Queen's University School of Business

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Automotive Plastics Ltd.
Belleville Division (A)

Introduction

Sitting at his desk late Friday evening, Bill Brent reflected on his first week as general manager of Automotive Plastics' Belleville plant. Just that morning there had been an angry telephone call from the company's largest customer, complaining that the door panels for that night's production run had not been received. Brent had spent the rest of the day arranging for an emergency replacement shipment.

Brent had left his position as general manager at Automotive Plastics' top performing plant in London to join the Belleville operation, accepting the challenge of turning the largest and poorest performing plant into a profitable operation within 12 months. He recognized that if his efforts were not successful, the plant would be shut down. But as his eye caught the pile of grievances and safety infractions on his desk, he recalled the many production problems encountered during the past week. Was a turnaround possible at all, let alone within one year? Where would he start?

Automotive Plastics

Automotive Plastics was formed in 1983 by Tony Whaler, who purchased a small plastic processing plant in Ann Arbor, Michigan, to provide injected molded parts to the automotive industry. Whaler recognized the opportunities presented by the growing trend towards outsourcing in the North American automotive industry, and was determined to take advantage of them. Through an aggressive strategy of acquisitions, and product and market development, Automotive Plastics grew from a small firm with two plants and sales of $14.8 million in 1983, to a large firm of 11 plastic processing plants, six automotive electrical plants, and total 1989 sales of $144 million (see Exhibit 1).

Despite impressive sales growth, Automotive Plastics' operating income had decreased from a profit of $1.7 million in 1988 to a net loss of $33.9 million in 1989. Rapid expansion had saddled the firm with a total debt load of almost $100 million, and taken it away from its core business. In light of this, Automotive Plastics restructured its debt and focused on supplying plastic-based components and component assemblies to the automotive industry, at the same time cutting back to six plants. The Belleville, London, and Ann Arbor plants focused on large tonnage injection molding, Toronto on small tonnage, and Grand Rapids and Lansing on padded products (see Exhibit 2).

This case was prepared by Queen's University School of Business students David Carey, Frank Goldschleger, Ed Murray, and Paige Wilson, for Professor John R.M. Gordon in fulfillment of course requirements. Preparation for publication by James Chisholm and Joe Wiseman. This case is intended as a basis for discussion rather than to illustrate either effective or ineffective handling of an adminstrative situation. Funding for this work was provided by Project Minerva Canada.

Automotive Plastics used a variety of processes to make parts for vehicle interiors, ranging from simple injection-molded parts such as interior trim, to complex component assemblies such as complete instrument panels and door panels. The company competed on quality, price, technical expertise, on-time delivery, and reputation.

The Plastics Industry

i) Resin Production

The plastics industry was divided into two segments: resin production and plastic processing. The Canadian resin production segment was highly-concentrated and dominated by a few multinational corporations. Fifteen companies, 12 of which were subsidiaries of multinationals, supplied almost all the resin requirements of plastic processors in Canada. These large corporations had the financial resources to invest in research and development to develop new polymers and polymer applications, and they provided extensive technical support to plastic processors. The geographic concentration of both resin production and plastic processing in Ontario and Quebec facilitated this technology transfer.

ii) Plastic Processing

The market for plastic products was diverse and the products highly-customized. The industry was characterized by small, entrepreneurial companies, and processors specialized in either custom-molded or proprietary products, with custom molding operations accounting for 90 per cent of firms. Most plastic processors focused production on a particular industry due to market fragmentation and buyer pressure (see Exhibit 3). There were approximately 2,550 plastic processors and, although the vast majority were small, larger companies were becoming more prevalent (see Exhibit 4).

Strong growth in the plastic processing industry throughout the 1980's had led to a shortage of trained personnel, and by 1989, the industry vacancy rate for process engineers was 22.7 per cent, for mold and die technicians 10.3 per cent, and for skilled personnel in general 7.3 per cent. This situation was compounded by a shortage of experienced managers.

Prior to the free trade agreement, the plastic industry had enjoyed high return on investment rates and net profits (see Exhibit 5). This was partly due to a 13.5 per cent protective duty imposed on imports into Canada, scheduled for removal over a 10-year period beginning in 1989. For the sector of the plastic industry that serviced automobile manufacturers, the 1965 Canada-United States Auto Pact had eliminated all tariffs on plastic parts crossing the border and resulted in a tenfold increase in the potential market for Canadian automotive plastic parts, due to the relatively larger number of cars produced in the US as compared to Canada.

