Statistical Area 21

No. of Employees 900

Telephone 301-662-6101 Primary SIC Code(s) 333411

Products (Automotive)	Capacity	Processes Used	Consumed by (Automotive)
Primary ingots	N.C.A.	Primary aluminum reduction	N.C.A.
Activities: Mfg.			

FIGURE 15-5. FREDERICK PLANT DATA

to the Joliet, Illinois, sheet mill. This includes $1.4 million for a hot mill coiler. Capital expenditures were $208.5 million in 1979, most of which went to the Mt. Holly plant.

15.4 FINANCIAL STATUS

Even though Alumax is wholly owned by large corporations the company publishes a full annual report each year. Alumax is preparing for major expenditures in the next five years.

15.4.1 Operating Analysis

Alumax has had significant gains in sales and earnings over the last five years. (See Figure 15-6.) Higher return on equity and return on assets were due in most part to a better return on sales. Higher selling prices were reported for fabricated products. The higher prices were reportedly due to a domestic shortage of rolling mill capacity. Earnings for 1978 were adversely impacted by the coal strike and strikes at the Joliet sheet mill and the St. Louis foil plant. Investment tax credits on the Mt. Holly plant significantly increased 1979 earnings.

15.4.2 Capital Analysis

Alumax has not had a significant input of equity funds in the last few years. (See Figrue 15-7.) The company increased its debt in 1977 through 1979, increasing the debt to capitalization ratio to 29.3 percent.

Alumax is now completing major capital expenditures, especially for the South Carolina project. The Mt. Holly Plant in South Carolina cost about $400 million and will reach full commercial operating levels in mid-1981. Another proposed plant in New South Wales will cost $500 million and be operational in the mid-1980's.

Alumax financed 75 percent of the Mt. Holly Plant and Mitsui (Japan) provided 25 percent of the funds. Mitsui has also contracted to purchase 25 percent of the plant's production.

Alumax will be seeking considerable outside financing, particularly in the form of long-term debt. In 1978 a $50 million 9¼ percent long-term loan was arranged with

Year	Sales ($Millions)	Earnings ($Millions)	Return on Equity, Percent	Operating Income*/Sales Percent
79	873	97	22.8	18
78	718	52	14.5	16
77	640	40	12.5	15
76	531	30	10.3	15
75	384	21	7.7	12
74	464	36	15.6	16

Year	Earnings/Total Assets Percent	Sales/Assets	Earnings/Sales Percent
79	12.5	1.13	11.1
78	8.7	1.19	7.3
77	7.9	1.25	6.3
76	6.4	1.12	5.7
75	4.9	.96	5.1
74	11.0	1.43	7.7

*Operating Income = Sales – Cost of Goods Sold – Selling, General and Administrative Expenses, Before Depreciation, Interest, and Income Taxes.

FIGURE 15-6. OPERATING ANALYSIS OF ALUMAX

			Sources			
Year	Sales	P/E Ratio[1]	Earnings	Depreciation	Changes in Long-Term Debt	Changes in Owners' Equity Other Than Retained Earnings
79	873	-	97	23	105	0
78	718	-	52	20	33	0
77	640	-	40	18	19	0
76	531	-	30	16	(44)	0
75	384	-	21	12	60	NA
74	464	-	36	10	NA	NA

		Uses					
Year	Change in Working Capital	Capital Expenditures	Dividends	Long-Term Debt[2] / Capitalization %	Coverage[3]	Cap. Exp. / Total Assets %	Current Ratio
79	14.7	209	13	29.3	9.8	26.9	2.7
78	40	35	9	20.6	13.8	5.9	3.1
77	56	20	6	16.9	14.1	3.9	3.4
76	(12)	15	3	NA	NA	3.4	NA
75	44	58	NA	NA	NA	13.8	NA
74	31	77	NA	NA	NA	23.6	NA

Dollar figures are in millions

[1] Average for the Year

[2] Capitalization Defined as Total Liabilities – Current Liabilities

[3] Operating Profit/Interest

FIGURE 15-7. CAPITAL ANALYSIS OF ALUMAX

institutional lenders. Pollution control facilities at South Carolina will be financed in part from the proceeds of $22.5 million of 7½ percent tax exempt bonds sold in December 1978. Funds for Alumax's Yankton, South Dakota, extrusions plant have been provided by the sale of $90 million of 7½ percent industrial development revenue bonds. This financing was arranged in December 1978 and completed in January 1979. At the end of 1979 Alumax had $148.6 million in marketable securities. The company feels these funds plus funds from operations will more than meet the remaining capital requirements for Mt. Holly.

15.5 LABOR RELATIONS

Major labor agreements were negotiated in 1978 covering nine plant facilities and 1,400 employees, while ten facilities employing more than 600 completed negotiations in 1979. The Joliet, Illinois, St. Louis, Missouri and Spokane, Washington, fabricating plants were struck in 1978, but none of the company's primary facilities were struck in 1979. Alumax is not part of industry-wide negotiations.

Alumax reports that safety programs initiated in 1978 resulted in a 20 percent decrease in injuries resulting in loss of work, and is implementing a major noise reduction program in the furnace and metal-saw operations.

16. METAL CASTING INDUSTRY

The metal casting industry is the fifth largest manufacturing industry based on value added by manufacture as reported by the U.S. Department of Commerce. In recent years the industry has been undergoing a period of rapid change due to changing markets, changing technology, pollution requirements, and safety requirements.

16.1 TYPES OF CASTINGS USED BY THE AUTO INDUSTRY

The automotive foundry industry is segmented by processes and metals used in casting. The key grouping is usually by metal cast (see Figure 16-1).

16.1.1 Metals Used

The key automotive metals are gray iron, ductile iron, malleable iron, and aluminum.

Gray Iron

Gray iron is the oldest known form of iron for producing castings. Because of damping and lubricating capabilities, gray iron is used for producing engine blocks, machine tools, and similar products. Gray iron shipments in 1977 were approximately $12.5 million tons or 64 percent of all casting shipments (see Table 16-1).

Malleable Iron

Malleable iron is a cast alloy rendered tough and ductile by controlled heat conversion. It is more expensive than gray iron and is used in parts that require toughness and elasticity, such as brake parts, suspension parts, universal joints, yokes, and automatic transmission parts.

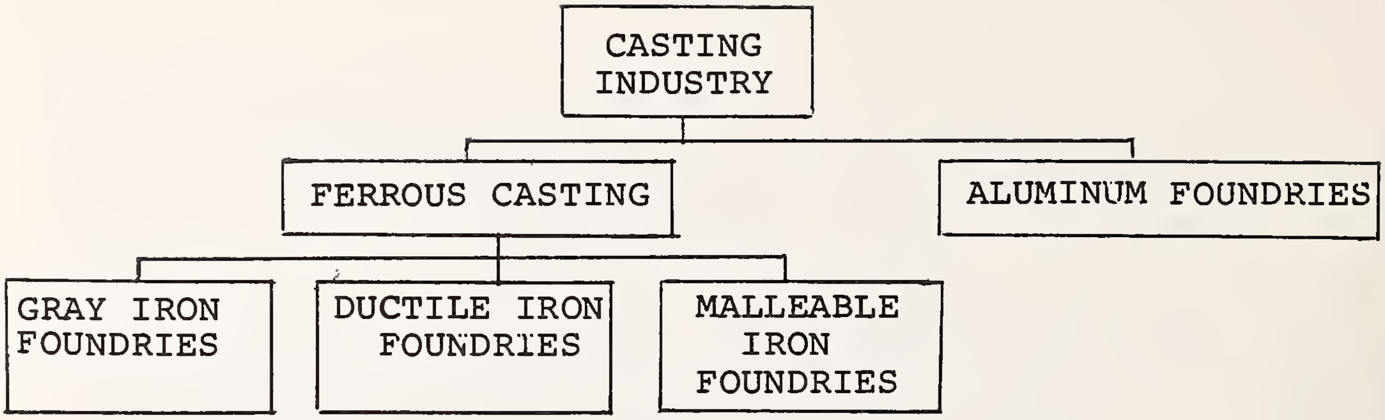

FIGURE 16-1. AUTOMOTIVE CASTING INDUSTRY SEGMENTED BY MAJOR METALS USED

TABLE 16-1. 1979 CASTING PRODUCTION

METAL	NET TONS (Millions)	PERCENT OF TOTAL
Gray Iron	11.9	64
Ductile Iron	2.7	15
Malleable	.7	4
Steel	2.0	11
Non ferrous	1.3	7
TOTAL	18.6	

Ductile Iron

Ductile iron castings are the newest form of iron casting and compete with malleable iron and cast steel. The ductile iron products are far more readily castable than steel and they exhibit strengths approaching cast steel. In addition the castings are more elastic than gray iron which is very brittle. While more expensive than gray iron, the ductile iron castings exhibit greater strength and can thus be cast on thinner, lighter sections. In addition, on applications where tough, ductile castings are required (as in brake parts), ductile iron can compete on cost and quality with malleable iron.

Aluminum

Aluminum is used in automobiles because it results in castings weighing roughly one-third of the same part cast in iron. However, the castings are generally four to five times more expensive than their iron counterparts. Thus aluminum castings have not been widely used until recently when the auto manufacturers began to lighten their cars to improve fuel economy.

16.1.2 Casting Processes

The key automotive casting processes are green sand molding, shell molding, permanent molding and die casting.

Green Sand Molding

Green sand molding is done by mixing a binder with sand and compacting it under pressure on a steel pattern. The process is used to produce a wide range of casting weights with good dimensional control. It is readily automated in certain casting ranges.

Shell Molding

Shell molding utilizes sand mixed with a resin which is heat-baked on a steel pattern. The process is used to manufacture small castings of high dimensional accuracy with an excellent surface finish for machining.

Permanent Mold Casting

Permanent molding is mainly used by the automotive industry for aluminum casting. The process employs metal molds and cores into which molten metal is poured. GM and Ford are using semi-permanent mold processes to produce aluminum intake manifolds.

Permanent mold castings have much lower tooling costs than die castings. With the permanent mold process intricate shapes can be obtained.

Die Casting

Die casting is expected to be a very important process in future high volume applications of aluminum in cars. In die casting, molten metal is forced into a die cavity under extreme pressure. The advantages of die casting include low finishing costs, high dimensional accuracy, and in high production quantities, lower costs than other casting processes.

There are two kinds of die casting processes: hot chamber and cold chamber. In the hot chamber process molten metal flows into an enclosed section where it is forced into the die cavity at pressures up to 2000 psi. Cold chamber die casting is similar but uses much higher pressures.

Cold chamber die casting is the predominant process. Aluminum cannot be practically hot chamber cast because of the solubility of ferrous materials in molten aluminum. However, hot chamber casting of magnesium is feasible and the process is highly efficient for production of small parts. There is currently considerable interest in this process and Ford is examining hot chamber magnesium possibilities carefully. The company currently uses a magnesium cast part in its tilt steering column assembly.

Magnesium is lighter than aluminum by about 30 percent, but the metal has traditionally been more expensive than aluminum. However, rising aluminum prices and improved magnesium fabrication technology may make magnesium attractive to the auto industry.

16.2 IMPORTANCE OF THE AUTO MARKET TO THE CASTING INDUSTRY

The automotive market is extremely important to the casting industry. The foundries that are part of General Motors, Ford, and Chrysler by themselves contain approximately 20 percent of the casting capacity of the entire industry. General Motors alone has hundreds of casting suppliers.

The automobile industry annually consumes approximately 25 percent of gray iron casting production, 65 percent of malleable iron casting production, 55 percent of ductile iron castings, and 55 percent of aluminum die casting production.

Joliet Plant

International Alloys Corporation, in which Alcan has a 50 percent interest, runs a secondary smelter in Joliet, Illinois. The smelter produces aluminum alloys used by foundries principally in the automotive equipment market.

12.3.2 New Plants

Alcan is constructing a major new aluminum smelter in Grande Baie, Quebec. The first phase of this project will be completed at the end of 1980 and will cost two hundred million Canadian dollars. The first phase involves the installation of a 57,000-ton per year potline, together with much of the basic facilities and electrode-making machinery for another two potlines of equal capacity. Most of the infrastructure, such as water supply and roads, and building foundations, has been completed. Alcan has authorized Phase II of the program which will involve the construction of a second 57,000-ton potline. The program will be completed in 1981 at an additional cost of ninety million Canadian dollars. The total potential capacity of the Grande Baie facility, 171,000 tons, will increase Alcan's Canadian primary capacity by more than 15 percent.

Planned Alcan expansions outside of North America include:

- Aluminum plant in British Columbia
- Alumina plant in Ireland
- Bauxite export project in Brazil
- Smelter expansion in Australia and Brazil
- Alumina and smelting complex in Spain
- Increased fabricating activity in Argentina.

12.4 FINANCIAL STATUS

Alcan is very secure financially and is in a strong cash position for its capital expenditures.

12.4.1 Operating Analysis

Alcan had poor years in 1975 and 1976, but began to recover in 1977. The Alcan group of companies showed a very strong performance in 1978 as did other major aluminum producers. (See Figure 12-8.) Operating margin and sales to assets both increased significantly reflecting increased tonnages and better prices. Earnings in 1979 reached a record high for a year. Both margins and sales have improved.

12.4.2 Capital Analysis

Through decreases in long-term debt and some increases in common equity in 1976, Alcan has reduced its debt to capitalization ratio from 40 percent in 1975 to 22 percent in 1979. Capital expenditures and dividends were decreased during poor earnings years 1975 and 1976. Since that time, both have increased markedly and capital expenditures were $450 million in 1979. (See Figure 12-9.) Dividends were also raised significantly in 1979.

12.5 RESEARCH AND DEVELOPMENT

Total Alcan group expenditures for R&D were $34 million in 1979 and $33 million in 1978. Alcan operates two large research centers in Canada and one in England. In addition, most of Alcan's major subsidiaries maintain their own plant labs.

Two new Alcan developments have stimulated interest from the automotive community. One involves highly formable medium-strength alloys, and the other, Alcan's new brazing process, called "Nocolok," which uses a noncorrosive flux to eliminate post-brazing cleaning. The process has been used for brazing of aluminum automotive radiators, oil coolers and other components, and licenses have been granted for its use.

Other Alcan development has produced a superplastic alloy combining improved formability with strength, for complex shaped parts for transport vehicles.

Alcan R&D efforts also concentrate on improved fabricating activities and technology. Alcan reports good results from its program in Canada to develop new methods of continuous casting of sheet directly from molten aluminum.

Year	Sales ($Millions)	Earnings ($Millions)	Return on Equity, Percent	$\frac{\text{Operating Income*}}{\text{Sales}}$ Percent
79	4,381	427	22.1	19.2
78	3,711	289	18.8	19.2
77	3,028	201	15.0	17.7
76	2,656	44	3.5	11.5
75	2,302	23	2.0	12.2
74	2,412	142	13.8	17.6

Year	$\frac{\text{Earnings}}{\text{Total Assets}}$ Percent	$\frac{\text{Sales}}{\text{Assets}}$	$\frac{\text{Earnings}}{\text{Sales}}$ Percent
79	9.7	1.04	9.3
78	7.9	1.01	7.8
77	6.2	.926	6.7
76	1.3	.76	1.7
75	0.7	.70	1.0
74	5.2	.88	5.9

*Operating Income = Sales – Cost of Goods Sold – Selling, General and Administrative Expenses, Before Depreciation, Interest, and Income Taxes.

FIGURE 12-8. OPERATING ANALYSIS OF ALCAN ALUMINUM LTD.

Year	Sales	P/E Ratio[1]	Sources: Earnings	Sources: Depreciation	Sources: Changes in Long-Term Debt	Sources: Changes in Owners' Equity Other Than Retained Earnings
79	4,381	5.3	427	149	76	
78	3,711	4.1	289	138	(66)	2
77	3,028	5.2	201	126	(89)	0
76	2,656	22.7	44	116	(134)	129
75	2,302	33.2	23	111	85	27
74	2,412	7.0	142	103	142	35

Year	Change in Working Capital	Uses: Capital Expenditures	Uses: Dividends	Long-Term Debt[2] / Capitalization %	Coverage[3]	Cap. Exp. / Total Assets %	Current Ratio
79	244	451	85	22	7.4	10.8	2.4
78	122	303	60	23	8.1	8.3	2.2
77	136	233	40	28	6.0	6.7	2.3
76	8	138	15	34	3.1	4.1	2.3
75	124	208	31	40	2.7	6.1	2.4
74	200	268	46	39	4.2	8.4	1.9

Dollar figures are in millions

[1] Average for the Year

[2] Capitalization Defined as Total Liabilities – Current Liabilities

[3] Operating Profit/Interest

FIGURE 12-9. CAPITAL ANALYSIS OF ALCAN ALUMINUM LTD.

In 1979 the firm began a $5 million expansion to its research and development center at Kingston, Ontario, and broke ground for a $7 million experimental engineering center at Arvida, Quebec.

12.6 GOVERNMENT AND LABOR RELATIONS

At the end of 1979, Alcan had approximately 65,400 employees worldwide. There were approximately 22,400 in Canada and the Caribbean, 4,800 in the U.S., 9,500 in Latin America, 17,000 in Europe and Africa, and 11,700 in Asia and the South Pacific. During 1979 strikes shut down three of Alcan's smelters of 543,000-ton capacity in Quebec for three months. A new union contract was signed for a period of three years.

In most of the countries where Alcan operates production facilities, environmental control regulations are in existence or are in the process of being established. Alcan feels that existing and planned anti-pollution measures will enable it to satisfy regulatory demands without material effect on its competitive position. Alcan estimates that approximately $60 million will be spent in 1980 to protect the environment and improve working conditions at the smelting and other locations. Approximately $40 million of this will be spent in complying with environmental regulations. Similar expenditures for protecting the environment and improving working conditions at Alcan's production facilities during 1981 are expected to be $88 million. Approximately $65 million of this amount will be spent in complying with environmental regulations.

13. REYNOLDS METALS

Reynolds Metals Co. supplies considerable amounts of molten aluminum, sheet, and bumpers directly to the auto manufacturers and claims to be the largest supplier of aluminum to the auto industry.

Reynolds sees a tremendous potential for automotive use of sheet products. The company also sees the large production needs of automotive and can users as an opportunity to establish new, efficient, high-volume production systems. The company has embarked on a major construction, modernization, and expansion program to meet the needs of the automotive and can industries.

13.1 CORPORATE SIZE AND STRUCTURE

Reynolds is the third largest aluminum producer in the world and the second largest in the United States. The company provides approximately 11 percent of the free world supply of aluminum.

13.1.1 Revenue, Profit and Employment Statistics

Sales in 1979 were $3.3 billion and profits were $177 million. Approximately 84 percent of sales are for fabricated products. The company employed approximately 37,000 people in 1979. (See Table 13-1.)

TABLE 13-1. REYNOLDS
REVENUES, PROFIT AND EMPLOYMENT

Year	Revenues (Millions)	Profits (Millions)
1979	$3,305.2	$177.1
1978	$2,829.3	$117.8
Average Number of Employees: 37,000(1979)		

13.1.2 Corporate Organization

Reynolds has separated its vertically-integrated operations into two areas:

- Aluminum Production and Processing
- Finished Products and Other Sales.

Aluminum production and processing includes the initial stage of Reynolds' business including mineral exploration, mining, shipping, alumina refining, and the production of primary aluminum. Fabricated Products includes the manufacturing and distribution of various finished aluminum products including packaging products, aluminum building products, and certain non-aluminum products like steel drums. The company is further organized into divisions by product line. These include:

- Can Division
- Alumina and Chemical Division
- Mill Products Division
- Consumer Division
- Architectural and Building Products Division
- Flexible Packaging Division
- Primary Metals Division.

Company management has recently unified administrative functions with the aim of promoting greater productivity and efficiency in their execution. A corporate administration department was created in 1978. Major projects of this new staff department include upgrading and expanding data processing capabilities and employment of new office technology within Reynolds' headquarters complex.

13.2 MAJOR MARKETS AND PRODUCTS

Figure 13-1 presents a summary of the major market information for Reynolds.

13.2.1 Major Markets

Reynolds' major markets are packaging, building and construction, transportation, and the electrical manufacturing industry. As shown in Table 13-2, the transportation and automotive market consumes approximately 12 percent of the firm's annual shipments of aluminum and aluminum products.

