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Great Lakes Maritime Research Institute

A University of Wisconsin - Superior and University of Minnesota Duluth Consortium

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Quarterly Update

(January – March 2011)

Cleveland Venues Highlight GLMRI Research

In February, GLMRI was included on the agenda at the **Great Lakes Waterways Conference** (formerly known as Marine Community Day). Carol Wolosz provided an update on the resent research and education projects and Dr. Michael Parsons provided an overview of the GLMRI design and engineering projects underway at the University of Michigan.

On Friday, February 18th, the **Society of Naval Architects and Marine Engineers had their Great Lakes and Ohio River Section meeting**, and featured Dr. Parsons where he presented an in-depth report of the work on the *Integrated Electric Plants in Future Great Lakes Self-Unloaders* authored by Dr. Parsons, Dr. David Singer and Samuel Denomy.



Also at Cleveland during the Great Lakes Waterways Conference, the GLMRI 2010 Annual Report made its debut. If you haven't received your copy, please contact the GLMRI Program Office.

Mark Your Calendars

International Assoc. of Great Lakes Researchers Annual Conference
Duluth, MN 30 May – 3 Jun

Great Lakes Maritime Teacher Institute
Door County, WI 20-24 Jun

Teaching Mathematics through Navigation Teachers' Workshop
Houghton, MI 28 Jun – 2 Jul

GLMRI Fall Meetings/Duluth, MN
Advisory Board 22 Sep
Affiliates Meeting 22-23 Sep

M/V Gott Repowering Project Completion

On February 24, Dr. Richard Stewart and a U.S. Environmental Protection Agency (EPA) team of Steve Marquardt, Anthony Maietta and Francisco Acevedo visited the *M/V Edwin Gott* in the shipyard in Sturgeon Bay, Wisconsin. Special Projects Engineer Rick Harkins from Keystone Shipping led the tour of the vessel. The main propulsion engines are in the process of being replaced and a portion of the cost is being paid for by a \$750,000 EPA Clean Diesel grant that the Great Lakes Maritime Research Institute was awarded in partnership with Key Lakes 1 Inc. (Article continued on Page 2.)



Transportation Research Board and Washington Meetings

In January, GLMRI staff and researchers were active throughout the week's schedule for the Annual Transportation Research Board meetings. On Sunday evening, GLMRI co-sponsored the Wisconsin reception hosted by the University of Wisconsin's Center for Freight and Infrastructure Research and Education (that again coincided with the NFL playoffs with the Green Bay Packers). Dr. Adams, Jason Bittner and Bob Gollnik from C-FIRE and Dr. Lindquist, Sarah Schafer and Samir Dhar from the University of Toledo Maritime Data Clearinghouse team were in attendance. Dr. Stewart brought several students to the conference from the University of Wisconsin-Superior's Transportation and Logistics program.

Dr. Stewart and Carol had meetings with the ABS Consulting Program Manager on the MARAD Great Lakes Study. Dr. Stewart also met with the team for the NCFRP-35 study progress.

Dr. Stewart gave a presentation on the issues with the lack of accurate and consistent maritime data for policy makers. He also had a poster on the lack of maritime research funding in the US.

On Tuesday, Dr. Stewart and Carol met with DOT Administrators and their staffs from MARAD and RITA to discuss funding for maritime research. Administrator Matsuda from MARAD hosted the meeting along with Deputy Administrator Orlando Gotay. Associate Administrator (acting) Curt Tompkins from RITA participated in the discussion. In the afternoon we met with Saint Lawrence Seaway Development Corporation Administrator Terry Johnson and staff members to discuss regional research and education topics. They also met with the GLMRI Advisory Board member from the American Great Lakes Ports Association, Executive Director Steve Fisher.

Progress on the MARAD Great Lakes Study

As a member of the American Bureau of Shipping Consulting team, GLMRI is participating in the MARAD Great Lakes Study. Carol Wolosz assisted with the three stakeholder meetings: Cleveland, OH (Feb 15), Duluth, MN (Feb 23) and Chicago, IL (Feb 25). Dr. Teresa Adams from the GLMRI affiliate UW-Madison attended the Cleveland and Chicago meetings. Dr. Stewart is advising as an expert on regional shipping and transportation. Dr. Adams will work with the team on the topic of TIGER Grant processes. Dr. Peter Lindquist (U. Toledo) is assisting with the data requirements for the port studies.

