By Patrick Lapinski

# Fitting out for a new generation

New diesel main propulsion engines were installed in the *Edwin H. Gott* in 2011.

Change is coming to the Great Lakes. With it come excitement and expectation. And the future.

New vessels are beginning to arrive from China, Korea and Japan. Their designs come with exotic themes: Trillium Class, Equinox Class. The ships bear the expectations of owners and operators to be productive, efficient and profitable.

Too, they promise maritime workers employment and safe conditions. And the new ships come wrapped in a popular color: green.

What is the impetus behind this tide of change on the Great Lakes? Two main factors: aging vessels and new exhaust-emissions regulations.

Until recently, cargo capacity and aging steam plants had been the big motivators to replace older vessels. Now a whole new dynamic has come into play, and with it, change.

What makes this change any different? The breadth and scale is significant, and it is occurring in both the American and Canadian fleets, although in rather different manners while producing encouraging results.

The Great Lakes maritime industry operates in a world of regulation. Increased awareness of exhaust contaminants and greenhouse gases has led to stricter standards to limit emissions from vessels. Another factor: U.S. and Canadian regulations within the 200-mile Emission Control Areas along our seacoasts and within the Great Lakes-Seaway.

Similarly, the U.S. Environmental Protection Agency has been incrementally putting into effect new environmental policies. Worldwide, new International Maritime Organization (IMO) regulations call for a significant decrease in sulfur dioxide emissions.

As a result of all this attention to the industry's environmental footprint, transformation is taking place in the engine rooms of Great Lakes and oceangoing vessels. Ships are being built with clean-burning engines, and older steam plants are being upgraded to modern marine-diesel technology. This is a maritime extreme makeover, and the results are exemplary.

The Interlake Steamship Company of Cleveland has garnered a lot of attention for its repowering projects. The company's strategy has been to convert its existing steam-powered vessels to diesel, therefore lengthening the lifespan of the vessel.

Longevity has always been a strong suit of the Great Lakes fleets. Unaffected by the corrosion of the salt water in which their oceangoing counterparts operate, the hulls of bulk carriers on the Lakes have a much longer shelf life. Those hulls that seem to last forever are still holding up. So it makes sense to install new power.

The venerable *Lee A. Tregurtha,* along with the *Hon. James L. Oberstar* and *Kaye E. Barker,* have all been fitted with new Bergen six-cylinder diesels, along with upgrades to auxiliary diesel service generators, reduction gears, controllable-pitch propellers and exhaust economizers that recycle energy from engine exhaust into steam or feed water. The engine controls are fully automated and can be switched to the pilothouse so that the captain has total control of the vessel's propulsion when maneuvering.

The conversion of steam to diesel has also kept several veteran lakers operating for Lower Lakes Towing Ltd. of Port Dover, Ontario. Its first conversion was the *Cuyahoga* in 2001, followed by the *Saginaw* (2008) and the *Michipicoten* in 2011.

Another vessel in its fleet, the *Ojibway*, was repowered in 2005 when operating for Voyageur Marine Transport as the *Voyageur Independent.*

The big U.S.-flag ships are getting

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upgrades as well. Interlake has repowered the *Paul R. Tregurtha* with MAK diesel main propulsion engines. The *James R. Barker* is scheduled for new generators this winter. In June 2010, Interlake was recognized for its leadership in reducing emissions when the company received the Midwest Clean Diesel Initiative Leadership Award.

In 2011, Key Lakes/Great Lakes Fleet completed upgrades to the *Edwin H. Gott* with MAK diesel main propulsion engines [*North Star Port*, Winter 2010-2011]. The American Steamship Company has been replacing diesel-driven electrical generators in its fleet of diesel-powered vessels as well.

While mandated regulations are a definite motivator, the upgrades have brought benefits as well as costs to the operators.

To begin, look at basic maintenance. Those of us who own cars know how much work they are, and that the older they get the harder it is to find parts. After a few years, knowing where a good junkyard is and how to get parts there is essential.

Take that same thought and transpose it to a ship's engine that is at least 40 years old. Keeping it running requires more than a bit of spit and bailing wire. Parts are hard if not impossible to find, repairs take longer and occur more frequently. Factor in the manpower needed to make the repairs and perform the daily maintenance and multiply that across a fleet and you get a maintenance challenge that only a marine engineer can love.

Steamers also take longer to get ready at fitout and require more shutdown time at layup — costs subtracted from the bottom line without moving a single ton of cargo.

With the emphasis on "green," this is where the new diesels really shine. While EPA regulations are designed to decrease emissions, they also bring the benefit of decreased fuel consumption and increased operating efficiency. The new engines are more fuel efficient, reducing costs associated with bunkering.

But it is what comes out of a ship's exhaust stack that receives the most scrutiny. Foremost among their efficiencies, the new engines and exhaust scrubbers are designed to reduce sulfur dioxide and carbon dioxide emissions well below the mandated levels.

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What about the Canadian Equinox and Trillium classes? The designs had been in the works for years, but for all intents and purposes they were just dreams sitting on a naval architect's desk; there were no Canadian shipyards capable of building replacements competitively. The biggest roadblock to replacing older Canadian vessels was a 30-year federal duty of 25 percent on buying ships from abroad.

