

Port Congestion Relief: Attacking the Entire Chain

By Thomas Ward

“Port congestion” is the buzz-phrase in the maritime community today. Every time we open a trade journal that covers our community, there are articles on relieving “port congestion”. Why are we so concerned, and what should we do about it?

Ports compete in a very open marketplace. Most shippers can choose from among a range of logistics paths, and shipping lines respond to shippers’ needs by shifting vessel patterns between competing ports in a given market range. At the same time, most port market ranges are not subject to any overall strategic capacity planning. Certainly, U.S. ports all make expansion decisions without any consideration of such decisions in other ports. And ports in competing countries within the same range also act very independently. This competition is good for the movement of freight, because it allows shippers to search out and find the cheapest, most effective path for goods movement. Right? Well, maybe.

It takes a very long time to build new capacity, and the development timelines are stretching in most major port ranges. Open land next to deep water is not plentiful any more. Building major deepwater landfills is expensive and time-consuming. The environmental permitting process is getting more complicated, expensive, and restrictive. And, most importantly, the natives are getting restless.

Many ports are in vibrant urban areas, but carry freight for distant inland markets in addition to coastal markets in their immediate area. That means port city residents carry an unfair environmental burden. In many cities, the residents are responding by putting increasing political and environmental pressure to slow or restrict port traffic increases, in spite of the strong role that such traffic has in their local economy. The environmental headaches are perceived as outweighing the economic benefits.

The growing restrictions on port development mean that rapid shifts of freight between ports in a given market range can cause chaos. The tremendous problems in Southern California in 2004, which became the “poster child” for “port congestion”, were, in part, due to a tremendous imbalance in growth across the West Coast ports.

The response this year has been a rapid re-balancing of trans-Pacific loads across West Coast, Gulf Coast, and even East Coast ports. While this is necessary and a very good thing in the short term, all the ports involved must be very careful. **Shifting just 5% of the traffic out of Southern California to another port can increase that port’s traffic by as much as a third.** How many ports can sustain such a rapid onslaught? What should they do?

Port capacity is all about velocity: the faster freight moves, the more the port facilities can handle on a fixed resource base. By making better use of existing facilities, ports can avoid time-consuming and difficult new developments. This approach seems obvious, but what does it mean in practical terms?

“Velocity” is simply distance over time. At sea, container freight moves at 25 knots. The 6,300 miles from Hong Kong to Los Angeles can be covered in eleven or twelve days. That’s when things grind to a halt. The ship may take three days to be worked in L.A. The container will reside for an average of five days more in the terminal. It will take another day to get out of the terminal and across the L.A. urban area,

which is about 50 miles across. The average velocity of the freight drops to about 0.25 knots or 1% of its velocity at sea. All the wonderful technology built into maritime transport is stymied by the port system's ability to get the freight inland.

All the while that the container is moving at such a low speed, it is consuming valuable port and urban resources: berths, terminal yards, urban roads, and regional highways. The slower it moves, the more it consumes. In order to reduce consumption, we must increase speed across the whole system. And, as we increase demand on fixed resources, we cannot just attack one element at a time – that will just shove the congestion from one step to the next, as was so amply demonstrated in Southern California in 2004.

We must attack the velocity problem at all points simultaneously, so that each element of the transport chain is capable of taking up the strain as neighboring links are improved.

The Ports of the U.S. are starting to take a more systematic approach to velocity improvement, looking well beyond the traditional boundaries of their jurisdictional areas. The Port Authority of New York and New Jersey recently completed its Comprehensive Port Improvement Plan. The Port of Oakland recently completed a comprehensive multi-modal Maritime Development Alternatives Study, coordinated by JWD Group. The Port of Los Angeles is working on a comprehensive effort to coordinate improvements across all transport links in its area. West Coast marine terminal operators are re-examining all elements of their business processes and identifying and implementing programs to increase container velocity inside and outside their terminals, starting with the PierPass OffPeak program.

What sorts of improvements are being contemplated, and how will they help?

Extended Gate Hours: Expanding gate operations to allow night-movement allows use of roadway capacity during off-commute hours. The Southern California ports will start offering 16 to 18 hour / day gate operations this summer. Given that many truckers and inland warehouse and distribution operators don't work at night, this can't work without some sort of inducement.

