Abridgment

Intermodal Freight Transport

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In describing the role of intermodal transport research, the Transportation Research Board's Special Committee on Rail Transport Activities said that

> Unfortunately, there has been relatively little research with respect to intermodal transport since much of what has been done has been modally oriented. There is a real opportunity for research approaching intermodal transport from a systems viewpoint. Analysis of the role of intermodal transport can set the state (sic) for more effective modal interface planning, including, for example, study of terminal design and location. Work on these intermodal issues is of continuing interest to the railroad industry.

If this is to be a mandate for the newly formed Intermodal Transport Committee, then definitions, for instance of intermodal traffic, must be formulated and agreed upon.

There are two elements characteristic of intermodal transport. The first is the through movement from origin to destination with no intermediate storage. With the exception of truck transport, movements by all other modes are made largely in conjunction with a second form of carriage. But it is not clear whether all such instances are typical of what is called intermodal transport.

The committee, in one of its earliest discussions, felt that intermodality implied something specific. Intermediate storage was one aspect that helped exclude certain shipments from being defined as intermodal. The committee did not attempt to provide a time dimension, although a transfer should take place within days, more likely hours.

The second element is an interchange or transfer between two or more modes, because so many shipments require more than one mode. It is the ease with which these transfers occur that brings them under the intermodal umbrella. In committee discussions, this type of transfer was not defined. By general agreement, however, some form of containerized handling, rather than piece-by-piece interchange of the components of a shipment will be involved. In fact, it is containerization, or some variation on it, that has popularized the concept of intermodal transport. Today's sophisticated techniques for rapidly transfering bulk materials also qualify as intermodal.

These transfers involve fairly high-volume shipping levels—at least 32 kg (70 lb) but likely to run 9 to 18 Mg (20 000 to 40 000 lb) or as high or higher than 91 Mg (200 000 lb).

Perhaps the single most important advantage to intermodal operations is the superior cost and service tradeoff it offers compared with the use of a single form of carriage or with two modes employed but not in an integrated fashion. The dollar savings are well known and may exist because an intermodal system uses a lower cost line haul means of transportation and still provides the needed flexibility for the short haul or destination handling to the shipper's dock. Moreover, service is improved, because there is more efficient transfer at the interchange point, in terms of both transit time and reliability.

In addition, handling or transport damage decreases and thievery drops off sharply. For any one component the cost or service comparison of an intermodal operation can be better or worse than a conventional system, but it is the existence of a real option to the shipping public that enhances its importance.

Robert Redding, formerly a Department of Transportation official, recently alluded to another advantage when he observed that many of this country's transportation facilities will not grow much during the next 15 years but that there will be a need to increase transport capacity (1). One way to expand capacity is to design intermodal operations that use the existing infrastructure, which, where the potential exists, can be done at a very reasonable cost.

If intermodal operations cost less and use the existing plant more efficiently, additional likely benefits are preserving scarce resources, minimizing pollution, and using land more efficiently. From several perspectives, then, intermodal transport offers distinct opportunities.

It is very difficult to establish how much intermodal transport there is compared with the various other forms of transport services. Through container shipments are made by air, but discovering how many containers are loaded by shippers at an off-airport location is very difficult. Estimates are available, but they vary greatly depending upon the person questioned. Out of the 2.740 billion Mg/km (4 billion ton miles) of air freight, or two-tenths of 1 percent of the total intercity freight movement for 1975, maybe 20 to 30 percent could be considered intermodal.

TRUCKING

For truck, one would have to do a good deal of arithmetic to develop an estimate of its involvement in intermodal transport. Although trucking is a major partner in the intermodal movement, it is infrequently the dominant partner. Of the trucking industry's 22 percent share of the market, it would seem that only a modest portion—say less than 3 percent—has been a part of an intermodal service. However, one important fact must be borne in mind: for selected truckers this business can be extremely important and may even be their entire operation.

WATER TRANSPORT

In water transport there are three distinct issues. Domestic water carriage suffers from problems of definition and data availability. Any assessment of intermodal operation is therefore difficult. In foreign trade, data on Lash and Seabee operations are lacking, although there is wide agreement that these barge and ocean vessel operations are clearly intermodal in character.

In marine containerization, however, intermodal has been a major success. There have been problems, but many of them have been overcome. This form of transport has revolutionized the steamship business, which has shown a clear, steady increase in intermodal containerization (Figure 1). In the 5 years since statistics began to be collected, there has been a quadrupling of container tonnage. A significant portion of this is only port to port; nevertheless this type of intermodal operation has made major progress. For confirmation one would have only to review the massive investment in container and Ro-Ro ships, in containers and trailers, and in terminals.

