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for: Industry Canada

**The Economic Importance of Rail Transportation
for Selected Industries in Canada**

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Introduction

I. Introduction

This paper is based on a wider and more detailed body of research that was done at Industry Canada on the subject of rail transportation and related issues, and their importance for certain industry sectors (viz. aluminum, automotive, chemicals, fertilizers, pulp and paper, and steel). The purpose of the work was primarily to assess the dependence of the six subject industries on the rail mode as a means of transporting goods, both inputs and outputs. The results of this research are intended to help transportation policy analysts, researchers and others who are involved in the future of the rail network in Canada. In addition, research is being done on other competitiveness factors affecting the economic performance of these industries. The views expressed in this paper are those of the authors and do not necessarily reflect the views of Industry Canada.

The rail industry in Canada is in the process of major structural change. A variety of influences have necessitated this restructuring and caused the railways to re-examine their niche in the Canadian transportation system. These include new competitive pressures, through which trucking and U.S. railways have become serious competitors with Canadian rail transportation. In order to remain competitive, the major railways have undertaken a number of measures to restructure their operations, including the utilization of advanced technologies and rationalization of the rail network. Rail rationalization could have a significant impact on the manufacturing and processing sectors in Canada and the consequences are likely to vary between companies and industries.

The next section describes some recent trends in the railway sector and the forces of change that are driving railway companies to restructure their operations. Section III explains some of the concerns of shippers - the industries that utilize the services of railway companies to transport inputs into their production processes or to bring their finished goods to market. The methodology and data sources are described in Section IV and a summary of the main findings is presented in Section V. Some conclusions are offered in the final section.



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**Section II -****II. Railway Trends: The Carriers' Perspective**

The railways operating in Canada can be categorized into four types:

Transcontinental railways operate extensive networks across Canada. CN North America and CP Rail System provide a range of freight transportation services and some passenger services. Combined they account for over 90% of the industry's total freight traffic.

Regional, short line and terminal railways operate lines in a specific area of the country. Most are connected to the main lines of the transcontinental railways while others run from a mine or plant directly to a terminal for export by ship. These railways provide freight transportation services and some passenger services.

U.S. railways operate small amounts of track in Canada linking shippers to their extensive networks south of the border.

Passenger railways operate primarily on CN and CP track to provide inter-city passenger, tour and commuter services for passengers.

CP Rail System is an operating division of private-sector Canadian Pacific Limited. It has almost 20,000 kilometres of track in Canada and over 10,000 kilometres of track in the U.S. CN North America is a commercial Crown corporation. It has over 28,000 kilometres of track in Canada and over 3,000 kilometres of track in the U.S. Together, these two railways serve some 25,000 shippers in virtually every sector of the Canadian economy. Resource bulk commodities, much of them concentrated in the west, account for more than half of their workload. Some 40% of Canada's exports, including manufactured goods and resource products, depend on rail transportation.

Canadian railways are under stronger pressure than ever from their main competitors - trucking and U.S. railways.

Trucking's share of the transportation market has grown steadily. On a tonnage basis, trucks account for about 40% of the surface transportation market, compared to 60% for rail. On the basis of revenues (\$), however, trucks comprise 60% of the surface transportation market (versus 40% for rail), because they have captured the major share of goods that move at higher freight rates. Trucks have some natural advantages, such as greater flexibility than rail. They also operate on publicly financed highways and often offer lower prices. It is in the transportation of finished goods, centered in the east, where trucks have made their deepest inroads.

U.S. railways are strong competitors for Canadian freight. For example, some 60 per cent of import/export containers transported between the West Coast and Eastern Canada move via the U.S. port and railroad system.

Moreover, the customers of Canadian rail services are facing intense global competition and they are putting additional pressures on the railways to improve the reliability and cost effectiveness of their services. In response to these pressures, the railway companies in Canada have taken steps to restructure their operations and to improve their long-term profitability. They are investing in new facilities, freight cars and locomotives, and adding new technology that lowers costs and improves services. Many of the new investments are in intermodal rail-truck systems that combine the advantages of long-haul rail movement with local distribution by road.

Two major difficulties for the Canadian railways are their relatively higher cost structure and lower productivity compared to U.S. railways.

High cost structure - The Canadian rail network is heavily underutilized. More than 90% of CN and CP's Canadian tonnage is carried on only 40% of the track. This means that 60% of the track has to be kept maintained in order to carry only one-tenth of total traffic. U.S. railroads have significantly higher track utilization. The Canadian track network has been substantially reduced in recent years to match demand more closely. Some low density branch lines have been transferred to lower cost short line railways or removed from the network all together. Kilometres of road operated were reduced by 13% between 1988 and 1993.

