Amy Roach Partridge *is assistant managing editor of Inbound Logistics.*

supply chain technology

January, 2007 | List all Supply Chain Technology articles

Virtual Container Yards Net Real Results

by Amy Roach Partridge

Waste is the sworn enemy of the supply chain. Whether time and money is squandered because of excess inventory, unnecessary cargo moves, manufacturing foul-ups, under-utilized technology systems, or inaccurate sales forecasting, logisticians are tasked every day with avoiding waste and inefficiency.

One particularly vexing source of waste for transportation carriers today is empty containers. Thanks to steady increases in global transportation, container trade levels are way up, which has led to an abundance of empty containers piling up at port terminals, rail ramps, and inland container depots across the United States.

The container influx also means a large volume of empty trailers and containers traversing U.S. highways. This efficiency-killer stems from two sources: empty import containers returning to a terminal from a consignee's facility, and empty containers traveling from the port to be loaded up with export goods at a shipper's DC.

Those extra trips add up to a lot of wasted transportation time and expense for both carriers and shippers.

It is no surprise then that the Virtual Container Yard (VCY), a relatively untapped technology aimed at reducing empty container handling, is gaining favor with ocean and motor freight carriers.

Though the details of each system vary, a VCY is a web-based information exchange platform that allows users to match empty equipment needs so they can interchange, or "street turn," empty containers without first returning them to a terminal, rail ramp, or container yard.

Wanted: Empty Containers

Trucking operators access a VCY system to post empty container availability, outlining pertinent information such as container location and availability. Other trucking operators, seeking empty containers,

check this availability and request a street-turn transaction. The system requests permission from the ocean carrier that owns the container, and the transaction is accepted or denied.

"The VCY concept represents an attempt to use simple, well-tested IT technologies -- including next-generation Internet and other new platforms -- to make landside port-related freight logistics more efficient and less costly," say Drs. Maria Boile and Sotiris Theofanis with the Maritime Infrastructure Engineering and Management program at Rutgers University's Center for Advanced Infrastructure and Transportation.

Managing empty containers is particularly troublesome in port regions and densely populated economic centers, say Boile and Theofanis, because the influx of empty containers moving on area roads adds to already elevated levels of traffic congestion and emissions pollution in these communities.

Typical daily container volumes entering and exiting the Port of New York/New Jersey in 2005, for example, totaled 5,899 and 6,383, respectively, according to a study prepared for the port by New York engineering firm Eng-Wong, Taub & Associates. Given the empty trips to and from the port, total daily truck trips in 2005 were nearly double that number each day.

Ports Push Technology

Clearly, empty containers are full of challenges for ports. As such, U.S. ports have been instrumental in pushing VCY technology.
The ports of Oakland -- the first to launch a VCY system in the United States -- and Los Angeles/Long Beach, as well as the Port of Melbourne in Australia, have also implemented or piloted some type of VCY system.

The Port of New York/New Jersey will launch its VCY -- powered by technology from eModal of Irvine, Calif. -- this May, becoming the first East Coast port to embrace a VCY solution.

As the port's cargo volume continues to grow, port officials sought "innovative ways to reduce traffic at our gates and in our marine terminal and regional roadway system," explains Peter Zantal, general manager of strategic analysis and industry relations for the Port Authority of New York and New Jersey.

"We hope VCY will also reduce the cost of transporting containers by truck because of savings generated from reduced vehicle miles traveled (VMT) and the decrease in required driver time," Zantal adds.

While VCY systems are a PR coup for ports, which can boast of their "good neighbor" efforts to mitigate traffic congestion and adverse environmental impacts, they are also a smart strategy for both ocean and motor freight carriers.

Ocean carriers have notorious difficulty with empty containers because they lose crucial asset visibility when their containers are transferred to

other carriers' control for final delivery. This robs them of the chance to impact what happens between the time a carrier takes their container from the yard, and when it is returned.

"Ocean carriers don't share operational systems with railroads or trucking companies, so once a container is handed off to those entities, it is out of control and out of sight," explains Phil Behenna, senior vice president, intermodal, for International Asset Systems (IAS), an Oakland, Calif.-based asset management solutions provider that paired with eModal to implement the VCY currently in use at the Port of Los Angeles/Long Beach.

"In the intermodal sector, reuse of trailers without bringing the box back empty to a yard can be as low as 2 percent," Behenna adds.

By using VCYs, ocean carriers can reposition their assets more effectively. With its VCY implementation, the Port of NY/NJ expects ocean carriers to "improve asset utilization, reduce gate transactions at the port, streamline inventory, and reduce disputes because of a formal agreement to participate in street turns," says Zantal.

For trucking companies, the aim of the game is reducing unproductive vehicle miles traveled. Using a VCY to cut down on the number of empty trips to and from terminals helps trucking companies combat the amount of time their trucks spend on the road -- a key metric for reducing all associated expenses, such as fuel costs, driver pay, and wear and tear on assets.

"For trucking operators, the potential to decrease VMTs and add extra paid trips is of major importance," note Boile and Theofanis. Truckers also get to slash the amount of time they wait in long lines with their engines running to get into inefficient marine terminals or container yards, says Behenna.

Naturally, any strategy or technology that improves efficiency and reduces expenses for carriers is ultimately good for the shippers that use their services. "The enhanced possibility for shippers and consignees to negotiate -- either directly, or indirectly through intermediary representatives -- better prices for drayage operations dealing with containers they use for their activities" is another check in the positive column for VCYs, say Boile and Theofanis.

Enter Automation

While the appeal of street turns is hard to argue, the systems for managing them have not been terribly robust to date. The web-based nature -- coupled with the casual, ad-hoc way many street-turn arrangements are formed -- has not lent itself to rich functionality or extensive integration with carriers' other transportation systems.

