

The INFRASTRUCTURE SQUEEZE on Global Supply Chains

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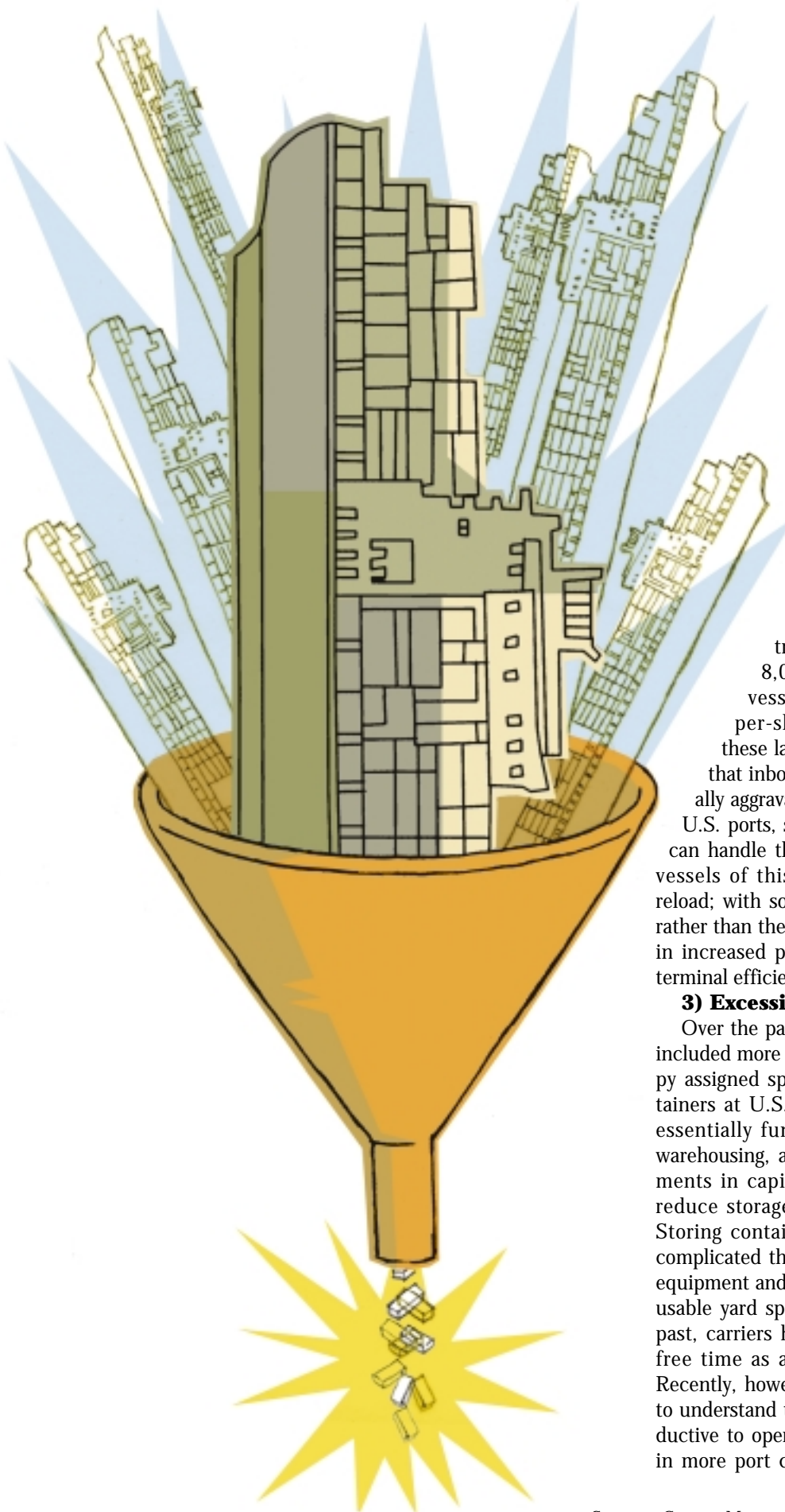
Remember the days when just-in-time practices were the rage, and the philosophy that inventory is bad was pervasive? It was only a few years ago, when many companies began to follow the philosophy of keeping inventory to an absolute minimum to reduce asset investment and inventory-carrying costs. Keeping inventory low is still, of course, a goal. But, recent changes in international trade have made following this principle more risky.