Low productivity - Canadian railway labour costs are substantially above those of the trucking industry and they take up a larger share of revenues than for U.S. railroads. However, railway labour productivity in Canada is improving: total tonnes originated declined by 9% between 1988 and 1993, but the workload was handled by 24% fewer employees. In addition, railway management structures have been pared and organizations have been redesigned from top to bottom.

With extensive mileages of low and medium density track still in their systems, both railways will continue to rationalize their existing networks. Some of this trackage has the potential to be more effectively operated by short line railway companies, if they can operate with lower cost structures. The remainder of this trackage has too little traffic to sustain a short line.

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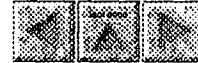


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Section III - Railway Trends: The Shipper's Perspective

III. Railway Trends: The Shippers' Perspective

Most shippers are facing intense competition, both at home and abroad. They are demanding more efficient and lower cost transportation services from the railway companies. Especially in the resource-based sectors, where transportation costs can be as much as 40% of the delivered price of industry output, railways play a major role in determining the competitiveness of these industries.

Shippers' concerns have been focused largely on the need for preserving competition in rail service because competition provides the market discipline necessary to drive rate and service improvements. The National Transportation Act, 1987 (NTA 1987) strengthened competitive provisions for shippers, giving them additional dispute resolution mechanisms and better access to competing railways. They would not want the competitive access provisions to be weakened or negated, i.e. competitive line rates, final offer arbitration, and interswitching. In the shippers' view, these provisions are a necessary counterbalance to confidential contracts.

Most shippers believe that rail rationalization will inevitably result in less physical plant and that this argues for a strengthening of existing competitive provisions; for example, by harmonizing federal and provincial regulatory provisions respecting competitive access, and by facilitating running rights and effective access by short line railways and U.S. railroads to federally regulated Canadian railroads. Most short line railroads would likely come under the jurisdiction of provincial governments and traffic originating on a provincial railway is not subject to NTA 1987. Provincial short lines could not expand their operations to compete with federal railways since running rights and joint track usage are not available to them without the consent of the railway owning the infrastructure. Also, U.S. railroads face significant barriers to entry because compensation for running rights usually includes a fixed contribution to the capital costs of a line, which could be prohibitive.

Some shippers are concerned that an accelerated pace of abandonment of low and medium density lines could have a negative impact on the competitiveness of their business operations. In some cases, intermodal competition with trucking is not a realistic alternative. In other cases, plants are "captive" to rail as a result of geography or due to the volume of the products to be moved. Sometimes, customer requirements may dictate use of the rail mode, or shippers prefer to use rail rather than the highway mode for safety reasons, because the product is classified in the "dangerous goods" category. Short line railways may be a possible solution in some cases.


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Section IV - Methodology

IV. Methodology

The research was focused on six manufacturing and processing industries, namely: aluminum, automotive, chemical, fertilizers, pulp and paper, and steel. These industries, plus wood products, are the largest industrial users of rail transport services. (The wood products industry was not included in the study because it is composed of many small-scale operations, which made it impracticable to collect data on this sector and analyze it within the time allotted for the project.) With the exception of automotive, they are all resource-based industries. Some details on rail freight traffic in these industries are presented in Tables 1 to 8.

A variety of sources were used, including information from Statistics Canada, the Railway Association of Canada and Transport Canada, and "corridor" rail traffic data for 1992 from the major railways (through the auspices of the National Transportation Agency). In addition to these sources, shipper information was received in confidence from individual companies (through their respective trade associations) on establishments that utilize rail services. Also, interviews and discussions were held with representatives from the railways, trade associations, companies and federal officials.

A detailed assessment was conducted for each of the selected industries. A number of factors were considered, including:

- industries' employment and shipments,
- share of establishments' outbound shipments that use rail and other modes of transport,
- share of establishments' inbound shipments that use rail and other modes of transport,
- traffic density of rail lines being used and whether they are main lines or branch lines,
- number and location of firms' production sites,
- location of major markets for goods being shipped,
- volume of products shipped,
- types of products shipped, and
- proximity to and availability of alternative modes of transport.

As stated earlier, the reason for this research was not to analyze the possible discontinuance of any individual branch lines, although the results and background work could be useful for this purpose. Rather, the focus was on assessing the dependence of the six subject industries on the rail mode as a means of transporting goods, both inputs and outputs, and by extension, the degree to which these industries could be impacted by a loss of rail service.

The shipper surveys were conducted on a sampling basis by the respective trade associations. In most cases, the returns encompass over two-thirds of industry shipments. The results were extrapolated to cover the entire industry for each of the six sectors included in the research. No claims were made about the accuracy of the returns.

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Section V - Findings

This section provides a summary of the general results of the industry-by-industry analysis.

