Emerging Changes in the Container Revolution

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•A NUMBER of emerging trends now affecting seaboard container economics will significantly influence the future of inland and land-bridge operations. First, container volume on routes in and out of the United States continues to grow rapidly. Seventy percent of all general cargo on the North Atlantic routes and 50 percent of general cargo on Pacific routes may be containerized by 1970. To build volume, steamship lines using East and West Coast ports are developing extensive and aggressive marketing programs, and some have already taken steps to move into forwarding, consolidation, and other inland activities.

Containership overcapacity is beginning to develop, especially on the North Atlantic routes. As many as 40 full containerships are planned for the North Atlantic routes by 1970, although 20 to 30 could handle the expected volume. This suggests that many containerships will be poorly utilized, forcing steamship lines to seek other routes. One source estimates that the ship capacity of lines serving West Coast routes will exceed all potentially containerizable cargo by 1970.

As a result of this developing overcapacity in containerships, many lines are now seeking to improve profit in a number of ways. First, so that they are free to move from one port location or one route to another, they are trying to avoid the long-term agreement with ports that characterize the early development of container facilities. Second, because running parallel services of break-bulk and containerships often proves uneconomic, many lines have decided to phase out their break-bulk and combination ships (which combine both break-bulk and containers) more quickly than originally planned and to concentrate on container volume alone. Some steamship lines are planning to move some of their containerships into new routes that currently have only break-bulk facilities.

Container facilities overcapacity already exists in some ports, and port costs are rising much higher than predicted. Poor utilization of facilities, high container consolidation costs, and escalating labor costs are all contributing factors. The clearest example is the recent labor negotiation setting the labor rates and policies for eastern seaboard ports. The high fixed cost of a container berth makes the average cost for each container significantly higher at low volumes. Thus, the cost of handling a container drops from $100 to approximately $30 as the weekly volume increases from 500 to 1,500 containers. Although the capacity of a typical container berth is at least 1,500 containers per week, many berths are currently used for only one ship per week. As a result, the cost to steamship lines is close to $100 per container. A prime example of the rapidly developing capacity for handling container volume is New York, where 11 container berths are currently in use and at least 20 are in the planning stage or under construction.

Finally, methods of rate setting are beginning to change as competitive forces favor marginal costing and "freight-all-kinds" approaches. Although ship and rail costs for container operations clearly do not depend on the type of commodity, but vary directly with container volume, rates are still determined by commodity. However, railroads are now offering unit trains at substantially lower rates than were possible with normal service. In addition, European freight rates have already moved towards containers and away from commodity rate structures. To capture larger volumes, steamship

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lines may soon break away from their conferences, which establish rates, and begin to use rates based on freight-all-kinds.

IMPACT OF CHANGING CONTAINER ECONOMICS ON INLAND TRAFFIC

In Europe, containerization is already beginning to have a significant impact on inland traffic. In the United Kingdom, for example, the "freightliner system" started only 3 years ago, now covers most large towns, and by 1970 is expected to handle over 1 million container movements per year. The road transport companies are climbing on the bandwagon by depending increasingly on rail for long-distance hauls and concentrating their business on collection, delivery, and consolidation of cargo. Recently, European railroads formed the Intercontainer Company with the objective of developing integrated container services throughout Europe linking the ports and all major centers of industry. They are now moving quickly to plan facilities, policies, and operating practices to meet this objective.

Growth of International Container Services in Europe

What are some of the reasons why international container services are growing extensively and rapidly in Europe? First, container service between rail terminals typically costs 40 percent less than regular service. This point is illustrated in Figure 1 which shows the typical cost of moving a 10-ton load on the railway either by regular service (described as a wagon-load cost), or by a container service using a special container train. The cost of management, truck, and train is slightly less with containers mainly because of more efficient use of equipment. However, greater cost savings are achieved in the terminal activity, with a reduction in costs of loading and discharging containers between road and rail.

A second reason why international container services are developing quickly is that on the longer hauls, the unit costs of rail movement are lower than the equivalent costs by road. Figure 2 shows the cost of shipping a 10-ton load over various distances for