Companies competing in the global arena today are finding that they have to consider a whole new set of supply chain strategies to cope with the new environment. Some of these strategies may appear to run counter to conventional supply chain practices. This article details the new approaches that need to be considered, outlining the advantages and disadvantages of each. Does this mean that such principles as minimizing inventory, reducing transportation costs, and slashing leadtimes are no longer valid? No. But in today's global transportation environment, they may not apply as strongly and as universally as they have in the past.

The Times are Changing

Several trends in international trade and transportation are combining to create a crisis in the United States trans-

A crisis is brewing in the U.S. transportation infrastructure. Increased trade from Asia in general and China in particular is putting the squeeze on port, ocean shipping, rail, and truck capacity. Dealing with these pressures may require rethinking your global supply chain.



portation infrastructure.

1) Increased trade volume from Asia to the United States.

Over the past five to ten years, there has been a dramatic shift in production from the United States to Asia. In particular, inbound volume moving from China through West Coast ports has increased, exacerbating the trade deficit. Ocean carriers and industry experts predict that overall imports to the United States will continue to increase in double digits. This additional east to west volume is causing congestion at ports in California and Washington.

2) Expansion in ship size.

Beginning in 2004, ocean carriers introduced larger vessels into the transpacific trade, many in excess of 8,000 TEUs. The hope was that these vessels would add capacity and reduce per-slot operating costs. But, even with these larger vessels, importers are still finding that inbound space is tight. These vessels actually aggravate port congestion because only a few U.S. ports, such as Los Angeles and Long Beach, can handle their draft requirements. Furthermore, vessels of this size take longer to discharge and reload; with some staying in port five to seven days rather than the normal two to three days. This results in increased port handling times and reduced port terminal efficiency.

3) Excessive container free time.

Over the past few years, importers' contracts have included more free time (or the time cargo may occupy assigned space free of storage charges) for containers at U.S. port terminals. Container free time essentially functions as a cheap form of portable warehousing, allowing importers to postpone investments in capital-intensive distribution centers or reduce storage payments to warehouse operators. Storing containers at the terminals, however, has complicated the ocean carriers' ability to fully utilize equipment and maximize profits. It also reduces both usable yard space and terminal productivity. In the past, carriers had felt compelled to offer increased free time as a competitive tool to gain business. Recently, however, ocean carriers have finally begun to understand that container free time is counterproductive to operational efficiency and actually results in more port congestion. As a result, they are now

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reducing the amount of extra free time offered to importers and have increased demurrage and detention fees in an attempt to turn equipment faster.

Similarly, railroads have begun reducing allowable free days and are increasing demurrage charges for holding onto containers past the expiration of free time. These charges are prompting shippers to change their operations. Ocean carriers, marine terminals, and railroads are now forcing shippers to turn containers more quickly to better control equipment and improve asset utilization.

Keeping inventory low is still, of course, a goal. But, recent changes in international trade have made following this principle more risky.

4) Customs has made border security a much higher priority since Sept. 11, 2001.

The U.S. Bureau of Customs and Border Protection (CBP) has implemented many new requirements and guidelines, such as the Customs-Trade Partnership Against Terrorism (C-TPAT). These programs often result in additional processing time, and regulations are expected to become even more stringent. CBP has also stepped up exams at ports on suspicious cargo, which adds to port congestion, causes delays in customs clearance, and increases costs to importers. The increase in random inspections of selected containers has forced importers to add days to their leadtimes as a hedge against unpredictable customs clearance times.

