

DREDGE HURLEY LADDER LENGTHENING

James H. Asbury IV, PE

**Brief History of the Ladder
Lengthening Project for the
Dredge HURLEY**
and the Partnership Between the
Marine Design Center and Ensley
Engineer Yard, Memphis TN

Marine Design Center, Philadelphia, PA

February 2010



US Army Corps of Engineers
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Dredge HURLEY

- Brief History of the Dredge HURLEY
- History of the Ladder Lengthening Project
- Brief History of major projects completed by EEY and MDC



Marine Design Center



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Dredge HURLEY – Built 1993

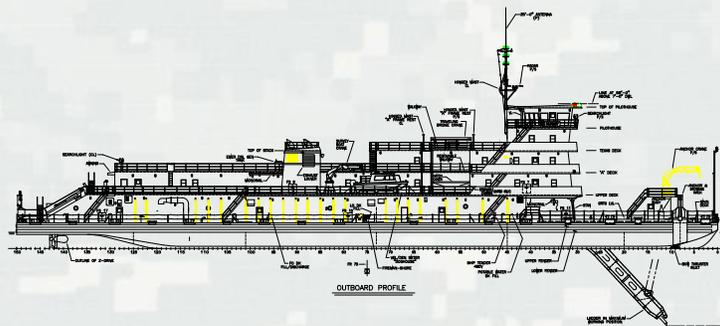


Memphis, TN – Max Depth 40 ft



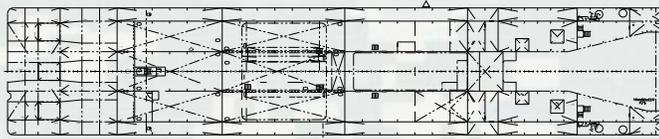
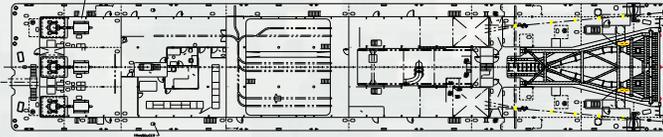
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Dredge HURLEY – Original Configuration 1993



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Dredge HURLEY – Original Configuration – 1993



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Dredge Hurley Ladder Lengthening Project

- Project was stalled by HQ after protests from private industry.
- Portions of project authorized to proceed in 2000.
 - ▶ New Bowthrusters
 - ▶ New A-frame
 - ▶ New Hoist Winch



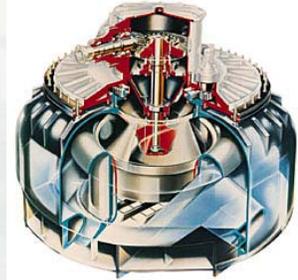
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Dustpan Dredge – Recent Changes

Dredge HURLEY Bow Thruster

• Schottel Pump-Jet Key Benefits Include:

- compact design
- low loss of buoyancy
- low suction effect
- high thrust even in extremely shallow water
- Directional Thrust Capability



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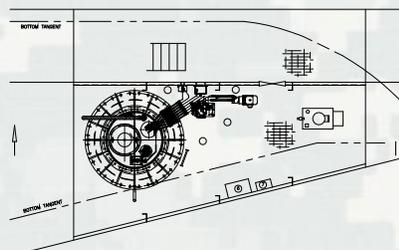
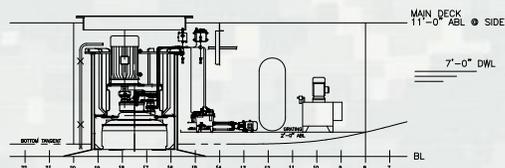


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Dustpan Dredge – Recent Changes