Automotive manufacturers and suppliers serviced by Reynolds include General Motors, Ford Motor Company, Chrysler

MARKET DATA

Major markets: Packaging, container, automotive, construction

Percent of sales to the auto industry: 8 percent

Supplies to: General Motors, Ford, Chrysler, others

Major products: Automotive: Primary aluminum, flat rolled aluminum sheet, fabricated specialty products (such as fastener products), bumpers, face bars

Other: Packaging and container products, siding, windows, doors, electrical wire and cable

FIGURE 13-1. REYNOLDS MARKET DATA

TABLE 13-2. PERCENT OF REYNOLDS' SALES BY PRINCIPAL MARKET

Principal Markets	Percent of Sales 1978	1979
Domestic		
Packaging and container	38	37
Transportation and automotive	12	12
Building and construction	8	8
All other	27	26
Foreign	15	17
TOTAL	100	100

Corporation, as well as many parts and components manufacturers who sell to the automakers. No single customer accounted for as much as 10 percent of Reynolds' sales.

13.2.2 Products

The major automotive products that Reynolds sells to the auto industry include primary aluminum (in either hot or cold ingot form), aluminum sheet, bumpers, and external face bars. Other Reynolds products include cans, foil, aluminum siding, windows, electrical wire and cable.

Reynolds' extruded aluminum face bars appear on the Ford Fairmont, Zephyr, Pinto, and Bobcat. Reynolds' aluminum sheet bumper reinforcements and brackets appear on the:

- GM "B" body Chevrolet, Cadillac, Buick and Pontiac
- GM "A" body Cutlass, Grand Prix, Century, Monte Carlo and Chevelle
- Ford Granada and Monarch (brackets only).

Sales Strategy

In advertisements aimed directly at the auto industry, Reynolds emphasizes the weight-saving potential of stamped aluminum sheet and the company's technical competence as the "sheet specialists, and experts in design, production and testing." The company has also publicized its work with Kelsey-Hayes on aluminum wheels for Chrysler, and with Ford Motor Company and GM on bumper extrusions and brackets.

New Products

Recent automotive products made out of Reynolds aluminum include hoods, inner hoods, catalytic converter heat shields, air cleaners and bumper reinforcements. Reynolds supplies the aluminum for Chrysler wheels. In addition, some of the cases for Ford's four-speed automatic transmissions are die cast at Ford's Sheffield, Alabama, plant from molten aluminum supplied by Reynolds.

13.2.3 Marketing Strategy

There are two key elements to Reynolds' marketing strategy. These are:

- To increase fabricated product sales
- To create new automotive uses for aluminum.

Increase Fabricated Product Sales

Even though 84.1 percent of Reynolds' sales presently comes from fabricated products, Reynolds still sees the greatest aluminum growth in coming years in sheet and plate products. Because of their light weight and longevity, these flat-rolled products are being used increasingly by a wide range of industries. Thus, to meet the projected demands for aluminum sheet and plate, Reynolds launched in 1978 a multiyear program aimed at expanding sheet and plate capacity. The target growth markets for these products include automotive, building and construction, and packaging.

Create New Uses for Aluminum

Another major thrust of Reynolds' marketing plan is in developing aluminum applications where the metal can save energy. Such applications include:

- Automotive parts and components
- Solar energy systems
- Building and construction products, such as thermally-improved windows, storm windows and doors, and insulation panels.

Reynolds opened a new automotive conference center, designed especially as a meeting place for auto company and Reynolds engineers, in 1979 in Richmond.

13.3 PRODUCTION AND OPERATIONS

Bauxite is the principal raw material used in the production of aluminum, and Reynolds obtains bauxite for its alumina plants from:

- Its foreign mining operation in Jamaica and Haiti
- Its domestic mining operations in Arkansas
- Purchases in the open market.

Reynolds refines bauxite into alumina at two plants in Arkansas and Texas. Reynolds also obtains alumina from two joint ventures in which it participates, one located in Jamaica, Alumina Partners of Jamaica (Alpart), and the other in Stade, West Germany.

Reynolds produces primary aluminum at Longview, Washington; Troutdale, Oregon; Arkadelphia, Arkansas (Listerhill); Sheffield, Alabama; Massena, New York; Corpus Christi, Texas; Jones Mills, and Baie Comeau, Quebec, Canada. Reynolds' worldwide primary aluminum production and capacity in tons for the last two years are shown in Table 13-3. As shown in the table, primary aluminum production as a percent of rated capacity decreased by 4 percent from 1978 to 1979, reflecting the increase in capacity for aluminum over that period.

TABLE 13-3. REYNOLDS METALS PRIMARY ALUMINUM PRODUCTION AND RATED CAPACITY FOR 1977-1978

Year	Primary Aluminum Production	Rated Primary Aluminum Capacity	Production as Percent of Rated Capacity
1979	1,093,400	1,300,000	84
1978	1,059,900	1,150,000	92

Reynolds produces semi-finished and finished aluminum products and miscellaneous non-aluminum products at 42 domestic and 8 foreign plants. Of these plants, 26 operate in the Aluminum Production and Processing area and 24 in the Finished Products and Other Sales area. The annual capacity of these plants depends upon the variety and type of products manufactured.

Reynolds' principal domestic and foreign properties are listed in Table 13-4.

TABLE 13-4. REYNOLDS PRINCIPAL DOMESTIC AND FOREIGN PROPERTIES

Location *	Principal Products
Jamaica (a)	Bauxite
Haiti (a)	Bauxite
Bauxite, Arkansas (a)	Bauxite
Eagle Pass, Texas (a)	Fluorspar
(Hurricane Creek) Bauxite, Arkansas (a)	Alumina
Corpus Christi, Texas (a)	Alumina
Jones Mills, Arkansas (a)	Primary aluminum
(Listerhill) Sheffield, Alabama (a)	Primary aluminum
Longview, Washington (a)	Primary aluminum
Arkadelphia, Arkansas (a)	Primary aluminum
Massena, New York (a)	Primary aluminum
Corpus Christi, Texas (a)	Primary aluminum
Troutdale, Oregon (a)	Primary aluminum
Baie Comeau, Canada (a)	Primary aluminum
Baton Rouge, Louisiana (a)	Calcined Coke
Hamburg, West Germany (a)	Sheet and foil products
Belgium (a)	Sheet, foil, extrusions and packaging products
Sheffield and Listerhill, Alabama (three plants) (a)	Sheet, wire, rod and bar, redraw rod and wire, welded tubing and reclamation
Phoenix, Arizona (two plants) (a)	Extruded shapes and tubing and structural fabrication
Torrance, California (two plants) (a) (b)	Extruded shapes, tubing and cans
McCook, Illinois (a)	Sheet and plate
Louisville, Kentucky (four plants) (a) (b)	Foil products, powder and paste, extruded shapes and tubing and rotogravure printing cylinders
Chesterfield County, Virginia (five plants) (a) (b)	Sheet, extruded shapes and tubing, printed products and foil processing can machinery and reclamation
Grand Rapids, Michigan (a)	Extruded shapes and tubing
El Campo, Texas (a)	Extruded shapes
Maracay, Venezuela (a)	Extruded shapes
Oshawa, Ontario, Canada (a)	Extruded shapes
LaMalbaie, Quebec, Canada (a)	Electric wire and cable
Malvern, Arkansas (a)	Electric wire and cable
Longview, Washington (a)	Electric wire and cable and redraw rod
Richmond, Virginia (two plants) (a) (b)	Foil and foil products
St. Louis, Missouri (b)	Printed products and foil processing
Grottoes, Virginia (b)	Plastic film
Birmingham, Alabama (b)	Packaging systems
Tampa, Florida (b)	Cans
Woodbridge, New Jersey (b)	Cans
Houston, Texas (b)	Cans
Hayward, California (b)	Cans
Wallkill, New York (b)	Cans
Bristol, Virginia (b)	Can ends
Ashville, Ohio (b)	Building products
Stratford, Connecticut (b)	Building products
Roseville, California (b)	Can ends

* (a) Aluminum Production and Processing Area
(b) Finished Products and Other Sales Area

13.3.1 Major Automotive Facilities

Four of Reynolds' facilities are predominant suppliers to the automotive industry. These are the McCook Sheet and Plate Plant in McCook, Illinois; the Grand Rapids Extrusion Plant, Grand Rapids, Michigan; the Listerhill Reduction Plant, Sheffield, Alabama; and the St. Lawrence Reduction Plant at Massena, New York. Information on these plants is given in Figures 13-2, -3, -4, and -5.

McCook Sheet and Plate

This plant has an area of over three million square feet in McCook, Illinois. Principal products are plate and sheet, much of which goes to the automotive industry. The plant has a capacity of 300,000 tons and employs 2,403 people.

Reynolds has embarked on a major expansion in its flat rolling capacity, and McCook expansion and modernization is an important part of the overall plan. The work at McCook is being done in a multiphase program with the goal of equipping the company to meet projected demand for aluminum sheet in a wide range of industries, particularly in the automotive and can markets. The first phase of the program costing $70 million will be completed this year and will be focused on expanding McCook's plate facilities. Improvements will include:

- A new, computerized 77-inch high-speed mill capable of handling coils of metal weighing up to 20 tons
- A new thermal equipment for ingot soaking and coil annealing
- Improvements in coil and ingot handling procedures.

In addition to a considerable increase in the plant's versatility and capacity, Reynolds feels that the improvements at McCook will allow the facility to realize increased productivity and energy efficiency. The program to expand McCook's sheet facilities is targeted for completion in 1981.

The expansion program also includes an investment of $14.5 million in Reynolds' Listerhill, Alabama, mill as a first phase of modernization to increase production capacity for sheet and coil products.

Company Reynolds Metals Co. | County | Plant Size 260 acres (3,131,237 Ft.^{2} under one roof)

Plant McCook Sheet & Plate | Congressional District

Address 1st Ave. & 49th St. McCook, IL 60525 | Standard Metropolitan Statistical Area 31 | No. of Employees 1897 (Hourly) 533 (Salaried)

Telephone 312-485-9000 | Primary SIC Code(s) 335301, 335302

Products (Automotive)	Capacity/Day	Processes Used	Consumed by (Automotive)
Aluminum Sheet for Automotive Stampings	300,000 tons	Aluminum ingots are placed into remelt furnaces. Molten metal is cast into sheet and plate ingots. Surfaces of ingots are machined on a giant scalper, and are soaked and clad. They then are passed through the rolling mill. Sheet ingots are first rolled into slabs. After the ends are sheared, they are further reduced in thickness. Then, the metal is rolled into strip and coiled. Coils are reduced to final gauge by cold rolling. Plate is made in an alternate facility equipped with a reversing mill, a roller hearth furnace, a mammoth plate stretcher and large skin milling machines. Subsequent McCook operations on the metal may include sheeting, blanking, embossing, corrugating, painting with Reynolds "Colorweld" process, leveling, machining and slitting.	

FIGURE 13-2. McCOOK SHEET & PLATE PLANT DATA

Company Reynolds Metals Co.

County

Plant Size 36 Acres; with 542,243 $Ft.^2$ under one roof (including new 58,000 $Ft.^2$ anodizing plant)

Plant Grand Rapids Extrusion Plant

Congressional District

Address 1701 Porter Street

Standard Metropolitan Statistical Area 81

No. of Employees 1,060 (Hourly) 180 (Salaried)

Telephone 616-243-0156

Primary SIC Code(s) 335401, 335505, 344220, 344231

Products (Automotive)	Capacity	Processes Used	Consumed by (Automotive)
Bumpers	36,000 tons/year	Produces alloy billets from virgin aluminum, then extrudes metal to form shapes and tubing. Extruded shapes are then heat-treated, straightened, cut to desired lengths, inspected, packed and shipped.	Ford 1978 Fairmont, Zephyr, Pinto, and Bobcat

FIGURE 13-3. GRAND RAPIDS PLANT DATA

Company Reynolds Metals Co.

County

Plant Size 35 Acres under one roof

Plant Listerhill Reduction Plant

Congressional District

Address P. O. Box 191 Sheffield, AL 35660

Standard Metropolitan Statistical Area 33

No. of Employees 1,246 (Hourly) 268 (Salaried)

Telephone 205-383-7141

Primary SIC Code(s) 333411, 333970

Products (Automotive)	Capacity	Processes Used	Consumed by (Automotive)
Molten aluminum Primary aluminum	202,000 Tons/Year	Electrolytic reduction of alumina to aluminum using anode and cathode with Soderberg pots...a total of 7 potlines are operable.	Almost entire production of molten and primary aluminum is consumed by nearby Ford Motor Co. foundry. Four speed overdrive transmission for 1980 Ford cars.

FIGURE 13-4. LISTERHILL PLANT DATA

Company Reynolds Metals Co.

County

Plant Size 165 acres, with 70 acres under one roof

Plant St. Lawrence Reduction Plant

Congressional District

Address P. O. Box 500, South Grass River Road, Rooseveltown, NY 13662

Standard Metropolitan Statistical Area 89

No. of Employees 750 (Hourly), 50 (Salaried)

Telephone 315-764-0211

Primary SIC Code(s) 33421, 333411

Products (Automotive)	Capacity	Processes Used	Consumed by (Automotive)
Molten aluminum Alloyed and unalloyed ingot	126,000 Tons (Total)	Alumina is added to the electrolytic cells along with electrolyte materials such as cryolite, aluminum fluoride, fluorspar, and others. These materials are transferred to the molten aluminum which is deposited in the cathode cavity beneath the bath and is siphoned into large crucibles. The aluminum can then be poured into 30, 50, 1,000, 2,000-pound ingots or transferred to the holding furnaces for further alloying, heat-treating, etc., for the customers' use. Pre-bake, horizontal pin Soderberg; 504 pots; 3 potlines of 168 each with a capacity of 42,000 tons per line.	Nearby Chevrolet foundry consumes approximately 35% of this facility's production.

FIGURE 13-5. ST. LAWRENCE REDUCTION PLANT DATA

Grand Rapids Extrusion Plant

The Grand Rapids Extrusion Plant in Grand Rapids, Michigan, produces aluminum alloy billets and extrudes metal to form shapes and tubing. The plant has a capacity of 36,000 tons per year and employs 1,240 people. The major automotive components are bumpers and extruded face bars. Ford 1978 Fairmonts, Zephyrs, Pintos, and Bobcats have face bars extruded by Reynolds. The Grand Rapids plant was recently expanded and the plant is equipped with total anodizing capabilities.

Listerhill Reduction Plant

Besides the Listerhill sheet mill previously discussed, Reynolds also operates a Listerhill Reduction Plant that makes primary and molten aluminum. The plant has a capacity of 202,000 tons per year and employs about 1,500 people in Sheffield, Alabama. Molten metal is picked up by Ford and carried in molten form to the nearby Sheffield Ford Motor Company Foundry. The prime reason for building the Listerhill reduction facility in 1955-57 was the contract with Ford along with the generally increasing trend toward the use of more aluminum in automobiles.

St. Lawrence Reduction Plant

The St. Lawrence Reduction Plant produces molten aluminum and aluminum ingots. The plant which is located in Rooseveltown, New York, has a capacity of 126,000 tons per year, and employs approximately 800 people. Chevrolet's Massena, New York, foundry consumes about 35 percent of the plant's production in the form of molten aluminum.

The plant also ships aluminum to the Grand Rapids Extrusion Plant and the McCook Sheet and Plate Plant, both of which sell products to the automotive industry.

13.3.2 New Plants

Reynolds brought on line a new continuous rolling plant in Arkansas in August of 1979. When it reaches full operation it will provide all of the aluminum feedstock needed to supply Reynolds' foil operations, at substantial cost savings and at a reduction of more than 30 percent in energy usage compared with conventional processes. This new plant will give the company large additional sheet capacity to meet market needs in the 1980's, and at a relatively low investment cost, according to Reynolds.

At the same time the firm made capital improvements in its Listerhill, Alabama, sheet plant, its foil plants in Richmond, Virginia, and Louisville, Kentucky, and its electrical cable plants in Malvern, Arkansas, and Longview, Washington. All were designed to increase capacity as well as quality and efficiency.

Hot Springs

The new greenfield continuous casting and cold rolling plant in Hot Springs, Arkansas is part of a $98 million expansion program for the Flexible Packaging Division. While this capacity will not be used for automotive products, it will nevertheless free up a large portion of the capacity at the McCook plant that was formerly used to produce foil feedstock. Thus, this plant construction is very closely tied to Reynolds' decision to increase its sheet capability for the auto industry.

The Arkansas rolling plant will be located adjacent to one of Reynolds' primary aluminum plants. Thus, Reynolds will be able to take molten aluminum directly from the adjacent reduction plant and convert it—at tremendous cost and energy savings—into feedstock for foil mills. The cost and energy savings will result from:

- Elimination of the need for ingot casting
- Elimination of cross-country transfer of ingot
- Elimination of the reheating of ingot at sheet and plate plants.

The first part of the new plant was producing late last year at about 50 percent of capacity. The plant will be fully operational in 1981.

Bauxite and Alumina Facilities

Reynolds is planning two projects in Brazil that will by 1983 supply 25 percent of present capacity requirements for bauxite. The company is also concluding negotiations to mine bauxite and produce alumina in western Australia. The Australian project should commence production at the rate of one million tons of alumina per year in 1983.

Reynolds additionally spent $25 million to modify its alumina plant at Corpus Christi, Texas, so that it will be capable of producing alumina from any bauxite in the world. Work was completed at this plant in mid-1979.

Primary Aluminum Facilities

There have recently been excess worldwide inventories of primary aluminum. However, Reynolds, anticipating increased demand for aluminum in the 1980's, is considering expansion of primary aluminum production.

Reynolds' first basic expansion of aluminum reduction facilities, according to the company, will probably be in addition to existing facilities. Rated capacity can be increased by about 10 percent in this manner. New plants are being considered for long-range production.

One hundred thousand tons of annual productive capacity was recently put back to work in Corpus Christi, Texas.

13.4 FINANCIAL STATUS

Reynolds has been attempting to lower its debt/equity ratio in recent years.

13.4.1 Operating Analysis

Sales in 1978 and 1979 showed a marked increase compared to the sales trend over the past five years. (See Figure 13-6.) This was due to higher volume, higher prices, and increased fabricated sales versus aluminum production sales. Both sales to assets and earnings to sales rose indicating better operating margins and greater sales rate. While stock analysts are predicting continued high earnings, the stock price has varied little since 1976 and the current P/E is only around 3. The aluminum industry is viewed as cyclical and investors may view current results as temporary.

13.4.2 Capital Analysis

The company decreased its debt in 1979, resulting in a reduction in the debt to capitalization ratio from 42 percent in 1978 to 38 percent in 1979. Dividends were increased in 1977, 1978, and 1979. Sources for funds in the past five years have thus included internal cash generation, debt increases (in 1976 and 1978), the sale of stock, and the sale of company assets. In 1978 Reynolds added to cash flow by the sale of its interest in two United Kingdom companies for about $86 million.

Capital expenditures have increased significantly in the past two years. Expenditures were approximately $230 million in 1979, mostly for the plans to increase sheet production by 30 percent. Expenditures over the next several years are expected to be in the range of 1979 figures.

Year	Sales ($Millions)	Earnings ($Millions)	Return on Equity, Percent	$\frac{\text{Operating Income*}}{\text{Sales}}$ Percent
79	3,305	177	16.0	12.0
78	2,829	118	11.8	13.0
77	2,353	86	9.2	10.0
76	2,084	75	9.1	9.0
75	1,679	60	7.6	9.9
74	1,993	114	15.8	14.7

Year	$\frac{\text{Earnings}}{\text{Total Assets}}$ Percent	$\frac{\text{Sales}}{\text{Assets}}$	$\frac{\text{Earnings}}{\text{Sales}}$ Percent
79	6.3	1.17	5.4
78	4.6	1.10	4.2
77	3.4	.92	3.7
76	3.3	.92	3.6
75	2.7	.75	3.6
74	5.0	.89	5.6

*Operating Income = Sales – Cost of Goods Sold – Selling, General and Administrative Expenses, Before Depreciation, Interest, and Income Taxes.