This is starting to change, however, as carriers realize the need for automated systems to curb human error, and providers realize the lucrative potential in offering robust functionality.

Automation is key for several reasons. Because ocean containers are valuable assets, turning them over to truckers to use at their discretion is not the wisest move. But manually monitoring each transaction, and the specifics surrounding it, is a burden few ocean carriers want to accept.

"Several critical checks have to be run to allow a street turn to take place," explains Behenna of IAS, which is releasing its fully automated system, VCY 2.0, in March. An ocean carrier, he explains, must determine the following:

1. Do I want this container filled with cargo? While most containers are more valuable full than empty, in some cases, carriers may choose not to put the container back into rotation. They may want to return a leased container to the leasing company, or sell an old container, for example.

2. To whom is the container going? Liability issues are key, particularly when one trucking company is asking to hand off the container to another trucking company. Ocean carriers must know whether the truckers are insured; also if a trucker owes per diem charges to a carrier, "it will not be overly thrilled to give that trucker another container," explains Behenna.

3. What will the container be used for? Ocean carriers must know what a trucker wants to transport in the container, and make sure it is an appropriate use of the asset. In addition, a trucker may unwittingly want to ship a container to a destination that cannot accommodate its size.

While those questions establish good guidelines, can a trucker realistically be expected to pick up the phone and ask an ocean carrier every time it wishes to initiate a street turn? Likewise, we can all imagine how happy the ocean carrier will be to handle a few thousand extra phone calls per day from truckers seeking to use its assets.

Seeking Customization

IAS' new system addresses these concerns by allowing ocean carriers to customize the VCY, inputting business rules to specify what type of containers can be street-turned, as well as which truckers are allowed access to their empty containers.

"The system helps filter out unsuitable containers. An ocean carrier can say, 'Never allow a street turn with a reefer or flat rack'; or 'Any unit with a certain prefix is a lease unit that I might want to off-hire so don't include those,'" explains Behenna.

"This way, the only containers visible to truckers accessing the system are containers the ocean carrier wants to have street-turned," he adds.

In addition, VCY 2.0 lets ocean carriers customize a list of approved truckers, which IAS updates dynamically. This prevents a street turn from occurring with unapproved truckers because only those truckers on

the ocean carriers' list will have visibility of container interchange opportunities.

"When a trucker requests a container through our system, it is prompted to enter the booking number associated with that shipment. The system dynamically checks the number against the ocean carriers' system to make sure it is a valid booking," Behenna explains. "Because the system is dynamic, truckers can make real-time decisions about street-turn opportunities -- the trucker sees the container, requests it, and receives an immediate yes or no without speaking to anyone.

"In addition, the ocean carrier gets the control it needs without being involved in every transaction," he says.

Integrating these capabilities with ocean carriers' transportation management systems is another benefit of automated VCYs. This aspect is one the Port of NY/NJ hopes will makes its VCY -- based on a similar automated system from eModal -- attractive to carriers.

"Ocean carriers will be able to post all their empty containers via a single data-mapped feed. eModal is already working with many ocean carrier parent or sister companies to receive data in a similarly mapped format," explains the Port Authority's Zantal.

A Solid Future?

It seems there is not much about VCYs to debate -- they offer a simple, yet effective technology that helps carriers curb expenses, improve visibility, and, in some cases, generate additional revenue. Add in the extra "green" bonus of improving congestion and pollution in economic hotspots and port communities -- what's not to love?

It is still unclear at this point how quickly VCYs will catch on, however. The willingness of ocean and trucking carriers to share information and assets -- though beneficial to both parties -- may be one barrier to widespread VCY adoption.

"It is critical to understand the needs and expectations of all VCY players, and to respond positively to them, in order to come to a widely accepted set of system characteristics, processes, and institutional arrangements that work best," say Boile and Theofanis, who recently released a study examining the feasibility of VCY systems using a simulation-based model to approximate realistic conditions.

Partial collaboration -- where groups of ocean carriers collaborate with their respective pools of truckers to share containers -- is more likely to occur than complete collaboration, the study shows.

"The simulation leads to encouraging results for the use of VCYs," they note. "In addition, the fact that established collaborations among groups of carriers exist on other business aspects increases expectations for the potential success of VCY systems."

In order for VCYs to be successful, Boile and Theofanis recommend

participants pay careful attention to the system's user requirements and functionalities; ensure equipment interchange rules are met; and balance costs and incentives among all parties.

Start Slow, Start Small

"The success of VCY systems depends on truckers and ocean carriers making it happen," adds Behenna. One way to do that is to start slow.

Carriers don't need to begin using a VCY system nationwide; and they don't need to start with extremely complex scenarios involving multiple ocean carriers and multiple truckers, he says. Carriers can reap benefits from even the most basic VCY transactions.

"Trucker A used to take a container back empty from a consignee facility; now it can give visibility of that unit to an ocean carrier and pick up an extra load. The ocean carrier saves money, and the trucker gets extra revenue," Behenna explains.

Currently, Behenna estimates carriers can save about $200 per street turn by using a VCY. And, once these systems become institutionalized, the potential for greater savings arises -- including savings that extend to shippers.

A trucker and an ocean carrier, for example, may determine that, based on their general import and export flows to one area, a certain type of ongoing street-turn arrangement makes sense.

"They realize they can all benefit -- by taking that extra load, the trucker receives 150 percent of the round-trip rate, while the ocean carrier and shipper each pay 75 percent of what they would have paid, and reduce their current haulage expense by 25 percent each," he explains.

You'd be hard-pressed to find waste in that scenario.