Clearing the way

The major challenge now facing US ports, especially on the West Coast, is how to handle increased trade growth. **Blair R Garcia** and **Theodore Prince** explore a range of solutions that could lead to increased productivity and reduce congestion.

The liner shipping industry experienced a year of significant growth in 2004, with more of the same forecast for 2005 and beyond. New – and larger – vessel capacity is rapidly coming on stream to support a deluge of international trade. And while ocean tradelanes are not hindered by the congestion of highways and railroads, the challenge to North American ports is to handle this increased growth in trade.

The world’s top 10 most active ports are located predominantly in the Pacific, with a few in Europe and one (combined) in the US. For the purposes of this article, the top 10 world ports in TEU throughput have been identified. Port productivity has been analysed using two metrics: annual TEU throughput to gross terminal acreage, and total metres of wharf.

Figure 1 demonstrates that Asian ports (led by Hong Kong) have the highest levels of TEU/acre/year and TEU/wharf metre/year. US and European ports are at the lower end of both of these productivity measures. These results reflect the high percentage (over 50%) of container transshipment in Asia. Containers moving between feederships and linehaul vessels are counted twice, and will increase the ratios. In addition, some Asian ports also conduct significant mid-stream transfer operations in which containers are counted but never used port equipment or infrastructure.

The reasons for Asian port performance are numerous, but essentially they reflect network accommodation of market and customer demands. Being located in the centre of global manufacturing (where units are loaded immediately) while not having the land to expand physically are two major factors. In addition, the need to handle numerous vessels, serving multiple tradelanes, requires a constant flow through the terminal on a 24/7 basis.

US ports currently operate very differently: containers cross the wharf once, and exit the gate – or are loaded onto railcars. US ports serve the inbound portion of the global supply chain. This factor, combined with a long period of abundant land and inland distribution capabilities, is reflected in operating practices (and productivity) significantly different from those in Asia. The most important difference is that US ports have allowed importers to store containers until they are needed. This practice essentially amounts to free warehousing. US ports have developed operations whereby containers are unloaded at multiple consumption locations, and then held for the customer until pickup.

Figure 2 indicates that over the past five years, US East and West Coast (USEC and USWC) ports have experienced similar growth rates. However, the USWC has greater throughput/acre productivity. Figure 3 illustrates productivity factors for the top 10 US ports. The primary factor contributing to this performance difference is the amount of transcontinental intermodal business handled by the USWC ports, which have a more concentrated transfer operation than local/regional truck transfer, especially if the marine terminal has on-dock intermodal.

While the US Gulf Coast ports have not experienced the same growth rates as the USEC and USWC ports, their productivity is still significantly higher than that of the USEC.

The primary reason for this performance is due to the Port of Houston handling 88% of Gulf Coast cargo and operating its current terminals at capacity.

For US ports to remain competitive and to handle the anticipated growth, beyond increasing crane move/hour, they must adopt a different type of operating philosophy. The change in operations will affect US marine terminals as well as most supply chain participants. Ocean carriers, Asian terminal operators, US railroads, truckers and shippers will need to adjust their business practices. The result of change: higher productivity and lower costs.

Today’s businesses are in the habit of receiving and storing cargo in the port until the customer is ready to pick it up. US ports use expensive waterfront land to warehouse containers. This land would be better utilised as a throughput put with a high cargo velocity – achieved by either strict enforcement of just-in-time shipping, or by moving the long-dwelling cargo to an inland location for storage, distribution and collection.

A combination of both will probably occur. The inland location should be:

- **regionally located for trucking distribution and collection operations.**

**Figure 1: International Port Productivity Top 10 Ports in TEU Throughput**

Source: Calculated from Seaports of the Americas – 2003, Containerisation International Yearbook 2003, and port-provided databases/interviews.
Asian ports and shipping partners were to adopt this strategy, existing port facilities would experience a significant amount of productivity increase. If the top 10 US ports were to continue their current growth rates and increase their throughput productivity to 10,000TEU/acre/year, the future available capacity over current throughput productivity in most ports would be significant. (This is not idle speculation. Some US railroads have achieved productivity greater than 15,000TEU/acre/year.)

Figure 4 shows the potential years of growth that could be accommodated for the top 10 ports, based on their volume growth from 1999 to 2003. (Seattle is excluded because it had no volume growth for this period.) Although the prospects are significant, there are numerous structural issues that must be solved. Paramount are land availability, financing and labour jurisdiction.

One commonly cited alternative to moving cargo through US ports faster is to develop a 24/7 operation, which would require shippers and distributors to accept and deliver cargo around the clock. This option is very costly – not to mention, politically problematic – and might well be avoided by shippers as much as possible.

To accommodate the anticipated trade growth over the next five years, North American marine terminals must achieve an average throughput approaching 10,000TEU/acre/year. They must also improve quay operations to increase wharf productivity and container velocity through the terminal must increase. It is no coincidence that the port with the most impressive metrics, Tacoma, is handling mostly intermodal cargo with low marine terminal dwell times. Possible outcomes differ by geography. Figure 5 indicates the volume growth and share by coast.