FIGURE 13-6. OPERATING ANALYSIS OF REYNOLDS

			Sources			
Year	Sales	P/E Ratio[1]	Earnings	Depreciation	Changes in Long-Term Debt	Changes in Owners' Equity Other Than Retained Earnings
79	3,305	3.5	177	83	(18)	0
78	2,829	5.2	118	78	38	(2)
77	2,353	7.9	86	74	(21)	52
76	2,084	8.9	75	72	18	(1)
75	1,679	6.2	60	73	(123)	(1)
74	1,993	3.1	114	77	12	(2)

		Uses					
Year	Change in Working Capital	Capital Expenditures	Dividends	Long-Term Debt[2] / Capitalization %	Coverage[3]	Cap. Exp. / Total Assets %	Current Ratio
79	(72)	230	39.7	38.8	5.7	8.2	2.1
78	114	162	32	41.5	5.4	6.3	2.4
77	61	99	27	42.3	3.7	3.9	2.6
76	26	78	22	45.7	3.1	3.7	2.6
75	(9)	110	19	46.6	2.7	5.0	2.9
74	94	99	20	50.1	3.8	4.6	2.7

Dollar figures are in millions

[1] Average for the Year

[2] Capitalization Defined as Total Liabilities – Current Liabilities

[3] Operating Profit/Interest

FIGURE 13-7. CAPITAL ANALYSIS FOR REYNOLDS

13.5 RESEARCH AND DEVELOPMENT

Reynolds spent $28.3 million in 1979 for basic and applied research and development activities, up from $25.2 million in 1978. Primary thrusts of the programs are improvements in materials, products and processes, as well as the development of new products for new and existing markets.

Reynolds' current research thrust as applied to the automotive community is to:

- Develop new applications for aluminum sheet and primary metals, such as the company did (working closely with Kelsey-Hayes) in achieving a workable stamped aluminum wheel. Reynolds is currently working diligently on techniques of producing a cast aluminum disc brake caliper (probably utilizing their Process 390 Aluminum).

- Work closely with the major automakers—both foreign and domestic—to help them better understand the requirements and possibilities of casting aluminum engine blocks utilizing 390 aluminum without cast iron cylinder liners. This process (and this metal) was used in the ill-fated Vega block, and got a bad name when overheating problems with the Vega engine caused extensive piston to cylinder bore problems. But the Porsche 928 is using 390 Aluminum for its V-8 engine block, without iron liners, and quite successfully.

Other research at Reynolds includes the development of economical processes for producing aluminum from clay, technological improvements which keep the aluminum can competitive with other containers, low-cost solar heating systems and revolutionary new types of food packages.

In primary production plants, Reynolds has an ongoing research program to improve energy efficiency and substantially reduce the energy required to make aluminum. Measures which have been particularly effective in reducing energy consumption involve:

- The use of a modified cell electrolyte management system

- Modifications to existing cells to reduce the electrical current density

- Replacement of older mercury arc rectifiers with more efficient silicon diode rectifiers.

For the future further gains in existing facilities are expected by using modified cathodes which permit lower voltage operations.

13.6 GOVERNMENT AND LABOR RELATIONS

Reynolds, like all other metals producers, has expended substantial effort and funds on environmental controls at many of its plants. These were expended primarily in response to regulatory requirements and to ensure that the discharges from its facilities would not cause any significant degradation of the environment. Capital expenditures for domestic environmental control facilities for the period 1975 through 1979 were approximately $123 million. Reynolds plans to add or modify environmental control facilities at a number of its plants in the United States and Canada to meet existing and certain anticipated regulatory requirements. Reynolds estimates that capital expenditures for these environmental control facilities will be approximately $10 million during 1980 and approximately $194 million during the period 1981-1984.

In 1979 Reynolds instituted accelerated management development seminars throughout the company. These are provided along with home study courses and company paid tuition programs. At plant locations, training programs were broadened in 1979, with more extensive programs for supervisors and with seminars emphasizing the company's Equal Employment Opportunity policies.

Major labor contracts were negotiated in the spring of 1980 with the United Steelworkers of America and the Aluminum Workers International union. These contracts replaced agreements which expired in May of 1980.

14. KAISER ALUMINUM & CHEMICAL CORPORATION

Kaiser Aluminum & Chemical Corporation is one of the five largest aluminum companies in the United States. Fabricated products account for approximately 75 percent of aluminum sales. Kaiser has stated that one of the most important goals of its aluminum division is to increase the percentage of fabricated sales. The company had a very high demand for sheet until the latter part of 1979, when sales declined. Both of its major sheet plants, which account for 50 percent of aluminum sales, operated at nearly 100 percent of capacity in 1979. The company is modernizing and expanding its sheet capacity.

14.1 CORPORATE SIZE AND STRUCTURE

One of the five largest domestic producers of primary aluminum and fabricated aluminum products in this country, Kaiser Aluminum is also involved in aluminum-related enterprises around the world, in chemical and refractory production and in other diversified undertakings.

14.1.1 Revenue, Profit and Employment Statistics

Kaiser had record sales of approximately $2.93 billion and earnings of $232 million in 1979. Seventy-two percent of sales were aluminum-related. No other corporate operation accounted for more than 11 percent of sales. Kaiser employed about 27,000 people in 1979. (See Table 14-1.)

TABLE 14-1. KAISER ALUMINUM & CHEMICAL REVENUES, PROFIT AND EMPLOYMENT

Year	Revenues (Millions)	Profits (Millions)
1979	$2,926.5	$232.2
1978	$2,466.0	$145.5
Average Number of Employees:		27,000 (1979)

14.1.2 Corporate Organization

Kaiser Aluminum & Chemical has six primary operating divisions:

- Raw and finished aluminum production
- Agricultural chemicals
- Industrial chemicals
- Refractories
- Trading in various products
- Real estate.

The agricultural chemicals division provides fertilizers and other products to the major farming regions of the southeastern and midwestern U.S. Refractory products are used as a lining material in high-temperature furnaces and kilns. The industrial chemicals division manufactures and markets directly to users most of the basic chemicals required for aluminum production. Aluminum accounts for 71 percent of corporate sales and the other divisions account for between 6 and 9 percent of sales. (See Table 14-2.)

TABLE 14-2. KAISER ALUMINUM SALES BY DIVISION (MILLIONS)

	1978	1979
Aluminum	$1,538.4	$2,083.1
Agricultural Chemicals	209.1	268.4
Refractories	157.3	197.4
Industrial Chemicals	155.8	150.7
Trading	193.2	226.9
Total	$2,253.8	$2,926.5

14.2 MAJOR MARKETS AND PRODUCTS

Figure 14-2 summarizes the major market information for Kaiser Aluminum.

MARKET DATA	
Major markets:	Electrical, building, construction, consumer durables, machinery, transportation, packaging
Percent of sales to the auto industry:	4 percent
Supplies to:	Douglas and Lomason, Chrysler, major auto companies
Major automotive products:	sheet, bumpers, and forgings

FIGURE 14-2. KAISER ALUMINUM MARKET DATA

14.2.1 Major Markets

Kaiser's major markets include electrical, building and construction, consumer durables, machinery and equipment, transportation, and packaging. Kaiser's non-aluminum divisions sell to the farm market, metals, cement, and glass markets, and to aluminum producers. Approximately 11 percent of Kaiser's sales goes to the total transportation industry, and about 4 percent of sales goes to the auto industry. The company supplies Chrysler with bumpers for the Plymouth Horizon and Dodge Omni.

14.2.2 Products

Kaiser's major products sold to the auto industry include sheet, bar and ingots, plus fabricated products such as bumpers and forgings. Approximately 75 percent of Kaiser's aluminum sales are in fabricated products.

Kaiser has recently been advertising its new extruded bumpers that are now featured on four American cars. The bumpers are extruded by Kaiser and fabricated and finished by Douglas and Lomason.

14.2.3 Marketing Strategy

Kaiser has one strategic plan that has been announced several times: to increase fabricated production. According to Chairman Cornell Maier, "One of the most important objectives of our aluminum division is to raise the total amount of metal that we fabricate ourselves...because these products increase our profit per pound of metal sold."[1] According to Maier, "We intend to increase that amount, but we will also continue to be an important supplier of metal to independent fabricators."[2]

14.3 PRODUCTION AND OPERATIONS

Kaiser mines bauxite from reserves in Jamaica and refines it into alumina at Baton Rouge and Gramercy, Louisiana. Kaiser also has interests in bauxite and alumina companies in Jamaica and Australia. The company operates four domestic primary aluminum smelters. These are located at Chalmette, Louisiana; Ravenswood, West Virginia; and Mead and Jacoma, Washington.

Kaiser Aluminum's largest fabricating plants are its sheet and plate mills located at Ravenswood, West Virginia, and Trentwood, Washington. The company has 40 additional aluminum fabricating plants and facilities located in principal marketing areas of the United States. Aluminum shipments in 1979 totalled 989,600 tons, up 4 percent over the 955,800 tons of aluminum shipped in 1978.

14.3.1 Major Automotive Facilities

Kaiser has four plants that supply to the auto industry. These are located in Ravenswood, West Virginia; Trentwood, Washington; Dolton (Chicago), Illinois; Halethorpe (Baltimore), Maryland; Erie, Pennsylvania; and Oxnard, California. Information on the plants is given in Figures 14-3 through 14-8.

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1. Remarks to New York Society of Security Analysts, June 14, 1978.
2. American Metal Market, April 2, 1979.

Company Kaiser Aluminum & Chemical Corp.

County Jackson

Plant Size

Plant Ravenswood, WV Plant

Congressional District

Address P.O. Box 98, 26164

Standard Metropolitan Statistical Area 35

No. of Employees 3750

Telephone 304-273-4311

Primary SIC Code(s) 333411, 335302, 335303

Products (Automotive)	Capacity	Processes Used	Consumed by (Automotive)
Sheet, plate Activities: Mfg., R&D, Eng.	NCA	Aluminum rolling mill	NCA

FIGURE 14-3. RAVENSWOOD PLANT DATA

Company Kaiser Aluminum & Chemical Corp.

County Spokane

Plant Size

Plant Trentwood Works

Congressional District

Address Spokane, WA 99215

Standard Metropolitan Statistical Area 63

No. of Employees 2630

Telephone 509-924-1500

Primary SIC Code(s) 335301, 335302

Products (Automotive)	Capacity	Processes Used	Consumed by (Automotive)
Aluminum sheet, strip & plate	N.C.A.	Aluminum rolling mill	N.C.A.
Activities: Mfg.			

FIGURE 14-4. TRENTWOOD PLANT DATA

Company Kaiser Aluminum & Chemical Corp.

County Cook

Plant Size

Plant Dolton (Chicago)

Congressional District

Address 14200 Cottage Gr. Dolton, IL 60419

Standard Metropolitan Statistical Area 31

No. of Employees 250

Telephone 312-849-9100

Primary SIC Code(s) 335401

Products (Automotive)	Capacity	Processes Used	Consumed by (Automotive)
Extrusions Activities: Mfg.	N.C.A.	Aluminum extrusion	N.C.A.

FIGURE 14-5. DOLTON PLANT DATA

Company Kaiser Aluminum & Chemical Corp.
County Baltimore City
Plant Size

Plant Halethorpe (Baltimore)
Congressional District

Address 2000 Halethorpe Ave. Baltimore, MD 21227
Standard Metropolitan Statistical Area 27
No. of Employees 190

Telephone 301-242-2800
Primary SIC Code(s) 335401

Products (Automotive)	Capacity	Processes Used	Consumed by (Automotive)
Extrusions	N.C.A.	Aluminum extrusion	N.C.A
Activities: Mfg.			

FIGURE 14-6. HALETHORPE PLANT DATA

Typical applications of castings in the auto industry include:

- Engine blocks
- Cylinder heads
- Manifolds
- Brake parts
- Housings
- Yokes
- Transmission parts.

16.3 SIZE AND STRUCTURE OF THE CASTING INDUSTRY

In 1978 there were approximately 1,416 gray and ductile iron foundries, 56 malleable iron foundries, and 2,866 non-ferrous foundries. Ninety-three percent of these employed less than 250 people.

Foundries that are owned by corporations and make castings predominantly for that corporation are termed "captive" foundries. Foundries that supply to outside customers are termed "jobbing" foundries.

In the auto industry each of the major manufacturers own foundries. These foundries make high-volume parts. General Motors Corporation owns 24 foundries with a total annual capacity of 3.1 million tons. Ford Motor Company owns six foundries with a total 1.8 million ton capacity. Chrysler Corporation has five foundries capable of making .6 million tons of castings a year. General Motors is considered to have a greater in-house casting capacity relative to its needs than the other car manufacturers. However, all the car manufacturers have a large amount of castings done by jobbing foundries outside the auto industry. Estimates on the amount of automotive castings done by the jobbing foundries range from 20 to 50 percent of total automotive casting tonnage.

There are an estimated 550 to 600 jobbing foundries that have a considerable amount of business with the auto industry. Table 16-2 lists some of the largest foundries in the United States. Companies selected for study in this report represent the largest of the non-captive foundries as well as some of the smaller foundries known to be heavily dependent on the auto industry. In addition, Doehler-Jarvis, the nation's preeminent die caster, was also selected for study.

TABLE 16-2. MAJOR FOUNDRIES

COMPANY	MONTHLY IRON CASTING PRODUCTION UNITS	TYPE OF FOUNDRY	PERCENT TO AUTO INDUSTRY
General Motors Central Foundry	100,000	Captive	
Lynchburg Foundry	25,000		50
Dayton Malleable	22,500		More than 30
Deer & Company	22,000	Captive	
Wheland	20,000		90
CWC-Textron	17,000		25
Hayes-Albion	16,000		75
International Harvester	15,000	Captive	
Caterpillar Tractor	12,000	Captive	
Waupaca	12,000		
Brillion	8,800		
Neenah	8,500		
East Jordan Iron Works	6,600		
Eaton Corporation	6,500		
Auto Specialties	5,400		
Columbus	5,000		50

Source: Cast Metals Federation and Company Statistics.

16.4 MAJOR ISSUES FACING THE CASTING INDUSTRY

The casting industry is undergoing significant change. Tonnage shipped has remained relatively steady over the past ten years, yet the number of establishments has dropped significantly (see Table 16-3). The foundries that have gone out of business have mostly been small facilities unable to cope with changing technology or pollution and safety regulations. Many larger foundries have been expanded and modernized. The Department of Commerce and foundry industry spokesmen forecast continued growth in the castings market over the next five years.

TABLE 16-3. METAL CASTING GROWTH

YEAR	CASTING PRODUCTION* (Millions of Tons)	CASTING VALUE** (Billions of Dollars)
1968	19.5	11.2
1969	20.8	12.3
1970	18.0	11.3
1971	17.8	11.6
1972	19.6	13.8
1973	21.9	17.0
1974	20.2	17.8
1975	16.4	16.4
1976	18.4	20.2
1977	19.4	22.1
1978 (Estimate)	19.6	23.0

Source: * U.S. Bureau of the Census.

** Foundry Management and Technology Metal Casting Industry Census Guide, 1979.

Major issues currently confronting the casting industry include:

- Changing technology. The industry is increasing ductile iron production as a substitute to gray and malleable iron.
- Changing markets. The auto industry downsizing and lightening of cars is leading to smaller castings and changes from iron to aluminum castings.
- Competition from overseas.
- Capital shortages.

Changing Technology

The major auto manufacturers have increasingly switched to ductile iron for many of their parts. As a result, foundries with a capability in ductile iron have seen substantial growth in their business. Other foundries have been forced to buy the new equipment needed to produce ductile iron and to learn the technology and production methods needed to produce these castings. Malleable iron foundries have had a particular problem with this changing technology since ductile iron is in many cases the preferred substitute to malleable iron.

Changing Markets

Changes in the auto industry are having important impacts on the foundry industry. The conversion of certain auto parts to aluminum has caused a decrease in gray iron sales for some companies, especially those producing parts that have been converted to aluminum, such as intake manifolds.

The general downsizing of cars has caused a weakening of the casting market since smaller castings lead to increased capacity in the industry. Some companies have claimed that the captive auto foundries have taken a greater share of casting production to the detriment of the jobbing foundries. Other foundries, especially those that produce ductile iron or produce parts that have not been downsized or switched to aluminum, report no impact from auto industry changes. The entire foundry industry is estimated to currently be operating at 70 percent of rated capacity.*

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* American Metal Market, April 21, 1978, page 6A.

It is still unclear what the ultimate effect of automobile downsizing will be on the casting industry. Industry spokesmen, such as Thomas Wiltse of General Motors Central Foundry Division, have suggested that both independent iron and aluminum foundries will see growth in the next five years. Other people close to the industry feel that these predictions are based on overly optimistic projections of automobile sales through the 80's. Automobile downsizing, it is felt, will cause considerable over-capacity in the gray iron foundry industry in the 1980's.

James Schultz, Detroit Manager of a major builder of foundries has suggested that automobile downsizing will accelerate the switch from gray and malleable iron to ductile iron: "You will see a changeover from gray to high ductile iron for the complete power train and undercarriage."* The ductile iron parts would be lighter due to the greater strength of the material.

There is a question whether the large captive foundries would assume a greater share of total auto foundry purchases if there was excess industry capacity due to auto downsizing. The captive foundries are large and tooled up for the components requiring high volumes. The jobber foundries tend to be more specialized and more susceptible to change. For instance, Dayton Malleable continues to sell automotive, air conditioning castings and CWC-Textron continues to sell camshafts to General Motors because the companies are able to produce the parts at less expense or with superior characteristics than GM's foundries.

Whether or not iron foundries have difficulties in the years ahead, aluminum foundries are expected to see considerable increases in business from the auto industry.

Competition From Overseas

Many foundries have found that some of their products are now being made overseas and sold at lower prices than the American foundries can charge. Castings are being imported from Japan, Brazil, and Europe. The castings are reportedly of good quality. Price has been cited as the principal reason for losing out to imports, even if quality had to be compromised. Although imports have affected the sales of foundries that serve the auto industry there have not been any reports of major auto companies purchasing castings from overseas.

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* American Metal Market, April 21, 1978, page 3a.

Capital Shortage

A study by the Cast Metals Federation has indicated that due to predicted expansions, modernizations, and pollution abatement expenditures, the entire casting industry could need as much as $10 billion from 1978 through 1981 for capital expenditures. Further, 18 percent of the capital necessary will have to come from unknown sources.* The study indicates that low selling prices in the industry have resulted in inadequate returns to generate the capital needed. This is particularly a problem with smaller foundries.

* <u>American Metal Market</u>, April 21, 1978, page 6A.

17. HAYES-ALBION

Hayes-Albion is one of the largest casting facilities in the United States. In the early seventies this company tried to shield itself from the cyclical auto market through diversification. Now auto downsizing has given the company the incentive to retarget its efforts to the auto industry. The company is pursuing permanent mold and die cast aluminum casting markets. To do this it has expanded facilities through acquisition and internal expansion. Also, to gain aluminum technology the company has teamed with a German aluminum casting company.

The company is also expanding its ferrous capability. It is expanding its overall capacity and shifting part of its production from malleable to ductile iron. This change is auto-related as many auto parts—such as brake parts—are now being made of ductile iron instead of malleable iron. However, this trend is not considered a direct effect of automobile downsizing.

17.1 CORPORATE SIZE AND STRUCTURE

Hayes-Albion is a Fortune 1,000 corporation. The company was formed in 1967 by the merger of Albion Malleable Iron and Hayes Industries. Current ferrous casting capacity is 174,000 tons, and non-ferrous casting capacity is 15,000 tons.

17.1.1 Revenue, Profit and Employment Statistics

Sales in 1979 were $254 million and cast products accounted for approximately 60 percent of the revenues. Profits in 1979 were slightly over $200,000, down dramatically from $9.2 million the previous year. In 1979, the company employed about 4,800 people and approximately 85 percent of these were hourly workers. (See Table 17-1.)

TABLE 17-1. HAYES-ALBION
REVENUES, PROFIT AND EMPLOYMENT

Year	Revenues (Millions)	Profits (Millions)
1979	254.0	.2
1978	218.4	9.3
Average Number of Employees: 4,831 (1979)		

17.1.2 Corporate Organization

The company is organized into two operating groups, as follows. (See Figure 17-1.)

- Cast products group which is responsible for manufacturing ferrous and non-ferrous castings

- General products group which is responsible for fabricating various automotive and non-automotive products.