Plastic processors depended on many small tool and die shops to custom manufacture the steel molds or tools used in the injection molding process. The molds, which cost as much as $500,000 and took up to six months to make, were designed and produced to customer specifications. After the tools were delivered, an additional 30 to 60 days were usually required to fine tune the production process so that the molded plastic parts met the customer's quality standards. Once this was achieved, the customer would pay for the tool costs, usually on terms of 120 days net. However, the plastic processor usually had to pay for the tool long before this point, since most tool makers required progress payments.

While the plastic processing industry had excellent working relationships with its suppliers, it had a much less cooperative relationship with automobile manufacturers. As Jack Strong, director of purchasing at Automotive Plastics said, "In the automotive industry, the buyer is powerful beyond reason".

iii) The Automotive Industry

The automotive manufacturers owned the majority of the tools in the processor's plant, and if dissatisfied with a processor, could remove the tools from the plant without warning and shift their business to another supplier. The three main criteria used by automobile manufacturers when evaluating potential plastic suppliers were quality, price, and on-time delivery.

With the automotive industry moving to just-in-time, what was loaded onto a truck in the morning was often installed in a vehicle that afternoon. Parts producers were given a one-hour window in which to deliver parts to the receiving dock at the assembly plant. If a late or incorrect delivery resulted in an assembly line shutdown, the parts producer was liable for costs incurred. The automobile manufacturer paid for the parts when they left the factory, but the producer was responsible for the parts until delivered to the factory. Even if a transport truck were in an accident, the parts producer was still expected to meet delivery deadlines.

The close coordination needed for just-in-time was achieved through electronic communication. A plant received weekly schedules showing delivery requirements for the next 12 weeks, and used them for raw materials purchase and production scheduling. Everyday, "ship" schedules were received which showed requirements for five days and the shipment required for that day. Although the five-day schedule was fixed, it could vary due to assembly plant problems and was updated daily.

The automotive industry required *open book bidding** from plastic processors and demanded that price reductions be written into every long-term contract. While these contracts

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* When an plastic parts supplier wins a contract from an automotive manufacturer under an *open book bidding* process, the automotive company gains the rights to look at the accounting books of the supplier. The automotive company can, for example, examine the purchasing or wage rate components of the plastic processor's operation, ensuring profit margins on contracts are "reasonable".

provided security for processors, price reductions forced them to focus on costs. It was essential that a producer honour all contracts, since its reputation was on the line. If it defaulted on a contract and left the automobile company scrambling, it was unlikely to get another contract.

The use of plastics in the automotive industry was growing, with additional applications expected in exterior body panels, "under the hood" applications, and in the contracting out of complete car interior assembly.

Automotive Plastics' Belleville Operation

The Belleville division of Automotive Plastics consisted of a 200,000 square foot facility which produced injected-molded and compression-molded plastic parts for the automotive industry. The plant had initially been part of the Brockville Corporation and, despite sustaining operating losses for 11 successive years, had been kept running to honour its contracts. In 1985, Automotive Plastics purchased the plant for $34 million and, for the first two years, the Belleville operation was profitable. From 1988 to 1991, however, due to retrenchment in the auto industry, decreased demand for new vehicles, and radical changes in customers' expectations and business practices, the plant's inherent challenges and problems came to the forefront, resulting in operating results at or below the break-even point. As a small part of the Brockville Corporation's multinational portfolio, these results would not have been viewed as a major concern. Now, however, as the largest of six plastics plants owned by a relatively small plastic component manufacturer, the plant's financial performance was a major concern.

Plant and Process Description

Automotive Plastics' Belleville plant had 28 injection molding presses and three compression presses for molding plastics. The injection molding presses were for thermoplastics, while the compression presses were for thermosetting plastics. Thermoplastics were used for coloured plastic products such as interior trim panels, while thermosetting plastics were used for products that required superior strength and heat resistance, such as engine covers.

