Double-Stack Container Trains: Issues and Strategies for Ocean Carriers

HENRY S. MARCUS AND CARL D. MARTLAND

Double-stack container trains are studied from the perspective of an ocean carrier. Use of double-stack container trains by ocean carriers involves such considerations as the origin and destination of the trains, the choice of the party to manage the rail movement, and the size of the containers. In the final analysis, the ocean carrier must determine how these issues can be integrated into its overall corporate strategy.

Much activity related to double-stack container trains has been observed in the past year. The implications in terms of the issues and strategies related to ocean carriers are discussed.

An overall strategic issue for an ocean carrier concerns the integration of double-stack container trains into a firm's corporate strategy. The topic is approached via the following questions, which represent some of the key issues involved:

- Should the carrier use double-stack container trains?
- What ports and inland cities should be used?
- Who should manage the inland movement?
- What size containers should be used?

Although these issues are interdependent, they are first considered individually and then integrated into a comprehensive strategy.

SHOULD THE CARRIER USE DOUBLE-STACK CONTAINER TRAINS?

An ocean carrier must determine whether the use of double-stack container trains can save the firm money, improve its quality of service, or both. A cost comparison of container movements from Asia to selected U.S. destinations by an all-water route, double-stack container train from the West Coast, and unit train container-on-flatcar (COFC) from the West Coast is given in Table 1. In all cases the double-stack container train is less expensive than the COFC from the West Coast. The comparison shows that the double-stack container train appears to be (a) less expensive than the all-water alternative when the destination is the U.S. Gulf Coast, (b) more expensive to the South Atlantic ports, and (c) generally less expensive to the North Atlantic ports. Double-stack containers are significantly less expensive than the all-water alternative to New York, but slightly more expensive to Baltimore.

In reality, the economic analysis is not so straightforward. The trains will not always be full, and double-stack container trains' costs will not be identical to the price offered to the ocean carrier. The transit time for a double-stack container train should always be less than that of an all-water service; however, the ocean carrier must be able to evaluate the value of this increased quality of service as well as its reliability.

WHAT PORTS AND INLAND CITIES SHOULD BE USED?

The obvious answer to this question appears to be that the double-stack container train chosen by the ocean carrier should operate between cities where the carrier has a large cargo. Port pairs carrying more than 50,000 long tons of marine container rail traffic in 1983 are given in Table 2. No data is included for inland cities, such as Chicago, that do not reside on the ocean.

However, the answer is not as simple as matching cities to cargoes. A carrier operating between Asia and the U.S. West Coast may have a great deal of cargo to and from Chicago. Because the carrier stops at more than one West Coast port, it will have to choose between existing ports of call (and possibly others). When choosing the inland city for cargo destined for the U.S. East Coast, it may be more economical to use a double-stack service only as far as a Midwest city, such as Chicago, if cargo volumes to specific cities do not justify a transcontinental double-stack service.

Other factors to be considered include (a) terminal facilities available at each end of the rail run, (b) terms offered by the railroad involved, and (c) inducements offered by the ports involved. Baltimore, New York, and Seattle are among the ports that have promoted double-stack container trains.

Public port authorities have the advantages of having access to tax-exempt bonds, state and local funds, and tax provisions that can be used to finance capital investments. Because of this access to public financing, public port authorities are able to finance projects that would be considered too speculative by private corporations.

WHO SHOULD MANAGE THE INLAND MOVEMENT?

If an ocean carrier uses a double-stack container train service on a particular city-pair route, more decisions must be made: (a) who should own (or long-term lease) and operate the terminal at the port and at the inland city? (b) Who should own the rail equipment? (c) Who should handle the paperwork? and (d) Who should provide a container-tracing service? In other words, the boundary of control for the ocean carrier on the intermodal movement should be determined. Each carrier must consider both its own resources and the options open to it in making these decisions.

A major consideration in managing a double-stack container train service is finding cargo for the backhaul direction. The major direction for existing double-stack services is eastbound, and westbound for the backhaul leg. In the forehaul direction marine cargo comprises most or all of the cargo. In the backhaul direction it is necessary to put domestic cargo in the marine containers in order
to fill the train. Ocean carriers generally have little or no experience in soliciting domestic cargo, and they may not wish to take on such a new responsibility.

