

In L.A., one railroad is four miles away and the other is 25 miles away. A trip to this far yard is a 50-mile roundtrip. We need on-dock or near-dock rail facilities to help relieve the highway gridlock, improve fuel conservation and increase the availability of trucks.

When double-stack service started, loads were increased by up to 400 FEU's per train. We are now looking at this reverse. A lot of the products moving in boxcars and in trucks can be moved in containers on double-stacks. So, to provide faster, more frequent service we are considering running three or four 100 FEU stack trains daily instead of one daily 400 FEU train.

There are trade-offs that have to be looked at in intermodalism. The most obvious one is the cost of land versus the cost of labor and equipment. If you want to store all your containers on wheels in a port, as is typically done in a rail yard, it takes a lot more land in the port. Land is getting more expensive and ports are running out of land, so I think you are going to see movement towards either a lot more ground stacking or a mix of wheel and ground storage. In our case, about 65-70 percent of our traffic is intermodal, and it does not make sense to take a container off the ship, store it on the ground, and then an hour later pick it up to take it to the rail yard. So we are forced to use chassis operations to store containers. But, every chassis takes up room.

For every three loads from Asia that go east of the Rocky Mountains, there is only one export load coming back. What complements this 3 to 1 imbalance in international moves is domestic business which is heavily weighted westbound. But for us to go to on-dock or near dock rail facilities, the rails are going to have to get used to handling the international business, and ports are going to have to adjust to handling domestic business.

Looking to the future, we will have direct ship to train transfers with rails right under the cranes, which will eliminate the need for trucking or storage. Other improvements could involve automated cranes to load and unload trains. Also, there may be automated container freight stations.

INTERMODAL TRENDS AT WEST COAST PORTS
AND THE ROLE OF THE U.S. ARMY CORPS OF ENGINEERS
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The Corps of Engineers has long been active in developing the nation's harbors and waterways. Studies of improvements for both deep- and shallow-draft navigation projects are directed by the Congress and the Administration, primarily to assist in determining the scope and dimensions of required navigation improvements to assure the continued viability of the nation's excellent system of ports and waterways.

Some of the world's largest and most modern deep-draft ports are found along our nation's West Coast. The principal West Coast ports for container traffic include Seattle/Tacoma, Oakland, and Los Angeles/Long Beach. The rapid growth of the West Coast ports makes them an ideal example to illustrate the

revolution that is taking place in the U.S. port industry.

Seattle/Tacoma

The Port of Seattle carried on two-way trade in 1987 worth 26.25 billion dollars with 125 countries. Since Seattle is geographically closer to Asia than its competitors to the south, it's understandable that trade with Asian nations accounted for more than 90 percent of the foreign waterborne cargo moving through the Port of Seattle, and 95 percent of total container cargo. The Port of Seattle handled 1,026,000 TEU of container traffic in 1987, nearly double its 1976 volume.

Existing channel depths at Seattle vary from 30 to 34 feet. A feasibility study recommending a deepening project of 39 feet was passed by the Board of Engineers for Rivers and Harbors in 1983. This project provided for deepening a total of about 4.8 miles of channel at a first cost of about \$50 million; however, the port has decided to put the study on hold pending further investigation of port priorities.

Recent growth in container traffic at the ports of Seattle and Tacoma is a function of the locational advantage of the region--260 nautical miles (N.M.) closer to Japan than the San Francisco Bay Area (15 hours sailing time advantage) and 563 N.M. closer to Japan than the LA/LB ports (30 hours sailing time advantage). Ship transit time for a vessel from Asia to Seattle is about 8 days.

Seattle and Tacoma are largely thru-put ports with 70-75% of container imports eventually moving to points east of the Rocky Mountains. Most of this goes by rail, some by truck. A large amount of cargo is warehoused prior to proceeding eastward.

Container traffic in Seattle is served by 7 container terminals equipped with more than 20 container cranes (30-51 LT capacity). Container terminals cover 328 acres. Seattle is served by 40 general cargo steamship lines on a regular basis. Both the Burlington Northern and the Union Pacific provide double-stack train service via three intermodal rail yards.