The injection molding presses had clamping capacities ranging from 150 to 2700 tons. The pressure rating of a press was directly related to the size and complexity of the parts that the press produced. The plastic resin was shipped as small pellets, and was either vacuumed from 1000-pound capacity shipping boxes or discharged from a silo into a main hopper, which then discharged by gravity into dedicated hoppers and screw feeders for each of the 28 presses. Coloured parts were produced using a pre-coloured plastic resin, or by blending a natural clear resin with a coloured concentrate to produce the desired colour. The latter method was preferred for cost reasons. When coloured concentrates were used, they were added directly to the feed end of each screw feeder by a highly accurate volumetric addition system. As the plastic concentrate moved through the screw feeder, it was heated above its melting point using a precise temperature control system. The resulting "shot", ranging in size from two to nine pounds depending on the part, was then injected into the water-cooled steel mold or "tool" that was used to define the final product shape. After about 30 seconds when the part had cooled sufficiently, the halves of the tool were separated and the new plastic part removed. The operator performed a visual inspection for surface blemishes, finish, uneven colour, and streaking, and accepted or rejected the part (see Exhibit 6).

The heart of the injection molding press was the tool. Depending on the type of part being made, tools ranged in size from two to eight feet long, and weighed as much as 50,000 pounds. Each part had a dedicated tool, and in order to minimize parts inventory, each tool was changed once every four or five days. A tool change took between four and 16 hours, depending on its size and the location of the press. An automatic tool changer was being considered in order to reduce time required.

From an operator's standpoint, two types of product were produced: "shoot-and-ship" products and value added products, which required additions prior to packaging. The shoot-and-ship products were produced using presses manned by one operator solely responsible for injection, quality inspection, and packing. If quality were acceptable, the operator used a utility knife to trim any extra plastic attached to the part and then packaged it. In the case of value added products, a work cell arrangement was used. Once trimming was complete, the press operator passed the part to another member of the work cell responsible for additional detailing, such as gluing on sound absorbing cloth or attaching mounting clips, and packaging the part.

Thermosetting plastics were formed into final products in the compression presses, which ranged from 750 to 1500 ton capacity. Raw materials were received as rolls of plastic cloth which were first cut into pieces of appropriate size for molding. The operator folded the cloth in a specific configuration before placing the material into the press. Pressure and heat were then applied with a large ram and, after 90 seconds, the hard plastic part was removed. It was then placed on an overhead conveyor system and painted. After drying, parts were placed on a rack that held approximately one days' worth of inventory.

Products

Products produced at the Belleville plant included door panels, large interior trim panels, fender liners, engine covers, and exterior bumpers (see Exhibit 7). Each was produced in a variety of colours to match the automobile interiors offered by Automotive Plastics' customers. In 1991, an average of 850,000 parts were produced monthly.

At any given time, the plant could be producing up to 125 different parts in as many as five colours. In order to meet customers' requirements and minimize inventory, it was necessary to make an average of six colour changes per shift. The press operator accomplished this by either changing to a new resin of the desired colour or by emptying the feed hopper if pre-coloured plastic concentrate were used. Once the raw material was changed, the operator opened up the tool, allowing the hot plastic inside the screw feeder to flow onto the floor. After about five minutes, the new colour had moved through the screw feeder, a "pure" colour was achieved, and the production of acceptable quality parts resumed. The pile of hardened plastic remaining on the floor, called a "toadstool", had size and physical characteristics that made recycling difficult and in some cases caused the plastic regrinder to fail. If the "toadstools" of plastic were too large for the grinder, they were shipped to the dump. A larger regrinding unit, capable of handling all the plastic "toadstools", was being considered to improve the level of internal plastic recycling.

Current Situation

i) Quality

Quality was the critical success factor for companies supplying the automotive industry, with an emphasis on dimensional conformity and physical appearance. Items had to be dimensionally accurate, a challenge when working with plastics which shrank as they cooled, and depended on chemical composition, shape and size. The surface had to be free of blemishes, such as a visible line where two streams of plastic had met in the mold, or shiny spots resulting from incorrect temperature gradients. Colour was equally important since products had to match exactly with those from other manufacturers. As there were hundreds of different colours, this was a critical part of the manufacturing process with no room for error.

Deciding whether a part conformed to quality standards was based on visual observation (see Exhibit 8). If the quality of the part fell below standard, the operator threw it into a scrap bin and called the foreman immediately so the machine could be adjusted. In some cases, employees were unable to keep up with the machine's production rate, particularly on graveyard shifts when fatigue affected performance. During 1991, the plant averaged seven per cent scrap on injection molded parts and five per cent on compression molded parts.

