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Time to toughen up US ports

James B. Rice Jr. and Kai Trepte | Jun 05, 2014 11:39AM EDT

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Contract negotiations between the International Longshore and Warehouse Union and U.S. West Coast waterfront employers are shining a light on the integrity of the U.S. ports system. If talks break down, import and export cargo flows will be at risk. One critical element missing from the debate is how to manage the risk of port disruptions and make these vital cargo-handling systems more resilient.

A research team at the MIT Center for Transportation & Logistics recently published a paper, "Failure Modes in the Maritime Transportation System — A Functional Approach to Throughput Vulnerability," that shows how port stoppages have become more frequent over recent decades. Moreover, the structure of the maritime transportation system increases the likelihood of serious economic damage when facilities are disabled.

In 2011, the U.S. marine transportation system carried more than 1.4 billion tons of international cargo worth more than \$1.5 trillion. This represents more than 99 percent of U.S. trade tonnage outside of North America, according to a June 2013 Waterborne Freight Transportation: Bottom Line Report.

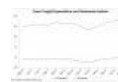
A number of factors contribute to the growing susceptibility of U.S. maritime trade to disruptions, including:

- An increase in global trade volume and waterborne commerce activity.
- An increase in vessel size and, therefore, a change in shipping economics.
- Varying investments in port infrastructure and superstructure.
- The increasing complexity of the industry, reflected in a large number of operating companies, third parties and various authorities.
- A shift in port ownership or governance.

There are two other, less obvious but no less important, factors that influence the risk profile of U.S.

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ports. First, while managing risk and building resilience have generated a lot of interest in the supply chain domain, ports and associated cargo flows have been largely overlooked except for a few initiatives. Within ports, the concept of building resilience traditionally has been overshadowed by the need to make cargo-handling systems more efficient.

Second, the distribution of cargo-handling capacity is concentrated in a relatively small group of U.S. ports. If one or more of these facilities is disabled, the economic impact can be wide-ranging. With the exception of raw materials and manufactured goods, for example, fewer than 20 of the more than 300 ports in the continental U.S. account for 80 percent of the cargo volume in each commodity class handled by the system.

A deeper analysis reveals that the flow of certain key classes is channeled through a few facilities.

Our research shows, for instance, that imports of chemicals and food and/or farm products are concentrated in a small number of ports in the U.S. Gulf Coast. Moreover, there are relatively few alternatives should these facilities be unavailable. If this region suffers a long-running disruptive event, the fallout for the U.S. economy can be substantial.

A comparison of two major disruptions illustrates the point. In 1995, an earthquake brought the Port of Kobe, Japan, which handled 30 percent of the country's import and export cargo, to a standstill. Because Kobe's cargo was diverted to Osaka and Tokyo, the overall system wasn't impaired seriously.

In contrast, when Hurricane Katrina hit the U.S. Gulf Coast in 2005, the impact on the U.S. economy was significant. Some 45 percent of the nation's food and farm products moved through three closely spaced ports near New Orleans. Other ports were unable to absorb the stranded cargo. An estimated \$882 million of agricultural trade was lost, and national food prices rose by 2.5 to 3.5 percent in 2006.

Our research shows there are ways to make the U.S. ports system more resilient. We have outlined critical capacities and suggested backup resources for port actors including terminal operators, intermodal operations and port authorities. These suggestions are a good starting point for port actors to take action toward making their systems more resilient.

We also developed a prototype Web-based app called Port Mapper that identifies alternatives when major U.S. ports are disabled. The U.S. Coast Guard used Port Mapper successfully in its response to Hurricane Sandy, and we believe the app can be useful for port scenario planning and options analysis in disruption response.

But more active engagement from industry is required. Each party in the port-related supply chain needs to make its segment resilient. It's not enough to tackle an organization's internal operations. The extended enterprise also must gird against disruption. Right now, a lack of understanding and motivation prevents this from happening.

The next step is for the industry to devote more effort to identifying the risks involved. It will then be possible to develop management strategies that mitigate or eliminate disruptions that can be very costly at the individual facility, national and international levels as the impact of disabled ports ripples through global supply chains.

Let's use the threat of stoppages at West Coast ports as a motivator to move forward on these issues. In doing so, we will strengthen these vital gateways and reduce the risk of future disruptions.

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Along the way, we'll also create competitive advantage and make the U.S. a more resilient economy.

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