The Port of Tacoma has existing depths ranging between 35 and 50 feet and an abundance of backup acreage and excellent rail service. Tacoma is already one of the nation's leading container ports, handling nearly 700,000 TEU in 1987. The Corps of Engineers is currently participating in feasibility studies for the Blair Waterway Navigation Project, a \$54 million multi-phase project that will open up approximately 300 acres of port terminal lands for container development. Dredged material from the Blair Waterway (existing depth 35 feet) will be used for expansion of the Sea-Land facility. The initial phases of this project are scheduled to begin in 1989.

Oakland

The existing navigation project at the Port of Oakland consists of a 3.4 mile outer harbor and an 8.5 mile inner harbor. The existing project depth is 35 feet. A project to deepen Oakland Harbor was authorized by Congress in October

1986. The Corps of Engineers is presently completing the design and the environmental impact statement. Initial construction, originally scheduled for May 1988, is on hold pending court action on acceptability of the selected ocean disposal site for dredged material.

The deepening project will be constructed in phases, with an initial depth of 38 feet to accommodate the new line of post-Panamax American President Lines (APL) container ships. The recommended plan of improvement will deepen the existing harbor channels to 42 feet and will relocate, deepen, and enlarge the turning basin.

Containers handled at the Port of Oakland reached over 950,000 TEU in 1987, a 50% increase since 1981. The port is projecting a doubling of its container tonnage by the year 2000.

About 40% of Oakland's Pacific Rim imports continue to the East and Gulf coasts by rail. The Port of Oakland is served by 9 container terminals with 22 cranes (capacities 30 IIT to 50 IIT) including two huge post-Panamax ones. The total TEU capacity on the almost 500 available acres is more than 22,000. Three major railroads--the Union Pacific, Santa Fe and Southern Pacific--provide service to the Bay Area. The UP is currently enlarging several railroad tunnels through the Sierras in order to handle double-stack trains carrying two of the new high cube (9-foot, 6-inch) containers. The project is being jointly funded by UP, the Port of Oakland, and APL.

Los Angeles/Long Beach

One of the most exciting developments at the Ports of Los Angeles and Long Beach is the new Intermodal Container Transfer Facility, which is operated by Southern Pacific and is capable of processing 230 containers per hour. During the first phase of operation the facility will have the capacity to handle 350,000 containers annually, many of them on double-stack container trains. This new facility, costing \$70 million and covering 150 acres, was opened by the ports in January 1987 and is considered to be the world's largest intermodal truck/rail yard. It handled over 260,000 containers in its first year of operation.

Over 50% of all West Coast container traffic is handled at the ports of Los Angeles and Long Beach (over 3,000,000 TEU in 1987). About 55% of incoming containers stay in the region, the remaining 45% continue on by rail to destinations east of the Rockies. Together, Asian traffic and petroleum make up about 95% of total business at these ports.

Existing channel depths at the Port of Long Beach vary from 35 feet to 62 feet. Container traffic using the Port of Long Beach is served by seven container terminals equipped with 26 forty-ton container cranes, and two more container terminals are planned for 150 acres of fill. Twenty-nine shipping lines use these facilities.

Of the approximately 20.4 million metric revenue tons (mrt) of container traffic in 1985-86, about 16.4 million mrt, or 80%, were imports. These

included textiles (about 70% of all textiles enter U.S. through southern California ports), electronic goods, clothing and shoes from Asia, and spirits, wines and beer from Europe. Currently, a high number of automobiles are imported from Japan and Korea, but future expectations are for growing volumes of containerized auto parts destined for assembly plants at inland U.S. points. Exports to both Asia and Europe consist largely of California agricultural products; seasonal fruits and vegetables in reefer and temperature controlled containers; and cotton.

Existing channel depths at the Port of Los Angeles vary from 35 to 52 feet. A total of seven active container terminals are available, equipped with 29 container cranes. Double-stack train systems operate on the AT&SF, SP and UP railroads and are used by Evergreen Lines, APL, NYK, Mitsui-O.S.K. and others. Total container tonnage through the port in 1986-87 was about 27.3 million mrt, representing about 85% of the total general cargo tonnage. This tonnage was transported in about 1.5 million TEU. Chief exports are the same as for Long Beach: seasonal fruits, vegetables and cotton.

