

## The de-Intermodalization of Southern California Ports

**Growth Fueled by Intermodalism.** A conceptually-convenient way of depicting the recent history of liner shipping is as a series of technological breakthroughs or “revolutions”. The first one was the invention of containerization, revolutionizing the ship-to-shore transfer process; the second was the hinterland extension of containerization, using the marine (ISO) box for the entire ship-to-door transfer and transport process, often referred to as *intermodalism*. Intermodalism was driven by the extensive use of rail for the land transport leg, culminating with the introduction of unit-trains, articulated double-stack railcars, and “on-dock” intermodal railyards.

The twin ports of Los Angeles / Long Beach (**LA/LB**) led the intermodal revolution. Intermodalism, in turn, allowed these ports to expand their hinterland to encompass almost the entire US and becoming the largest US port complex with about 15 million TEUs, 3 times larger than the second in rank. Currently, the intermodal traffic at these ports accounts for 40 - 50% of their total traffic. A growing tendency in present and, especially, future LA/LB container terminals, is to have large “on-dock” (inside the gate) intermodal yards, which occupy about 1/3 of the terminal area that, otherwise, would be used as container yards.

**Convergence of Opposing Factors.** It seems, however, that intermodalism at these ports has peaked and is likely to substantially decline in the future. This unfortunate (although some local resident may see it as fortunate) turn downward is the result of the convergence of several factors listed below in the order of the global to the particular:

- **Shifting Trade Lanes.** With the sources of imports moving from China to South Asia and, perhaps, Latin America (“near-shoring”), the traditional transpacific trade lane is expected to lose ground to the Suez and other direct All-Water trade lanes to the USEC and USGC ports;
- **Improvements in Logistics.** A related improvement in the supply chain of big retailers allows them to become less dependent on the faster and more costly intermodal route. Instead, they constructed large distribution centers and warehouses nearby the USEC and USGC ports, closer to the consumption areas.
- **Rising Fuel Cost.** Higher fuel cost favors water transport over the much higher fuel-consuming land transport, resulting in widening the cost differentials between the All Water Route , either through Panama or Suez, and the intermodal route.
- **Expansion of the Panama Canal.** The new Panama Canal locks will allow the All Water route to deploy new Panamax (**NPX**) ships of similar size and transport cost to those deployed on the transpacific leg of the intermodal route, resulting, again, in widening the cost differentials between the All Water and the intermodal route.
- **Dwindling Ship Size Economies.** Although there are a few containerships larger than the NPX (e.g., Maersk E-class), the savings in capital and operating costs of ships beyond the NPX size (which this author believes may eventually reach close to 15,000 TEUs) are relatively small.

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Hence, future deployment of post-NPX on the transpacific will not affect much its relative cost vs. the All-Water via the Panama. Likewise, post-Panamax can be deployed on the Suez route.

- **Development of Transloading.** The near-port transfer of cargo from 40-ft marine containers to 53-ft domestic containers has been gaining popularity. The larger boxes have 50% more capacity, do not have to be returned to foreign destinations and also allow mixing and matching during the transloading process. While transloading seems to substantially save on transport cost, it requires more time and further dilutes the “express effect” of the intermodal route through LA/LB (see more below).
- **Rising Port Costs.** The LA/LB region suffers from severe problems of air pollution and traffic congestion, with the area’s ports considered as an important source for both. The result is a bevy of mitigation costs including, among others: harbor fees, cold ironing, speed reduction for ships, clean fuel for ships, new harbor trucks, electrified handling equipment and, under the banner of the environment, unionization of harbor trucking.
- **Shortage in Waterfront Lands.** The LA/LB area has a severe shortage of developable waterfront land; development of the few still available site faces stiff environmental resistance. This shortage may force the terminal to pursue expensive technologies for storage densification which, in addition to higher cost, may result in slower operation.
- **Emergence of Alternative Intermodal Gateways.** The last count by this author indicates at least 15 (!) present and future ports, in the Pacific, Gulf and Atlantic Coasts of the US, the Pacific and Atlantic Coasts of Canada and the Pacific Coast of Mexico, are vying to intermodally serving the US hinterland.