Current State of the U.S. Transportation Infrastructure

All of these trends have had a serious effect on transportation infrastructure, resulting in constraints across all modes.

Ocean Carriage and Ports

In ocean shipping, the recent trade increase from Asia has meant that vessel strings from Asia to the West Coast of North America are now at capacity. This increase has had repercussions on vessel strings to ports across the continent. For example, all-water strings to the East and Gulf Coasts of the United States are not a panacea for the West Coast congestion. Instead, the Panama Canal is at capacity, and these vessel strings are full as well. While Canal expansion plans are under discussion and will be put to public referendum later this year, the outcome is uncertain. And even if Panamanians vote to expand the Canal, it will take several years to complete. Additionally, ocean shipping capacity from Europe to the U.S. East Coast is also tight, forcing importers to scramble to find ways to satisfy demand.

Capacity is tight not only on vessel strings but also at the ports themselves. Most major U.S. ports are already at capac-

ity (particularly Los Angeles and Long Beach), and only a few plan to expand. Many existing ports cannot add capacity due to the unavailability of land and/or backlash from the community about environmental concerns such as traffic and air pollution. Meanwhile greenfield sites with intermodal connections are prohibitively expensive to develop.

Ports have not been able to improve their productivity levels to respond to the increased demand either. Waterfront labor productivity has not dramatically increased despite recent contracts that allow ports to implement technology to improve operational efficiency. Longshore work hours could be increased to raise port throughput, but labor union issues and work rules may make this difficult.

As a result of the congestion, ocean carriers and shippers are seeing increased costs. The Panama Canal Authority recently announced to ocean carriers that it will phase in dramatically higher usage fees over the next few years. At the Port of Long Beach, a 5 percent general tariff increase took effect on July 1, 2005, to cover the increased costs of infrastructure, environmental, and security projects. Other ports will likely follow with their own increases and these costs will eventually cascade down to shippers.

Variability in cargo leadtimes to U.S. ports is also significant. During the peak season for 2004, companies experienced delivery variability from 3 to 28 days when vessels were held at anchor outside the ports of Los Angeles and Long Beach due to terminal congestion. While longer leadtimes can be accommodated in the import planning cycle, variability in leadtimes is much more difficult to handle. Shippers prefer predictability even if the transit time is slightly longer.

Rail

As a result of the increase in intermodal traffic through U.S. West Coast ports to inland points, the railroads' container and track capacity are tight, particularly in the West Coast port corridors and east of the Mississippi River where the bulk of America's population resides. U.S. railroads generally lack double tracks that allow for dedicated eastbound and dedicated westbound trains. This is compounding port congestion and hampering the smooth handoff of intermodal containers from the ports to the railroads. Further delays are created because freight trains generally compete for the same tracks as passenger trains, even in key corridors such as in Northern California.

In addition to track capacity issues, switching yard operations are also constrained in many locations; for example, throughput in Chicago is problematic. Shortages also persist in labor, locomotives, flat cars, and containers. Burlington Northern Santa Fe Railway and Union Pacific Railway, however, are in the process of making changes including adding personnel, laying more track, and expanding fleets by 10 percent.

Complicating matters, demand for rail comes in waves as opposed to at a steady rate. The new generation of 8000+

TEU vessels, for example, dumps a huge number of intermodal containers on West Coast rails at one time. Additionally, carriers deploy many of their vessels to arrive at the West Coast on weekends to enable cargo availability to customers early in the week. This schedule creates cargo surges that affect the flow of intermodal containers moving to the railroads.

Truck

Rail isn't the only mode with a labor shortage. The current long-haul driver base is too small to handle increases in trade, especially with driver turnover at a historic high. Many long-haul drivers who didn't want the difficult lifestyle any longer have left the trade, and, according to the American Shipper, a large number are nearing retirement age (the average age of an over-the-road driver is approximately 55). While there is a need to increase the driver base, trucking companies are finding it difficult to recruit sufficient numbers of new long-haul drivers. If current trends continue, experts forecast a shortage of 111,000 drivers by 2014. The supply of port drayage truckers is also decreasing. Port congestion is making it difficult for port drayage truckers to make a reasonable living, and dri-

vers are leaving the trade in record numbers, according to the Journal of Commerce. The new federal hours of service legislation only compounds these problems by reducing total available driving hours.