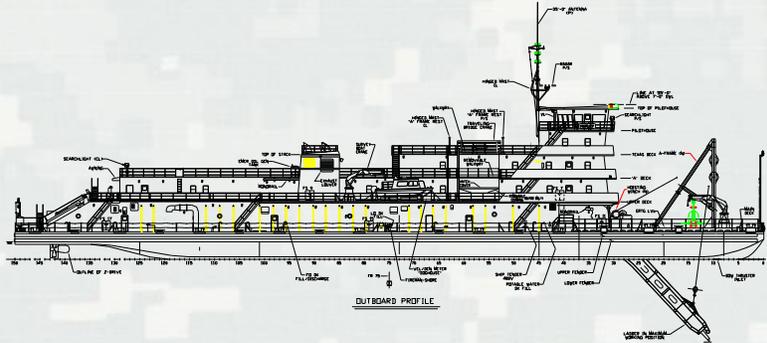
Dredge HURLEY - Bow Thruster

PORT BOW THRUSTER ROOM



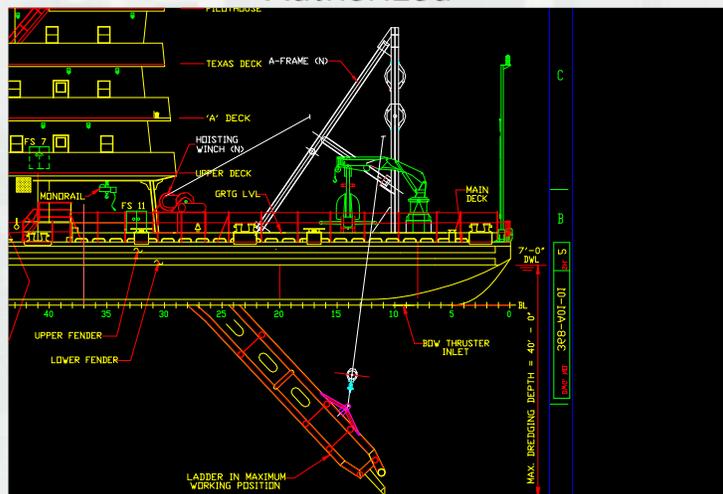
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Dredge HURLEY – Phase 1 Modifications – 2002-2003



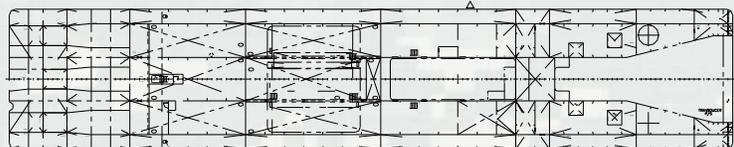
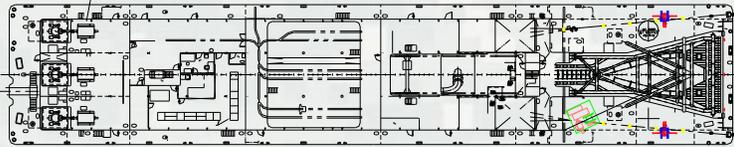
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Dredge HURLEY – Portions of Project Authorized



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Dredge HURLEY – Phase 1 Modifications 2002-2003



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Dredge HURLEY – Original Hoist Winch Removal



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Ensley Engineer Yard Modifies
Dredge Hurley
Dredge HURLEY – A-Frame



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Ensley Engineer Yard Modifies
Dredge Hurley
Dredge HURLEY – New Bow Thrusters



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Ensley Engineer Yard Modifies Dredge Hurley

Dredge HURLEY – New Bow Thrusters



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Dredge HURLEY – Installation of new Bow Thrusters Hauling Winch and A-Frame



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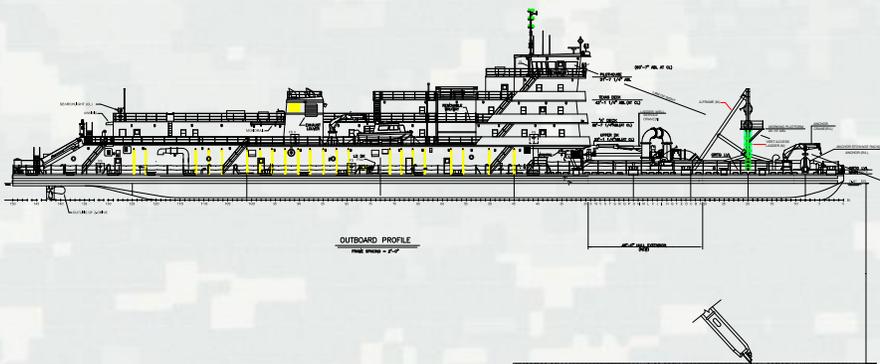
2007 Extreme Highwater enables Hurley Ladder Project to Proceed

- Following extreme high water on the lower Mississippi River, need for a deep digging USACE dredge is realized.
- 2008 Project cost re-evaluated, project receives increased authority to \$17.8 mil
- MDC partners with EEY to complete Ladder Lengthening Project.