For thermoplastics, some of the scrap was remelted and used again to make black parts such as bumpers. Because the thermosetting plastics were the result of an irreversible chemical process, they could not be recycled. Approximately 11 pounds of plastic at 74¢ per pound were used for each of the 150,000 engine covers produced annually. Another pervasive and growing form of scrap was the packaging material that suppliers used to protect parts used for assembly. It seemed to Brent that this material was everywhere at the Belleville plant, even though the practice was to send it to the dump. At $140 per ton, dumping costs were starting to add up, and were more than $100,000 in 1991.

ii) Health and Safety

Having noticed the untidiness of the production area and a large number of hazards, Brent inquired about the plant's safety record. He was advised that safety conditions were so bad that the plant was on the verge of being subjected to an additional Workers' Compensation Board (WCB)

Assessment. Since it was one of the worst in its WCB Rate Group, it was assessed a premium of more than $300,000 in addition to the basic rate assessment of $350,000. An example of the conditions was the maximum interval without a Lost Time Accident during the past year - only 14 days, far worse than the industry standard (see Exhibit 9).

The more time Brent spent investigating the situation, the more alarmed he became. A joint Health and Safety Committee, comprised of six union members and six salaried employees, including the union president and plant operations manager, had been formed in compliance with the Ontario Health and Safety Act. The purpose of the committee was to, "Assist in creating and recommending actions which will improve the effectiveness of the Health and Safety program, and promote compliance with regulations." Despite this mandate, committee meetings were chaotic and had degenerated into a forum for shouting and accusations. Members of the committee would actually not report hazards so they would have something to complain about at the next meeting. The committee was confrontational to the point that progress was paralyzed and hazards were not being fixed. Highlighting this inability to report and address potential safety problems quickly and reliably, Brent discovered two hazards, previously designated as "URGENT", which hadn't been resolved for over a year.

There were also concerns about the quality of employee safety training. When employees received WHMIS (Workplace Hazardous Materials Identification System) training, they gathered at an off-site location and were given an eight-hour lecture by someone relatively unfamiliar with specific hazards at the plant. Although this was a positive first step, it was generally felt that a higher level of training was required. While there was a substantial safety training budget, there was no program for individual safety training, since the resources had been expended on training for the former health and safety coordinator, whose first priority had been to write a safety manual for the plant.

A record of all injuries was available in a book in which accidents were logged when they occurred. However, employees sometimes entered injuries as much as two weeks after the occurrence, and there was no analysis of accidents aimed at eliminating the source hazards, nor any systematic program for improving working conditions at the plant. Processes at the plant involved the use of hazardous materials. However, there was no formalized system of tracking these materials, even though it was known that an accumulation of leftover hazardous chemicals existed at the back of the building. Overall, as one long-time employee described it, the attitude toward health and safety in the plant was that "accidents are going to happen".

iii) Employee Relations

Absenteeism was about four per cent, much higher than Brent had experienced at the London plant. One manager told him it was not unusual for half the workers to miss an unpopular weekend shift. The management/union relationship could at best be described as cold, and at worst hostile. As Kevin Lacey, United Steel Worker's local union president recalled:

There was resentment towards the salaried employees. They had their privileged parking spots, fancy parties, and they didn't seem to care about the quality of the work. There was no communication between the shop floor and management, and no respect for the individual. We tried to suggest changes that would make the plant better but we were ignored. Finally we stopped cooperating. There was one day when one of the die setup people failed to come to work. No one would volunteer to fill in for him so a whole shift on some machines was lost. Another time there was almost a wildcat walkout on an afternoon shift when a management person was put in a union job. We finally demanded to meet with Mr. Whaler. Shortly after the meeting the plant manager was fired, the personnel manager left and Bill arrived.

Conclusions

Brent had several decisions to make. The plant had lost money during 1991, yet it was operating at full capacity, seven days a week. The previous manager had recommended purchasing a new press for $1 million to cut down on overtime and to provide extra capacity to allow for new products. There were other capital projects as well. Automatic die changers could be added at a cost of $250,000 each, and a larger grinder capable of handling all of the "toadstools" could be purchased and installed for $150,000.

Brent wondered how to make expenditures on new equipment, modify processes, and focus attention on people all at once. He knew something had to be done about health and safety, as well as about the pile of grievances left over from the previous management. Of course, the ultimate goal was still to produce a profit. Where would he begin?