On top of the shortage of drivers, certain road freight corridors, such as Los Angeles, are excessively congested, and alternatives have to be identified. For example, in an attempt to avert proposed legislation, marine terminal operators formed PierPass, a not-for-profit organization to reduce congestion and air pollution around the Los Angeles and Long Beach ports. PierPass has implemented "OffPeak," a program that encourages the use of port night gates by assessing to importers a "traffic mitigation fee" of \$40 per TEU or \$80 per 40-foot container picked up from a port terminal on the day shift. The goal of PierPass is to have 40 percent of inbound containers moving on roads at night and on weekends. However, an insufficient number of truck drivers are willing to work at night without a guaranteed increase in compensation. Additionally, the longshore labor that works nights could perhaps be less skilled, thereby increasing the time truck drivers spend at terminals. Finally, most import distribution centers aren't open at night, so truck drivers will be forced to

IKEA Responds to Transportation Constraints

Based on an interview with Keith Keller, manager of distribution services, IKEA North America

IKEA, the international retailer of home furnishings, has two main challenges relating to transportation capacity—a transatlantic ocean-shipping capacity shortage and delays at U.S. West Coast ports.

Atlantic Capacity Issue. IKEA ships a significant volume of product from Europe to North America. The Atlantic ocean shipping lines, however, are withdrawing some of their capacity to serve the more profitable Asian shipping lanes. In response, IKEA is adjusting its leadtimes and building inventory earlier for some products to protect against delays. It also is becoming much more proactive when booking freight with carriers. IKEA is now securing space on a vessel three to four weeks in advance, whereas the norm had been about a week in advance. The company is also moving freight via road to European ports with more capacity. For example, the company might truck freight to Bremerhaven, Germany, that was originally meant to be shipped from Rotterdam in the Netherlands. To support this strategy, IKEA is securing smaller, niche truckers. Now, IKEA is proactively going beyond its key carriers to secure additional capacity to move freight between European ports.

Delays at U.S. West Coast Ports. In 2004, IKEA had 21- to 28-day delays on the West Coast with significant variability in leadtime. These delays were not due to capacity shortages on shipping lanes from Asia but to capacity problems at the ports. Part of the problem was caused by a chassis shortage on both

coasts. The ports, however, are now filling dock depots with more chassis. While this is helpful, it does require truckers to pick them up—which still results in time delays. To ensure enough chassis are available when needed, IKEA now works with ports to secure space to hold them, and when that space is full, IKEA rents yard space.

In the end, IKEA's ability to get its containers out of the port as fast as possible depends heavily on equipment and driver availability. Port free time has been reduced on the West Coast from five to four days, which has helped free up equipment, says Keith Keller, vice president of distribution services for IKEA. This is enhanced by increased demurrage charges for equipment that is not released quickly enough. The company is also using PierPass and other methods to move freight more quickly through the ports. Changes at ports, such as 3 a.m. gate openings for truckers and Saturday openings, has helped to move product.

To cut down on variability, IKEA has added resources to track and trace shipments so that potential delays are visible sooner and can be addressed quicker. In addition, IKEA is increasing visibility into its carriers by connecting with its carriers' systems to allow for easier access. With the new connections, staff members don't have to access the carriers' Web sites to track freight.

In addition, IKEA is going beyond normal capacity planning and is tying its forecast more closely with its carriers' forecasts to ensure capacity and reduce delays. IKEA also needs to be continually looking at its sourcing locations, both in Asia and elsewhere, to identify the best way to achieve the lowest net landed cost for inbound goods.

find secure yards in which to park the loads before they can be delivered the following morning. With the trucks back on the road on the next morning, this arrangement will defeat the original intent of the program.