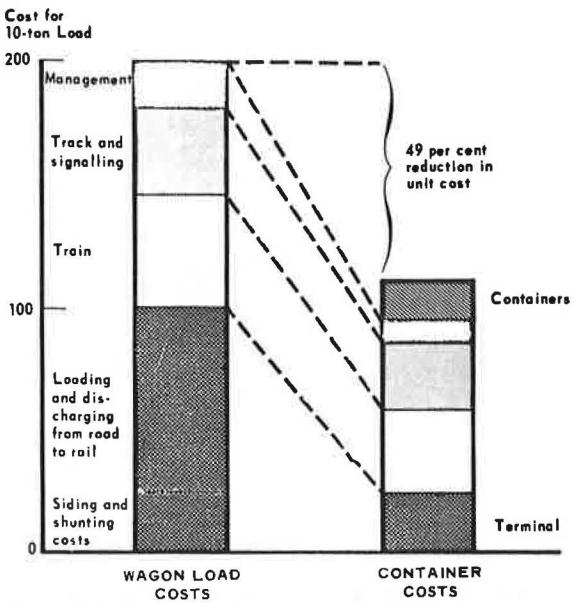
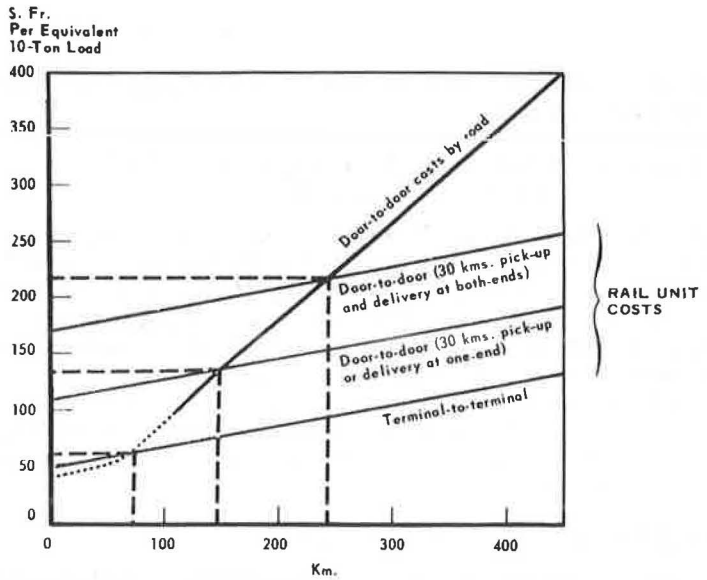
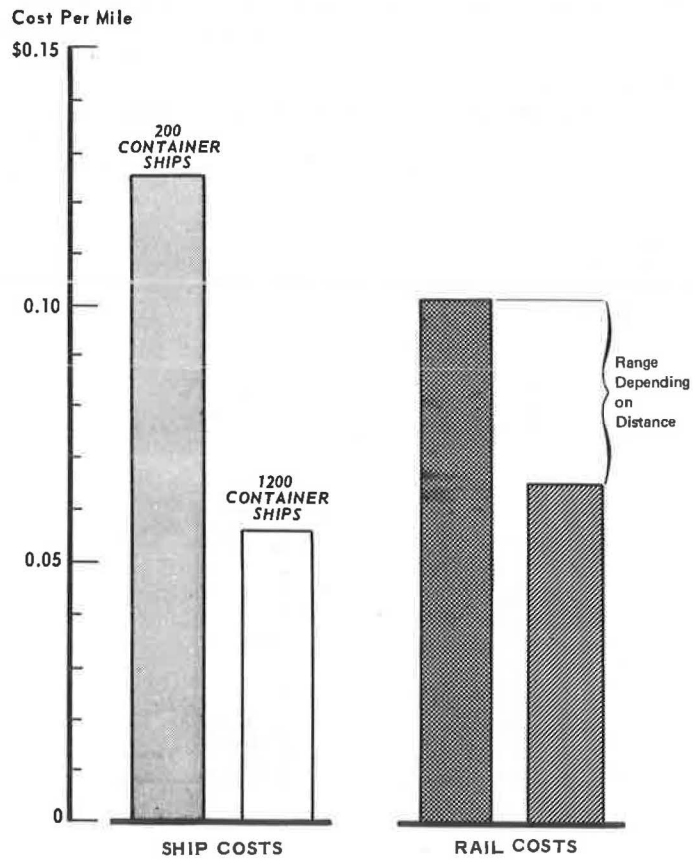


Figure 1. Container services between rail terminals can cost over 45 percent less than the equivalent wagon services.



Source: McKinsey synthesized costs

Figure 2. Unit costs by rail are substantially below equivalent costs by road on longer hauls.



Based on: (1) 85 percent load factor on both ship and train.
(2) One empty container in every four movements.
(3) Rail costs for a 45-container capacity train.

Source: McKinsey cost synthesis.

Figure 3. Rail has cost advantage over small containerships.

a door-to-door road movement or an alternative road and rail shipment. The costs of shipping terminal to terminal on the rail are substantially the same as the road shipment for distances less than 75 km; but above this distance, rail costs are lower.