At first glance, the last factor, to be further elaborated below, appears as the most important. However, it is the *conversion* of all the above factors that gather the critical mass to tip the scale, to reverse the trend in intermodalism in Southern California. This change may take some times to be fully realized – but it appears to be *irreversible*.

**New Intermodal Gateways.** Most of the intermodal cargo handled at LA/LB is destined to the Midwest, with the rest destined to the Gulf and East Coasts. The main contender for the Midwest cargo is the Canadian port Prince Rupert, which is about 700 NM closer to Asia. In fact, already about 85% of the cargo of this port is destined to the US Midwest. Other contenders, all of which are substantially closer to Asia, are the Pacific Northwest ports of Vancouver, BC; Seattle, Tacoma and, in the distant future, Grays Harbor. The main contender for Gulf Coast cargo is the Mexican port Lazaro Cardenas, connected to the US rail system by an affiliate of the KCS railroad. This port is 400 rail miles closer to Houston than LA/LB and only 200 rail miles further to Chicago. Another long-term contender is the Mexican port of Punta Colonet, located 80 miles south of the border. Here the government of Mexico is pursuing a green field 1,900 Ha, 6-million TEUs port complex, with a total investment of \$4.96 billion, of which \$1.08 billion is dedicated for a new rail connection. Gulf Coast cargo could also be served by All Water services utilizing the expanded Panama Canal. In fact, Zim has already been deploying, prior to the recent recession, full Panamax ships on its direct Asia service. Moreover, the US Gulf Coasts ports of New Orleans and Mobile could be future contenders for the Midwest cargo. For example, New Orleans is only 390 rail miles from Memphis and 920 rail miles from Chicago, vs. 1,940 and 2,230 miles for LA/LB respectively. New Orleans’ unique location on the Mississippi River could be further enhanced by *extended* All Water services reaching the Midwest using specialized shallow-water containerships similar to those used on the Rhine. Finally, the growth in both Panama and Suez All Water services to the USEC, could enhance the position of the US Atlantic Coasts’ ports of Jacksonville, Savannah, Charleston,

Norfolk and New York as contenders for the Midwest intermodal cargo. These ports already have double-stack trains and intermodal yards.

In the longer term, a new port could be developed in Nova Scotia, being the closest to Asia for Suez Express services, mirror imaging Prince Rupert on the Pacific. These 2 Canadian ports are essentially “pure rail ports” (PRT), whereby almost all their traffic consists of intermodal containers. These PRTs could develop specialized terminal configurations, providing for direct (“live”) ship-to-rail transfer to expedite the process and significantly reduce handling costs. There also is the related possibility that shipping lines calling thesees PRTs will deploy “pure rail services”, carrying only intermodal cargo (see more: [http://asafashar.com/JOC%203-3-08\\_Other\\_Voices.pdf](http://asafashar.com/JOC%203-3-08_Other_Voices.pdf)). The combination of shorter ocean distances, specialized terminals and dedicated services will create a new type of intermodal service, an “express” one. The figure on the right illustrates the extent of the port competition and the multitude of gateway ports and rail routings for serving the Asian cargo of the US hinterland. Because of their shape, rail routings in this figure are often called “bridges.”



**Segmentation of the Intermodal Traffic.** The multiple-gateway situation, as depicted in Figure 1, is likely to foster a process of specialization and segmentation based on the time sensitivity of cargoes. The highest time-sensitive cargo will be served by the “express” bridges in the north; the lowest time sensitive will be served by All Water services. The remaining, intermediate segment will continue using LA/LB -- which means a substantial reduction in these ports’ intermodal traffic. Moreover, the remaining intermodal traffic of LA/LB, being less time sensitive, is unlikely to use marine boxes for the intermodal transport. The smaller marine boxes are likely to stay near the shore with their content being transloaded into larger domestic boxes. Moving the intermodal cargo using marine boxes, the trade mark of early intermodalism, will be limited mainly to the “express” service.