Importers Change Their Strategies

In response to these constraints on the global supply chain infrastructure, importers are adopting strategies to improve product flow, mitigate the risk of having product delayed in ports on the West Coast, and increase supply chain velocity. In many cases, these actions run counter to traditional thinking. But in all cases, they deliver up some benefits. Smart companies are using a combination of approaches to successfully cope with their congestion problems. (See the sidebars on IKEA and Newell Rubbermaid for two examples.)

Use alternative ports and/or diversify port usage.

Perhaps the most common strategy that importers are using in the transpacific trade is to reduce the volume of intermodal cargo directed through the ports of Los Angeles and Long Beach. Many are routing cargo through alternate West Coast gateways, such as Oakland, Calif.; Tacoma, Wash.; Seattle; and Vancouver, British Columbia. According to the Pacific Shipper, in the first quarter of 2005, containerized imports grew 42.7 percent in Seattle, 26.7 percent in Tacoma, and 36.5 percent in Oakland. Vancouver saw so

much growth that in early 2005, it had to put an embargo on new import shipments for nearly two months until it could clear a backlog of intermodal cargo with the railroads.

Some importers are even looking beyond the United States and are pushing ocean carriers to serve new ports in Canada and Mexico's Baja peninsula. For example, construction is in the first phase for a port at Prince Rupert, BC (five hundred miles from Vancouver), and a study is being completed regarding the feasibility of operating a deep-water port in Punta Colonet, Mexico (about 150 miles south of San Diego). Yet, these new ports are not without their own obstacles. A port at Punta Colonet is expected to take five years to build due to the lack of basic infrastructure, and rail service is still constrained in both Canada and Mexico. Canadian railroads are running close to capacity, while Mexico lacks reliable, secure, and efficient railroads. These limitations, along with increased inland transportation costs, may hamper the effectiveness of such alternate gateways and may make them cost-prohibitive.

Similarly, some carriers are developing plans to add vessel strings from South China, Southeast Asia, and the Indian Subcontinent to the United States via the Suez Canal, even though the nautical distance is longer than transiting the Panama Canal. To be economically viable, however, vessel strings will need ships in the 5,000 TEU size, which are scarce in the charter market.

Dealing with Delays: Newell Rubbermaid's Strategy

Based on an interview with Scott Richardson, group vice president, global logistics

Newell Rubbermaid is a global manufacturer and marketer of consumer products and their commercial extensions with brands such as Rubbermaid, Sharpie pens, and Irwin tools. As most of Newell Rubbermaid's (NR) freight comes in from Asia, the West Coast delays are a growing obstacle for the company. U.S. port and rail congestion is a "pinch" point in shipping from Asia. In response, Newell Rubbermaid is now carrying more inventory and shipping it earlier to prevent out-of-stocks. NR used to build its holiday inventory in October/November. Now, it is getting the products in September/October (about 35 to 45 days earlier on average). This change requires additional space and increases inventory-carrying costs and the risk of obsolescence.

Indeed Scott Richardson, group vice president of global logistics, said that these port issues have added four to eight days and millions of dollars to NR's costs (including additional inventory-carrying costs). In addition, drayage from the port to the distribution center averages 6.5 days. In effect, this scenario is increasing the bullwhip effect in the supply chain as companies add more inventory to cover for the additional delays. Companies are, therefore, seeing an increase in working capital and a reduction in operating income. But in NR's case, the additional inventory-carrying costs are easier to take than the cost of out-of-stocks and

resulting fines from retail customers. Richardson refers to the extra cost of earlier importing and more inventory to cover for delays as "The China Price" or "Lead Time Tax."