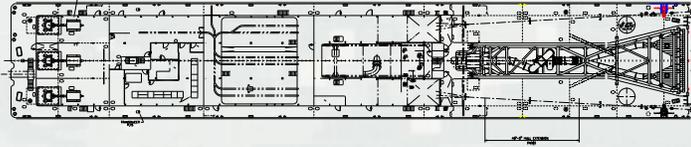
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Dredge HURLEY – Extended Ladder

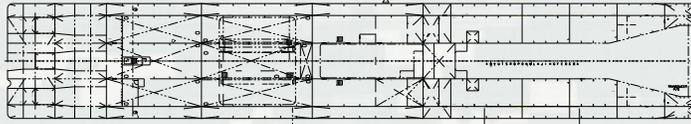


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Dredge HURLEY – Extended Ladder



MAIN DECK



HOLD AND INNERBOTTOM PLAN



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Dredge HURLEY – Ladder Extension Project

- MDC places major supply contracts in support of EEY
 - ▶ Steel procurement for new ladder, A-Frame, and Horn sections
 - ▶ Power Cable Procurement
 - ▶ New Steel Deck Grating
 - ▶ Rigging Services Contract for heavy lifting of components
 - ▶ Procuring Ladder Service Crane
 - ▶ Planned procurement of Ladder Dredge Pump and drive system



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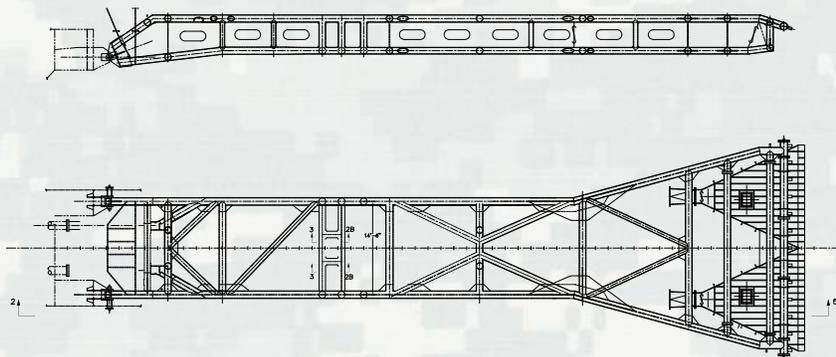
Dredge HURLEY – Ladder Extension Project - Current

- Phase I – Extend Spare Dredging Ladder
 - ▶ MDC Procures Pre-Cut Steel for EEY
 - ▶ EEY Begins work on one of two spare ladders while Hurley is out working



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Dustpan Dredging Increases in Dredging Depth



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Dredge HURLEY – EEY building Dredging Ladder Insert



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Dredge HURLEY – Barnhart Moving Ladder Insert from Fab Shop



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Dredge HURLEY – EEY Moving Ladder Insert Into Position on Barge to Join with Existing Ladder



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Dredge HURLEY – Construction of Dredging Ladder Insert – Dredge Ladder Suction Pipe



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Dredge HURLEY – Ladder Extension Project - Current

- Phase II – Construct New A-Frame
 - ▶ EEY Begins work on Constructing new A-Frame



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Dredge HURLEY – Construction of New A-Frame



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Dredge HURLEY – Ladder Extension Project - Current

- Phase III – Construct New Hull Insert Sections
 - ▶ EEY Begins work on Constructing new Hull inserts in Fab Shop



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Dredge HURLEY – Construction of New Hull Inserts



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Dredge HURLEY – Construction of New Hull Inserts



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Dredge HURLEY – Barnhart Moving Horn Insert from Shop to their Facility for lift into Drydock.



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Dredge HURLEY – Barnhart Moving Horn Insert from Shop to their Facility for lift into Drydock.



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Dredge HURLEY – Barnhart Moving Horn Insert from Shop to their Facility for lift into Drydock.



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Dredge HURLEY – Barnhart Moving Bow Section and Inserting new Horn Sections



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Dredge HURLEY – Barnhart Moving Bow Section and Inserting new Horn Sections



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Other Major Project Partnerships between MDC and EEY

- Dredge JADWIN Propeller Tunnel Modifications
- Towboat MISSISSIPPI Engine Cooling System Modifications



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Dredge JADWIN Tunnel Modifications

- Dredge JADWIN partnered with EEY and MDC to upgrade propulsion system



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Dredge JADWIN Tunnel Modifications



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Dredge JADWIN Tunnel Modifications



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Dredge JADWIN Tunnel Modifications



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Dredge JADWIN Tunnel Modifications



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Dredge JADWIN Tunnel Modifications - Completed



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Dredge JADWIN Tunnel Modifications - Completed

- Project greatly improved maneuvering of Dredge Jadwin
- Increased speed of Dredge from 12 to 15 knots
- Cut fuel consumption by 1/3 by optimizing propeller thrust



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M/V MISSISSIPPI Engine Cooler Installation

- Towboat MISSISSIPPI identified engine cooling problems when operating in shallow water.
- Poor engine performance when backing down, engines stall due to overheating



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M/V MISSISSIPPI Engine Cooler Installation

- Memphis Dist. And MDC partnered to remove the old cooling system and install a new cooling system on the Towboat MISSISSIPPI.



