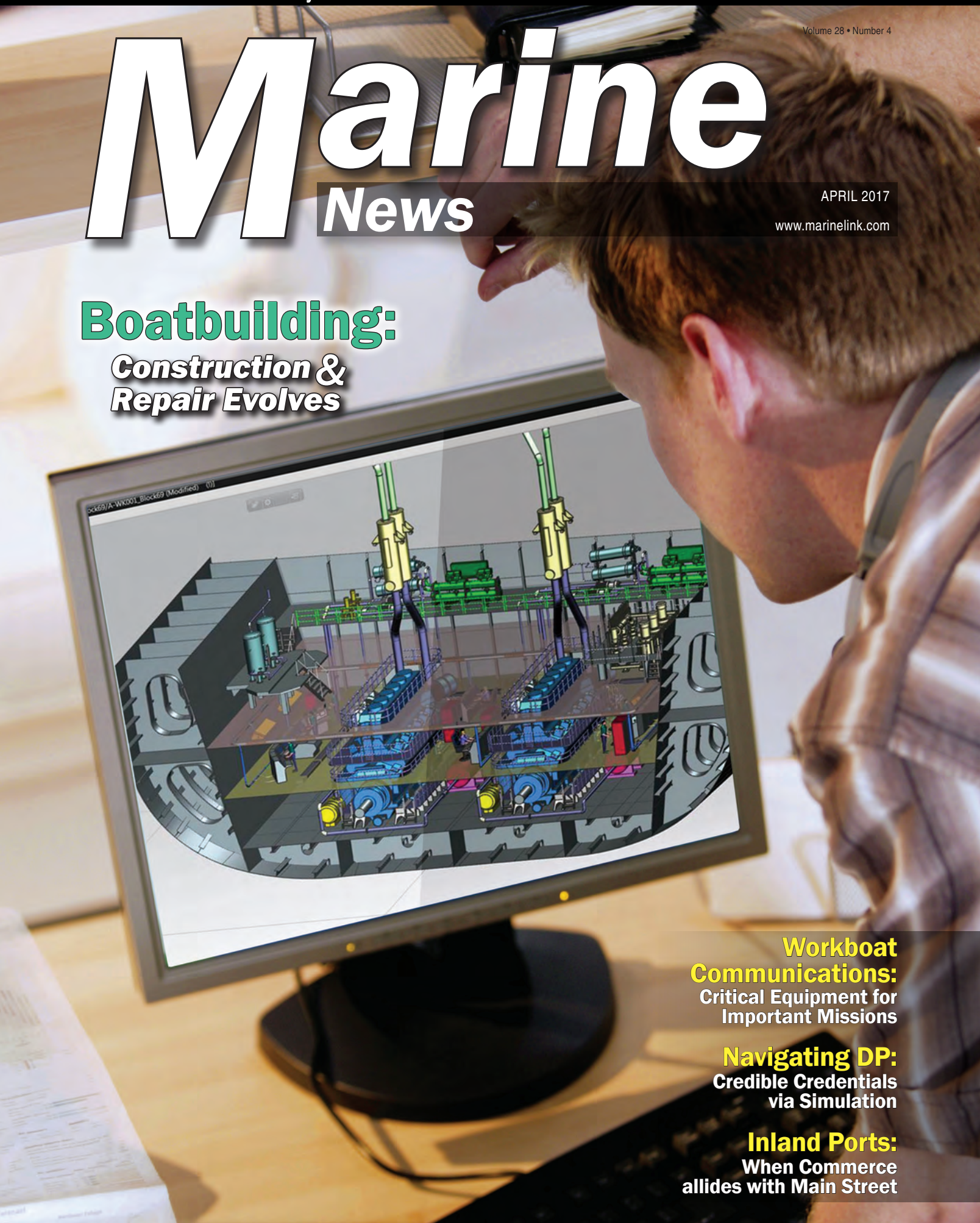
The Information Authority for the Workboat • Offshore • Inland • Coastal Marine Markets

Volume 28 • Number 4

Marine News

APRIL 2017

www.marinelink.com



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EAL's Rise Up on Deck

The next critical area of consideration for the use of Environmentally Acceptable Lubricants is on Deck. What's leaking into the water from your cranes and winches?

By George Cook, Senior Applications Project Manager, RSC Bio Solutions

Vessel fleets face an increasing number of environmentally-focused regulations, adding complexity to their operations and creating urgency around compliance. These regulatory requirements, however, do not offset an operator's need for products that perform consistently well. With the right Environmentally Acceptable Lubricants (EALs), marine companies can see performance benefits that can save time and money, while further protecting the environments in which they operate. Nowhere is that important today than on deck.

EALs for Deck Machinery & Cranes

While the primary focus of environmental regulations has been the biggest discharge contributors—stern tubes—and other equipment such as stabilizers, thrusters, rudders, propellers and hydraulic systems, discharges from deck machinery and cranes deserve equal attention. According to a recent research study by Dagmar Schmidt Etkin, Principal Consultant at Environmental Research Consulting, occasional spills or leaks from this type of equipment are easily evident because they result in a sheen on the water surface. As Etkin points out, the oil that is used on deck-based machinery can enter the water through rain runoff or during deck washing activities.

Based on the research findings, it is estimated that about 10% of the oil enters the water through runoff or washoff. The rest would adhere to the deck and equipment. Etkin estimates that bulk carriers and container ships have the highest inputs of deck machinery-sourced discharges and hydraulic deck machinery is the largest source of lubricating oil discharge.