A more practical comparison is between a movement involving a 30-km road pickup or delivery at one end and a door-to-door movement by road. In this case, the break-even between road and rail occurs at about 150 km, and above this distance, the combination of road and rail is cheaper. If the delivery is to include a 30-km road pickup and delivery at both ends, then the break-even occurs at 240 km.

Figure 2 compares costs for European transportation and is quoted in Swiss francs. Converting these costs to U.S. dollars per mile, road transport is 32 cents per mile and the variable costs of container rail transport are approximately 6.5 cents per mile. These costs are substantially the same as estimates for the United States, suggesting that a freight-liner service between major cities in the United States would have a substantially better competitive position than the railroad services currently available to a shipper.

A comparison of rail costs with costs of small containerships shows us the final reason why international container services are developing in Europe. Where land-bridge opportunities exist for moving cargo over rail, rather than via sea routes, freight-liner services give the rail a competitive advantage. Figure 3 compares the costs of moving containers via containerships with capacity of 200 twenty-foot containers with the costs of rail service. The rail service cost depends on distance and is 20 to 40 percent lower than the cost of a small containership.

Because of the difference in costs of the large and small containerships, however, land-bridge opportunities may not be as attractive in the United States as in Europe. In the U.S. case, a fair comparison would be with larger containerships with a capacity of 1,200 containers rather than the low-capacity ferry services in the European example. For the large ship, the cost of container movement is close to the cost over rail, and in the case of a 1,200-container-capacity ship, it is slightly lower than the rail cost.

Impact of Container Trends on U.S. Import-Export Traffic

To investigate the impact of container trends on U.S. import-export traffic, we will take the example of routes from the East and West Coasts to the Far East and Europe.

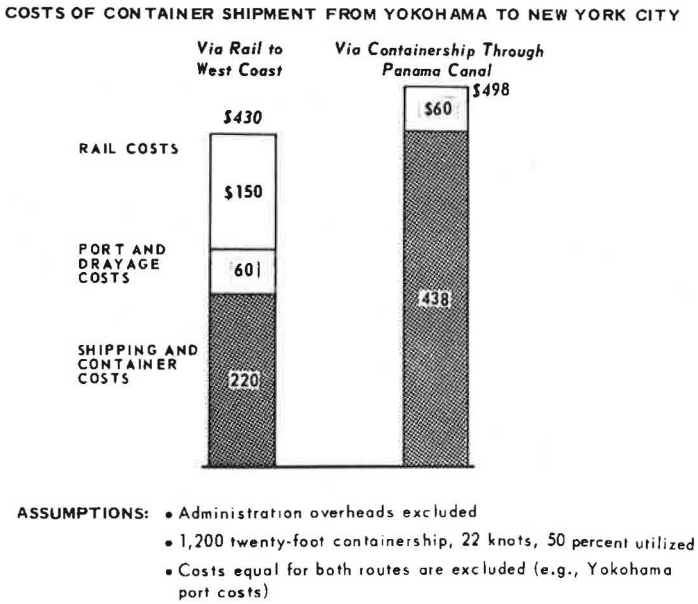


Figure 4. Cost economics favor container shipment to Far East via West Coast even from New York City.

This analysis leads to the conclusion that steamship lines on routes between the East Coast and Far East and West Coast and Europe will probably lose business to more direct overland routes. Currently the majority of cargo originating east of Chicago goes via an East Coast port. However, as the use of container trains increases, movements of container cargo from inland United States to the Far East are more likely to go via the West Coast. Taking the limited example of a shipment of cargo from New York City to Yokohama, the costs of shipment over land and by sea are almost identical. Figure 4 shows that cost economics (the basic costs of moving the cargo without regard to current rate structures, profit margins, or company overhead) favor container shipment to the Far East via West Coast ports even from New York City. The total cost of moving by rail to the West Coast is $430, whereas the cost by containership through the Panama Canal is nearly $500. These costs assume a highly utilized and dedicated unit train service across the United States; a more realistic level of utilization (which assumes a partial empty load in one direction), would probably increase the overland costs by $50 to $70, making the New York position about break-even for the two routes.

Nonetheless, this last example clearly shows that shipments originating from inland United States would almost certainly go by the more direct land route, if basic cost economics are the criterion for selecting the route, rather than current commodity rates. But railroads must meet the challenge quickly because steamship lines plan to have containerships on the route from the East Coast to the Far East by 1970.

