US Army Corps' cost-benefit deepening review flawed

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Asaf Ashar is a research professor (emeritus) and independent consultant at the National Ports and Waterways Institute. He was paid to conduct a study on the impact of Jaxport's planned harbor deepening by the St. Johns Riverkeeper, an environmental nonprofit challenging the $483 million project in federal court. His commentary is as follows:

The US Army Corps of Engineers, the federal agency tasked with maintaining and deepening channels, does not have a uniform standard regarding channel depth, allowing questionable projects, such as the deepening of the Jacksonville harbor, to move forward.

Port access channels are essential components of ports, dictating the size of vessels that can call there. The corps, which for historical reasons owns and operates US port channels and controls their funding, applies a complicated methodology to assess the benefit-cost-ratio (BCR) for each project.

The corps compares the cost of deepening with the reduction in vessel cost, defined as benefit, due to the predicted employment of larger (deeper) and more economical vessels. The cost of deepening varies according to each port's physical conditions; the benefit varies according to the predicted increase in vessel size and the volume of cargo handled by these larger vessels, defined as benefiting cargo. As a result, the "optimum depth," defined as when the BCR reaches its maximum (and is above one), widely varies. Ports endowed with short channels and ports handling large volumes of traffic "justify" deeper channels and vice-versa. The Army Corps also allows ports to pursue a deeper, "locally preferred" depth, at their own expense, usually adding two feet to the optimum depth.

Altogether, when all corps-approved deepening projects are completed, the depths of South Atlantic Ports will be: Charleston, 52 feet; Savannah, 47 feet; Jacksonville, 47 feet; Port Everglades, 48 feet; and Miami, 50 feet.

These deepening efforts are meant to attract trans-Pacific services, shipping services that have multiport rotations, consisting of ports with different depths, which they handle by adjusting vessels' draft, calling some ports fully-loaded and others partially or light loaded.

However, the corps' analysis seems to disregard the multi-port nature and related partial loading of trans-Pacific services, which I believe is a serious flaw, as demonstrated in *Economic Reassessment of Port of Jacksonville's Channel*, my recent study of Jacksonville's channel, the St. Johns River.

Jacksonville's single versus multi-port analysis

Most Asia-US East Coast (USEC) services calling Jacksonville employ vessels ranging from 7,500 to 10,000 TEU, mandating that they call at Jacksonville partially-loaded. These vessels do not arrive or sail all the way to/from Asia partially-loaded, however; their USEC rotation includes deeper ports as "first in" and "last out" and shallower ones as "mid port."

