Using Sonar to Expand Your Port's Future Business

By Steve Campbell

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>
> **–Brian Abbott**

(Above) The City of Portland, Oregon used sonar to acoustically "see" and survey the underwater infrastructure of its mile-long harbor seawall along the Willamette River. Here, the sonar images (combined with above-water photography) highlight underwater features of the wall including outfalls, wall joints, damaged or weakened areas, and unknown debris or scour at the "mudline" of the river bottom just below the Burnside Bridge. Sonar images can be combined into composite images that can be analyzed to determine a planned schedule of underwater maintenance activity at ports and harbors and along river and lake fronts. Source: Brian Abbott, Nautilus Marine Group.

While the global recession has temporarily dented the growth in international trade and shipping, there's little doubt that continued expansion of global trade and increased business for ports is just over the horizon. In addition to increasing harbor traffic, the expansion of the Panama Canal holds the promise of more competition and more business for this expanded import/export traffic. It's vital that ports ensure their infrastructure is ready to handled increased trade when it comes.

But, out of sight, out of mind, as Brian Abbott of Nautilus Marine Group notes. "If you can't see it, it's easy to miss a problem that is developing or getting worse underwater. It's not until something expensive happens that people pay attention."

Nautilus provides engineering support services in the unique underwater environments of coastal and inland waterways in support of marine activities, e.g., navigational charting, channel maintenance, construction management, pipeline routing, archaeology and structural condition assessment.

"Given the aging state of many older piers, docks, wharfs, bridges and dams pre-dating World War II, it's vital these structures be assessed for any weaknesses or physical issues," said Abbott. "Sonar enables these operations to be conducted in zero visibility in rivers, lakes, harbors, reservoirs and offshore."

The first step in using sonar in any port maintenance program, says Abbott, is to generate a baseline of what is on the sea floor by scanning all the sections methodically and then forming a mosaic of the images. In addition, baseline images are acquired of all pilings, walls and port structures to establish a foundation of what is there. In the future, these

images can be compared easily to newer images and analyzed to determine what has changed.

If there's something new, such as the appearance of a suitcase or metal box or something attached to a support piling, a diver can go down for a closer look.

"Every port needs a baseline archive of sonar images as part of their maintenance program and for legal liability purposes," notes Abbott. "The Duluth incident (where in 2008 a docking ship struck a submerged object that pierced the hull and flooded the engine compartment) points out that ports need to know what's down there and whether some infrastructure is about to fail, causing damages and costs that will be apportioned."

As an example, if the submerged object in Duluth was a container, a history of banked sonar images might be able to pinpoint exactly when the container was dropped and determine who is responsible. This is an important feature when the lawyers look to apportion costs.

But, importantly, given our global economy, if a pier or port structure goes out of commission, this can affect the port's bottom line as business is lost or companies lose confidence in a port's reliability. All ports need to know what they have now in order to plan ahead for maintaining current facilities and building new port capacity.

"With expanding global trade and the upcoming expansion of the Panama Canal affecting port business, it's vital that port infrastructure be ready to handle increased work," says Abbott. "Sonar is one tool that can make sure your infrastructure is solid and ready to handle increased work." *IP*

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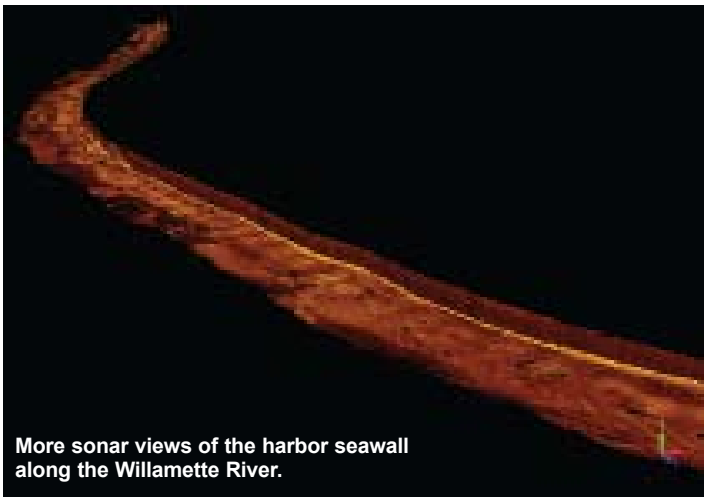

More sonar views of the harbor seawall along the Willamette River.