Exhibit 1a

INCOME STATEMENT
Automotive Plastics Ltd. (*all plants*)
Years Ended December 31
($000s)

	1991	1990	1989	1988	1987	1986
Net Sales	85,951	96,739	143,869	95,317	46,513	41,256
Cost of Goods Sold	73,955	86,254	135,829	80,688	38,526	33,438
Gross Profit	11,996	10,485	8,040	14,629	7,987	7,818
Sales and G&A expenses	8,141	10,385	13,331	8,514	4,157	3,644
Amortization of intangibles	120	121	275	151		
Nonrecurring Operating Expenses	4,033	12,522	14,113			
Operating Income (Loss)	(298)	(12,543)	(19,679)	5,964	3,830	4,174
Other expense, net	(11,023)	(12,682)	(14,201)	(4,289)	(1,323)	(1,594)
Income (loss) from continuing ops.	(11,321)	(25,225)	(33,880)	1,675	2,507	2,580
Income tax provision	1,594	50	(5,061)	1,199	891	1,125
	(12,915)	(25,275)	(28,819)	476	1,616	1,455
Equity in losses of subsidiary				(2,291)	1,358	
Income (loss) from discontinued ops.		(19,455)	(283)	3,163	7,680	5,034
Extraordinary gain						
Net Income (Loss)	**(16,815)**	**(44,730)**	**(29,102)**	**1,348**	**10,654**	**6,489**

Exhibit 1b

CONSOLIDATED BALANCE SHEET
Automotive Plastics Ltd. (*all plants*)
Years Ended December 31
($000s)

	1991	1990	1989	1988	1987	1986
ASSETS						
Current Assets						
Cash and cash equivalents	4,099	3,313	5,950	3,071	1,401	1,185
Accounts receivable	10,789	7,785	24,295	27,844	15,709	8,051
Inventories	6,660	6,960	26,625	26,864	16,868	13,784
Other	3,876	18,015	7,271	7,596	1,806	1,457
Total Current Assets	25,424	36,073	64,141	65,375	35,784	24,477
Net property, plant and equipment	29,472	32,013	51,360	44,015	18,489	10,171
Notes rec, from principal shareholders	1,735	1,026	1,042	843	993	150
Goodwill and other intangibles	3,100	3,236	13,900	14,604	7,994	5,823
Net noncurrent assets of discontinued ops.	419	6,038	291	1,134	2,256	1,339
Total Non current Assets	34,726	42,313	66,593	60,596	29,732	17,483
Total Assets	**60,150**	**78,386**	**130,734**	**125,971**	**65,516**	**41,960**
LIABILITIES & SHAREHOLDERS' DEFICIT						
Current Liabilities						
Notes Payable			94,570	2,682		13,555
Current installments of LT debt obligation	201	532	728	846	298	1,785
Accounts payable, trade	14,150	20,081	26,698	17,678	8,226	6,308
Income taxes	562				1,419	465
Accrued salaries and wages	1,543	1,762	2,184	2,074	1,634	1,273
Accrued workers' compensation	1,814					
Accrual for loss on sale of discontinued ops.	2,126	3,509	2,337		163	1,074
Accrued Interest		8,443	6,193	1,625		
Dividend Declared				17,257		
Other accrued expenses	3,085	4,945	6,464	6,618	2,071	1,844
Total current liabilites	23,481	39,272	139,174	48,780	13,811	26,304
LT debt, excluding current installments	99,205	96,381	4,052	59,999	21,075	16,087
Deferred gain on debt restructure	8,821		-			
Notes payable to principal shareholders			5,000			
Income taxes	1,495	568	568	6,301	3,565	900
Accrued interest	103					
Accrd. pension liability & other long term	1,661			363	982	1,111
	111,285	96,949	9,620	66,663	25,622	18,098
Total Liabilities	134,766	136,221	148,794	115,443	39,433	44,402
Shareholders equity	(74,616)	(57,835)	(18,060)	10,528	26,083	(2,442)
Liabilities and Shareholders equity	60,150	78,386	130,734	125,971	65,516	41,960

Exhibit 2

PLANT STATISTICS
Automotive Plastics Ltd.