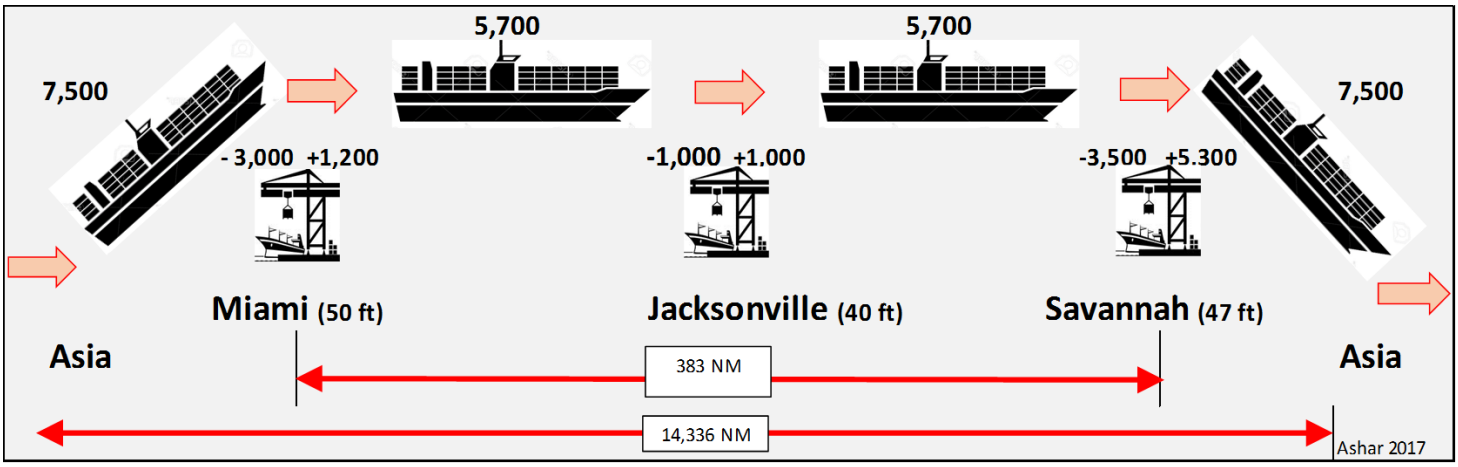

Figure 1: Asia-US East Coast South Atlantic rotation

Figure 1 illustrates the rotation of a typical South Atlantic service combining calls at Miami, Jacksonville, and Savannah, with cargo allocation among these ports planned to provide for Jacksonville, a "mid port," to be called partially loaded. Note that vessels sail partially loaded only along the stretch between Miami and Savannah, or less than 3 percent (383/14,336) of the entire Asia-USEC rotation. Accordingly, the benefit due to deepening Jacksonville from its current 40 feet to 47 feet to enable fully-loaded vessels would be generated only along a short stretch of the South Atlantic coast. The corps' analysis is single-port, assessing each project separately, and therefore credits Jacksonville's channel-deepening project with the benefit of sailing fully-loaded along the entire Asia-USEC rotation, yielding a BCR of 2.66 versus 0.14 in my multi-port analysis. The BCR < 1 in my multi-port analysis indicates that Jacksonville's channel-deepening project is economically infeasible.

Jacksonville's channel depth and market share

Based on market share of Asian trade import tonnage, the primary South Atlantic ports are Savannah (60 percent), Charleston (22 percent), and Miami (11 percent). Jacksonville (6 percent), with market share of one-tenth of its main rival Savannah, is clearly a secondary port.

This primary/secondary hierarchy has been evolving over many years, reflecting the overall situation of these ports, for example, Savannah's major distribution centers and proximity to Atlanta. That evolution is not necessarily based on their channel situations, as evidenced by the fact the Savannah River is much longer and difficult to navigate than St. Johns River.

Likewise, since South Atlantic primary ports already have depths of 47 feet or more, deepening Jacksonville from the present 40 feet to 47 feet is unlikely to affect the ship size of future trans-Pacific services as assumed by the corps' analysis. The deepening also is unlikely to dramatically increase Jacksonville's market share at the expense of other South Atlantic ports and transform it from secondary to primary port — contrary to a central premise in Jaxport's strategic plan.

Shipping patterns of the Asian trade, including rotations of major trans-Pacific services, have stabilized following the upheaval caused by the Panama Canal expansion and consolidation of shipping lines. This stability also implies that Jacksonville's present trans-Pacific services will not disappear if its channel remains at 40 feet — contrary to another central premise in the port authority's strategic plan.

Altogether, my prediction is Jacksonville will retain its niche market position in the Asian trade. Deepening its channel will have little impact on it.

Total versus vessel cost

There are other flaws in the corps' methodology. First, because of the above-mentioned divided ownership of the port/channel complex, the corps' BCR analysis only includes the channel, but excludes related port facilities. This can lead to irrational decisions.

To reduce channel-deepening cost and improve the corps-calculated BCR, Jaxport suggests shortening the deepened section from 13 miles to 11 miles and relocating TraPac, its main container terminal, to the deeper section. But, the reduction in cost due to channel shortening would roughly equal the increase in cost due to terminal relocation. Hence, the total cost of the project and its true economic BCR should remain the same.

Second, the corps' analysis assumes that if Jacksonville remains with its 40-foot channel, vessels deployed on past trans-Pacific services at the base year (2010), ranging from 4,500 to 6,500 TEU, will continue calling Jacksonville throughout the entire project's 50-year economic life, but larger vessels are already calling the port.

The corps' analysis also does not account for "berth pockets" to facilitate tide riding, the ongoing deployment of 12,000 to 14,000 TEU ships, and in the future, the deployment of 18,000 to 22,000 TEU ships on the trans-Pacific trade, which would necessitate feeder services to Jacksonville. The Corps' also assumes that the Caribbean trade will be handled by these trans-Pacific services and considers it benefiting cargo.

Finally, the corps' analysis is based on dated 2010 information and that does not reflect recent changes in vessel design, sailing speed, and the cost of fuel, among other issues.