Use of Land-Bridge Routes Between the Far East and Europe

A final example of the impact of the emerging trends in shipboard container economics is the possible use of land-bridge routes between the Far East and Europe. Figure 5 shows the transit times on competitive routes over land and via the Panama Canal. If containerships are installed on the Panama Canal route, there will be a small time difference between the sea and overland routes. At present, the sea route is handled by break-bulk ships, which are substantially slower than containerships, and typical time for movement of cargo from Yokohama to Hamburg would be 35 to 40 days. Therefore, the land-bridge route, using containerships on the Pacific and Atlantic routes and unit trains across the United States for a total transit time of about 23 days, has a substantial time advantage over the current sea route.

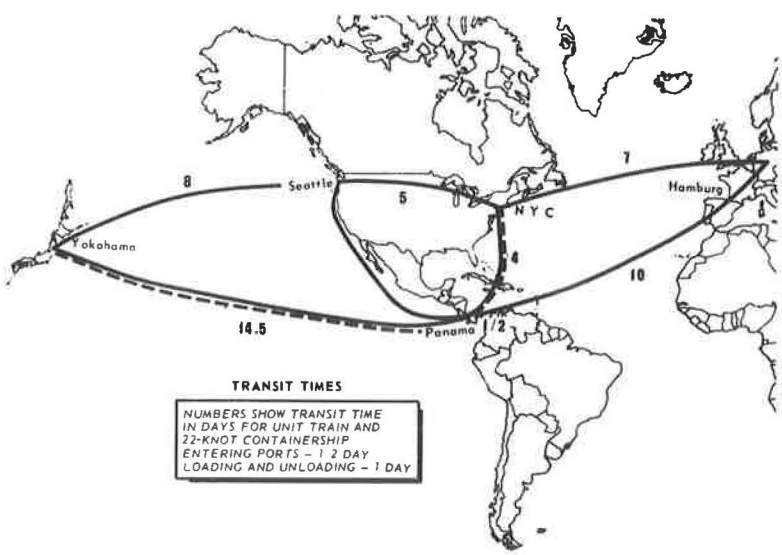


Figure 5. Transit times on competitive routes.

This example suggests that if the costs to the shipper are lower on the land-bridge or at least equivalent to the current sea route, the land-bridge may develop as a significant competitive alternative to the sea route. However, it is certain that steamship lines on the Panama route will eventually install faster containerships, and consequently, the time advantage will be almost completely removed.

Looking at the costs of the sea route versus the land-bridge route, we find that cargo movement on the land-bridge is more expensive than by sea, owing mainly to the handling costs through the ports. The costs are approximately $700 via the land-bridge and $550 via the sea route, with 50 percent utilization of ships; and the costs are roughly equal, with 35 percent utilization.

Because cost economics are against the land-bridge when containerships are installed on all of the sea routes, it would appear that land-bridge opportunities between Europe and the Far East will probably develop slowly. However, at present the land-bridge offers a time advantage for all cargo and a price advantage for some commodities. In the long run, steamship lines interested in maintaining Panama Canal routes will clearly be able to compete against land-bridge routes by cutting rates and using faster ships.

Land-bridge routes would develop faster if a steamship line (or consortium of two lines) with trade routes on both coasts tried to lead the field to capture more volume for its containerships and port facilities, or a port and/or railroad subsidized port operations to obtain land-bridge traffic. A final factor in this development is that railroads have already taken a number of steps to market their land-bridge routes and quote unit train rates across the country.

CONCLUSIONS

From this analysis of the emerging trends in container economics and the impact of these trends, a number of conclusions may be drawn. Potentially favorable economics of containerization, based mainly on major improvements in port productivity, are not always being realized. Overcapacity will soon plague many operations, and the advantage of U.S. land-bridge routes remains questionable. However, container volume on sea routes is growing rapidly, and containerization in Europe is already having a significant impact on the movement of inland traffic. Container rail services are rapidly developing in the United Kingdom and on the Continent, and clearly have the opportunity of becoming competitive with road for all but short hauls.

In the United States, import-export container traffic will go through rerouting changes toward shorter land routes during the next few years if railroads introduce container train services similar to those being installed in Europe. Railroads in the United States, therefore, have a significant opportunity to use containerization to competitive advantage in developing traffic and holding their share of market over road transportation. To do this, they will have to develop inland container train services not necessarily based on coast-to-coast, land-bridge operation, but rather on modern container train services with dedicated equipment and efficient, low-cost road/rail terminal operations.

It appears that the key to success of container transport systems lies in high utilization of capital resources and low-cost, rapid transfer between modes and at terminals. Where this is being obtained, development of container services is moving ahead quickly. But where the age-old inefficiencies and high costs of intermodal transfer are retained, development is stymied.