			Injection Presses - Tonnage					
DIVISION	Sq. Ft.	Employees	110 - 350	360 - 1000	1010-2000	2010-2700	Total	OTHER
Belleville	200,000	340	6	8	11	3	28	3 Compression Presse
London	76,000	180			2	2	4	Vacuum Forming
Toronto	50,000	220	14	28			42	
Lansing, Mich.	48,400	50					0	Vacuum Forming, Foar
Grand Rapids, Mich.	77,000	250		8			8	Vacuum Forming, RIM
Ann Arbor, Mich.	163,000	100	3	3	2		8	
Totals	**614,400**	**1140**	**23**	**47**	**15**	**5**	**90**	

Belleville Division
Selected Statistics

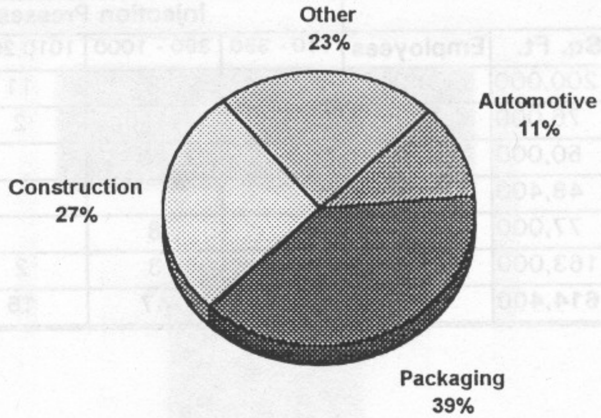
	1989	1990	1991
Sales	$39,000,000	$25,000,000	$24,000,000
Supplies / SDLH *	*not tracked*	*n.t.*	$6
Excess Freight Charges / mth	*n.t.*	*n.t.*	$35,000
Dumping Cost	$85,000	$90,000	$105,000
Active Tools	120	95	100
Parts / Month	*n.t.*	*n.t.*	850,000
Scrap - Injection	7.00%	7.00%	7.00%
Scrap - Compression	5.50%	5.20%	5.00%
Inventory Turns	9.5	8.0	8.2
Productivity**	*n.t.*	*n.t.*	28%

* SDLH: Standard Labour Hour Unit. Includes all hourly staff.

** Productivity is measured as the % of a standard 8 hour day for the entire plant staff which was revenue generating. It is a measure of throughput.

Exhibit 3

CANADIAN MARKET FOR PLASTICS: *1988*



From: International Status Report on Plastics for 1988, International Plastics Association Directors

Exhibit 4

COUNTRY-BY-COUNTRY PLASTICS PROCESSING

Country	No. of Firms	Employees	Sales ($US million)
Brazil	4,500	220,000	n/a
Canada	2,550	98,500	9,593
Japan	18,861	397,200	69,325
United Kingdom	4,000	180,000	14,476
United States	12,800	605,000	60,206

From: International Status Report on Plastics for 1988, International Plastics Association Directors

Exhibit 5

PROFITABILITY - CANADIAN PLASTICS PROCESSORS

	Return on Investment (%)		Net Profit before Taxes (as % of sales)	
Classification	1987	1988	1987	1988
By Ownership				
Custom Processors	14.2%	20.0%	5.6%	6.5%
Proprietary Processors	31.2%	26.0%	10.7%	6.7%
By Size				
Sales < $4 million	28.2%	22.9%	6.5%	7.0%
Sales $4 - 10 million	21.5%	28.4%	7.5%	n/a
Sales > $10 million	18.8%	20.4%	7.9%	7.9%
By Process				
Injection molding	18.3%	24.9%	4.7%	7.0%
Extrusion	18.0%	26.7%	5.6%	5.9%
Film extrusion	-2.9%	18.1%	4.2%	7.1%
Profile extrusion	23.7%	37.8%	4.4%	4.9%
Reinforced products	27.5%	8.6%	13.5%	6.5%
Other	32.0%	23.4%	10.4%	6.0%
Industry Average	21.8%	22.8%	7.5%	6.6%