In 1974, the most recent year for which data are available, container freight amounted to over 43 percent of total liner cargo. And for U.S. flag carriers alone this percentage would be almost 52 percent. In terms of

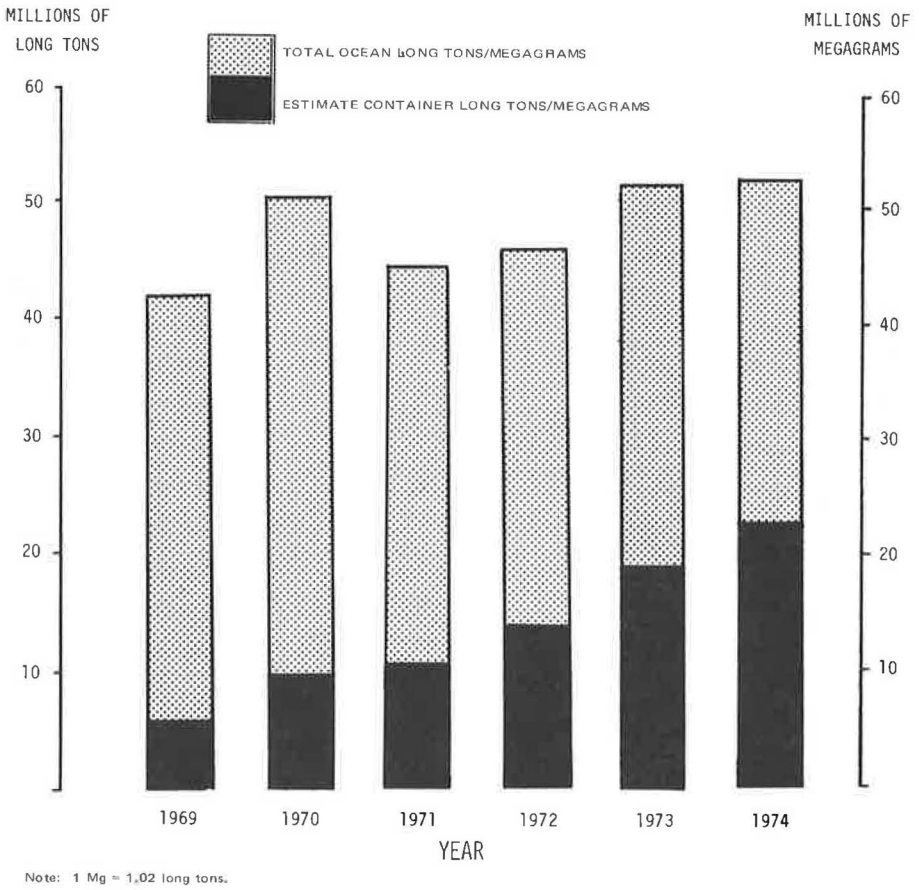

Figure 1. Containerization and total U.S. ocean intermodal.

Note: 1 Mg = 1.02 long tons.

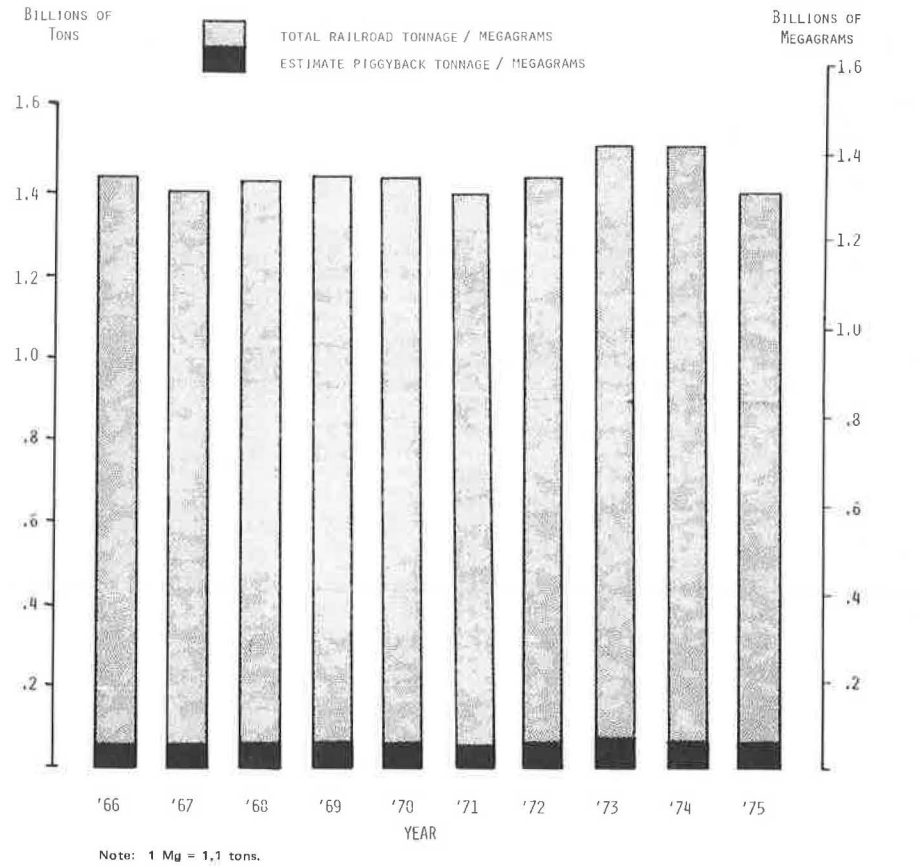

Figure 2. Piggyback and total U.S. rail intermodal.