Congestion Pricing: Congestion pricing, in one form or another, is being introduced to deter use of port, roadway, and rail capacity during peak traffic hours, so that freight can move more quickly without causing so much friction with the urban environment. Congestion pricing is complicated, and very difficult to make "fair" across the logistics system. The key is to make sure money flows from the ultimate source – shippers – to the cost centers responsible for providing services. JWD Group prepared the pan-terminal survey of night operating costs and established the basis for the PierPass OffPeak daytime container movement charge.

Trucker Appointment Systems: For off-peak gate hours to work, truckers need to be confident that they will be safely and efficiently served in the port at night. Many, if not all, Southern California terminals will likely impose mandatory appointments for the pickup of import loads, during both day and night operations. This will allow the operators to prepare imports for rapid delivery to truckers, reducing trucker delay and increasing overall yard velocity.

Off-Dock Container Yards: Some liner operators, trucking companies, and even stevedores are establishing off-port container storage yards, allowing container storage dwell time to be split across more facilities. This improves velocity in two ways. First, containers moving to off-dock facilities can be moved quickly and efficiently by contract truckers at night. Second, off-dock facilities are frequently in less-congested areas, making containers more accessible for rapid movement by truck and rail.

Fast Rail Shuttles: Several ports are considering the deployment of rapid inland rail shuttles, moving containers between the port area and inland rail complexes, where reconsolidation and distribution can be done more efficiently than in the tight confines of the port. The Port of Oakland is pursuing a shuttle to

California's Central Valley, the Port Authority of New York and New Jersey has included rail shuttles in the Port Inland Development Network, and the Alameda Corridor Transit Authority is pursuing Inland Empire Shuttle for Southern California. These programs have the potential to allow space-consuming redistribution to take place where there is room for it to occur. Velocity can only be improved, however, if the shuttles can be handled rapidly in the port.

Integrated Maritime and Rail Movement: Several ports are examining methods for more tightly integrating the movement of containers between maritime and rail systems. Rail capacity is perhaps the most rigid element in any port/hinterland system, as increasing the tempo of movement is very hard to do, and building new track takes a very long time and a lot of money. The key to making rail systems work is to tighten the linkage between the maritime movement and the rail movement, so that rail cars can be made available when containers are ready, and containers are ready to move when rail equipment is in place.

Expanded Rail Connections: Several ports are expanding rail connectivity, including rail operating yards, mainline access tracks, and switching and routing tracks. These improvements allow more efficient placement of railcar resources against demand, and more efficient train movement across the entire system. Rail geometry is intrinsically inconsistent with port and road geometry, so careful planning is required, as has been done all along the West Coast.

Automated Yard Marshalling and Inventory Control: Within the marine terminals, most operators are deploying automated inventory control for containers, so that every container's location is tracked continuously in real-time. Beyond this, several operators are pursuing automated container handling, at least as far as using robotic cranes to marshal containers when the terminal is normally not operating. When combined with appointment systems and better freight movement data integration, this allows the operator to make import containers more accessible for upcoming deliveries, improving truck service and increasing overall velocity.

High-Speed Gates: Most terminals are deploying automated high-speed gates that rely on optical character recognition, digital imaging, and other technologies to speed truck processing and integrate truck/terminal operations. These systems, especially when combined with appointment systems and automated marshalling, can greatly speed truck movement and make off-peak truck movement more effective and economical. They are but one more important element in making better use of residual capacities in the port transport system.

Multi-pick Cranes: Most ports have pursued the deployment of quay cranes capable of twin-20 operations. While the technology for tandem-40 / quad-20 operations is not 100% mature, we can tell that it will likely mature rapidly and become a major element in improving vessel service productivity. However, as JWD has learned in recent planning projects, these new cranes will have a profound impact on the layout and operations of the marine terminal. Only through comprehensive approach to site planning and operations analysis can these new machines be deployed to fulfill their maximum potential.

No one of these approaches is sufficient, by itself, to relieve port congestion in a significant way. Each is reliant upon improvements in other areas and on other logistics links. As we shown with ships, just because we can move at 25 knots at sea doesn't mean we can move freight quickly. We must move freight velocity in every port element to a level consistent with the high speed of ocean transport.