NR is also dealing with the delays by forming tighter relationships with its carriers. In particular, it has established closer relationships with two asset-owning carriers to get guaranteed capacity. To become a more favored customer, the company has bundled together multiple services, which it sources from the carriers. For example, NR uses warehousing space from its carrier if more storage is needed due to inbound inventory from larger ships. In essence, NR leverages its spend to become a preferred customer and protect ocean capacity.

NR is also taking long-term steps to reduce leadtime. It has submitted its C-TPAT applications to customs and border control and is awaiting validation. In the future, programs such as C-TPAT may result in faster clearance of goods into the United States. NR has also embarked on an aggressive port diversification strategy, which will reduce its dependence on the congested southern California gateway. NR can realize more predictable leadtimes and possibly lower total transport costs by using alternative West Coast ports such as Seattle and Tacoma, Wash., or East Coast ports via the Panama and Suez Canals. Newell is also looking at manufacturing in Mexico instead of China. China is no longer an automatic answer for production. Finally, Richardson and NR are involved in an effort to quantify the effect that port delays have on the U.S. economy.

Companies are not just seeking new ports and routes, they are also spreading their shipments across multiple ports. This diversification reduces the risk that a glitch or terrorist event at one port will delay all inbound product movements. Spreading volume across more ports, however, will reduce economies of scale and require additional coordination, which will increase administrative costs. Using an alternative port may also increase total transportation costs, depending upon the inland destination and routing.

As these strategies indicate, transportation constraints seriously challenge the supply chain principle of simultaneously increasing service and reducing costs. Shippers are currently incurring increased transportation costs just to meet minimum/current service levels; achieving higher service levels may prove to be cost-prohibitive.

Place orders with foreign factories earlier and ship before peak season. To cope with the delays and better manage lead time uncertainty, importers are increasing their own lead times and placing orders with their Asian suppliers earlier. Longer leadtimes are not a great alternative, but they are more tolerable than variable leadtimes in the eyes of importers. As mentioned, customer surveys consistently show a desire for predictability over speed.

This strategy, however, inflates cycle times and increases safety-stock requirements — the opposite of traditional supply chain goals. Additional safety stock, in turn, increases total assets and the accompanying inventory-carrying costs. Placing orders earlier also requires an accurate forecast. But as time is added between the forecast and the event it is trying to predict, the risk of forecast error only increases. As a result, the potential for not meeting customer demand and inventory obsolescence also rises.

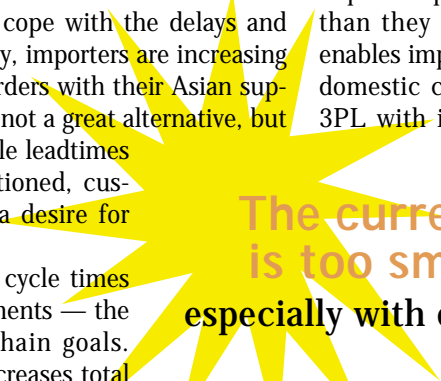
Alter distribution center strategies. Many importers are rethinking their distribution center strategies in terms of number and placement. Some importers, including big box retailers, believe it makes sense to locate distribution facilities near port gateways to get product under their control more quickly. This might require adding facilities closer to the ports. As a result, distribution network design will not only need to consider criteria like demand, transportation, and handling but also whether the network needs to have a facility on one or both coasts. Most consumer goods companies already have five to seven U.S. distribution centers (usually not at port locations) in order to hit the required service levels expected by most of their customers—usually one- to two-day delivery from the distribution center across the entire network. Additional port facilities will only increase distribution costs whether the facility is company-owned or handled by a third-party logistics (3PL) provider.

Obviously, the number of distribution centers affects the total inventory-carrying cost. Additional DCs increase facility management costs, inventory levels, and the complexity of the decision about what items to store in each distribution center.

These cost increases will somewhat offset any reduced inland transportation expenditures from having more DCs.