Note: 1 Mg = 1.1 tons.

consistent growth and in percentage of total cargo carried, intermodal operations now transport a major portion of this business.

RAIL TRANSPORT

The rail picture is something else again. Piggyback has been around for quite some time now, and many have looked to it as a way of maintaining railroad participation in the merchandise traffic business. Progress, however, has been less than exciting. As can be seen from Figure 2, rail and truck intermodal has grown only modestly. Disregarding the major slump in 1975, which returned piggyback carload volume to its 1967 level, the growth from 1966 to 1974 is only about 3 percent per year. And in terms of the total rail market, tonnage has been between 3 and 4 percent. Yet, in its defense, in terms of megagram kilometers this percentage would be closer to 4 percent. As a proportion of freight revenue, piggyback might run as high as 9 percent. And, if present piggyback service volume were to be compared with the domestic containerizable freight market, the figure might be 5 percent. In fact in some individual origin and destination markets it might even be as high as 30 percent. But, to quote an editorial in Traffic World (1) a few months ago, "the possible maximizing of efficiency of freight markets that shippers for years have envisioned in their dreams about intermodalism is still far from being realized."

What is holding things back? More study has been suggested, although this may not be immediately necessary. Considerable analysis has been completed in the past 5 years, but much of this information has not been communicated or fully evaluated. Unfortunately, intermodalism has been discussed with people in planning positions and with operating authority who have been unwilling to consider the fundamental changes required of their businesses.

Agents of change for an entrenched institution often have to come from the outside. Consider, for example, the innovation of Malcolm McLean of Sea Land. His plans for marine containerization certainly were not accepted by the traditional steamship operator, but ultimately they turned the business upside down.

The members of the Intermodal Transport Committee must look beyond traditional statements and solutions if the issues are to be identified and resolved. The barriers and problems that have prevented intermodal operations from achieving their potential must be overcome.

REFERENCE

1. R. E. Redding. Wanted: More Vitality for Intermodality. Traffic World, Vol. 168, No. 3, Oct. 18, 1976.

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Intermodal Issues in Transport Planning

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Economic and institutional aspects of intermodalism are discussed from the viewpoint of a fully integrated Canadian multimodal transport owner and operator. The development of Canadian Pacific Ltd. into the world's only fully intermodal transport enterprise and the Canadian institutional and regulatory environment in which it operates are described. Intermodal ownership has not been destructive to transportation competition in Canada, and intermodal ownership was of considerable importance in the early achievement of intermodal handling of traffic there. The organization of an intermodal transport enterprise is discussed, the most workable format apparently being a fairly loosely structured company with all modes represented by self-standing profit centers that operate and market independently. Corporate management only sets overall policies and guidelines, allocates capital and personnel, and sorts out serious conflicts. This type of organization, with all its inherent conflicts, is to be preferred with a tightly structured and highly centralized system. Neither intermodalism nor multimodal ownership offers easy answers to the very serious problems facing the investor-owned transport industry.

This paper is about economic and institutional issues from the viewpoint of the private sector, specifically of a fully integrated multimodal Canadian transport owner and operator. I emphasize Canadian because, although the countries are close geographically and similar in many ways, one must also recognize the many differences.

HISTORICAL BACKGROUND

Canadian Pacific Ltd., now called CP Rail, began as a railway but from the outset had a very strong intermodal bias. The main line of the railway across Canada was completed in 1886 and was the first transcontinental line in Canada. It had something over $1 billion in total revenues in 1976, and was profitable, but only marginally, with a return on invested capital of slightly more than 6 percent, after taxes. This may not look bad compared with some other railways, but it certainly does not look good compared with most other businesses.

In the year the railway was completed, CP began chartering ships on the Pacific Ocean to connect with the railway. In fact, within three weeks of commencing transcontinental operations, a chartered ship was unloading 45 000 kg of tea at Vancouver for rail delivery in eastern North America. Intermodalism is almost as old as the railway itself.

Then came the acquisition of an interest in shipping in the Atlantic to connect with the eastern terminal of the railway. Before the end of the last century, CP offered an integrated through service between Western Europe and the Orient. Over the years, the company's ocean shipping interests developed in their own right, reflected changes in trade patterns and technology, and adapted to