**WHAT SIZE CONTAINERS SHOULD BE USED?**

An ocean carrier typically prefers the largest container that is economically, legally, and physically possible. The largest size of marine container that can fit below decks on a fully cellular containership is 40-ft long, 8-ft wide, and 9.5-ft high. Many 40-ft containers are 8.5-ft or 8.0-ft high. If one shipper cannot fill one container with cargo, the shipments of other shippers may be consolidated in the same container.

American President Lines (APL) is the only operator of fully cellular containerships to carry on deck larger marine containers with dimensions 45-ft long, 8-ft wide, and 9.5-ft high. The national standard on over-the-road (OTR) truck limits are 48-ft long, 8.5-ft wide, and 9.5-ft high. APL has already purchased some marine containers of this size.

There are physical restrictions involved in carrying high cube containers on a double-stack container train. Cars on these trains can typically carry containers that are longer than 40 ft only on the top row. Some double-stack container trains cannot carry 48-ft containers on some (or all) of the top row. Height restrictions may apply on a particular route in terms of the tunnels or bridges involved.

An ocean carrier may also take into account restrictions on moving high cube containers in the foreign ports that it serves. For example, Japan has restrictions on both length and height. Because of the narrow streets in Hong Kong, there are problems using containers over 40-ft long.

**CORPORATE STRATEGY**

Corporate strategies that integrate the foregoing issues are discussed using APL for example. APL is one of the largest containership operators in the transportation trade; its ships do not leave the Pacific basin. Consequently, APL must reach the U.S.

---

TABLE 1  ALL-WATER VERSUS BRIDGE AND STACK CAR OPERATING COSTS FROM ASIA TO SELECTED DESTINATIONS

<table>
<thead>
<tr>
<th>Destination</th>
<th>All-Water to East Coast</th>
<th>Unit Train COFC from West Coast</th>
<th>Stack Car from West Coast</th>
</tr>
</thead>
<tbody>
<tr>
<td>Savannah-Charleston</td>
<td>1,700</td>
<td>2,100</td>
<td>1,950</td>
</tr>
<tr>
<td>Range from various Far East ports</td>
<td>1,300-1,700</td>
<td>1,850-2,100</td>
<td>1,700-1,950</td>
</tr>
<tr>
<td>Baltimore</td>
<td>2,000</td>
<td>2,250</td>
<td>2,050</td>
</tr>
<tr>
<td>Range from various Far East Ports</td>
<td>1,350-2,000</td>
<td>1,950-2,250</td>
<td>1,750-2,250</td>
</tr>
<tr>
<td>Houston</td>
<td>2,300</td>
<td>2,000</td>
<td>1,800</td>
</tr>
<tr>
<td>Range from various Far East ports</td>
<td>1,800-2,300</td>
<td>1,700-2,000</td>
<td>1,550-1,800</td>
</tr>
<tr>
<td>Chicago</td>
<td>2,450</td>
<td>1,500</td>
<td>1,850</td>
</tr>
<tr>
<td>Range from various Far East ports</td>
<td>2,150-2,450</td>
<td>1,300-1,500</td>
<td>1,100-1,400</td>
</tr>
<tr>
<td>New York</td>
<td>2,150</td>
<td>1,950</td>
<td>1,850</td>
</tr>
<tr>
<td>Range from various Far East ports</td>
<td>1,800-2,150</td>
<td>1,700-1,950</td>
<td>1,600-1,850</td>
</tr>
</tbody>
</table>

Source: Values in the table are estimated from the bar chart in American Shipper, Aug. 1985, p. 12

Note: All numbers in dollars per FEU.

---

TABLE 2  PORT PAIRS CARRYING MORE THAN 50,000 LONG TONS OF MARINE CONTAINER RAIL TRAFFIC IN 1983

<table>
<thead>
<tr>
<th>Port Pair</th>
<th>Thousands of Long Tons</th>
</tr>
</thead>
<tbody>
<tr>
<td>Los Angeles 5/Long Beach 4</td>
<td>to New Orleans 9</td>
</tr>
<tr>
<td>Los Angeles 5/Long Beach 4</td>
<td>to New York/New Jersey 1</td>
</tr>
<tr>
<td>Seattle 2/Tacoma 14</td>
<td>to New York/New Jersey 1</td>
</tr>
<tr>
<td>Los Angeles 5/Long Beach 4</td>
<td>to Houston 11</td>
</tr>
<tr>
<td>Los Angeles 5/Long Beach 4</td>
<td>to Mobile 25</td>
</tr>
<tr>
<td>Oakland 3/San Francisco 21</td>
<td>to New York/New Jersey 1</td>
</tr>
<tr>
<td>Los Angeles 5/Long Beach 4</td>
<td>to Boston 17</td>
</tr>
<tr>
<td>Houston 11</td>
<td>to Los Angeles 5/Long Beach 4</td>
</tr>
</tbody>
</table>


Note: Succeeding numbers indicate U. S. ranking of port.
East Coast by rail. As part of its marine system, APL operates
major port terminals, utilizes a worldwide satellite communication
network and uses computers to control tens of thousands of pieces
of equipment.