Cast Products Group

Ferrous castings are made at the Albion and Tiffin Divisions. Capabilities exist in malleable and gray iron. Recent conversion at the Albion plant has allowed Hayes to start producing nodular iron castings. The Briggs-Shaffner Division does aluminum sand and permanent mold castings and also manufactures aluminum spools and metal furniture components. Aluminum, magnesium, and zinc are die cast in the Litemetal Diecast Division and the Paramount Diecasting Division. Recent additions have extended Hayes-Albion's capability in non-ferrous casting. The company started a joint venture, Honsel-Hayes Aluminum Products Company, with Honsel-Werke, AG, of West Germany, in July 1978 to enter the permanent mold aluminum casting field on a volume basis. In addition, in June of 1978 the company merged with St. Louis Diecasting Corporation. This adds three die casting facilities to the two already operated by Hayes-Albion. These are the Keokuk Diecast, Tennessee Diecast, and St. Louis Diecast divisions.

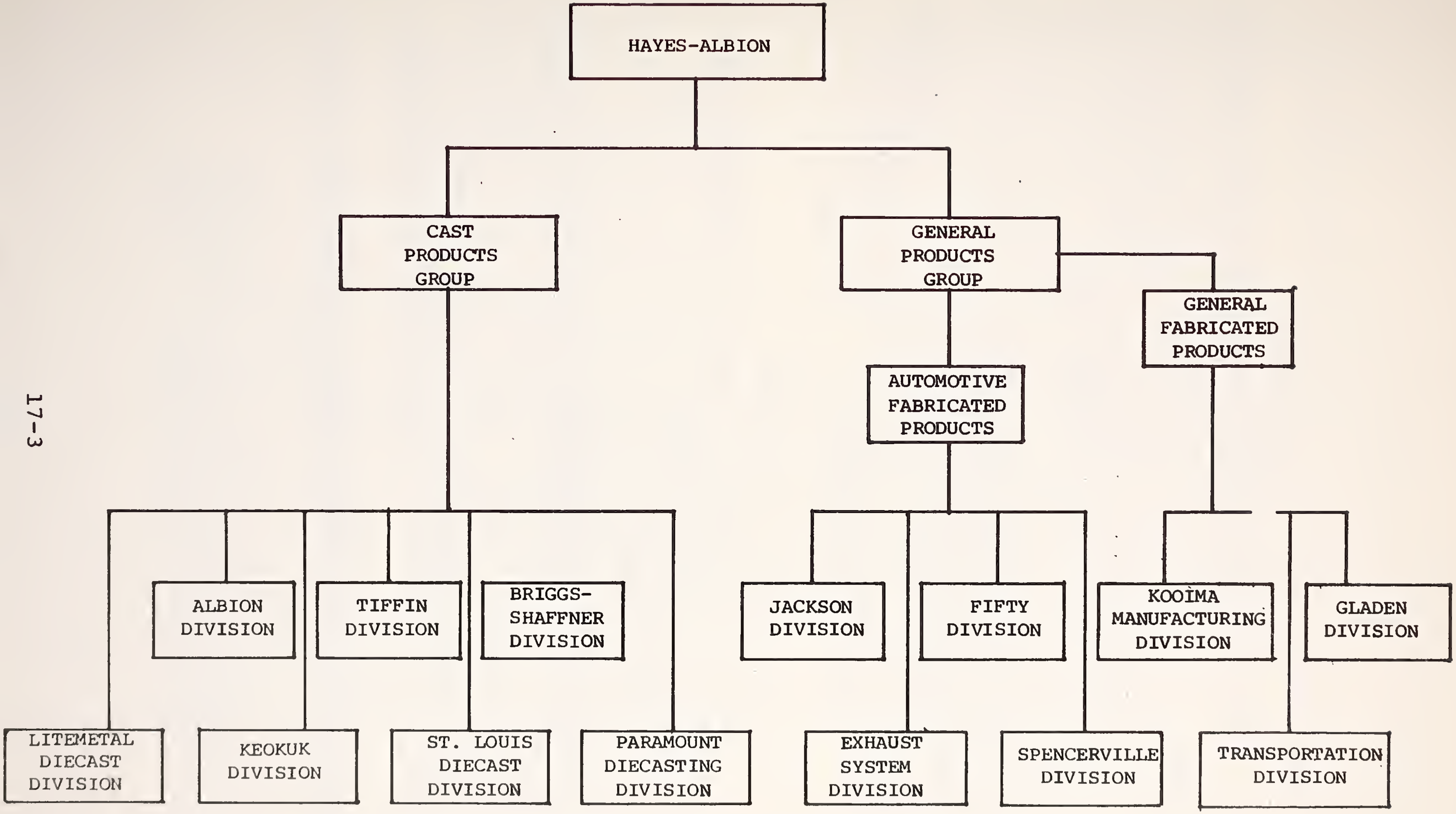

FIGURE 17-1. CORPORATE ORGANIZATION

General Products Group

The former Fabricated Products Group was reorganized in 1979 to become the General Products Group. The group, whose sales account for 40 percent of total company revenues, is divided into two subgroups. The first subgroup is the Automotive Fabricated Products subgroup which includes the Jackson Division, Fifty Division, Exhaust System Division, and Spencerville Division. These divisions manufacture exhaust systems, door frames, window assemblies, engine cooling fans, engine pulleys, automotive decorative trim, and machined shafts. The other subgroup, called the General Fabricated Products subgroup, is divided into three divisions. The Gladen Division produces silicone rubber dies, sheets, and rollers for hot-stamping decorative designs and lettering on plastic surfaces. The Transportation Division operates a fleet of trucks to transport raw materials and finished goods for the Cast Products and Fabricated Products Groups. The Kooima Manufacturing Division produces machined shafts.

17.2 MAJOR MARKETS AND PRODUCTS

Figure 17-2 presents a summary of the major market information for Hayes-Albion.

17.2.1 Major Markets

Hayes-Albion's major markets are passenger car, truck, railroad, agricultural equipment, and appliance industries. Approximately 65 percent of sales are to the passenger car market, 17 percent to the truck market, and 3 percent to the aftermarket. Ferrous castings are estimated to have accounted for 75 percent of 1979 casting sales, and 70 percent of the casting sales are attributed to the auto industry.[1] The General Products Group accounted for 40 percent of sales.

Hayes-Albion's major customers are the auto manufacturers. Ford is the most important customer, accounting for approximately one-third of sales.[2]

1. Kidder, Peabody and Company estimate.
2. Ibid.

MARKET DATA

Major Markets: Passenger cars, trucks, railroad equipment, appliances

Percent of Sales to the Auto Industry: 65 percent

Supplies to: Ford, Chrysler, General Motors, Kelsey-Hayes, Caterpillar, Cummins Engine

Major Products: Transmission housings, universal yokes, disc brake calipers and rotors, rear axle housings, fan spacers, intake manifolds, master cylinders, water pump bodies.

FIGURE 17-2. HAYES-ALBION MARKET DATA

17.2.2 Products

The major cast iron products sold to the auto industry are transmission housings, universal yokes, disc brake calipers and rotors, rear axle housings, and front wheel hubs. Aluminum die cast products sold to the auto industry include fan spacers, power steering pump units, water pump bodies, and valve covers. Permanent mold castings include intake manifolds and master cylinders.

Sales Strategy

Hayes-Albion promotes its automotive products by emphasizing the following points:

- The most modern and efficient core-making, melting, metal handling and finishing operations available in the industry

- Secure operations: state-of-the-art pollution controls and environmental improvements; privately-funded gas pipeline for the Albion Division to assure an adequate supply of vital energy in the future

- Complete range of operations. Gray, malleable, or nodular iron. In-depth support services for heat-treating, finishing, quality assurance and secondary operations

- Ready access to interstate highways

- Tradition of years in the forefront of the ferrous castings field

- A leader in castings technology

- In-house stampings

- Capability in precision die casting and secondary operations in aluminum, magnesium, and zinc alloys.

New Product Plans

Hayes-Albion's newest products are high volume permanent mold aluminum castings and ductile iron castings. The aluminum castings include intake manifolds and brake cylinders and the company hopes to greatly expand their automotive aluminum market in the next few years. Ductile iron production just began last year. The company uses the in-mold process which is supposed to be more energy-efficient than processes used by other manufacturers. Ductile iron production is expected to increase significantly in the next few years, replacing much of Hayes' malleable iron production.

17.2.3 Marketing Strategy

In the early 70's, Hayes-Albion diversified to protect itself from the cyclical nature of the auto market. Many of these ventures were unsuccessful and hurt company profits. Hayes-Albion's current strategy is to eliminate these unprofitable ventures and refocus on the automotive market. Auto downsizing provides Hayes-Albion with the capability to expand its casting sales. It is positioning itself for this by gaining permanent mold aluminum and die casting capability.

The company sees lightweight castings as a major area of opportunity. The company has initiated a two-phase program for entering this field. One involved a joint venture with Honsel Werke, AG, a West German company, to manufacture permanent mold aluminum castings at the company's Tiffin, Ohio, plant. The second involved a merger with St. Louis Diecasting Corporation in June 1978, which more than doubled its aluminum and magnesium die casting capabilities.

17.3 PRODUCTION AND OPERATIONS

Hayes-Albion has ferrous casting plants in Albion, Michigan, and Tiffin, Ohio. Its aluminum die casting plants are in Keokuk, Iowa; Jackson, Michigan; Stevensville, Michigan; Bridgeton, Missouri; and Ripley, Tennessee. Permanent mold aluminum castings are made in Tiffin, Ohio, and Winston-Salem, North Carolina. The Tiffin, Albion, and Jackson plants are devoted to automotive production. Only approximately 6 percent of the sales of St. Louis Diecasting's three plants go to automotive manufacturers, so those plants are not presently tied to the auto industry.

17.3.1 Major Automotive Facilities

Data on the Tiffin, Albion, and Litemetal plants are presented in Figures 17-3 through 17-5.

Tiffin Plant

The Tiffin plant (Figure 17-3) produces gray iron castings and houses the permanent mold aluminum facilities of Honsel Werke. The company hopes to achieve an initial target of 1,800 tons of aluminum castings in the current year. The addition of aluminum capacity at Tiffin is scheduled to be completed in 1981 and will provide up to 18,000 tons of aluminum capacity. The estimated cost of this project is $15 million. Ford and General Motors have approved molds for cylinder heads and intake manifolds. Ford cylinder heads and intake manifolds will be used in the 1981 Erika. The equipment for these parts will come from Germany, and production is scheduled to start in March 1980.

The relationship with Honsel Werke should speed up Hayes-Albion's expansion program and provide the company with sophisticated aluminum casting technology.

Albion Plant

The Albion plant (Figure 17-4) was, until recently, a malleable iron foundry. In 1977 work was begun on a major plant expansion and modernization. The work will increase the capacity of the plant by 22,000 tons per year and give the company the capability to produce nodular iron. The program, which will cost about $17 million, includes replacing one of the plant's two automated molding lines with a new line that offers greater flexibility and capacity.

Company Hayes-Albion

County

Plant Size 400,000 sq. ft, iron
100,000 sq. ft, aluminum

Plant Tiffin Plant

Congressional District

Address Greenlawn Drive
Tiffin, Ohio 44883

Standard Metropolitan Statistical Area

No. of Employees 600

Telephone (419)448-9310

Primary SIC Code(s) 3320

Products (Automotive)	Capacity	Processes Used	Consumed by (Automotive)
Brake drums Brake calipers	97,400 tons/yr, iron 18,000 tons/yr, aluminum (by 1981)	Automatic match plate and mechanical green sand molding. Gray iron. Blown, shell, hotbox and gas hardening coremaking. Stress-relieving heat treatment. Radiographic, magnetic or dye inspection.	90% auto industry 75% passenger auto (estimate)
Intake manifolds Master cylinders Cylinder heads		Permanent mold aluminum casting	Ford, General Motors

FIGURE 17-3. TIFFIN PLANT DATA

Company Hayes-Albion **County** ________ **Plant Size** 500,000 square feet

Plant Albion Plant **Congressional District** ________

Address 601 N. Albion Street
Albion, MI 49224 **Standard Metropolitan Statistical Area** ________ **No. of Employees** 1,450

Telephone (517) 629-2141 **Primary SIC Code(s)** 3320

Products (Automotive)	Capacity	Processes Used	Consumed by (Automotive)
Differential housings, yokes steering knuckles	100,000 tons/year 122,000 tons/year after completion of expansion	Malleable and ductile iron Automatic match plate green sand molding Blown shell, hot box, and gas hardening core making Annealing, normalizing and quenching heat treatments Hardness, radiographic, magnetic, or dye testing	75% passenger auto (estimate)

FIGURE 17-4. ALBION PLANT DATA

Company Hayes-Albion

County

Plant Size $10 million sales

Plant Litemetal Division Jackson Plant

Congressional District

Address 1927 Wildwood Avenue Jackson, MI

Standard Metropolitan Statistical Area

No. of Employees 210

Telephone (517) 789-6168

Primary SIC Code(s) 3320

Products (Automotive)	Capacity	Processes Used	Consumed by (Automotive)
Fan spacers Power steering pump unit	N.C.A.	Aluminum diecast	N.C.A.

FIGURE 17-5. LITEMETAL DIVISION-JACKSON PLANT DATA

Entrance into the nodular market will be accomplished with the installation of special facilities needed to produce nodular castings.

Litemetal Plant

The Litemetal Division Jackson plant produces aluminum die cast components (Figure 17-5). Automotive products are an important part of this business. However, the sales of these components are quite small compared to the current Hayes-Albion iron sales. Total Hayes non-ferrous casting sales comprise only about 24 percent of total casting sales and this includes castings for the furniture, textile and applicance industries.

17.3.2 New Plants

Hayes-Albion is taking significant steps to increase its automotive die casting production. In 1978 the company merged with St. Louis Diecasting, an aluminum and magnesium diecaster with three plants and approximately $19.3 million in sales. This more than doubled Hayes' die casting capacity. However, only 6 percent of St. Louis' sales were to the automotive industry. Hayes-Albion is now seeking automotive customers for these operations and filled several orders for 1980 and 1981 cars.

A significant asset in St. Louis Diecasting is the company's capability for hot chamber magnesium die casting. The process is supposed to produce intricate, thin-walled parts at lower cost than traditional methods. If Hayes-Albion is to meet its goal of 20 percent of the automotive aluminum market, it is likely that further expansion of facilities will be required.

17.4 LABOR RELATIONS

Of Hayes-Albion's 4,800 employees, approximately 85 percent are hourly workers and 92 percent are unionized. Unionized employees are members of the UAW, Teamsters, AIW, IAM, AFL-CIO, and the United Electrical Workers. All plants have individual contracts which expire over a three year period. Over the last several years Hayes-Albion has not had significant problems with the labor force.

A recent modernization at the Albion Division Plant reduced the number of workers needed in that plant. However, the new permanent mold aluminum facilities that are part of the Honsel-Hayes venture have resulted in the addition of 500 new employees.

17.5 RESEARCH AND DEVELOPMENT

Research and development costs were $2.7 million in 1979 and $2.3 million in 1978, or approximately one percent of sales. These costs are associated with the development of new products or changes in existing products. At the division level, manufacturing and engineering personnel assist customers in the analysis of factors affecting initial pricing, efficient casting of the component, and machining and assembly operations. A separate corporate R&D group maintains physical and metallurgical test laboratories to analyze product designs to meet required service parameters. In addition, a pilot foundry operation is maintained at Albion. This facility furnishes pre-production castings to test new tooling and product designs.

Hayes-Albion is currently working on prototype automotive parts, substituting nodular iron or aluminum for malleable iron. In addition, the company is investigating hot chamber magnesium die casting techniques.

17.6 FINANCIAL STATUS

Hayes-Albion is in a difficult period of new plant start-ups and heavy capital expenditures.

17.6.1 Operations

Hayes-Albion's sales have shown substantial growth in the last five years. (See Figure 17-6). Earnings and return on equity declined from 1978. This change was attributed to start-up costs at the Albion plant as well as to a five-week strike and losses due to discontinued operations. Since sales to assets have remained relatively constant, these effects are seen primarily as a decline in operating margin and earnings to sales. In addition, a slight decline in sales to assets can be attributed to the increase in assets due to modernization and expansion without, as yet, the expected increase in sales. Start-up expenses included those for training workers, running dual coremaking operations, and modifying and adding equipment. The very poor performance in 1979 was attributed by Hayes-Albion to start-up costs and losses associated with the abandonment of equipment.

17.6.2 Capital Analysis

Hayes-Albion has not had a significant stock offering in the last five years (see Figure 17-7). Long-term debt was increased by $18 million in 1974, and has been increased further in 1978-79. Long-term debt to total capitalization has decreased from 32 percent in 1974 to 30 percent in 1979. Internal cash generation has basically been adequate for capital expenditures, dividends, and gradual increases in working capital.

However, Hayes-Albion is presently entering a major capital expenditure period. Capital expenditures from 1974-1977 were about $6 to $8 million, about 7 to 8 percent of total assets. Expenditures in 1978 were $21.1 million, or 17 percent of total assets. Funds for these expenditures were provided from operations, $2.4 million in long-term debt, and a significant reduction in marketable securities which shows up as a $6.5 million drop in working capital.

Year	Sales ($Millions)	Earnings ($Millions)	Return on Equity, Percent	Operating Income* / Sales Percent
79	254	0.2	0.3	5.5
78	218	9.3	13.8	9.9
77	200	10.7	17.9	13.9
76	183	8.8	16.5	12.0
75	146	4.7	9.4	10.4
74	132	6.0	12.8	11.9

Year	Earnings / Total Assets Percent	Sales / Assets	Earnings / Sales Percent
79	0.2	2.0	0.1
78	6.9	1.64	4.2
77	9.1	1.72	5.3
76	8.4	1.90	4.4
75	5.0	1.73	2.9
74	6.2	1.44	4.3

*Operating Income = Sales – Cost of Goods Sold – Selling, General and Administrative Expenses, Before Depreciation, Interest, and Income Taxes.

FIGURE 17-6. OPERATING ANALYSIS OF HAYES-ALBION

Year	Sales	P/E Ratio[1]	Sources: Earnings	Sources: Depreciation	Sources: Changes in Long-Term Debt	Sources: Changes in Owners' Equity Other Than Retained Earnings
79	254	N.M.	0.2	7.8	7.0	0.2
78	218	10.6	9.3	6.3	2.4	4.2*
77	200	6.5	10.7	5.6	(0.6)	0.1
76	183	7.4	8.8	5.3	(1.4)	6.0**
75	146	9.5	4.7	5.0	(0.9)	0
74	132	7.4	6.0	3.9	18.5	0

Year	Change in Working Capital	Uses: Capital Expenditures	Uses: Dividends	Long-Term Debt[2] / Capitalization %	Coverage[3]	Cap. Exp. / Total Assets %	Current Ratio
79	2.4	16.1	4.9	29.8	5.2	12.1	2.0
78	(6.5)	21.1	4.3	23.6	9.8	16.9	1.96
77	6.0	7.9	3.7	23.8	13.4	7.1	2.37
76	5.0	5.8	3.2	26.5	10.3	5.6	2.34
75	(0.2)	7.4	3.2	30.0	6.5	7.7	2.74
74	12.0	8.1	3.2	31.7	15.2	16.8	2.16

Dollar figures are in millions

[1] Average for the Year

[2] Capitalization Defined as Total Liabilities – Current Liabilities

[3] Operating Profit/Interest

* Due to merger of St. Louis Diecasting.

** Stock dividend.

FIGURE 17-7. CAPITAL ANALYSIS OF HAYES-ALBION

Capital expenditures were \$16 million in 1979, down from the \$21 million in 1978. The recent relatively poor earnings performance could lead to a shortfall in funds which would require some borrowing.[3] However, increased sales in the early '80s should substantially improve the cash flow situation. Since major spending programs will be completed by 1981, the long-term needs of the company can be funded internally with perhaps some short-term borrowing. In addition, the company has a program of divesting itself of poorly performing operations. Many of these operations were added in the early '70s when the automotive market was not perceived as a strong growth area. Sales of some of these operations could provide additional funds to Hayes-Albion.