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M/V MISSISSIPPI Engine Cooler Installation



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M/V MISSISSIPPI Engine Cooler Installation



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M/V MISSISSIPPI Engine Cooler Installation



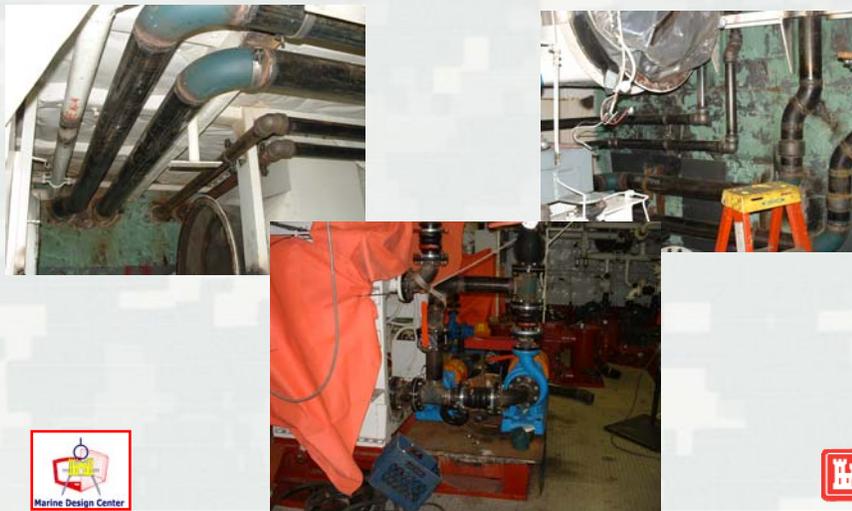
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M/V MISSISSIPPI Engine Cooler Installation



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M/V MISSISSIPPI Engine Cooler Installation



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M/V MISSISSIPPI Engine Cooler Installation



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EEY Featured in Waterways Journal

THE WATERWAYS JOURNAL, St. Louis, Missouri, Monday, February 21, 2005

Unique Cooling System Installed On Mv. Mississippi

By GEORGE STRECHAM
Memphis Engineer District

With over ten years of service and thousands of river miles under its keel, the Mv. Mississippi was pulled out of the water to improve the cooling system for its engineering plant. The Corps' Enbridge has been expected to go back into the water early next month after spending nearly four months in drydock.

The system is not just new to the Mv. Mississippi, but unique to river vessels in the United States as well.

This design is actually the first of its kind in the U.S., said James Ashby, a mechanical engineer at the Corps' Marine Design Center (MDC) who helped design the new coolers. "These coolers are used extensively throughout Europe in both river and ocean-going craft."

Inland river towboats are normally built with a type of cooler that circulates water in a closed loop from the engine to a cooler and back to the engine, he said.

Don Mayer, a mechanical engineer in associated plumbing was then contacted by the engineering plant where it would be used to cool the three main engines, their reduction gears and two air conditioning chillers.

"The river water wasn't too hard to the system and there was a lot of corrosion," Mayer said. "The new system changes all that."

The new system was designed by the MDC in Philadelphia, Pa. and will have low coolers on the port and starboard sides of the hull just below the waterline. The components and associated plumbing was then mounted in the plant section, explained that the old for hull were then welded into place, leaving openings for river water to circulate.

In addition to corrosion problems the old system was subject to clogging of the strainers and other components of the system, Ashby said.

"In many instances, when the vessel would go in full reverse, the engines would overheat and shut down because the river water being pulled into the vessel would become saturated with air from the propellers and cause the water pumps to lose suction," he said.

With these types of coolers, the river water can come in and out freely without the need for pumps or plumbing. Unlike the old system, where river water was pumped to the engines' coolers, now the non-corrosive coolant used in the engineering plant is pumped to the coolers and back to the appropriate component through closed-loop piping.

To install the new coolers, 22 by five-foot holes were cut in the port and starboard sides of the hull just below the waterline. The components and associated plumbing was then mounted in the plant section, explained that the old for hull were then welded into place, leaving openings for river water to circulate.

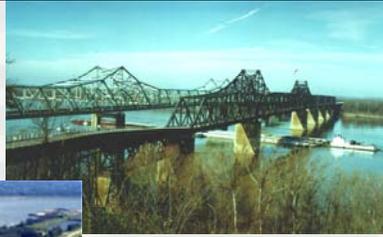
Piping used in the old system reveals considerable corrosion.

—Photos courtesy of Memphis Engineer District Memphis.



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Questions?



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