Aluminum

- The aluminum industry is dependent on the availability of rail service.
- Over 90% of the aluminum rail freight traffic (on a tonnage basis) is from origin points in Canada to U.S. destinations.
- About two-thirds of the outbound shipments of aluminum are shipped by rail.
- Over three-quarters of the industry's inbound shipments (such as alumina and chemicals) are transported by rail.
- Many of the aluminum rail shipments travel on medium density lines from remote locations in northern Québec to distant markets in the United States.
- Some aluminum plants are located on branch lines.
- Many aluminum plants do not have good highway access.

Automotive

- The automotive industry is dependent on rail for the delivery of finished vehicles from motor vehicle assembly plants in southern Ontario to destinations all across North America.
- Approximately 90% of the finished vehicles are shipped by rail.
- Almost two-thirds of the automotive rail freight traffic (on a tonnage basis) is between points in Canada and the United States.
- High density track is used most often, although some automotive parts move by rail on medium density track.
- Trucks are used to bring in most inbound shipments; although rail is used for some essential bulk inputs, such as body metal and plastics.
- Automotive assembly plants are located near excellent highway access.

Chemicals

- The chemicals industry (especially commodity chemicals) is a major user of the rail system.
- About 70% of outbound shipments (on a tonnage basis) are sent by rail; for example, from Alberta to Ontario or British Columbia, and from plants in Ontario and Québec to the United States and to maritime ports for shipment overseas.
- About 60% of the rail freight traffic (on a tonnage basis) in this sector is domestic; most of the remainder is from origin points in Canada to U.S. destinations.
- Many chemical products, such as sodium chlorate, chlorine, hydrochloric acid, caustic soda, sulphuric acid and benzene, are shipped by rail.

- Except for some shipments to remote locations, such as aluminum plants and paper mills in northern Ontario and northern Québec, most rail shipments travel on high density lines and most plants have good highway access.
- In many cases in this industry, trucking is not a realistic alternative to rail service because of the large volumes and long distances, the type of product (e.g. hazardous chemicals), the specialized equipment needed to carry them, and customer requirements at the receiving end.
- An estimated 80% of the chemicals industry's current outbound rail shipments would not be able to be transferred to trucks.

Fertilizers

- The fertilizer industry (i.e. potash and chemical fertilizers) is a major rail user.
- About one-half of the rail freight traffic (on a tonnage basis) in this sector is domestic and most of the remainder is from origin points in Canada to U.S. destinations.
- About two-thirds of fertilizer shipments are delivered by rail; mostly from Alberta and Saskatchewan, south to the United States, east to Ontario, or west to Vancouver (for export by water).
- The average rail haul distance in this industry is about 2,000 km compared to about 800 km for trucks.
- Most fertilizer shipments travel on medium or high density track.
- Most fertilizer complexes have good highway access.
- Some of them are located on branch lines.
- An estimated 95% of the fertilizer industry's current outbound rail shipments would not be able to be transferred to trucks because of the large volumes, long distances and specialized handling requirements, and in some cases, for safety reasons.

Pulp and Paper

- The pulp and paper industry is dependent on the availability of rail service.
- Almost 60% of the rail freight traffic (on a tonnage basis) in this sector is from origin points in Canada to U.S. destinations.
- About one-half of inbound shipments and about one-half of outbound shipments travel on railway lines.
- The outbound shipments comprise mainly of pulp, paper and paperboard sent from remote locations in northern Ontario and northern Québec to domestic markets in Ontario and Québec and to export markets in the United States.
- There is also a sizable amount of product shipped from Alberta and British Columbia to central Canada and to the United States.
- An estimated one-quarter of the industry's inputs are hazardous chemicals, which are shipped by rail.
- Some of the paper mills in northern Ontario and northern Québec are on medium density rail lines and do not have good highway access.
- An estimated 95% of the pulp and paper industry's current outbound rail shipments would not be able to be transferred to trucks because of the large volumes, long distances and specialized handling requirements.

Steel

- Of the six industries that were studied, the steel industry is the least dependent on rail as a mode of transport.
- About 40% of outbound shipments and about 15% of inbound shipments travel by rail.
- However, the situation varies between companies; some steel companies are very dependent on rail, particularly for inbound shipments.
- Most of the outbound shipments by rail transport in the steel industry consist of steel sheets, coils and bars, and various other steel products.
- The inbound rail shipments comprise mainly of steel scrap, alloys, refractories, lime, acids and other materials.
- Most steel production is in Ontario and Québec, and most of the industry's shipments by rail are to other destinations in Ontario and Québec, or to U.S. customers.

- About 70% of rail freight traffic (on a tonnage basis) in the steel sector is domestic and about one-quarter is from origin points in Canada to U.S. destinations.
- A large part of the industry's inputs (i.e. iron and coal) are shipped by water.
- Most rail shipments in this industry travel on medium or high density lines and most steel plants have good access to other modes of transport.