Recently, the Corps assisted the ports in the development of their "2020" master plan completed in 1985. Their conceptual plan includes deepening of navigation channels and landfill development within the bay to an ultimate extent of about 2,600 acres to meet the estimated increase in cargo throughput from the present 66 million metric tons to 195 million metric tons.

Section 201(a) of the Water Resources Development Act of 1986 (P.L. 99-662) authorizes the Corps to deepen the entrance channels to Los Angeles and Long Beach harbors to a depth of 70 feet and 76 feet, respectively, including creation of 800 acres of land. The authorization however, is subject to a favorable Chief of Engineers report and the Secretary of the Army's recommendation to the Congress for construction authorization. There are unresolved questions of cost-sharing requirements related to land enhancement, optimal channel depths, etc.

Market Trends

Together, the Pacific Coast ports accounted for over 50% of total U.S. containers (TEU) in 1987, up from just 31% in 1981. Much of the West Coast's growth came at the expense of the North Atlantic port range, whose share of total container traffic dropped from 35% to 26% during the 1981-1987 period. As an illustration of this trend, combined movements through L.A. and Long Beach surpassed New York for the first time in 1985, even while the latter's traffic continued to increase at a modest 5% annual rate through 1985.

The West Coast ports in general, and L.A./Long Beach in particular, have gained ground for several reasons, among them: increasing overall U.S. trade with Pacific basin countries; an increasing share of Asian trade moving through West Coast ports; and increasing rail minibridge penetration of the U.S. interior and East Coast markets.

One factor accelerating minibridge traffic growth is the difference between the amount of time required to move a container from various Asian ports to U.S.

East Coast ports such as New York via either the West Coast (using rail double-stack service), or by the all-water route through the Panama Canal. The all-water route is generally about 10-15 days longer. For higher value and time-sensitive cargoes this time difference can actually result in transportation cost savings using the minibridge alternative.

Projections of container tonnage at West Coast ports by the Pacific Maritime Association for 1990 and 2000 show an increase from 87.4 million revenue tons in 1990 to 171.9 million tons in 2000 based on a 7% growth rate. Using an 11% growth rate, these revenue tonnage figures would be 101.3 million tons in 1990 and 287.5 million tons in 2000.

PORT OF TACOMA:
BUILDING THE INTERMODAL ADVANTAGE
BY
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Port of Tacoma

In 1981, the Port of Tacoma introduced the original on-dock rail intermodal yard. The Port also introduced the use of the high-speed straddle carrier for loading/unloading containers from rail cars.

Our intermodal traffic increased from 8 lifts per week in 1984, to 1,330 lifts weekly in 1985, to over 3,800 lifts per week at present. We have achieved a total of 937 lifts in an eight-hour shift. That is the equivalent of a 28 car double stack unit train completely unloaded and reloaded.

The Port of Tacoma now operates two on-dock rail intermodal yards where the longest distance from ship to rail is only 1,100 feet. We have the capacity to handle 117 double stack cars. That's 1,170 TEU's (twenty-foot equivalent units) or about 4 unit trains of 28 cars each.

On-dock railroading is not new to Tacoma. Since 1873, when Tacoma was chosen as the western terminus of the Northern Pacific Railroad Co., rails have been important fixtures on our docks. The silk trains of the 1890's originated here. Even today, 10 of our modern general cargo berths have double rail tracks alongside the berth.

Just as speed was important to the silk trade, so is it today. Be it auto parts or electronics, dresses or foodstuffs, the shipper expects to realize the fastest delivery and the most economical. With last port of call from Tokyo, Japan, we can have cargo to Chicago in 12 days and to New York in 15 days which compares to 22 days all-water. That 12 days to Chicago is comprised of 9 days on the water, less than 1 day in port and 3 days on the rails.

Saving a week in-transit over the all-water route to the East Coast means that achieving just-in-time deliveries to a manufacturer's assembly line is closer to reality. It means that consumer goods are on the showroom floor ready for sale a week early. It means real dollar inventory savings, as a container valued at \$100,000 would generate about \$250 in carrying costs in these 7 days. And finally, it's cheaper. A container of auto parts for diesel engines will cost \$200 less going via a landbridge move at \$6,348 than via an ocean