M/V Gott Repowering Project (cont from p.1)

The two former 16 cylinder Enterprise engines were replaced with eight cylinder engines that conform to EPA Category 3 Tier 2 engine emission requirements. The original engines were installed in 1979 and were still running but could never be retrofitted to meet the new EPA air emission standards.

The process of repowering a vessel's engines requires that the gears, clutch, shafts and propeller all work together for maximum efficiency. This means new electronic systems, adaptors, fuel filtration packages and quill shafts had to be installed as well as the engines. A new engine bed of approximately 3' x 20' x 3" thick steel had to be fabricated and installed so that the engine could be mounted on resilient mounts to reduce vibration.

Each of the two new MAK/Caterpillar 8M43C engines will produce about 7200 Kilowatts (9650 horse power) each while powering the *M/V Edwin Gott* as it carries cargo on the Great Lakes. This is now the most powerful vessel on the Great Lakes. Prior to being shipped to the U.S. from Germany, the engines were operated in a test facility at maximum rated power. After the several hour test run all components were examined to see that they functioned without problems under maximum load. These engines are expected to operate in the vessel for decades.



The old Enterprise Diesel engines were removed by cutting a very large hole in the deck then another one through the ballast tank to enter into the engine room. Cutting the openings and preparing the rigging to take out the old engines took almost two weeks. Once preparations were completed the old engines that weighed 102 tons each were removed by the crane

operator and line handlers in a few days. Just like truck engines that are removed when supported by an EPA clean diesel grant, these engines will be rendered unusable.



Preparing the space for the new engines took another couple weeks and then on the coldest day in December the new engines that weigh 117 tons each were set onto the beds in about four hours. When the crane operator brought the engines close to the mounting bolts the alignment was only a few millimeters off and the rigging crew could ease the massive machines into place.

If someone wants to see quality work they should spend time with these shipwrights. I am constantly impressed by the people who keep our complex transportation systems running smoothly. Trucks, rails, vessels, planes all required dedicated, creative, intelligent people to design, manufacture, operate and maintain the systems.

In addition to the main engine repowering, the company has taken proactive steps to reduce the sediment that comes in the vessel when ballasting. Moving beyond compliance with existing environmental laws additional ballast water intakes were installed, at considerable expense, higher up on the side of the vessel. American Steamship company as well as Key Lakes 1, Inc. are taking these steps to reduce the environmental footprint of their vessels on our Great Lakes.

On March 25th, the *M/V Edwin Gott* underwent sea trials to test her new engines and systems in a variety of evaluations required by the U.S. Coast Guard and the American Bureau of Shipping. On March 26th, she initiated her maiden voyage with her new engines.

Richard Stewart, Ph.D. GLMRI

Key Outreach, Events, Presentations, Meetings

- Dr. Stewart participated in the American Great Lakes Ports Association meeting, and presented an update on GLMRI and the MARAD Great Lakes Study. He also met with Marine Delivers, as a member of their Oversight Committee. Toronto, Canada. Jan 19-22.
- TRB Involvement and DOT office visits. Washington, D.C. Jan 23-26. (see detailed paragraph on page 1)
- Dr. Stewart presented on Great Lakes Shipping at University of Wisconsin-Manitowoc. Manitowoc, WI. Feb 23.
- Dr. Stewart visited the shipyard with the EPA/Key Lakes team to tour the *M/V Gott*. Sturgeon Bay, WI. Feb 24-25.
- Carol Wolosz and Dr. Adams participated in the MARAD Great Lakes Study Stakeholder Meetings. Cleveland, OH (Feb 15), Duluth, MN (Feb 23) and Chicago, IL (Feb 25).
- Carol Wolosz attended the Harbor Technical Advisory Committee meeting. Superior, WI. Mar 2.

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