3. Kidder, Peabody

18. DAYTON MALLEABLE

Dayton Malleable Inc. is a large independent foundry whose sole business is the manufacture of castings for outside customers. Dayton claims slackening demand for gray and malleable iron automotive castings in the last few years and the increased foundry capacity that has resulted from automobile downsizing have hurt the company's operations. These factors particularly affected Dayton because of poor operating efficiencies in some of its divisions, its dependence on malleable iron for much of its sales, and a 14-week strike at two of its plants in 1978.

Dayton switched one of its largest plants from malleable to nodular iron in 1978. In addition it has built a second aluminum foundry and is preparing for expansion there. The company feels that its sales and profitability will return shortly as the over-capacity in the foundry industry ends.

18.1 CORPORATE SIZE AND STRUCTURE

Dayton Malleable claims to be the largest independent foundry organization in the United States. The company's single business is the production of rough commercial castings which are made to the customer's designs and specifications. Patterns and tooling are owned by the customer.

18.1.1 Revenue, Profit and Employment Statistics

In 1979 sales were $184 million and profits were $3.1 million, up from $143 million and $2.2 million in 1978. The company employs 3,147 people (see Table 18-1).

TABLE 18-1. DAYTON MALLEABLE

Year	Revenues (Millions)	Profits (Millions)
1979	$184.0	$3.1
1978	142.0	2.2
Average Number of Employees: 3,147 (1979)		

18.1.2 Corporate Organization

Dayton Malleable is organized into ten divisions. Nodular iron castings are made at the Ironton Division. Malleable castings are made at the Ohio, Meadville, and Belcher Divisions. Gray iron castings are made at the GHR Division and the Attalla Division. Steel castings are made at the Pratt and Letchworth Division and machining is done at the Peerless Division. Finally, permanent mold aluminum casting is done at the Meta-Mold and Columbia Divisions.

18.2 MAJOR MARKETS AND PRODUCTS

Figure 18-1 presents a summary of the major market information for Dayton Malleable.

18.2.1 Major Markets

Dayton Malleable's main markets include: automobile and light truck, automotive air conditioning, medium and heavy truck, air conditioning and refrigeration, railroad, and farm and off-highway equipment. More than 30 percent of sales is for the automotive industry. Major customers include GM, Chrysler, Ford, Rockwell, Eaton, Mack Truck, White Motors, Carrier, and Caterpillar. GM accounts for 16 percent of sales and Chrysler accounts for 14 percent of sales.

MARKET DATA

Major markets: Automotive, light truck, air conditioning, truck, railroad, off-highway

Percent of sales to the auto industry: More than 30 percent

Supplies to the following automotive companies: GM, Chrysler, Ford, Delco Air

Major products: Disc brake calipers, auto transmission parts, differential carriers and cases, steering gear housings, air conditioning parts

FIGURE 18-1. DAYTON MALLEABLE MARKET DATA

18.2.2 Products

Major automotive products made by Dayton include disc brake calipers, differential carriers and cases, front knuckle castings, air conditioning compressor housings, and steering gear housings.

Dayton recently began producing nodular iron castings in one of its divisions. Other new casting products include aluminum automotive air conditioning compressors, aluminum manifolds, aluminum master cylinders, and nodular iron brake calipers. New products coming on stream in high volumes include calipers for Volkswagens and light trucks, spindles, automatic transmission drums and starters, and air conditioning compressor bodies. All these parts are produced in either gray or nodular iron and Dayton will be the primary supplier.

18.2.3 Effect of Auto Downsizing on the Market

Dayton feels that automobile downsizing has created excess capacity in the foundry industry and has resulted in lower prices and lower profits. According to Chairman J.F. Torley, as a result of vehicle downsizing, without expanding melting facilities or adding to molding equipment, the capacities of casting suppliers has increased. "The increase occurred as the parts were smaller and lighter; therefore, more parts could be processed from the same plant equipment."*

Further, Mr. Torley feels the captive foundries have aggressively cut prices in order to keep production in their facilities. This has led to, he claims, lower volumes and profits in some foundries in Michigan and Connecticut as well as at Dayton. In certain cases, Dayton is still able to competitively outbid GM's foundries. According to Mr. Torley, Dayton makes the majority of General Motors' air conditioning casting requirements even though there is excess capacity in GM's foundries.

* Chairman's Report, Annual Meeting of Stockholders, December 6, 1978.

18.2.4 Marketing Strategy

Dayton made some strategic moves a few years ago that are now beginning to help the company.

Pursue Permanent Mold Aluminum Casting

The first move was expansion in permanent mold aluminum casting. Permanent mold casting is emphasized rather than die casting because it is more complex and a customer would find it difficult to enter the die casting business. Dayton has enough work for its two aluminum plants to increase their output by 50 percent in the next year and a half.

Increase Ductile Iron Production

The other strategic move was to increase ductile iron production. This was necessary because disc brake calipers, steering spindles, and other safety critical items which Dayton supplies are now being made in ductile iron. These parts are less expensive, lighter (thinner), have greater strength, and better fatigue life than gray or malleable iron counterparts.

The company has indicated it is now rethinking its strategy.

18.3 PRODUCTION AND OPERATIONS

Dayton Malleable has a plant associated with each of its ten divisions. The company has four plants that serve the auto industry: the Ironton Division plant makes ductile castings, the GHR plant makes gray iron castings, and the two aluminum plants make aluminum castings for automobiles.

18.3.1 Major Automotive Facilities

Data on the Ironton, GHR, Meta-Mold, and Columbia plants are given in Figures 18-2 through 18-5.

Ironton Plant

The Ironton plant is a large 90,000-ton-per-year nodular iron foundry. The foundry is highly mechanized and uses induction furnace melting as well as cupola melting. Major auto parts include brake parts, transmission parts and differential carriers and cases.

The plant is located in Ironton, Ohio, and sends about 25 percent of its production to the auto industry.

Ironton has seen considerable changes in recent years. A $12 million melting system became operational in 1977. The new system consisted of one cupola replacing two old ones and increasing melting capacity by 40 percent. In addition, in July 1978, after months of planning, engineering, and construction, the Ironton Division discontinued production of malleable iron to produce just nodular iron.

Ironton has had considerable start-up problems due to the introduction of the new facilities. The plant was not operating at capacity in 1978. This was due in large part to the 14-week strike at the plant last year.

GHR Plant

The GHR plant is a highly-mechanized iron foundry with cupola and electric channel induction melting. In addition to making brake and transmission parts, this foundry makes automotive air conditioner parts. The plant is located in Dayton, Ohio and has the capacity to produce 120,000 tons per year of gray iron castings. GHR employs 800 people and sends 25-30 percent of its output to the auto industry. In 1978 the plant was used to its capacity most of the time.

Meta-Mold Plant

The Meta-Mold plant was Dayton's first aluminum casting plant. Most of this plant's production goes to the auto industry and the plant was fully utilized most of the time in 1978. Meta-Mold is in Cedarburg, Wisconsin, and employs about 200 people. Major parts include automatic transmission parts, master cylinders, and air conditioner compressor parts.

Company Dayton Malleable   County ____   Plant Size ____

Plant Ironton Division   Congressional District ____

Address 2618 S. Third St.
Ironton, OH 45638   Standard Metropolitan Statistical Area ____   No. of Employees 1,000

Telephone (614) 532-8143   Primary SIC Code(s) ____

Products (Automotive)	Capacity	Processes Used	Consumed by (Automotive)
Disc brake calipers Automatic transmission parts Differential carriers and cases Front knuckle castings	90,000 tons/yr	Nodular iron Green sand mold Blown & shell core making Annealing Quench and temper treatments Hardness, radiographic and magnetic testing	25% auto

FIGURE 18-2. IRONTON DIVISION

Company Dayton Malleable County ____ Plant Size ____

Plant GHR Division Congressional District ____

Address 400 Detrick Street
Box 308
Dayton, OH 45404 Standard Metropolitan Statistical Area ____ No. of Employees 800

Telephone (513) 224-0851 Primary SIC Code(s) ____

Products (Automotive)	Capacity	Processes Used	Consumed by (Automotive)
Automotive transmission parts Air conditioner compressor housings Steering gear housings	120,000 tons/yr.	Gray iron Automatic match plate green sand molding Blown and shell core making Stress relieving and annealing heat treatment Code certification and hardness testing	25-30% auto

FIGURE 18-3. GHR DIVISION

Company Dayton Malleable County ______ Plant Size ______

Plant Meta-Mold Congressional District ______

Address N39 W5789 Hamilton Rd Cedarburg, WI 53012 Standard Metropolitan Statistical Area ______ No. of Employees 200

Telephone (414) 377-0700 Primary SIC Code(s) ______

Products (Automotive)	Capacity	Processes Used	Consumed by (Automotive)
Automatic transmission parts Master cylinders Air conditioner compressor parts	N.C.A.	Permanent mold aluminum castings	70%

FIGURE 18-4. META-MOLD DIVISION

Company Dayton Malleable County _____ Plant Size _____

Plant Columbia Division Congressional District _____

Address Highway 165N & Rt 847 Columbia, LA 71418 Standard Metropolitan Statistical Area _____ No. of Employees 40

Telephone (318)649-5635 Primary SIC Code(s) _____

Products (Automotive)	Capacity	Processes Used	Consumed by (Automotive)
Automatic transmission parts Master cylinders Air conditioner compressor parts	N.C.A.	Permanent mold aluminum castings	70% auto :

FIGURE 18-5. COLUMBIA DIVISION

Columbia Plant

This is the second aluminum plant at Dayton Malleable. It is located in Columbia, Louisiana. The plant, whose production goes in large part to the auto industry, was added as a direct response to auto industry demands for more aluminum castings. The first phase operation of the plant is underway and expansions are planned. As a first step toward expansion, additional acreage has been purchased contiguous to the present property.

18.3.2 Expansions and New Plants

Dayton currently has excess capacity and is concentrating on filling that rather than constructing new plants. In March 1980 Dayton announced it would close a malleable iron plant in Columbus, Ohio. The company cited decreased demand for automotive castings as a major problem. At the same time, Dayton announced it would build a new aluminum foundry in Springdale, Arkansas.

18.4 FINANCIAL STATUS

Due to its present operating difficulties, Dayton's financial situation is in a state of flux.

18.4.1 Operating Analysis

Dayton has suffered a marked decline in earnings in 1978 and 1979 (see Figure 18-6). This has been attributed to the 1978 strike, start-up problems with the new equipment at Ironton and inability to recover rising costs. Operating margin (operating income to sales) has been lower in the last three years as has earnings to sales. The decline in sales to assets is not nearly as pronounced. This further suggests that Dayton's major problems have been with prices and costs. Management has indicated there were problems with operating efficiencies in certain divisions during 1977 as well as 1978.

18.4.2 Capital Analysis

Dayton Malleable is run very conservatively. Its debt-to-capitalization ratio is about 0.3 and the company has been gradually paying down its debt in the last few years (see Figure 18-7). No major stock changes have occurred in the last five years.

Thus Dayton has been financing its capital programs internally. If it continues to do this with current poor

Year	Sales ($Millions)	Earnings ($Millions)	Return on Equity, Percent	$\frac{\text{Operating Income*}}{\text{Sales}}$ Percent
79	184	3.1	5.7	4.9
78	143	2.2	4.1	5.8
77	152	5.9	11.3	8.7
76	148	7.7	16.2	12.0
75	135	6.3	14.8	10.9
74	138	5.2	13.2	8.9

Year	$\frac{\text{Earnings}}{\text{Total Assets}}$ Percent	$\frac{\text{Sales}}{\text{Assets}}$	$\frac{\text{Earnings}}{\text{Sales}}$ Percent
79	3.8	2.2	1.7
78	2.8	1.76	1.6
77	7.5	1.9	3.9
76	10.5	1.9	5.2
75	9.5	2.0	4.7
74	8.3	2.1	3.7

*Operating Income = Sales – Cost of Goods Sold – Selling, General and Administrative Expenses, Before Depreciation, Interest, and Income Taxes.

FIGURE 18-6. OPERATING ANALYSIS OF DAYTON MALLEABLE

			Sources			
Year	Sales	P/E Ratio[1]	Earnings	Depreciation	Changes in Long-Term Debt	Changes in Owners' Equity Other Than Retained Earnings
79	184	11-8	3.1	5.7	(.49)	0
78	143	17-13	2.2	5.8	(.50)	.1
77	152	7-5	5.9	5.0	.10	.1
76	148	6-4	7.7	4.2	(.50)	(0.3)
75	135	5-3	6.3	4.0	(.30)	(0.3)
74	138	4-3	5.2	3.9	(.60)	(1.2)

		Uses					
Year	Change in Working Capital	Capital Expenditures	Dividends	$\frac{\text{Long-Term Debt}^2}{\text{Capitalization}}$ %	Coverage[3]	$\frac{\text{Cap. Exp.}}{\text{Total Assets}}$ %	Current Ratio
79	(6.4)	7.2	2.2	2.5	75.0	8.8	1.6
78	.9	4.7	2.2	3.4	52.3	5.9	1.9
77	4.2	7.1	2.2	4.3	82.6	9.0	1.9
76	6.6	11.8	1.9	4.3	98.9	16.2	1.7
75	(10.7)	6.6	1.8	5.7	77.3	9.9	1.5
74	1.9	4.8	0.9	6.9	58.6	7.7	2.0

Dollar figures are in millions

1 Range for the Year

2 Capitalization Defined as Total Liabilities – Current Liabilities

3 Operating Profit/Interest

FIGURE 18-7. CAPITAL ANALYSIS OF DAYTON MALLEABLE earnings, capital expenditures will have to be curtailed. The company has so far not cut dividends, claiming that its current problems are transitory.

Capital expenditures decreased in 1977 and 1978 but were raised in 1979. Planned capital expenditures are $80 million for the next five years.

18.5 RESEARCH AND DEVELOPMENT

Dayton recently developed an automatic brake caliper fatigue machine. The machine can test twelve disc brake caliper assemblies at the same time, under simulated emergency stopping conditions, until failure. Dayton claims that its advanced testing facilities and quality control in manufacturing have prevented a single failure in over ten million calipers the company has produced.

In addition, Dayton works with manufacturers in the development stage to design new castings. For instance, Dayton's research and development group worked with the engineering departments of some customers for up to four years to develop the new castings Dayton will manufacture this year.

18.6 GOVERNMENT AND LABOR RELATIONS

In mid-1979 employees at Dayton's Columbia, Louisiana, facility voted to be represented by the United Auto Workers. Three-year agreements were signed in 1979 at Attalla and at Meta-Mold. Although the Attalla negotiations were concluded without a strike, a three-week stoppage occurred at Meta-Mold.

Labor agreements at the Meadville and Belcher facilities expire during fiscal 1980. Although labor disputes are not expected, inflationary pressures have increased the tension between labor and management increasing the chances for interruption of production from strikes.

Dayton Malleable anticipates capital expenditures related to environmental protection for fiscal 1980 and fiscal 1981 to be $.9 million and $.2 million respectively. These expenditures will bring the various divisions' facilities into compliance with Federal, state and local environmental provisions. On a continuing basis, the company expects operating costs related to environmental protection to be about $2.5 million per year.

19. LYNCHBURG FOUNDRY

Lynchburg Foundry is a major ductile and gray iron producer of small automotive castings for the auto industry. Although automotive downsizing has resulted in smaller castings, Lynchburg's total tonnage is up. This is partly because Lynchburg is very strong in the ductile iron market which is growing rapidly. In addition, Lynchburg has been marketing specific castings for specific applications, and the company claims this has had excellent results.

A pioneer in shell mold casting in the 1940's, Lynchburg continues as an industry leader in this technology. Lynchburg has no announced plans to build new facilities or to enter the aluminum market. The company is attempting to expand in the medium castings field, which is not an automotive market. Lynchburg built a new medium castings facility in 1977 which just went into two-shift operation in 1979.

19.1 CORPORATE SIZE AND STRUCTURE

Although its sales in 1979 were less than those of Hayes-Albion and Doehler-Jarvis, Lynchburg Foundry of the Mead Corporation claims to be the largest independent foundry in the United States in terms of market share.

19.1.1 Revenue and Employment Statistics

In 1979 the industrial manufacturing group of the Mead Corporation, of which Lynchburg is a part, had sales of $240.2 million and an operating profit of $12.6 million, down from $261.1 million and $29.4 million in 1978. Lynchburg Foundry accounted for over half of the sales of this group. The Foundry employs 4,500 people (see Table 19-1).

TABLE 19-1. LYNCHBURG FOUNDRY
ESTIMATED REVENUES AND EMPLOYMENT 1979

Revenues (000):	$120,000+
Total Employees:	4,500

19.1.2 Corporate Organization

The company is fully owned by Mead Corporation and is part of that company's industrial products group. The other parts of the industrial products group include a coal mine and three rubber facilities. (See Figure 19-1.)

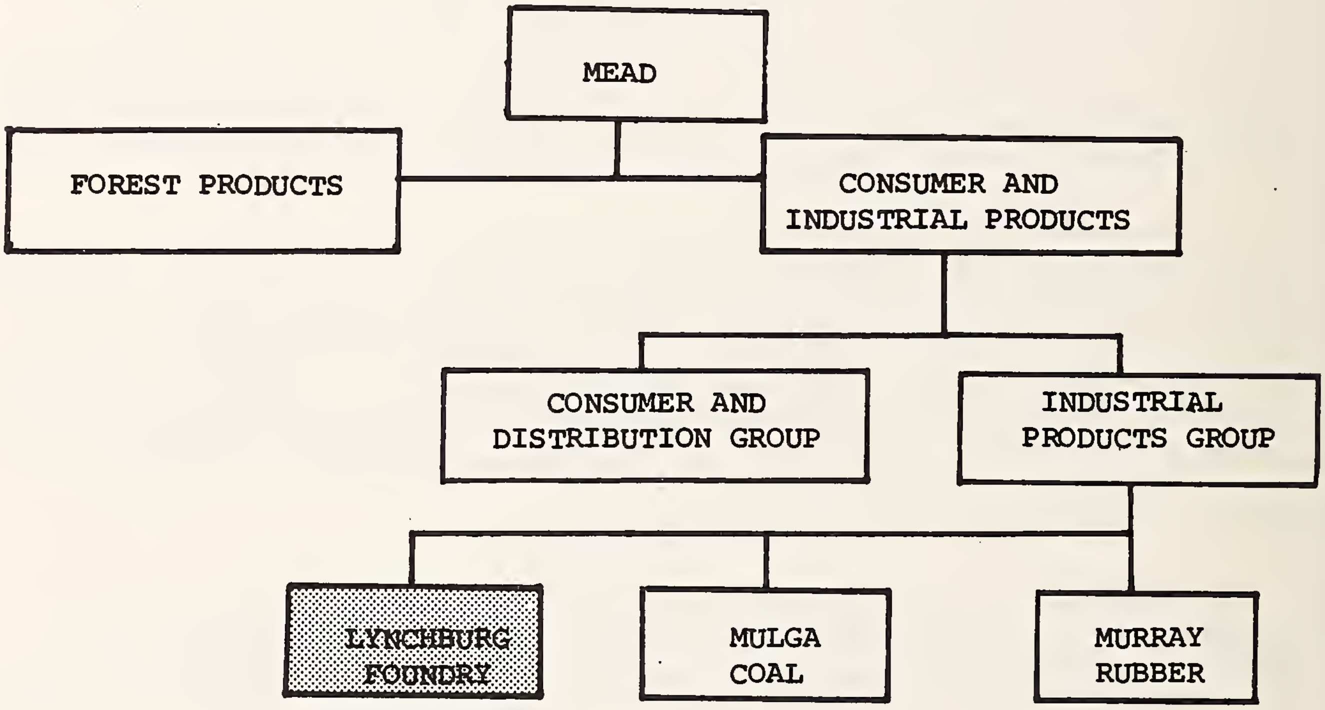

FIGURE 19-1. MEAD CORPORATION STRUCTURE

The group contains about 11 percent of the sales of Mead Corporation, which derives the bulk of its revenue from wood and wood products. Mead regards the industrial products group sales as an important countercyclical input to the total corporate performance.

19.2 MAJOR MARKETS AND PRODUCTS

Figure 19-2 summarizes the major market information for Lynchburg Foundry.