Transload at West Coast 3PL facilities. Another option for improving overall transit time is to use a port-to-port ocean rate and take possession of the container at a West Coast port. This way, the container can be immediately transloaded into rail or truck equipment at an importer's or third-party logistics provider's facility rather than relying on the ocean carrier to move the container intermodally by rail on a through bill of lading. For extra-hot shipments, team drivers can be hired to speed delivery.

Transloading enables importers to take advantage of port-to-port ocean rates, which are usually less expensive than inland, store-door rates. Moreover, since the cubic capacity of domestic containers is greater than ocean containers, importers pay less freight to move rail and truck containers than they would for ocean containers. Transloading also enables importers to operate merge-in-transit programs where domestic cargo is consolidated at the gateway port by the 3PL with inbound import cargo for delivery to stores and



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final customers. However, transloading goes against traditional supply chain thought by adding a node to the chain and increasing facility and administrative costs.

Ship direct from origin to customers, bypassing distribution centers. To reduce leadtime, importers can arrange to have product shipped directly from its origin to the final customers rather than routing these orders through the importer's own distribution centers. A distribution-center bypass program can greatly reduce the per-unit cost of goods by eliminating the need to rehandle product in the importer's distribution center. It can also reduce overall delivery time to the customer. This option does require the importer to reconsider the structure of its supply chain. Shipping direct to customers requires additional coordination at the point of origin. Also, the company will need to add quality inspectors and/or cargo consolidators to ensure that customers get what they ordered and to minimize noncompliance chargebacks. Additional value-added services (VAS) now must be done at the factory or the origin cargo consolidator's facility. Also, the direct ship option poses some risk if the importer wants to control the interface with the customer at delivery. The strategy also risks negatively impacting customer-service levels if delivery windows are missed.

Pay premiums to ensure reliable, prompt delivery. Importers can choose to pay ocean carriers more to deliver better and faster service. They can pay higher ocean rates for additional services, including "hot hatching"—where cargo is stowed above deck in the first hatches to be discharged from the ship

at the destination port (like priority luggage handling for first-class airline passengers). They can also pay extra during peak season to guarantee space and equipment at ports and space on priority trains, which move out of the ports first. This option, however, increases total transportation costs and requires additional coordination for the importer and ocean carrier.

Utilize air freight to a greater degree. For extremely high priority cargo, product launches, or product that is out of stock, it might make sense to ship from other countries via air freight. This option increases transportation costs but enables the importer to meet customer delivery times and/or capture sales opportunities.

Acquire customs certifications. By becoming C-TPAT-certified and making sure documents are in order, importers can reduce the chance of cargo inspection by CBP and reduce customs clearance time. Certifications may increase supply chain administrative costs, but they allow for shorter cycle times (faster movement through ports) and lower inspection costs.

Use software to speed product and data flow. Shippers and their business partners can use advanced planning, forecasting, and shipment visibility tools; automated customs document creation; and IT connectivity to better manage supply chain operations. Many of these software applications are creating better supply chain visibility and enabling faster customs clearance. This helps to reduce order cycle times and safety-stock levels and decreases inventory-carrying costs.

Questioning the Traditional View

Today's supply chain is under a lot of pressure. The recent increases in the trade volume from Asia to North America have resulted in problems and delays on the sea, at ports, and on land. These changes have required managers and executives to look at their supply chain objectives in a much different light. They have been challenged to reconsider strongly held supply chain goals such as:

- Strive to simultaneously increase service and reduce costs.
- Keep inventory to a minimum.
- Keep transportation costs to a minimum.
- Reduce leadtimes.
- Consider single sourcing.
- Reduce the number of logistics service providers and port/airport gateways used.
- Reduce the time between when the forecast is created and the event it is trying to predict to decrease forecast error and reduce safety stock.

Now importers must take another look at how much inventory to hold and where; how much to pay for transportation; how long their leadtimes should be; and how many ports and transportation providers to use. Only by keeping an open mind about what is the best way to structure the supply chain will they succeed in getting product into the country and to their customers on time and at reasonable cost in a much more challenging environment. 