Facing an aging Great Lakes fleet, Canadian ship owners were looking at some harsh realities if forced to continue with their existing vessels. They lobbied hard for removing the duty and in 2010 were finally successful. The harbinger of that change arrived on the Great Lakes in August 2011, when the Algoma Central Corporation christened the *Algoma Mariner,* the first new Canadian bulk carrier introduced on the Lakes in a quarter of a century.

*Bigger, faster, more fuel efficient* is now the mantra being heard across the Canadian fleets on the Great Lakes. An initial order placed by Algoma called for six identical Equinox-class vessels to be built in China and an additional two that Algoma will operate for the Canadian Wheat Board. The first of the new Algoma vessels are expected onto the Great Lakes in 2013.

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Canada Steamship Lines (CSL) followed suit by ordering two of its new self-unloading Trillium-class vessels for the Great Lakes. *Baie St. Paul,* CSL's first Trillium-class self-unloading laker, set sail on Oct. 6 on her maiden voyage from Jiangyi, China, to Montreal. She is expected to complete the voyage in 50 to 60 days. The 35,500-ton vessel will be joined on the Great Lakes by three sister ships.

CSL also has ordered two Seaway-max size gearless bulkers for delivery in 2014. They will follow the *Rt. Hon. Paul E. Martin,* which already has left Jiangyi.

In August 2012, Fednav Limited, based in Montreal, announced plans to add six new ice-class vessels to its Seaway-Great Lakes fleet. Fednav operates primarily in the Baltic, St. Lawrence Seaway and Arctic trade with the largest fleet of ice-class vessels in the world. Building the new 35,000-ton vessels will take place at the Oshima Shipyard in Japan. These vessels are expected to reach the Great Lakes in 2015 and 2016.

The hulls of these ships are designed to improve flow through the water while providing maximum cargo lift. A special marine coating is applied to the hulls to reduce friction and increase flow to the propeller, allowing for increased speed with lower horsepower. The vessels are fitted with bow and stern thrusters, a well-established standard on the lakes.

And what's under the hood? Most of the innovation takes place in the engine room. The main engines are all compliant with IMO 2011 emission standards and have a high level of automation.

An important complement to the new engines is the installation of exhaust scrubbers, expected to remove up to 97 percent of sulfur dioxide emissions, allowing vessels to burn a lower-cost heavy fuel oil, which will reduce overall operating expenses. As a result, Algoma's Equinox-class vessels are predicted to be 45 percent more fuel efficient (fuel per ton-mile) than the company's existing vessels.


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The *Michipicoten* was upgraded from steam to diesel in 2011.

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With all the technology and automation, it takes trained personnel to operate these expensive new and upgraded vessels.

Attracting the next generation of mariners to the Great Lakes is critical to the future of the industry. Many fleets are looking at large percentages of their current labor force retiring in the next five to 10 years. Replacing these mariners is a big concern. There is little incentive for students of maritime academies to learn state-of-the-art technology and then go to work on older, worn-out vessels. With this generation of new and repowered vessels, fleet operators are hoping the changes will attract renewed interest in their boats as a good place to earn a good living.

As vessels that were built 30 to 40 or more years ago are making their final hauls, not everyone is sad to see them go.

For many, this current transition isn't about just replacing ships; it is about building on the legacy of the generations of mariners who served on these fleets. Carrying on the tradition and passing the torch to those who follow. Investing in the future. That's what this new phase of construction and renovation is all about.

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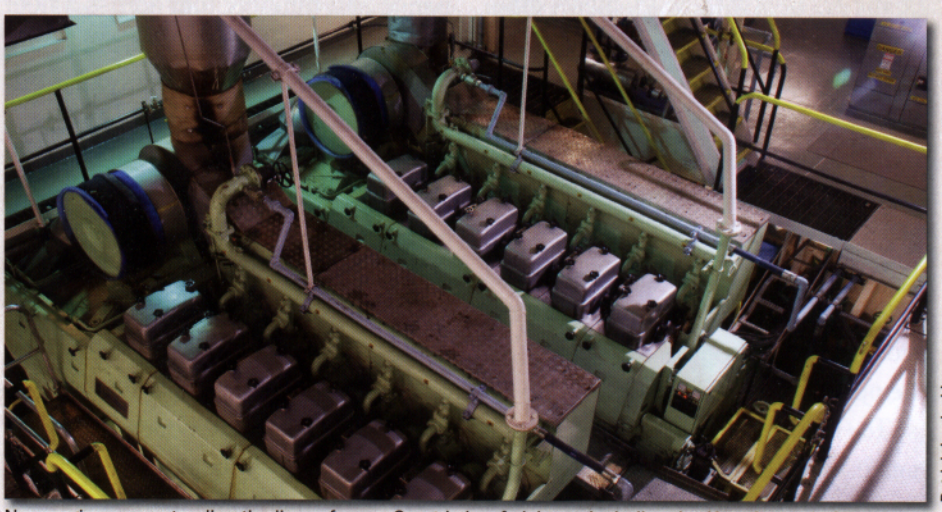

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New engines are extending the lives of many Great Lakes freighters, including the *Hon. James L. Oberstar* with its two Bergen six-cylinder diesels installed in 2009.