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Section VI - Conclusion

VI. Conclusion

The findings of this research should be helpful to transportation policy analysts, researchers and others who are involved in the future of the rail network in Canada. All of the six industries examined in the research are major users of the rail mode and could be impacted negatively by a loss of rail service. The consequences would vary considerably from industry to industry and from company to company within each industry.

In these industries, rail transport is often the only cost effective method of transporting goods. The weights and quantities of materials involved, and the long distances travelled, trucking as an alternative mode of transport is not a realistic solution for many companies that use rail services, even if the appropriate equipment were available. In some cases, e.g. certain chemical products, trucking is not a viable alternative for rail because of safety reasons, and in other cases, customer requirements make trucking an impracticable alternative.

An important lesson to be learned from this research is the *strategic* importance of rail in weaving together the industrial fabric of the Canadian economy, especially in the resource-based sectors that ship large quantities over long distances. An example of this inter-industry linkage is the relationship between the chemicals and paper industries, and the railways' role in that. Various hazardous chemicals are used in the paper-making process, such as chlorine or hydrogen peroxide. Not only are most of these materials shipped by rail from chemicals plants to paper mills, but many of the input ingredients to produce these chemicals are also shipped by rail, and a large share of paper companies' outputs (e.g. newsprint) is sent by rail to markets in the United States.

The findings also underscore the dependence of some key industries in the Canadian economy on efficient rail transport services in order to maintain and improve their profitability. Some of these industries (e.g. pulp and paper, automotive, chemicals and fertilizers) are major foreign exchange earners and rely on rail carriers to deliver their products to major export markets.


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**Appendix - Tables****Table 1****Truck/Rail Market Share: Selected Industries
(Percent, Tonnage Basis)**

Industry	Outbound/Inbound	Truck (*)	Rail (*)
Aluminum	Outbound	35	65
	Inbound	20	80
Automotive	Outbound	10	90
	Inbound	85	15
Chemicals	Outbound	30	70
	Inbound	n/a	n/a
Fertilizers	Outbound	35	65
	Inbound (1)	n/a	n/a
Pulp and Paper	Outbound	50	50
	Inbound (2)	50	50
Steel	Outbound	60	40
	Inbound (3)	65	35
All Industries		40	60

Source: Industry Canada estimates based on information from shippers

Notes:

- 1) Most fertilizer and petrochemical plants are located at the site of the resource. Pipelines are also an important mode of transport for inbound shipments in these sectors.
- 2) Of the total inbound rail shipments, in the pulp and paper sector, 25% are estimated to be in the "dangerous goods" category.
- 3) An estimated 60% of the inbound shipments in the steel industry are by water.

Table 2**Rail Freight Traffic: Selected Industries
(Thousands of Tonnes, 1992)**

Industry	Domestic Traffic	Canada to U.S. Traffic	U.S. to Canada Traffic	Total Traffic
Aluminum	64 (8*)	743 (92*)	?	809 (100*)
Automotive	1,225 (37*)	1,292 (39*)	788 (24*)	3,306 (100*)
Chemicals	6,257 (58*)	3,265 (30*)	1,310 (12*)	10,832 (100*)
Fertilizers	7,508 (51*)	6,588 (45*)	518 (4*)	14,614 (100*)
Pulp and Paper	4,944 (40*)	6,956 (57*)	404 (3*)	12,303

Steel	2,314	(70*)	836	(25*)	179	(5*)	3,328	(100*)
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Note: Totals may not add due to rounding.

Source: Based on data from the National Transportation Agency

Table 3
Rail Freight Traffic by Origin and Destination: Aluminum
(Percentage Distribution, Tonnage Basis, 1992)

Domestic Traffic

Origin	Destination	West	Ontario	Quebec	Maritimes	Total
West		3	neg	--	neg	3
Ontario		1	--	--	--	1
Quebec		1	3	83	10	96
Maritimes		neg	--	--	--	neg
Total		4	3	83	10	100

Canada to U.S. Traffic

Can. Origin	U.S. Destination	Central	Northeast	South	West	Total
West		neg	neg	neg	--	neg
Ontario		--	--	neg	neg	neg
Quebec		23	36	40	neg	100
Maritimes		--	--	--	--	--
Total		23	36	40	neg	100

U.S. to Canada Traffic

U.S. Origin	Canadian Destination	West	Ontario	Quebec	Maritimes	Total
Central		--	2	24	--	26
Northeast		--	54	4	--	57
South		1	--	16	--	16
West		--	--	--	--	--
Total		1	56	44	--	100

Note: Totals may not add due to rounding

Source: Based on data from the National Transportation Agency

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