MARKET DATA	
Major markets:	Automotive, construction equipment, trucking, farm machinery, internal combustion engines, air conditioning, pumps and compressors, industrial valves
Percent of sales to the auto industry:	50 percent
Supplies to:	Ford & Chrysler
Major automotive products:	Disc brake calipers, power steering housings, automotive transmission drum, wheel spindles

FIGURE 19-2. LYNCHBURG FOUNDRY MARKET DATA

19.2.3 Major Markets

Lynchburg Foundry's major markets are:

- Automotive
- Construction equipment
- Trucking
- Farm machinery
- Internal combustion engines
- Air conditioning
- Pumps and compressors
- Industrial valves.

The foundry concentrates on the production of complex castings requiring a high degree of dimensional and metallurgical accuracy. Concentration is on large company accounts requiring long production runs.

An estimated 50 percent of Lynchburg's sales are to the auto industry. Although the company supplies to all of the major American auto manufacturers, major work is done for Ford and Chrysler.

19.2.4 Major Automotive Products

Lynchburg makes small gray and ductile iron parts for the auto industry. These include disc brake calipers, power steering housings, automotive transmission drums, front wheel spindles, and valve housings. Lynchburg was the second licensee of ductile iron in 1949 and has since been producing ductile iron parts.

19.2.5 Marketing Strategy

Lynchburg divides its markets by casting size: small (under 100 pounds), medium (100-1,000 pounds) and large (over 1,000 pounds). Of these three market categories, Lynchburg is strongest in the small casting market. Even with vehicles becoming smaller and smaller, Lynchburg sees this market as remaining a major part of its business. At the same time, Lynchburg sees major opportunities in the medium castings field while it sees virtually no opportunities in the large castings market.

Thus, Lynchburg's market strategy includes:

- Maintaining its strong position in the small castings market
- Increasing penetration in the medium castings market which is identified as a high growth market
- Avoiding the large castings market.

Maintain Position in Small Castings

Small castings are primarily used for automotive vehicles, air conditioning, and farm machinery. The automotive market is the largest volume customer of small castings at Lynchburg. The company attempts to get contracts on vital parts such as brake calipers and power steering parts and is normally the majority supplier to a particular automotive customer. This approach is taken to minimize the effects of changing automobile models by the manufacturers. Also, as a majority supplier, the company is less likely to be discontinued as a supplier during a recession.

Lynchburg sees some growth in the valve, air conditioning, and farm machinery small castings markets. Even though automobile downsizing has resulted in smaller castings the total tonnage is up. Part of the reason for this may be Lynchburg's special capability in ductile iron. The overall market growth for ductile iron castings has been 14 percent per year, and Lynchburg's growth in ductile iron has been 17.4 percent per year. This has given Lynchburg a growth in sales of all types of castings of 5.7 percent.

Expand Market Penetration in Medium Castings

Lynchburg hopes to expand its market share in medium castings. Medium castings primarily serve the construction equipment, trucking and farm machinery industries. Lynchburg sees above average market growth in this segment, particularly in the construction equipment industry. The company sees the greatest growth opportunity in ductile iron medium castings.

Avoid the Large Casting Market

Large castings primarily serve the process equipment and machine tool markets. Based on predictions in the mid-seventies of slow growth in this market coupled with future modernization requirements of its large castings foundry, Lynchburg withdrew from this market between 1976 and 1977.

19.3 PRODUCTION AND OPERATIONS

Lynchburg has three major facilities housing six foundries. These are all in Virginia—two near Lynchburg and one at Radford.

19.3.1 Major Automotive Facilities

Three of Lynchburg's six foundries make automotive castings, one in each of its major plants in Lynchburg, Archer Creek, and Radford. Information on these plants is given in Figures 19-3, -5, and -6. A map of the facilities at Archer Creek is shown in Figure 19-4.

Company: Lynchburg | County: Campbell | Plant Size: 336,000 sq. ft.

Plant: Archer Creek | Congressional District: ____

Address: (Mail) Drawer 411
Lynchburg, VA
24505
(Plant) Mt. Athos Rd.
Lynchburg, VA

Standard Metropolitan Statistical Area: ____ | No. of Employees: 1,000

Telephone: (804) 528-8702 | Primary SIC Code(s): 3320

Products (Automotive)	Capacity	Processes Used	Consumed by (Automotive)
Front wheel spindles Power steering housings Automotive transmission drums Disc brake calipers (ductile)	75,000 tons/yr.	Gray & ductile iron Automated green sand molding Isocure cores Two 90-inch cupolas	N.C.A.

FIGURE 19-3. ARCHER CREEK

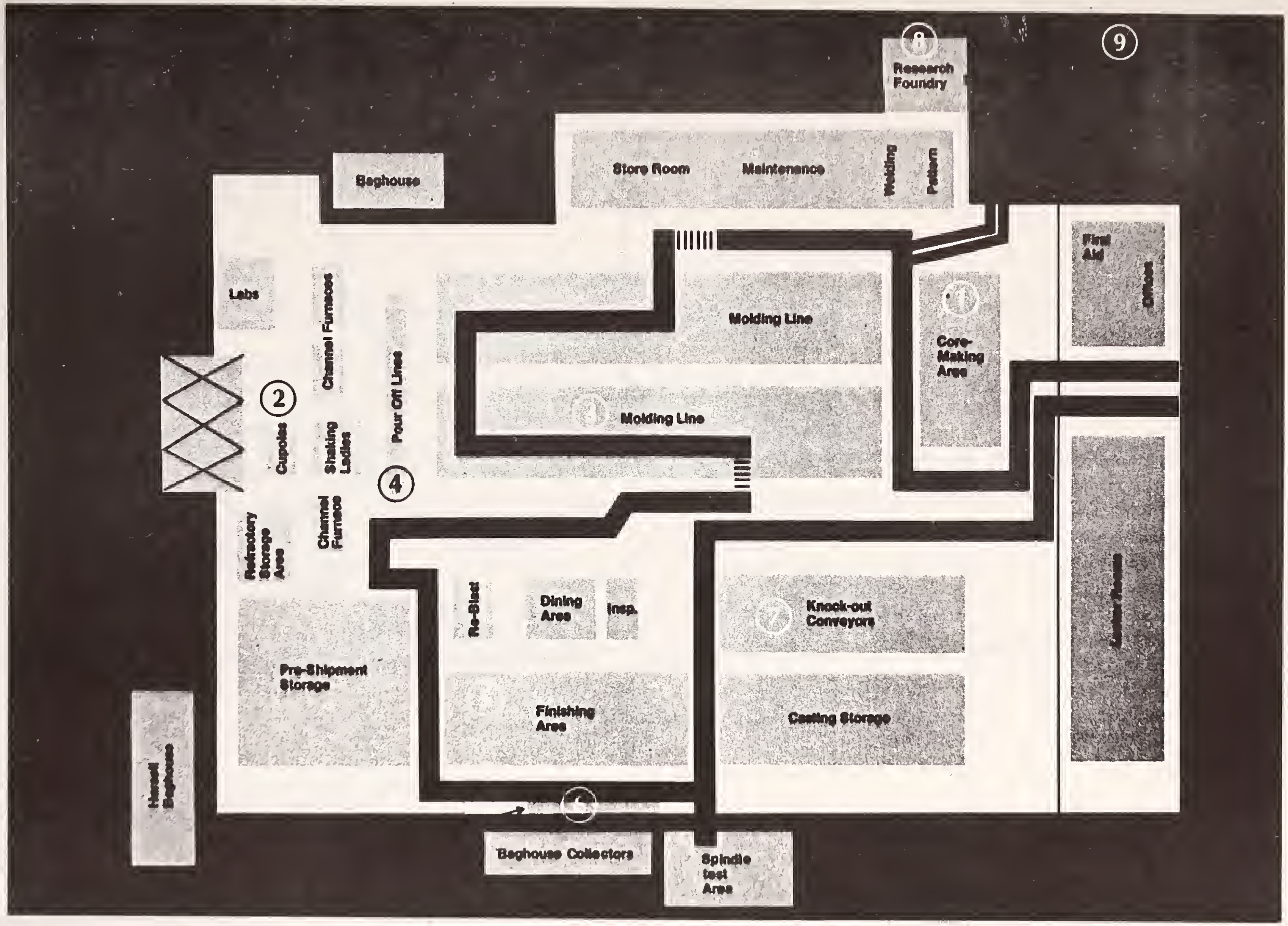

FIGURE 19-4. LYNCHBURG FOUNDRY—ARCHER CREEK PLANT LAYOUT

Company Lynchburg

County

Plant Size

Plant Lynchburg Shell Molding Facility

Congressional District

Address (Mail) Drawer 411
Lynchburg, VA
24505

(Plant) Concord Tnpk
Lynchburg, VA

Standard Metropolitan Statistical Area

No. of Employees 1,900 (whole plant)

Telephone (804) 528-8200

Primary SIC Code(s) 3320

Products (Automotive)	Capacity	Processes Used	Consumed by (Automotive)
Transmission parts	50-55,000 tons/yr	Gray & ductile iron	N.C.A.
Hubs		Shell molding	
Carriers		Hot blast cupolas	

FIGURE 19-5. LYNCHBURG SHELL MOLDING FOUNDRY

Company Lynchburg County ______ Plant Size 150 acres

Plant Radford Shell Foundry Congressional District ______

(Mail) Drawer 411
Address Lynchburg, VA
24505
(Plant) First Street
Radford, VA

Standard Metropolitan Statistical Area ______

No. of Employees 1,350 (whole plant)

Telephone (703)639-2411

Primary SIC Code(s) ______

Products (Automotive)	Capacity	Processes Used	Consumed by (Automotive)
	60,000 tons/yr.	Gray iron only Shell molding	N.C.A.

FIGURE 19-6. RADFORD SHELL FOUNDRY

Archer Creek Plant

The Archer Creek facility is a new $28 million small casting plant that was opened in 1973. The plant's products are largely automotive. The Archer Creek facility also houses the Lynchburg Research Foundry and the pattern shop for all the Lynchburg Foundry plants. The facilities are located near Lynchburg and employ over 1,000 people. Total capacity is around 75,000 tons per year and major automotive products include front wheel spindles, power steering housings, automotive transmission drums, and disc brake calipers. Both gray and ductile iron castings are produced.

Lynchburg Plant

The Lynchburg plant houses two facilities: a medium casting and a shell molding foundry. Automotive parts, such as disc brake calipers and valve housings, are made at the shell molding facility. Both gray and ductile iron castings are produced. The foundry has a capacity of 50-55,000 tons per year. It employs approximately 1,900 people.

Radford Plant

Three foundries operate at the Radford, Virginia, plant. A shell molding foundry with a capacity to make 60,000 tons of castings per year makes automotive castings out of gray iron, and a pipe foundry makes pressure pipes for municipalities.

The third foundry is a nonautomotive medium casting facility. This facility was added to the Radford Plant in 1977 as the plant's large casting operation was being phased out. The medium casting plant has been the major addition to Lynchburg's facilities in the last few years, and reflects Lynchburg's goal of expanding its market penetration in the medium castings area. The capacity of this facility is 15,000 tons per year.

The new plant was slow getting started due to what has been described as a soft market for products such as those used in off-highway earth-moving equipment. The market has strengthened in recent months and the new foundry went onto two-shift operation earlier this year.

19.3.2 New Plants and Expansions

There have been no announced plans for major expansion at Lynchburg, although heat treating facilities were added at Archer Creek in 1979. And to relieve congestion, the shell finishing department at Lynchburg was moved to Archer Creek.

19.4 FINANCIAL STATUS

No separate financial data are released on Lynchburg Foundry.

19.5 RESEARCH AND DEVELOPMENT

A $600,000 research facility was completed at Archer Creek in 1976. The Research Foundry tests materials and equipment, works to improve quality control procedures, participates in employee training and performs special services for customers. The Research Foundry is also used to test equipment and patterns for new Lynchburg Foundry facilities prior to production. Lynchburg has stated that an important part of its marketing strategy is to maintain its technological leadership in foundry work.

19.6 LABOR RELATIONS

In the 1930's Lynchburg launched an innovative and highly regarded apprenticeship and training program which has grown and matured over the years. Designed to keep both young employees and experienced personnel abreast of technical changes, the strenuous 4-year program has graduated more than 300 skilled workers, nearly 60 percent of whom are still at the company. In recent years this program has been supplemented with a college-level cooperative education program, designed to produce college graduates with first-hand foundry experience in 5 years. The company also has several training programs for all levels of management and professionals.

20. CWC-TEXTRON

CWC-Textron is a major gray iron foundry in Michigan. The company has had a significant input into the auto industry through its production of camshafts and manifolds. Automobile downsizing has hurt the manifold sales, but camshaft sales have remained strong.

CWC management believes aluminum use in castings will not be as great as previously expected. The company has therefore decided not to enter aluminum casting for the auto industry. Instead, CWC has expanded its product range in iron and has introduced ductile iron capability. CWC is promoting thin wall castings, high strength gray iron castings, and ductile iron castings as alternatives to aluminum.

20.1 CORPORATE SIZE AND STRUCTURE

CWC Castings is a division of Textron Corporation. The division operates nine foundries and claims to have the most modern, highly automated independent gray iron foundries in the world. Total production is approximately 200,000 tons per year. The company recently began to produce castings made of ductile iron. Other Textron divisions are Aerospace, Consumer, Metal Products and Creative Capital.

20.1.1 Revenue, Profit and Employment Statistics

CWC sales in 1979 were approximately $150 million, down 12 percent from the previous year's sales. The decline was due almost entirely to lagging automotive sales. The company employed approximately 3,200 workers in 1979. (See Table 20-1.)

TABLE 20-1. CWC-TEXTRON
REVENUES, PROFIT AND EMPLOYMENT

Year	Revenues (Millions)	Profits (Millions)
1979	$150.0	N.A.
1978	$170.0	N.A.
Average Number of Employees: 3,200 (1979)		

20.1.2 Corporate Organization

The various casting operations of CWC have long supplied their markets virtually as independent foundries. Recently the casting operations have been coordinated so that as a unit they can provide a broader range of capabilities and operations to meet more demanding customer needs of the future. CWC is a full division of the Industrial Group of Textron.

20.2 MAJOR MARKETS AND PRODUCTS

Figure 20-1 presents a summary of the major market information for CWC-Textron.

20.2.1 Major Markets

CWC's major markets are farm and agricultural equipment, marine, automotive, truck, air conditioning, and electrical products and appliances. About 25 percent of the castings goes to the passenger auto industry. CWC makes all the camshafts for General Motors cars except the Chevrolet, and all the camshafts for American Motors. These are made out of gray iron. Manifolds are sold to Ford, Chrysler, and American Motors. There is a possibility that CWC may get much of Ford's camshaft business.

MARKET DATA

Major markets: Farm equipment, marine, automotive, truck, air conditioning, electrical products

Percent of sales to passenger auto industry: About 25 percent

Supplies to: General Motors, Ford, American Motors

Major automobile product: Camshafts, manifolds

FIGURE 20-1. CWC-TEXTRON MARKET DATA

20.2.2 Products

The major cast iron products sold to the auto industry are camshafts and manifolds.

Sales Strategy

CWC emphasizes the range of technical capacity and technical knowledge available in its casting centers. The company recently introduced ductile iron capability to its facilities and has been heavily promoting this new capability. CWC is able to produce volume castings, similar to the large captive foundries, but has the flexibility to produce these for various outside customers.

New Product Plans

CWC is now negotiating production of new gray iron products for the auto industry, including camshafts for Ford. The company is promoting new alternatives to aluminum such as thin wall castings, high strength gray iron castings, or ductile iron castings, particularly for manifolds.

20.2.3 Marketing Strategy

CWC in 1977 predicted a doubling of its sales within five years. To date, this expected growth has not occurred. Sales were about the same in 1978 as 1977 and actually declined in 1979. However, the company is still trying to expand its business. The company has lost some sales in the manifold market due to increased use of aluminum in this area.

CWC's marketing strategy is to stay out of aluminum casting, promote new iron products, and maintain their camshaft market.

Stay Out of Aluminum Casting

Earlier the company was carefully considering the new market opportunities presented by automobile downsizing. Particularly, it was looking at adding aluminum capacity, either through buying a casting facility or building. But the company has backed away from this endeavor. Two reasons are cited: (1) aluminum use in cars will not be as high as expected due to technical problems for high temperature uses and (2) the large volume auto business is not as profitable as other businesses at CWC.

Promote New Iron Products

In the meantime, the company is bidding on gray iron contracts to the auto industry and promoting its new cast iron products as alternatives to aluminum.

Maintain Camshaft Market

CWC's market in camshafts is considered very strong, since the company has almost no competition. This means that the company can count on continued growth in its auto business even if the auto industry purchases less gray iron castings. To date there has been little interest in lighter camshafts in the auto industry.

20.3 PRODUCTION AND OPERATIONS

CWC operates four casting centers in Muskegon, Michigan, and one each in South Haven, Michigan; Ravenna, Michigan; and Columbus, Indiana. Castings for the auto industry are done in Plant 5 of the Sherman Operations in Muskegon, Michigan; Camcast Operations in Ravenna, Michigan; and National Motor Castings Operations in South Haven, Michigan.

20.3.1 Major Automotive Facilities

Data on the Plant 5 foundry, Camcast Operations and National Motor Casting Operations are presented in Figures 20-2, -3, and -4.

Plant 5, Sherman Operations

The Sherman Operations are made up of three separate casting facilities engaged in volume production of gray iron castings in the 1-pound to 100-pound range. Plant 5 produces 35,000 camshafts per day, mostly for General Motors. The plant employs 337 people and is located in Muskegon, Michigan. Camshafts are also made for American Motors and General Motors of Canada.

Company CWC-Textron County ____ Plant Size ____

Plant 5, Sherman Operations Congressional District ____

Address 2672 Henry Street
Muskegon, MI
49441 Standard Metropolitan Statistical Area ____ No. of Employees 337

Telephone (616) 733-1331 Primary SIC Code(s) ____

Products (Automotive)	Capacity	Processes Used	Consumed by (Automotive)
Camshafts	Production: 35,000 camshafts/ day 36,000 tons/yr	Gray iron	90% auto General Motors - all except for Chevy GM of Canada American Motors (all) Olds Diesel

FIGURE 20-2. PLANT 5, SHERMAN OPERATIONS

Company CWC-Textron
County
Plant Size

Plant South Haven National Motor Castings Operations
Congressional District

Address Indiana Avenue South Haven, MI
Standard Metropolitan Statistical Area
No. of Employees 331

Telephone (616)637-8461
Primary SIC Code(s)

Products (Automotive)	Capacity	Processes Used	Consumed by (Automotive)
Intake and exhaust manifolds	28,000 tons/yr.	Gray iron Automatic match plate green sand molding Hot box & blown core making Stress relieving heat treatment Hardness and magnetic or dye inspection	70% auto Ford Chrysler American Motors

FIGURE 20-3. NATIONAL MOTOR CASTINGS OPERATIONS

Company CWC-Textron

County

Plant Size

Plant Ravenna, Camcast Operations

Congressional District

Address 2600 S. Slocum Rd. Ravenna, MI 49451

Standard Metropolitan Statistical Area

No. of Employees 62

Telephone (616)853-6212

Primary SIC Code(s)

Products (Automotive)	Capacity	Processes Used	Consumed by (Automotive)
Camshaft	2,300 tons/yr.	Gray iron	Oldsmobile Aftermarket (Sears) Also Int'l. Harvester

FIGURE 20-4. CAMCAST OPERATIONS, RAVENNA

National Motor Castings Operations

The National Motor Castings Operations produces automated high production cored and thin-wall machineable gray iron castings ranging from 3 to 50 pounds. Capacity is over 100,000 castings per week. Much of this work involves making manifolds for Ford and Chrysler. The plant employs 331 people and produces about 70 percent of its output for the auto industry. Other markets served include pump, electric motor, appliance, farm equipment, machinery, and engine building markets. The plant is located in Muskegon, Michigan.

Camcast Operations

Camcast Operations is a small, specialized facility for the production of cast camshafts. Oldsmobile camshafts for gasoline and diesel engines are produced here, as well as camshafts for the aftermarket. The plant employs 62 people and produces approximately 2,300 tons of castings per year. It is located in Ravenna, Michigan.