**On-Dock vs. Near-Dock.** The decline in LA/LB intermodal traffic based on marine containers has immediate implications for the future terminals in LA/LB, all of which are designed with large on-dock yards. A study conducted by this author on the ship-to-rail process (see: <http://asafashar.com/On-Off%20Terminal%20Ship-to-Rail%20Transfer.pdf>) indicated that dedicating scarce waterfront lands to on-dock intermodal yards, along with the required access for mile-long trains, supporting switchyards, rail gates, grade separations, etc., is worthwhile only when the rail share of the total traffic reaches 50% and beyond. For ports with smaller rail share, the “near-dock” option is preferable. Near-dock yards are located adjacent to but *outside* the port area. These yards are much larger than on-dock yards, serving several marine terminals, as well as domestic traffic. Near-dock yards require drayage, but because of the short distance, the drayage is fast and relatively inexpensive. It is less costly than switching long trains to smaller on-dock yards, requiring breaking trains into short strings, pushing them in/out the on-dock yards, assembling these strings to trains and then switching them back, blocking the traffic to/from the marine terminals and around them. Other advantages of the near-dock over the on-dock are their higher operational efficiencies, better utilization of railcars, greater availability of rail services to more destinations and the employment of less restrictive labor than port labor. Most importantly, relocating the rail handling from on-dock to near-dock yards releases large chunks of waterfront land at the marine terminals that can serve as container yards. Since in most US terminals the yards dictate the terminal

overall capacity, the shift from on-dock to near-dock yard can substantially add to the marine terminals' capacity.

**Dedicating Scarce Terminal Capacity to Southern California Traffic.** Ironically, there also is a positive side to the expected decline in the intermodal traffic in LA/LB. The combination of decline in traffic and increase in yard space stemming from the conversion from on-dock to near-dock intermodal yards will substantially add to LA/LB capacity. As noted at the outset, because of the severe shortage of developable waterfront lands the future growth of LA/LB ports is capped. The added capacity should be allocated first and foremost for serving the *local* Southern California traffic. Since this traffic is much more important to the local economy than the intermodal traffic of Chicago or New York. Besides, unlike the intermodal traffic, the local traffic has no alternative gateways.

**Facilitating the Transformation from On-Dock to Near-Dock.** The expected decline in intermodalism in LA/LB suggests that new terminals should not be constructed with on-dock yards and, perhaps, that existing terminals with on-dock yards should consider *removing* them. The expected shift to near-dock intermodal yards mandates re-examination of the linkage between these yards and the marine terminals. One relatively-simple option is construction of dedicated connecting roadways, whereby port equipment (terminal tractors) is allowed to freely travel. Another, more innovative possibility, is to employ a system of multi-trailer trains for connecting marine terminals and near-dock yards. To reduce air pollution, these trains could be electrified.

**National Gateway?** Following the rise in intermodalism, LA/LB ports have been claiming the role of national gateway, based on the vast US hinterland these ports intermodally serve. As seen in Figure 1, in the new era of multiple gateways and intermodal bridges, this US hinterland could be served by numerous ports in the US, Canada and Mexico, each specializing in a different market segment. None of these ports, LA/LB included, can claim the mantle of "national". Presumably, the Obama administration will take note of the imminent change in LA/LB ports' status when preparing for new investments in transportation infrastructure. Put differently, it will be very difficult to justify another Alameda Corridor in the LA/LB area based on national benefits.

**Spreading and Advancing the Intermodal Revolution.** As to the revolution-fraught history of liner shipping, the de-intermodalisation of LA/LB does not indicate the undoing of the intermodal revolution. On the contrary, it indicates that the revolution continues in full force; intermodalism, once centered in LA/LB, is now spreading to many US, Canadian and Mexican ports. In parallel to this process of expansion, intermodalism also is undergoing a process of segmentation and specialization, culminating with the expected emergence of more advanced "species", the express intermodal systems, based on pure-rail shipping services and pure-rail ports.