All operators want to avoid fines for improper deck washdowns. While options include holding or treating all deck runoff, it is not always feasible or safe for the crew or the environment. In order to meet operational needs, as well as regulatory demands, operators would be wise to seek high performing products that won't harm coating surfaces, people or the marine environment.

A Conscious Change via Conversion to EALs

One operator – Seaspan Marine – considered a number of factors before ultimately selecting RSC EnviroLogic products. The products are fully compliant with the U.S. Environmental Protection Agency's (EPA) EAL requirements and, as it turned out, compatible with a majority of the systems that Seaspan Marine would convert. Additionally, a minimal amount of cleaning and flushing of the existing systems is required in order to introduce the RSC EnviroLogic EALs. With the conversion of a number of older vessels, the ease and timeliness of that conversion was very important.

As these products are critical to marine operations, distribution plays a large part in ensuring that quality, compliant products are available. Seaspan Marine needed products that would be supported in a location with a readily available supply. RSC Bio Solutions' products were available in Seattle and were likewise offered by regional, national and multi-national distributors.

"Like all marine operators, we're fairly conservative, and we don't change easily with systems that are already operating fine to something that may or may not change the performance parameters," said John Fowlis, Vice President of Fleet Maintenance at Seaspan Marine. He adds, "With a boat, you can't just park it on the side of the road and call somebody. The crew onboard is relying on that machinery for the safe operation of their vessel, and so experimentation has to come in a very measured kind of way."

The quality of performance is always a concern when switching to a new product, but Seaspan Marine has seen equal or superior performance from the EALs compared to petroleum-based products. In fact, they've found that the hydraulic system of the log loader was actually running cooler with RSC Bio Solutions' product, which prolongs the life of the machinery in this demanding application. Based on the quality performance of the loader, Seaspan Marine is now looking to expand the use of RSC Bio Solutions' hydraulic oil into deck-mounted cranes, anchors and other on-ship machinery applications.

EALs: Confusion in the Marketplace

There's no shortage of conflicting information in the marketplace about EALs. A lack of agreed upon definition is one contributing factor, as is lack of awareness of the four different types of EALs that are available. Inconsistent performance claims from manufacturers have also led to the confusion. Let's clarify a few myths:

MYTH: All EALs are the same.

TRUTH: There are four classifications of EALs Recognized by the U.S. Environmental Protection Agency (EPA) and the International Organization for Standardization (ISO) per Standard 6743/4:

- ***Hydraulic Environmental Triglycerides (HETG)***
- ***Hydraulic Environmental Polyalkylene Glycols (HEPG)***
- ***Hydraulic Environmental Synthetic Esters (HEES)***
- ***Hydraulic Environmental Polyalphaolefins & related hydrocarbon products (HEPR)***

That's all well and good – but what does all of that mean? Chart (a.) to the right provides some guidance.

EALs are defined by the EPA as offering these three characteristics. First, they must be "biodegradable" – biodegrading into carbon dioxide and water by ≥ 60% or more within 28 days (according to OECD 301B or ASTM D7373 methods). Next, they must be "minimally toxic," causing only a light impact on the aquatic environment (LC50> 100mg/L for lubricants and LC50>1000mg/L). Lastly, they are "not bioaccumulative," and must have a low propensity to bioaccumulate in organisms. Additionally, the Clean Water Act of 1972 mentions discharges of oils should not exhibit any visible 'sheen' on the water's surface otherwise it is considered a pollutant (according to CFR 40 Part 435 A). All RSC FUTERRA and EnviroLogic products (including HEPR and HETG types) are readily biodegradable.

MYTH: EALs are not compatible with seals or petroleum-based lubricants.

TRUTH: RSC FUTERRA and EnviroLogic products are compatible with seals and petroleum-based fluids, allowing operators to use the seal that is the best choice for their specific needs.

Clean (& High Performance) Sailing

EALs are not only mandated by the EPA, they perform equivalent or better than petroleum-based lubricants. EALs prevent wear and tear on parts, reduce friction (for improved performance), reduce heat and prevent corrosion. EALs don't eliminate spill occurrence and the need to report and clean up a spill or discharge, but they are safer for employees to handle and have less impact on the environment. And, after all – when you combine safety and compliance with increased performance – isn't that what we're all looking for?

Classification	Advantages	Disadvantages
HETG	High viscosity index	Susceptible to oxidation under high temp/PSI
	Very good wear properties	More prone to hydrolysis
	Compatible w/most seals, hoses	Shorter lifespan than other EALs
HEPG	Designed to be water soluble; but solubility may increase toxicity.	Compatibility challenges w/seals, hoses, paints & varnishes.
	Excellent high/low temp. viscosity performance	Incompatible with mineral oils and other EALs
	Fire resistant properties	Typically not derived from renewable resource
HEES	Delivers high performance	Can be prone to hydrolysis.
	Good thermal & oxidation stability	
	Good corrosion prevention, hose compatibility	
	Extended fluid life	
HEPR	Durable & offer extended wear protection	Typically not derived from renewables, although RSC FUTERRA is the first & only EAL from a renewable hydrocarbon.
	Extended fluid life	
	Broad temperature range performance	
	Excellent thermal and hydrolytic stability	
	Excellent seal compatibility	
	Excellent water separation characteristics	
	Good corrosion protection & oxidation stability	