20.3.2 Expansions and New Plants

Over the past five years a considerable effort has been made to modernize the casting facilities of CWC. The program has reportedly cost $25 million. At one of the plants at Muskegon, nineteen molding lines were replaced with a single molding line with the same capacity. The work environment was improved and the number of people was reduced from 2,300 to 1,000. A similar program is now complete in Columbus, Indiana.

As this program is completed, CWC will be looking to expand its production capacity. The company is considering building an additional plant for its camshaft business in order to reduce its dependency on a single plant, and is installing new production lines and equipment at several of its foundries.

As a corporation, Textron spent $111 million for capital expenditures in 1979. Twenty-two percent of this went to the Industrial Products group which includes CWC.

20.4 FINANCIAL STATUS

CWC is one of the larger and more profitable Textron divisions. Capital for investments is provided through Textron Corporation and new projects must meet certain profitability criteria. No separate financial statistics are published for the CWC division.

20.5 RESEARCH AND DEVELOPMENT

CWC claims it has been responsible for a number of major innovations in foundry practice, metallurgy, and new product development over the years, including the duplexing of metals to produce new alloys and the development of cast crankshafts.

CWC's research and development staff is currently engaged in several projects:

- Investigation of alloys for camshafts to improve the hardness of lobes while still keeping the product machineable

- Developing camshaft alloys for large diesels

- Developing methods to reduce core use in casting processes

- Perfecting the use of higher strength, lighter gray iron in manifolds.

Textron's overall corporate R&D expenditures were $99 million in 1979, up from $88 million in 1978.

21. DOEHLER-JARVIS

Doehler-Jarvis is a worldwide leader in die casting and is heavily dependent on the auto industry. In recent years the company has had a significant deterioration in its zinc die casting business due to the reduced use of zinc die casting by the auto industry. Doehler-Jarvis is a division of NL Industries, Inc.

Doehler-Jarvis is now actively pursuing the automobile aluminum market. It has set up aluminum permanent mold casting facilities in Greeneville, Tennessee and has been quite successful in winning contracts, especially from Ford, for this permanent mold facility. In addition, the company has a significant aluminum die cast contract from Ford.

21.1 CORPORATE SIZE AND STRUCTURE

Doehler-Jarvis of NL Industries is one of the largest casters of zinc, aluminum and magnesium in the United States. The company is also the largest custom die caster in the world, and now has expertise in other component-making technologies such as permanent and semi-permanent mold casting and various types of machining and assembling.

21.1.1 Revenue, Profit, and Employment Statistics

Sales in 1979 were $217.7 million (about 12 percent of NL Industries' total sales). Sales increased in 1979 despite the continuing decline in the volume of zinc casting. (See Table 21-1.) Operating profit for the corporate group which includes Doehler-Jarvis was $36.4 million on sales of $352.8 million. Doehler-Jarvis employed a work force of 7,000 in 1979.

TABLE 21-1. DOEHLER-JARVIS
REVENUES, PROFIT AND EMPLOYMENT

Year	Revenues (Millions)	Profits (Millions)
1979	$217.7	N.A.
1978	$209.0	N.A.
Average Number of Employees: 7,000 (1979)		

21.1.2 Corporate Organization

Doehler-Jarvis is the largest of NL Industries' fabricated products divisions and accounts for approximately 50 percent of fabricated sales and approximately 12 percent of NL Industries' total sales. Other parts of NL Metals include the Fasteners Division, Bearing Division, the Lead Recycling Group and the Magnesium Division. Other NL divisions are Petroleum Services Operations and Chemicals Operations.

21.2 MAJOR MARKETS AND PRODUCTS

Figure 21-1 presents a summary of the major market information for Doehler-Jarvis.

MARKET DATA

Major markets: Automotive, appliance

Percent of sales to the auto industry: More than 50%

Supplies to: Ford, GM, Chrysler, Bendix

Major automotive products: Automatic transmission cases, cover plates, manifolds, master cylinders

FIGURE 21-1. DOEHLER-JARVIS MARKET DATA

21.2.1 Major Markets

Doehler-Jarvis' principal market is the automotive industry which accounts for more than 50 percent of the division's sales. Other markets include appliance, power tool, and office equipment manufacturers.

Doehler-Jarvis supplies approximately 20 percent of the aluminum case castings for Ford's new Automatic Overdrive Transmission introduced on the 1980 models. The units are made on die casting equipment. Doehler-Jarvis is also making master cylinders for Ford's Fairmont series and intake manifolds for two of Ford's V-8 engines.

21.2.2 Major Automotive Products

Die cast aluminum auto products include rack and pinion steering housings, automatic transmission parts, and windshield wiper parts. Steering column housings for tilt steering mechanisms are magnesium die cast. Intake manifolds, master brake cylinders, and cylinder heads are permanent and semi-permanent mold cast aluminum. Zinc castings are now usually decorative parts.

Sales Strategy

Doehler-Jarvis promotes its aluminum products by emphasizing the following:

- Light weight
- Lower fabrication and assembly costs
- Reduced machining
- Elimination of welding.

It is targeting its ability in permanent mold casting to the auto industry by emphasizing the process' capability to handle complex coring arrangements.

New Products

Doehler-Jarvis only recently began using semi-permanent and permanent mold casting for aluminum. This has allowed it to make automobile parts such as cylinder heads or intake manifolds. Die casting, however, remains the largest part of the business.

21.2.3 Marketing Strategy

The auto industry changes are having a direct influence on Doehler-Jarvis' strategy. With the trend toward use of lightweight materials in automobiles, Doehler-Jarvis is making two important marketing moves:

- Pursuing the aluminum casting market for automotive parts and components
- Withdrawing from the zinc die casting market.

Pursue Aluminum Casting Market for Automotive Parts and Components

NL is aggressively pursuing aluminum castings for the auto industry. This is clearly seen in the company's advertising and the type of casting facilities it has built in the last few years. In addition, the company has been successful in obtaining many of the first contracts for casting the new aluminum auto parts (i.e., cylinder heads and intake manifolds).

Withdraw from the Zinc Die Casting Market

At the same time it is pursuing the aluminum casting market, Doehler-Jarvis is withdrawing from the low-priced zinc market. The company has indicated that the demand for zinc alloy die casting has been "softening" as users turn to lighter castings of aluminum and magnesium. Much of Doehler-Jarvis' zinc castings have gone to the auto industry and according to the company, the demand for lighter metals has been largely responsible for the decision to shut down some of its zinc operations.

21.3 PRODUCTION AND OPERATIONS

Doehler-Jarvis has five plants engaged in casting production. Aluminum die casting is done at two plants in Toledo. Aluminum and zinc castings are made at Pottstown, Pennsylvania. Magnesium die castings are made in Batavia, New York, and permanent and semi-permanent aluminum castings are made in Greeneville, Tennessee.

21.3.1 Major Automotive Facilities

Each of Doehler-Jarvis' casting facilities does some work for the auto industry. Information on the plants is given in Figures 21-2, -3, -4, -5, and -6.

Toledo Plants

Doehler-Jarvis has two die casting plants in Toledo, Ohio. The first is a 650,000 square foot facility that makes small castings for the auto industry. These include engine parts, automatic transmission parts, and rack and pinion steering housings. The plant employs 787 people.

The second Toledo plant is a 598,000 square foot facility that makes larger die cast parts, up to 75 pounds. The major automotive product in this plant is automatic transmission parts. The plant employs 661 people.

The two Toledo plants formerly made zinc die castings as well as aluminum die castings. However, zinc operations there were phased out last summer. The two plants have since concentrated on aluminum and magnesium operations. Some of the zinc operations were transferred to the Pottstown plant. The new Ford transmission cases will be made in the Toledo plants.

Pottstown Plant

Doehler-Jarvis has a plant in Pottstown, Pennsylvania, that is used for die casting aluminum and zinc. The plant is 470,000 square feet in area and produces small automotive castings such as windshield wiper housings, compressor housings, automotive air conditioning parts, and cover plates. The plant employs 950 people.

Batavia Plant

The Batavia, New York, facility is the one plant at Doehler-Jarvis that is not heavily oriented to the automotive industry. However, it could potentially do considerable automotive work. The plant does magnesium die casting. The major automotive component currently made in the 279,000 square foot facility is the steering column housing for tilt steering mechanisms.

Company Doehler-Jarvis | County ____ | Plant Size 650,000 Sq. Ft.

Plant Toledo #1 | Congressional District ____

Address 1945 Smead
Toledo, Ohio | Standard Metropolitan Statistical Area ____ | No. of Employees 787

Telephone (419) 248-5691 | Primary SIC Code(s) ____

Products (Automotive)	Capacity	Processes Used	Consumed by (Automotive)
Engine parts Automatic transmission parts Rack and pinion steering housings	N.C.A.	Aluminum die casting	N.C.A.

FIGURE 21-2. TOLEDO PLANT # 1

Company Doehler-Jarvis

County

Plant Size 598,000 Sq. Ft.

Plant Toledo #2

Congressional District

Address 5400 N. Detroit
Toledo, Ohio

Standard Metropolitan Statistical Area

No. of Employees 661

Telephone (419) 248-5781

Primary SIC Code(s)

Products (Automotive)	Capacity	Processes Used	Consumed by (Automotive)
Automatic transmission parts	N.C.A.	Aluminum die castings	N.C.A.

FIGURE 21-3. TOLEDO PLANT # 2

Company Doehler-Jarvis | County | Plant Size 470,000 Sq. Ft.

Plant Pottstown | Congressional District

Address P.O. Box 318
Pottstown, PA 19464 | Standard Metropolitan Statistical Area | No. of Employees 950

Telephone (215) 323-1100 | Primary SIC Code(s)

Products (Automotive)	Capacity	Processes Used	Consumed by (Automotive)
Windshield wiper housings Compressor housings Automotive air conditioning parts Cover plates	N.C.A.	Aluminum and zinc die casting	N.C.A.

FIGURE 21-4. POTTSTOWN, PA. PLANT

Company Doehler-Jarvis

County

Plant Size 279,000 Sq. Ft.

Plant Batavia, NY

Congressional District

Address P.O.Box 400
Evans St.
Batavia, NY

Standard Metropolitan Statistical Area

No. of Employees

Telephone (716) 343-3000

Primary SIC Code(s)

Products (Automotive)	Capacity	Processes Used	Consumed by (Automotive)
Steering column housings for tilt steering mechanisms	N.C.A.	Magnesium die casting	N.C.A.

FIGURE 21-5. BATAVIA, NY, PLANT

Company Doehler-Jarvis　　County ____　　Plant Size 115,000 Sq. Ft.

Plant Greeneville, Tenn.　　Congressional District ____
NL Permanent Mold Casting
Box 3013
Rufe Taylor Rd.
Greeneville, TN 37743

Address ____　　Standard Metropolitan Statistical Area ____　　No. of Employees 150

Telephone (615) 639-1155　　Primary SIC Code(s) ____

Products (Automotive)	Capacity	Processes Used	Consumed by (Automotive)
Intake manifolds Master brake cylinders Housings Cylinder heads	N.C.A.	Permanent and semi-permanent mold aluminum castings	N.C.A. (Ford)

FIGURE 21-6. GREENEVILLE, TN, PLANT

Greeneville Plant

The Greeneville, Tennessee, plant is Doehler-Jarvis' newest plant. In 1977 NL's Fasteners Division closed down plants in Puerto Rico and Greeneville, Tennessee, due to changed market conditions arising from severe foreign competition. The Greeneville plant was converted to the production of permanent mold castings and provides both gravity and low-pressure permanent mold capacity. Initial production began in 1978. This is where the Ford intake manifolds and master cylinders are made. The 115,000 square foot plant also makes housings and cylinder heads. The plant presently employs 150 people and output from the plant is expected to be expanded this year.

21.3.2 New Plant Plans

NL has not announced any major new plants for Doehler-Jarvis. The company is still expanding permanent mold production capacity at its Greeneville plant.

21.4 FINANCIAL STATUS

Financial data is not reported separately for Doehler-Jarvis. Data is, however, available for the NL Metals Operation Group of which Doehler-Jarvis represents about 30 percent. This operating group of NL Industries had lower earnings in 1977 than in 1976 and higher earnings in 1978 than in 1977. These fluctuations in earnings over the period 1976 to 1978 were attributed to:

- Cost of relocating zinc operations
- Start-up costs at one facility
- Costs associated with improving operating efficiency.

Operating profit rose further in 1979, as NL successfully withdrew from most of its lead operations.

21.5 RESEARCH AND DEVELOPMENT

Doehler-Jarvis' current R&D for auto castings consists of an active group of engineers designing new parts for Detroit. Parts are being designed for die casting that are currently cast iron. A new computer-aided design system is helping this endeavor.

NL Industries' overall budget for R&D in 1979 was $27 million, up considerably from $20 million in 1978. Most of the increase was devoted to Petroleum Services R&D.

22. WHELAND FOUNDRY

The Wheland Foundry is a large supplier of gray iron castings to the auto industry. The company has not indicated any plans to cast aluminum or to switch to ductile iron production. Nevertheless, sales and profits continue to rise. Furthermore, the company completed a $3.25 million expansion in late 1978. The company states that automobile downsizing will not affect its market, although sales to automotive clients declined in 1979.

22.1 CORPORATE SIZE AND STRUCTURE

Wheland Foundry is a large caster of gray iron with virtually all of its sales directed toward the auto industry. It claims to be the third largest independent gray iron foundry in the United States.

22.1.1 Revenue, Profit and Employment Statistics

Sales for the foundry in 1979 were $108.8 million and operating profit was $16.5 million, up from $86.5 and $10.8 million in 1978. The foundry division employed about 1,376 people in 1979. (See Table 22-1.)

TABLE 22-1. WHELAND FOUNDRY
REVENUES, PROFIT, AND EMPLOYMENT

Year	Revenues (Millions)	Profits (Millions)
1979	$108.8	$16.5
1978	$ 86.6	$10.8
Average Number of Employees: 1,376 (1979)		

22.1.2 Corporate Organization

Wheland Foundry is a division of North American Royalties, Inc., and accounts for 92 percent of that company's sales and 86 percent of the operating profit. The other division of the company is the Oil and Gas Division. This division explores for and produces gas and oil. Two-thirds of the stock of the company is controlled by Gordan P. Street, the Chairman of the Board.

22.2 MAJOR MARKETS AND PRODUCTS

Figure 22-1 presents a summary of the major market information for Wheland Foundry.

22.2.1 Major Markets

The Wheland Foundry sells almost exclusively to the automotive industry, about 95 percent of its total sales. Its major customers are Chevrolet Division of General Motors, Ford, Motor Wheel Corporation (a subsidiary of Goodyear), Kelsey-Hayes Company and Budd Company. In 1979 these five customers accounted for nearly 90 percent of Wheland's sales.

MARKET DATA

Major markets: Automotive

Percent of sales to the auto industry: 95% estimated

Supplies to: Chevrolet, Ford, Motor Wheel, Kelsey-Hayes, Budd, American Motors

Major automotive products: Disc brake rotor, brake drum, automatic transmission castings

FIGURE 22-1. WHELAND FOUNDRY MARKET DATA

22.2.2 Products

Wheland's major products are disc brake rotors, brake drums, and automatic transmission castings. Approximately 85 percent of castings are for brake parts and 15 percent are for transmissions. Of the brake parts, 65 percent are for passenger cars and 35 percent are for light trucks.

22.2.3 Market Strategy

Wheland's strategy is to continue to expand gray iron sales, while also expanding its oilfield operations to be less dependent on the automotive market. Despite automobile downsizing, the company sees no long-term effect on its business. The company's products are quite few, and the business is heavily oriented toward brake and transmission parts. As long as these parts are not switched to aluminum, continued growth in sales is expected. The company also has no capability in ductile iron.

22.3 PRODUCTION AND OPERATIONS

Wheland has three plants located in Chattanooga, Tennessee. The three plants operate as a unit, and each produces all the company's products at varying rates depending on demand conditions. Information on the plants is given in Figure 22-2. The foundry complex has a capacity to cast 235,000 tons per year, and for the last two years the foundry has worked at full capacity.

Wheland has backed its commitment to gray iron by completing a $3.25 million expansion program, increasing total division capacity by 8 to 10 percent. The expansion of the Middle Street Plant involved a Disamatic molding machine, new supporting equipment and expanded facilities.

Other energy saving and cost saving expenditures have recently been made. A heat recuperative system was installed on one of the foundry's cupolas which reduces the foundry's natural gas consumption by 20 percent. Two more such units are scheduled for installation.

Recently installed was a new sand and casting cooling drum, which measures 65 feet in length and 13 feet in diameter. This type of rotating drum is a European development new to the U.S. foundry industry.

22.4 FINANCIAL STATUS

North American Royalties and its primary division, Wheland Foundry (92 percent of sales), have been very secure financially over the past several years.

22.4.1 Operating Analysis

Sales for North American Royalties have increased dramatically in the last few years, as have earnings (see Figure 22-3). Margins have increased steadily over the last six years, while the ratio of sales to assets has been more steady. The automotive slump in 1980 has significantly hurt the company's earnings.

Company Wheland Foundry

County

Plant Size

Plant Chattanooga, TN (3)

Congressional District

Address 200 E. 8th St.
Chattanooga, TN
37402

Standard Metropolitan Statistical Area

No. of Employees 1,378

Telephone (615) 265-3181

Primary SIC Code(s) 3320

Products (Automotive)	Capacity	Processes Used	Consumed by (Automotive)
Brake rotors, drums (85%) Transmission castings (15%)	N.C.A.	Gray iron Automated sand casting	Chevrolet Ford Motor Wheel Kelsey-Hayes Budd

FIGURE 22-2. WHELAND FOUNDRY PLANT DATA

Year[1]	Sales ($Millions)	Earnings ($Millions)	Return on Equity, Percent	Operating Income* / Sales Percent
79	92	8.5	16.5	25.9
78	118	10.6	24.5	21.5
77	97	8.6	24.6	21.0
76	88	7.0	25.5	19.8
75	79	5.2	23.9	17.8
74	58	2.8	14.8	13.0

Year[1]	Earnings / Total Assets Percent	Sales / Assets	Earnings / Sales Percent
79	9.6	1.03	9.3
78	13.7	1.52	9.0
77	12.6	1.43	8.8
76	11.7	1.46	8.0
75	9.8	1.48	6.6
74	5.7	1.19	4.8

*Operating Income = Sales – Cost of Goods Sold – Selling, General and Administrative Expenses, Before Depreciation, Interest, and Income Taxes.

1. Ending April 30 of <u>following</u> year.

FIGURE 22-3. OPERATING ANALYSIS OF NORTH AMERICAN ROYALTIES

22.4.2 <u>Capital Analysis</u>

North American Royalties sold $3 million in preferred stock and increased its long-term debt by over $4 million in 1974 to help finance the expansion of the Wheland Foundry. (See Figure 22-4.) Much of the increase in debt came in the form of non-interest-bearing advances from Wheland's customers. The unpaid advances were repayable by the issuance of credit against future.purchases made by these customers. Since that time Wheland has been paying down the debt and now seems capable of generating its capital requirements internally. In addition, in 1977 the company began reducing the preferred stock and paying out dividends on common stock.

22.5 RESEARCH AND DEVELOPMENT

Wheland has not announced any plans to develop new automotive products or change to the use of different materials. The company insists that it continues to produce a product in great demand.

22.6 LABOR RELATIONS

A three-week strike at the firm's foundry operations followed expiration of a three-year contract in April of 1979, and curtailed operations for a short period. Normal operations were resumed on May 21, 1979. The strike had an adverse effect on first quarter earnings, but the foundry then began operating on overtime.