From: SPI Canada

Exhibit 6

PROCESS FLOWCHART

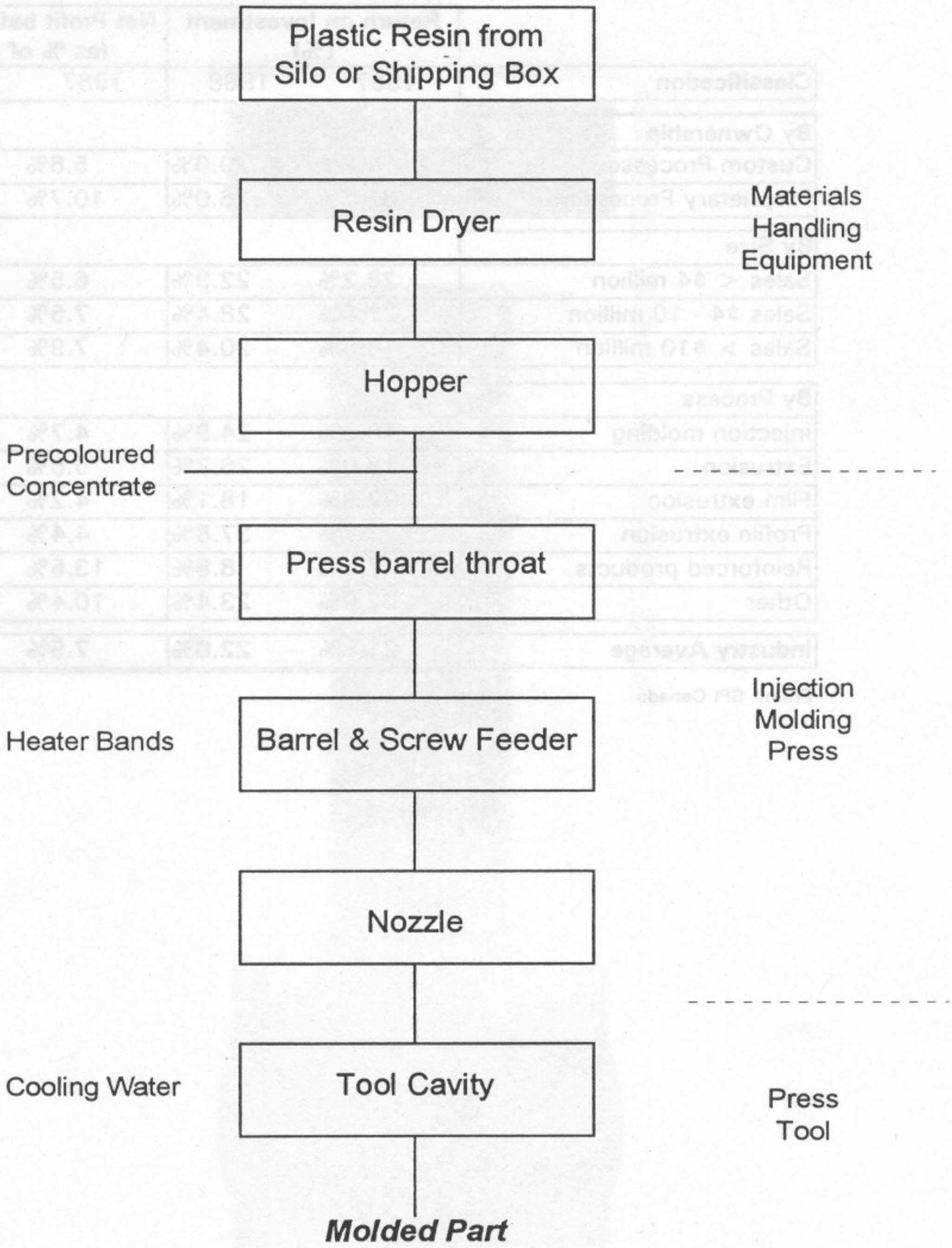


Exhibit 7

1990 SEDAN INTERIOR TRIM

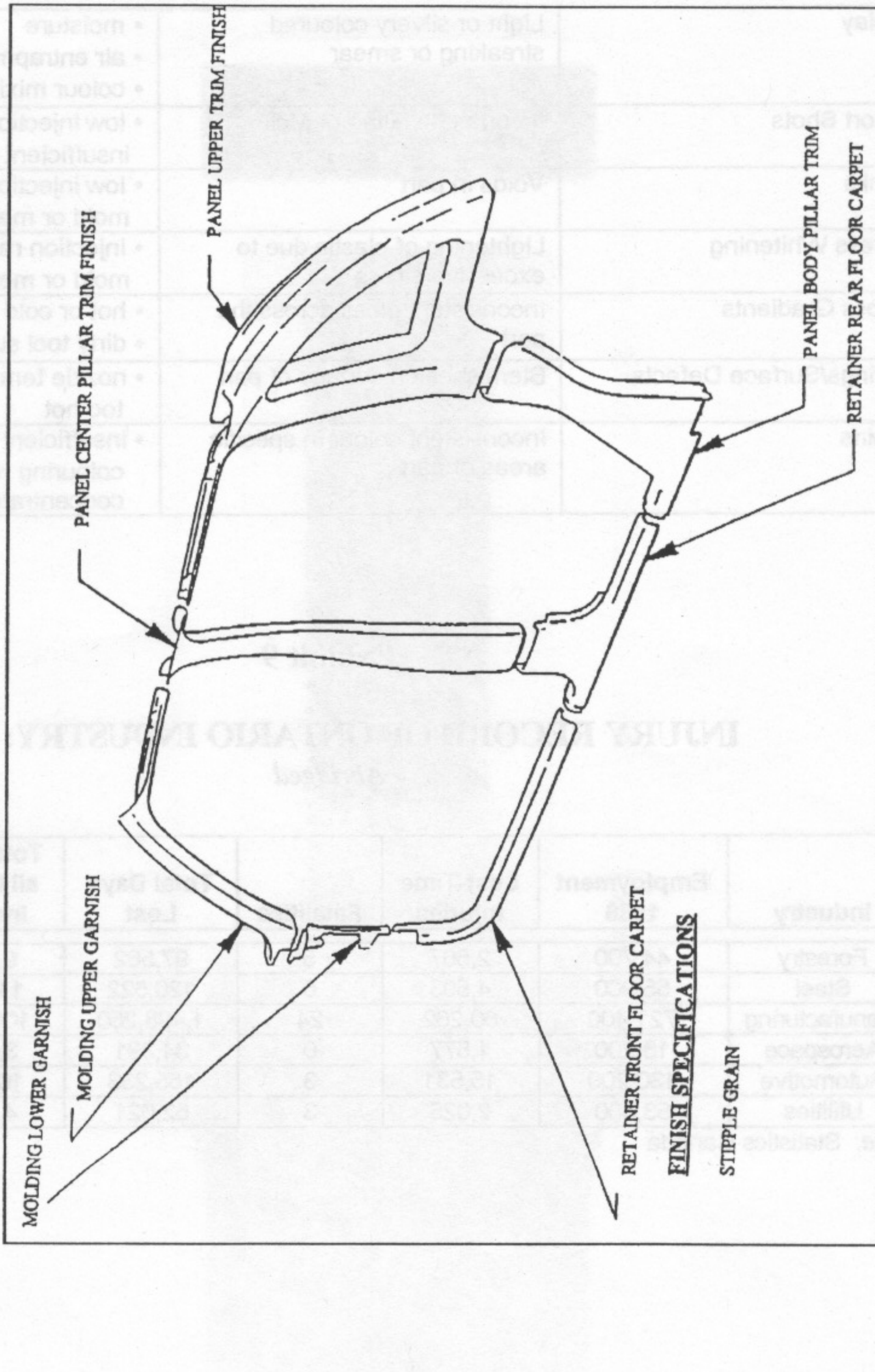


Exhibit 8

QUALITY INSPECTION CRITERIA

CRITERIA	DEFINITION	POSSIBLE CAUSE
Splay	Light or silvery coloured streaking or smear	• moisture • air entrapment • colour mixing
Short Shots	Incomplete filling of Mold	• low injection pressure or insufficient plastic
Sinks	Voids in part	• low injection speed, or low mold or melt temperature
Stress Whitening	Lightening of plastic due to excessive stress	• injection rate or temperature of mold or melt too high
Gloss Gradients	Inconsistent gloss across the part	• hot or cold spots on mold • dirty tool surface
Strings/Surface Defects	Blemishes on surface of part	• nozzle temperature or material too hot
Swirls	Inconsistent colour in specific areas of part	• insufficient distribution of colouring resin in plastic concentrate

Exhibit 9

INJURY RECORD OF ONTARIO INDUSTRY: 1988

Abridged

Industry	Employment 1986	Lost-Time Injuries	Fatalities	Total Days Lost	Total Cost for all Lost Time Incidences	Risk Rank
Forestry	44,700	2,567	5	97,562	9,144,000	1
Steel	55,900	4,593	6	120,522	11,706,500	2
Manufacturing	721,400	60,262	24	1,498,250	108,191,000	3
Aerospace	18,200	1,577	0	34,391	3,024,000	4
Automotive	130,200	15,531	3	155,233	10,427,000	5
Utilities	53,300	2,025	3	52,021	4,882,500	6

Source: Statistics Canada