In using double-stack container trains, APL made a strategic
decision not only to enhance its existing marine service but also to
diversify into a new field, domestic transportation. APL spent
approximately $60 million to acquire the following from Brae
Corporation: National Piggybank Services, Inc. (reportedly the
nation's largest shippers' agent); National Piggybank Specialized
Commodities (which focuses on movements of perishables); and
Intermodal Brokerage Services, Inc. (which specializes in move­
ment of time-sensitive cargos, primarily for U.S. automakers).

APL has purchased its own double-stack container train equipment
and controls the entire movement. APL has an advantage over
others in soliciting domestic cargo because it has the only high
cube marine containers over 40 ft on its double-stack train. APL
only needs a railroad to haul the trains.

No other ocean carrier has followed the APL strategy of pur­
chasing domestic transportation operations. However, Sea-Land,
one of the largest containership operators in the world, has also
aggressively used double-stack trains. This U.S. flag carrier does
not operate an all-water route from Asia to the U.S. East Coast;
therefore, it also relies on double-stack container equipment it has
purchased.

A third U.S. flag carrier that has more recently entered the
double-stack container train scene is United States Lines (USL). It
owns the world's largest containerships with a capacity of
4,456 20-ft equivalent units and serves both the U.S. East and
West Coast from Asia. A double-stack container train from a West
Coast port would be expected to compete with the East Coast
service; however, by placing containers on a double-stack service
from the West Coast to Chicago, better transit time to the Midwest
than is possible through the East Coast is provided, and apparently
no major diversion of cargo from the East Coast service is caused.

Foreign-flag ocean carriers did not approach double-stack con­
tainer trains with the eagerness of APL or Sea-Land, but several
are now involved (e.g., NYK, Mitsui OSK, and Maersk). Some
foreign carriers have set up their own U.S. firms, and others have
formed contractual relationships with existing U.S. companies.
The introduction of the foreign carriers to the use of double-stack
container trains was made easier by the aggressive promotion of
this service by certain railroads such as Burlington Northern, and
ports such as Seattle.

Although APL represents one extreme in terms of investment,
the other extreme should be considered. A small containership
operator, or a carrier that carries a relatively small number of
containers as part of a combination-bulk cargo vessel service,
cannot afford to spend millions of dollars on an activity not
directly related to vessel operations. The firm does not have suffi­
cient volume on a steady basis to write a long-term contract with a
railroad. The company uses neither satellite communications nor
computerized container-control systems. It has few, if any, sales
offices in locations other than its ports of call. It does not have the
financial resources to buy double-stack container railcars or the
management resources to manage a separate domestic transporta­
tion division.

Such a small operator must take advantage of public services
provided by railroads and ports. The Burlington Northern, the
Chessie (CSX) and Conrail all provide or did provide at one time)
common carrier double-stack container train service. Seattle
provides services to carriers and shippers including container trac­
ing in some instances. The Port of New York and New Jersey
served as a shippers' agent to promote Conrail double-stack ser­
vice. Although not directly helping an ocean carrier, this activity
helped to keep the double-stack service in operation. The Port of
Baltimore has subsidized the rate charged by CSX on double-stack
service provided at its port.

As carriers examine the issues involved and the extreme range
of strategies possible, they must decide on the particular strategy
best for them. A carrier deciding to purchase its own double-stack
container rail cars must determine the capacity of this equipment in
terms of 40-ft, 45-ft, and 48-ft containers. The container widths
may also vary at 8 or 8.5 ft. This decision should be tied to the
carrier's desire to purchase high cube containers longer than 40 ft,
as well as accompanying design changes that might have to be
made to its vessels. If a carrier believes that all the existing and
announced double-stack container train services will result in
overcapacity, its decision to purchase railcars will also be affected.

In conclusion, ocean carriers have a wide range of issues and
strategies to deal with. Although the decision-making process may
be difficult, double-stack container trains appear to be here to stay,
therefore, ocean carriers cannot afford to ignore them.