Year	Sales	P/E Ratio[1]	Sources: Earnings	Depreciation	Changes in Long-Term Debt	Changes in Owners' Equity Other Than Retained Earnings
79*	92	10-6	8.5	9.1	(0.9)	N.A.
78	118	N.A.	10.6	6.2	(1.6)	(0.1)
77	97	7-5	8.5	5.3	(1.7)	(0.25)
76	88	7-4	7.0	3.9	(3.3)	(0.25)
75	80	7-4	5.2	4.0	(2.8)	(0.4)
74	58	21-5	2.8	2.9	4.2	2.7

Year	Change in Working Capital	Uses: Capital Expenditures	Uses: Dividends	$\frac{\text{Long-Term Debt}^2}{\text{Capitalization}}$ %	Coverage[3]	$\frac{\text{Cap. Exp.}}{\text{Total Assets}}$ %	Current Ratio
79	0.4	19.8	.9	8.7	32.9	22.4	2.1
78	0.8	16.2	.94	11.3	32.2	20.9	2.0
77	(1)	13.6	.8	16.1	23.6	20.1	2.0
76	3.1	6.5	.65	21.4	18.0	10.9	2.2
75	6.6	3.1	.3	30.9	12.6	5.8	2.2
74	3.2	13.0	.3	41.7	6.4	26.6	1.3

* Year ending following April
Dollar figures are in millions

[1] Range for the Year

[2] Capitalization Defined as Total Liabilities – Current Liabilities

[3] Operating Profit/Interest

FIGURE 22-4. CAPITAL ANALYSIS OF NORTH AMERICAN ROYALTIES

23. AUTOMOTIVE SPECIALTIES

Automotive Specialties Manufacturing Company (AUSCO) is an important supplier of malleable auto components to the auto industry. The company feels that automobile downsizing and foreign imports are major threats to its business. As a result, it is attempting to expand into markets besides the auto industry that need volume production of castings. Possibilities include the electrical and rail industries. In addition, the company has recently begun to produce ductile iron castings. This is apparently a response by AUSCO to the major automobile manufacturers' requirements for strong, inexpensive, lightweight materials.

23.1 CORPORATE SIZE AND STRUCTURE

AUSCO is a major supplier of malleable castings to the auto industry.

23.1.1 Revenue and Employment Statistics

Sales in 1979 and 1978 were about $50 million. The company employed about 1,365 people in 1979. (See Table 23-1.)

TABLE 23-1. AUTOMOTIVE SPECIALTIES REVENUES AND EMPLOYMENT

Year	Revenues (Millions)	Profits (Millions)
1979	$50.0	N.A.
1978	$50.0	N.A.
Average Number of Employees: 1,365 (1979)		

23.1.2 Corporate Organization

AUSCO is a closely held company. As shown in Figure 23-1, the company is organized into three divisions. The Casting Division makes malleable and ductile iron castings and has been producing malleable iron castings for the auto industry for over 70 years. The AUSCO Brake Division is a major source of brakes, clutches, and brake valves for all types of off-road vehicles. The Jack Division is one of the largest suppliers of original equipment jacks to auto and truck manufacturers. This division manufactures a complete line of lifting equipment.

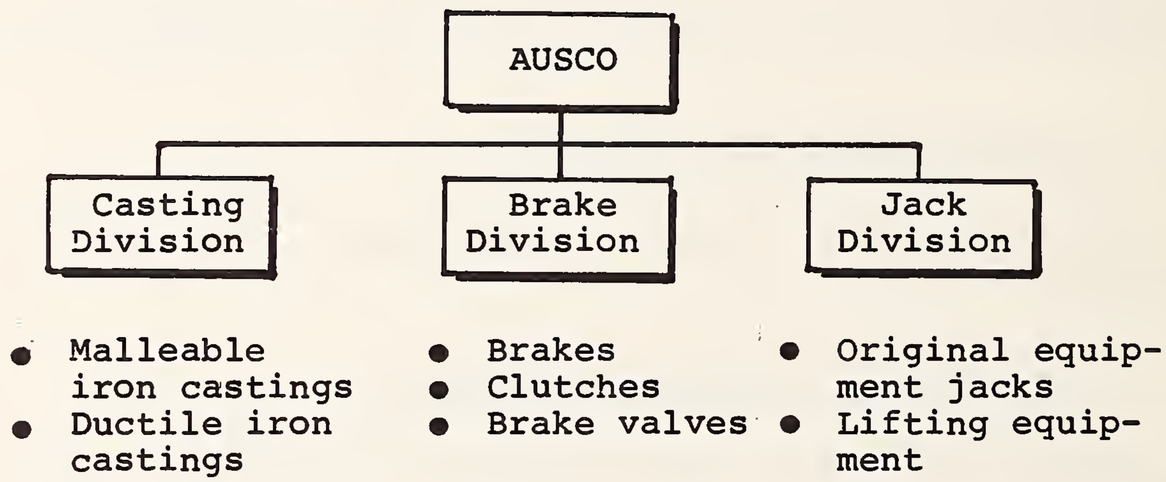

FIGURE 23-1. AUSCO CORPORATE ORGANIZATION

23.2 MAJOR MARKETS AND PRODUCTS

Figure 23-2 presents a summary of the major market information for AUSCO.

23.2.1 Major Markets

The major markets for AUSCO are automobile, truck, farm equipment, aircraft, and machinery manufacturers. Virtually all casting sales are to the automotive, truck, and off-road vehicle industries. Key customers in the automotive industries are:

- Chrysler (differential carriers and cases)
- American Motors
- Eaton (truck parts)
- Rockwell
- Warner Gear (cases and yokes)
- Ross Gear (cases and yokes)
- Kelsey-Hayes (brake components)
- Budd
- Dana.

MARKET DATA

Major markets:	Farm equipment, automobiles, trucks, aircraft, machinery
Percent of sales to the automotive industry:	Virtually 100 percent (including light truck and off-highway vehicles)
Supplies to:	Chrysler, AMC, Eaton, Rockwell, Warner Gear, Ross Gear, Kelsey-Hayes, Budd, Dana
Major automotive products:	Differential carriers and cases, brake calipers, yokes, power steering parts

FIGURE 23-2. AUTOMOTIVE SPECIALTIES MARKET DATA

23.2.2 Major Automotive Products

Major automotive products include differential carriers and cases, brake calipers, yokes and power steering parts. The company is mainly a malleable iron foundry, but recently has begun to make ductile iron products.

Sales Strategy

AUSCO has advertised itself as a dependable, punctual source for quality iron castings in quantity. Quality assurance programs are emphasized and termed the most extensive in the industry. The company also emphasizes its high production, automation, and material handling techniques.

Recently AUSCO has been advertising that it is now in the position to provide alternative castings types (malleable or ductile). This allows the company to evaluate for each job which type of casting is best suited to a particular application.

New Products

AUSCO is developing new products for markets outside the auto industry such as the rail or electrical industries. In addition, the company has begun to make malleable iron castings.

23.2.3 Key Issues Facing AUSCO's Market Position

AUSCO currently sees two areas as potentially threatening their present market position. These are:

- The trend toward smaller cars
- The import market.

Effect of Auto Downsizing on Markets

AUSCO sees automobile downsizing as a significant threat to its markets. The company was, until recently, only a malleable iron foundry, and the growth in malleable iron is viewed as particularly slow. Ductile iron is in some respects a cheaper, lighter material than malleable iron. Last year AUSCO added the capability to produce ductile iron at its Riverside Plant. This move is hoped to counter the weakening malleable market. However, this leaves AUSCO entering a new, competitive market at the same time cars are being downsized. It is felt there is significant threat that industry over-capacity will hurt independent suppliers as the large captive foundries do a larger percentage of work in house.

Threat of Imports

AUSCO also sees a significant threat from imports, particularly from Hitachi in Japan. The importers are able to underprice products with good quality merchandise. Possible reasons cited for this situation include large costs for U.S. foundries due to pollution controls and other government requirements, high energy costs, and high labor costs.

23.2.4 Marketing Stragey

AUSCO has two important strategies to combat its declining market. These are:

- To pursue new markets outside the auto industry
- To provide ductile iron production.

Pursue New Markets Outside the Auto Industry

While the auto market may be declining, other markets are still strong. Product sales to these markets would be more secure. AUSCO is looking for customers who want volume production. Potential markets for AUSCO castings could be the rail or electrical industries.

Promote Ductile Iron Production

According to AUSCO, ductile iron is in many ways a one-for-one substitute for malleable iron. Thus, with major auto manufacturers such as Ford and General Motors switching to ductile iron for some of their parts, AUSCO felt it had to establish a capability in this area. The company now emphasizes its ability to choose the right iron for customers' casting requirement.

23.3 PRODUCTION AND OPERATIONS

AUSCO has plants in St. Joseph, Michigan; Hartford, Michigan; Benton Harbor, Michigan; Baberton, Ohio; and Stockton, California. Facilities that cast products for automobiles and light trucks are at St. Joseph and Benton Harbor.

23.3.1 Major Automotive Facilities

Information on the St. Joseph and Benton Harbor plants is presented in Figures 23-3 and -4.

St. Joseph Plant

The St. Joseph plant is a 40,000-ton malleable iron foundry with over 70 percent of its output going to passenger automobiles. The plant employs from 550 to 600 hourly workers and produces differential carriers, differential cases, brake calipers, yokes, and power steering parts.

Riverside Plant (Benton Harbor)

The Riverside Plant in Benton Harbor, Michigan, makes differential carriers and cases for light trucks. The plant's capacity is from 22 to 25 thousand tons per year, and it employs 350 hourly workers.

23.4 FINANCIAL STATUS

No publicly available financial data presently exists on AUSCO. It was, however, learned that earnings for the casting division in 1979, as in 1978, were reportedly under 3 percent of sales. This would indicate that the softness of the malleable market is hurting the casting division's profit margins.

Company Automotive Specialties **County** ______ **Plant Size** 400,000 square feet

Plant St. Joseph **Congressional District** ______

Address 643 Graves Drive, St. Joseph, MI 49085 **Standard Metropolitan Statistical Area** ______ **No. of Employees** 550-600 hourly; 200 salary shared with Riverside

Telephone (616) 982-2200 **Primary SIC Code(s)** ______

Products (Automotive)	Capacity	Processes Used	Consumed by (Automotive)
Differential Carriers Differential Cases Brake Calipers Yokes Power Steering Parts	40,000 tons/year	Malleable Iron Shell Coremaking Shell Coremaking Cope and Drag Lines Sand Casting	70% Auto Industry 30% Light truck, rail, captive use Kelsey-Hayes (Brake parts) Ross Gear Warner Gear Others

FIGURE 23-3. ST. JOSEPH PLANT

Company Automotive Specialties

County

Plant Size 215,000 square feet

Plant Riverside

Congressional District

Address Riverside Road
Benton Harbor, MI

Standard Metropolitan Statistical Area

No. of Employees 350 hourly
200 salary shared with St. Joseph

Telephone 982-2525

Primary SIC Code(s)

Products (Automotive)	Capacity	Processes Used	Consumed by (Automotive)
Truck Differential Carriers and Cases	22-25,000 tons/ year	Malleable Iron Ductile Iron Sand Casting	80 percent light truck industry 15 percent large trucks

FIGURE 23-4. RIVERSIDE PLANT

24. COLUMBUS FOUNDRIES INCORPORATED

Columbus Foundries, Inc., is much smaller than Hayes-Albion or Lynchburg Foundry, but is nevertheless a major producer of ductile iron castings for the auto industry. This company started in 1971 and has been constantly expanding to serve the growing ductile iron market. The company hopes to maintain its growth even with auto downsizing by obtaining contracts for castings on the new smaller cars that will become the dominant vehicles in the 80's.

24.1 CORPORATE SIZE AND STRUCTURE

Columbus Foundries is a relatively new corporation started in 1971 and is now one of the largest ductile iron foundries in the country. The company acquired a 4-year-old, 100,000 square foot foundry in 1971 and has increased production capacity by 500 percent since that time.

24.1.1 Revenue and Employment Statistics

Sales in 1979 were approximately $39 million, up from about $33 million in 1978. The company employed about 1,000 people in 1979. (See Table 24-1.)

TABLE 24-1. COLUMBUS FOUNDRIES REVENUES AND EMPLOYMENT

Year	Revenues (Millions)	Profits (Millions)
1979	$39.0	N.A.
1978	$33.0	N.A.
Average Number of Employees: 1,000 (1979)		

24.1.2 Corporate Organization

Columbus' entire operation is at one location in Columbus, Georgia. The location includes two foundries and an administrative building. The company is privately held.

24.2 MAJOR MARKETS AND PRODUCTS

Figure 24-1 presents a summary of the major market information for Columbus Foundries.

24.2.1 Major Markets

The foundry supplies castings to the following markets: construction equipment, materials handling, heavy truck, automotive, agricultural equipment, power transmission and utilities. Approximately 50-55 percent of sales go to the auto industry. Major customers are Dana, Chrysler, Bendix, and Simpson which account for 38 percent of sales. Altogether, the company serves about 40-50 customers.

MARKET DATA

Major markets:	Construction equipment, materials handling, heavy truck, automotive, agricultural equipment, power transmission.
Percent of sales to the auto industry:	50-55 percent
Supplies to:	Dana, Chrysler, Bendix, Simpson, Chevrolet, Alfred Teves, Ford, General Motors.
Major automotive products:	Steering gear knuckles, disc brake components, steering gear housings, shifter forks.

FIGURE 24-1. COLUMBUS FOUNDRIES MARKET DATA

24.2.2 Major Automotive Products

Major products are disc brake caliper housings, spring hangers, and steering gear housings. Only ductile iron castings are made.

Sales Strategy

Columbus promotes it products by advertising the company's quality and service. The company claims that since it pours only ductile iron castings, more consistent quality control is attainable than when pouring several types of iron in the same foundry. The company emphasizes that its rigid quality control and recordkeeping procedures have allowed it to become an approved source by most of the major users of ductile iron in America.

Columbus boasts a response time unparalleled in the foundry industry.

New Products

New products presently being produced by Columbus include transmission shifter forks for GM X-body cars.

Marketing Strategy

Columbus seeks continued growth in the ductile iron market and promises to continue to grow with its customers. In order to maintain sales to the auto industry, the company is aggressively bidding on castings for cars that are perceived to be strong competitors in the 80's. The company recently started producing parts for the Ford Fairmont series and the GM X-body cars.

24.3 PRODUCTION AND OPERATIONS

Columbus operates two adjacent foundry facilities situated on 20 acres in an industrial park in Columbus, Georgia. A schematic layout and other information on the plants is given in Figures 24-2 and -3, respectively.

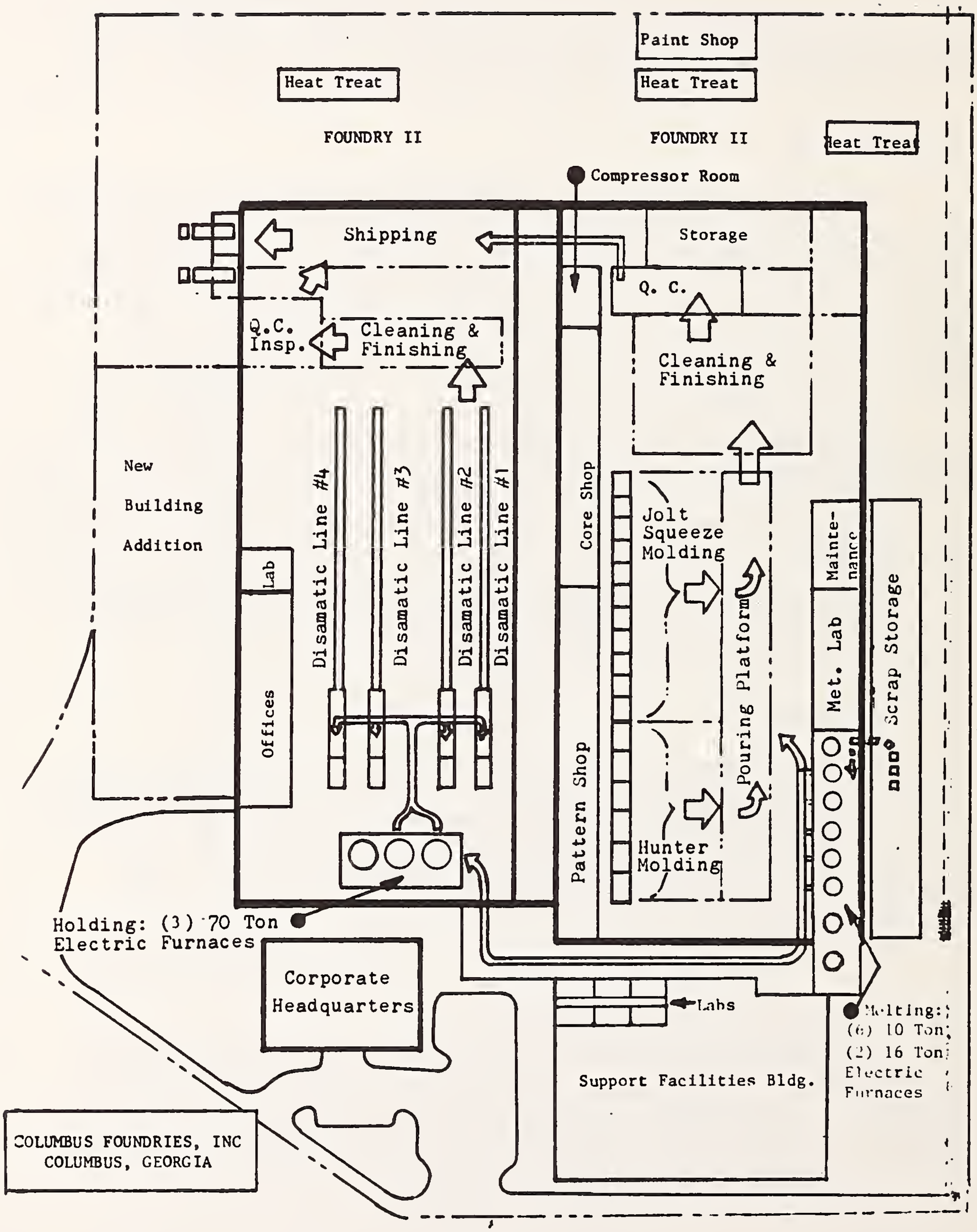

FIGURE 24-2. COLUMBUS FOUNDRIES PLANT LAYOUT

Company Columbus Foundries County ______ Plant Size 260,000 Square Feet

Plant Columbus (2) Congressional District ______

Address 1600 Northside
Industrial Blvd.
P.O. Box 4201
Columbus, GA 31904

Standard Metropolitan Statistical Area ______

No. of Employees 1,000

Telephone (404) 323-5221 Primary SIC Code(s) ______

Products (Automotive)	Capacity	Processes Used	Consumed by (Automotive)
Steering gear knuckles	N.C.A.	All ductile iron	N.C.A.

FIGURE 24-3. COLUMBUS FOUNDRIES PLANT DATA

24.3.1 Major Automotive Facilities

Both of the Columbus Foundries serve the automotive industry. Foundry I contains six Hunter molding machines and seven International jolt-squeeze machines. Foundry II has four Disamatic automatic molding lines. The capacity of Foundry I is 25,000 tons per year and Foundry II has the same capacity (currently).

The foundries combined employ 1,000 people. Twelve percent of the output (by sales value) is steering knuckles for Dana Corporation. Ten percent of the output consists of brake components for Chrysler and 9 percent is brake components for Bendix.

24.3.2 New Plants and Expansions

The company completed in 1979 a major expansion of facilities. A new Disamatic foundry (shown as Foundry II in Figure 24-3) was completed at the end of 1977. At that time two Disamatic molding machines, each with a 12,000 tons/year capacity were installed. This brought the total capacity of the Columbus Foundries to its current 50,000 tons/year. By late 1979, two more Disamatic lines were installed, bringing total capacity up to 70,000 tons/year (two-shift capacity).

Columbus also completed during 1979 a new three-story, 45,000 square foot building that will house the pattern shop, layout, engineering, six laboratories, maintenance spare parts, and vehicle maintenance and personnel facilities.

24.4 RESEARCH AND DEVELOPMENT

Columbus likes to work with manufacturers during the initial stages of component development. Without making a commitment to purchase castings from any specific foundry, the major auto manufacturers at times ask independent foundries to aid in the development of new castings. Columbus is working on a new brake program and did earlier work for the Citation. This type of work allows the company to gain the experience on a product and allows it to be a strong contender when the manufacturer asks for quotes on mass producing the part.

24.5 LABOR RELATIONS

Columbus Foundry's hourly employees are represented by the United Steelworkers of America. The former contract expired in September, 1980, and a new three-year agreement was negotiated. Since the company started in 1971, it has never experienced a labor-related work interruption.

24.6 FINANCIAL STATUS

Columbus is a privately held company and no financial data is available.

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