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Greener boxes

Lessors seek ways to make standard ocean containers environmentally friendlier.

By [Chris Gillis](#)

How do you make the ocean container — today's standard for shipping goods throughout the world — more environmentally friendlier than it already is?

Container lessors believe they have some answers, but costs will ultimately dictate whether the shipping industry actually embraces them.

"When making improvements to containers what we've always found is that simple is better in order to keep them sound and as versatile as they are today," said Steven Blust, president of the Institute of International Container Lessors, based in Washington.

In other words, container changes, no matter how ingenious on paper or in prototype form, must make economic sense in a market that lives off razor-thin profits. That said, container lessors note the standard 20-foot and 40-foot ocean boxes can be made more environmentally friendlier in ways that are relatively subtle and cost neutral to the industry.

For the past several years, IICL members have worked together on a variety of tests, including the reduction of wood in container floors, application of water-based exterior paints, and incorporation of high tensile steel in box construction.

In 2007, IICL's Flooring Working Group began exploring various alternatives to traditional all-wood container floors. Countries throughout Asia, where most of this wood is sourced today, are taking action to combat the illegal timber trade in the region. This reduction in illegal harvesting results in greater demand on the limited availability of the legally harvested wood that is used in the manufacturing of containers and other products, Blust said.

The working group initially considered materials, such as bamboo, composites and plastics. But initial costs, limited supply and technical obstacles quickly rendered these options too challenging for inclusion in a test program. All-steel flooring, another consideration, tended to suffer from permanent deflections under the weight of forklifts and heavy cargo that passed over it.

Undeterred, the group pursued a flooring design that incorporated half wood and half steel plating. The institute built five containers using wood and steel in alternative flooring configurations. After review and advice from ocean carriers and other participants at IICL's 2007 Flooring Forum, several designs were selected for further evaluation.

Two patterns were ultimately picked: one that uses a pattern of every other wood blank separated by a steel strip that runs the length of the container, which IICL calls the "omega"; and the "tunnel" pattern which includes a wide steel strip up the middle of the box with wood planks on both sides.

Both designs, which were subject to extensive testing, easily supported forklifts and heavy cargoes; allowed for blocking materials to be nailed into the floor; and met International Standard Organization, IICL, and classification society criteria.

IICL then agreed to build a test group of boxes, painted a distinctive blue for identification. The omega floor pattern was incorporated in 100 20-foot and 100 40-foot containers, and the tunnel design was installed in a similar number of 20-foot and 40-foot boxes. The containers entered service in September and October 2008 among about a dozen carriers to test their effectiveness and serviceability.

IICL intended to conduct the test through October 2009 before evaluating the results. However, with the global slowdown in shipping in 2009 due to the economic recession, the organization decided to extend the test through October 2010, Blust said.

So far, the flooring of the test containers is holding up well to the rigors of shipping, said Anthony Sowry, vice president of operations at Textainer in San Francisco, one of the four IICL members involved in the test. The other participants are CAI, TAL and Triton.

"Is it right to move the industry in this direction?" Sowry said. "We don't control the buying community for containers."

IICL noted the prototype boxes were just slightly more expensive to construct and 5 percent heavier with the additional steel than those containers with traditional all-wood floors, which cost about \$2,400 per 20-footer and \$3,850 per 40-footer, according to *Containerization International's 2008 Container Leasing Marketing Analysis*.

If the new floors do take off, Sowry doesn't expect the change to be swift. "There will probably be a transition period where both specifications — all-wood floors and the steel-and-wood mix — are built," he said.

Some carriers have taken it upon themselves in recent years to construct some boxes with alternative floors. In 2007, CMA CGM purchased 30,000 TEUs of containers with bamboo floors, furthering a program that it started in 2005 with 400 TEUs using this material.

IICL also restarted a program this spring to audit more than a dozen container flooring manufacturers in China to review the quality of the wood used and the suitability of the manufacturing process. The institute temporarily suspended the program in 2009 when the container sector was at a near standstill.

San Francisco-based Triton, together with Valspar, recently started testing a low-solvent, non-zinc water-based paint for ocean container exteriors. Environmental regulators worldwide have pressed for the phase-out of solvent-based industrial applications due to their adverse effects on the earth's ozone layer.

Valspar has already developed a two-coat water-based paint system that it now applies to railcars. But the marine environment with its salty, moist air is far more challenging to the paint's durability. For 20 years, paint manufacturers have struggled to develop an economic and robust water-based paint to endure marine conditions.

In addition, the container manufacturing industry, now domiciled in China, relies on simple, quick-drying application of heavy solvent-based paints. These paints dry within 24 hours even in the most extreme humidity.

Water-based paints require temperature and humidity controls for drying. Only one of the estimated 30 Chinese container manufacturers has the proper facilities for water-based paint applications, said



Brian Darnowski, vice president of global operations at Triton, located in Atlanta.

CIMC's plant at Tai Chung worked with Valspar and Triton earlier this year to paint a batch of 100 40-foot high-cube boxes with water-based paint.

Triton believes that by using a short-sea carrier, the containers will receive continuous action. "We'll be able to hyper-performance test these containers," Darnowski said.

With another intra-Asia carrier this March, Triton put in service a test pool of 100 high-cube 40-foot containers made from high tensile steel (HTS).

"In theory, high tensile steel is stronger and lighter than traditional steel used in containers," Darnowski said. The weight of the test containers is about 490 kilograms or 11 percent lighter than comparable steel containers in the market, yet they're comparable in price. Lighter boxes help to reduce fuel burn during transport.

Today HTS is used in a variety of industrial applications, but has been known to fracture under excessive vibration. "We definitely need to know how HTS holds up in the maritime sector," Darnowski said.

Another big difference with HTS boxes compared to traditional steel containers is their slightly thinner plating and multi-profile corner posts, which could pose challenges for repair yards, he said.

Triton believes that both the water-based paint and HTS tests are worth the time and money to pursue. "We won't know how these materials hold up unless we give them a real-world try," Darnowski said.

Triton plans to share its test results with IICL membership. "Ultimately, these actions could benefit the environment and our industry as a whole," Darnowski said.

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