Trade growth is forecast to grow for the next 10 to 20 years, and ocean carriers will be introducing significant transpacific capacity to accommodate the increase. On the USWC, it is uncertain whether any port can challenge the continued growth of San Pedro. The two reasons why Los Angeles and Long Beach have achieved their pre-eminence are infrastructure and demographics. Most of the other ports on that coast would have trouble fulfilling individual criteria, let alone all of them.

San Pedro has the required infrastructure to handle the cargo volume. It has marine terminals with the necessary acreage, berth size and channel depth to handle large numbers of ever-larger ships. Railroad terminals already exist that can handle the large volume of intermodal traffic, and the railroads have network capacity to handle the necessary train volume.

The Los Angeles Basin’s demographics are also compelling. The local population almost mandates that major retailers position distribution centres (DCs) there. It is not feasible to support the Los Angeles market from another USWC location, and it is probably inefficient to run two USWC operations. Because Los Angeles is a consumption market, there is a steady volume of inbound domestic equipment that becomes available for reloading with import cargo destined throughout the country.

A current development in Long Beach could be an important harbinger. BNSF and Union Pacific (UP) are both seeking the same piece of property for intermodal development. BNSF is seeking to develop a second Los Angeles-area terminal that would handle intermodal cargo only. (UP already has such a setup with an intermodal container transfer facility, or ICTF, adjacent to the San Pedro ports.) UP seeks to develop shorthaul intermodal into the Inland Empire, an area inland from the ports with extensive DCs. Both justify their option by claiming to take trucks off the highway. (It also highlights that on-dock is still far from the expected panacea.)

Ocean carriers and marine terminals need to commit to further develop efficient intermodal operations. Such development requires

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**FIGURE 4: POTENTIAL US PORT PRODUCTIVITY**

**TOP 10 PORTS IN TEU THROUGHPUT**

Source: Calculated from Seaports of the Americas – 2003, Containerisation International Yearbook 2003, and port-provided databases/interviews

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**FIGURE 3: US PORT PRODUCTIVITY**

**TOP 10 PORTS IN TEU THROUGHPUT**

Source: Calculated from Seaports of the Americas – 2003, Containerisation International Yearbook 2003, and port-provided databases/interviews

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**FIGURE 5: US PORT CONTAINER**

**THROUGHPUT SHARE BY COAST**

Source: Calculated from Seaports of the Americas – 2003, Containerisation International Yearbook 2003, and port-provided databases/interviews
Intermodal cargo, which does not now travel further west than the Mississippi River, would be distributed among the calls, with most imports discharged at the first port of call.

The other option is that a US port could become a transhipment hub. Such a shortsea alternative has been widely discussed recently. A tranship operation, with shortsea cargo that does not involve highway moves at the hub, seems more practical than an operation that attempts to penetrate the shorthaul truck market. We will all be watching to see if any location can duplicate Los Angeles’ intermodal rail success as a transhipment centre.

It must be remembered that an increase to 10,000 TEU/acre/year will only solve the capacity problem for approximately a decade. To support the envisioned long-term trade growth – and for US ports to reach productivity levels achieved elsewhere in the world – further modifications to the current infrastructure might well be required.

Carriers and terminals are labouring to increase terminal and network capacity through Los Angeles, but they are also developing plans to expand intermodal coverage elsewhere. BNSF, which has available network capacity, has advocated increased volume through the Pacific North West (PNW). UP has accommodated some business growth through both Oakland and the PNW. Yet it appears that Oakland faces more geographic and rail network challenges to accommodate significant intermodal rail growth. Canadian National (CN) and Canadian Pacific Railroad (CPR) have struggled to participate in Vancouver (BC)’s growth.

Shippers routing through southern California theoretically have the option of routing containers either intact or for local rehandling. Vessel deployments through the PNW – at least, for imports – predominantly (60-80%) comprise intermodal cargo. Shippers do not enjoy intermediate options. One might well see the development of ‘intermodal-only’ ports, with Prince Rupert (BC) becoming the first of this breed. It has rail access to the US, but no local market. Similar operations could also emerge from Mexico.

Over time, these intermodal ports will accommodate trade growth. San Pedro will probably see longhaul intact intermodal continue its decline in market share. On-dock will eventually be expanded to shuttle containers within 200 miles, for devanning to a regional market, and consolidating the remaining transcontinental train segments.

Further growth on the USEC and Gulf Coast is also expected to continue. All-water routes are expected to increase – subject to the capacity (and cost) of the Panama Canal. While the market share for the USEC and Gulf Coast ports has remained steady for the past five years, these ports might soon gain more of the market share. Several different scenarios could evolve.

The first option offers more of the same. Panamax vessels of approximately 4,500TEU would continue to make several port calls.

Intremodal cargo discharge at the hub, seems more practical than an operation that attempts to penetrate the shorthaul truck market. We will all be watching to see if any location can duplicate Los Angeles’ intermodal rail success as a transhipment centre.

It must be remembered that an increase to 10,000 TEU/acre/year will only solve the capacity problem for approximately a decade. To support the envisioned long-term trade growth – and for US ports to reach productivity levels achieved elsewhere in the world – further modifications to the current infrastructure might well be required.

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