Locking Up Success in the Soo

Every day and night, vessels traverse the Soo Locks to maneuver the 21-foot drop between Lake Superior and Lake Huron. The 800-foot MacArthur Lock was built in the 1940s and implemented the same manual process for more than 70 years. Fast forward to the present: advancements in technology and a need for increased safety measures meant it was time to bring the hard-working Lock into the 21st century.

Project

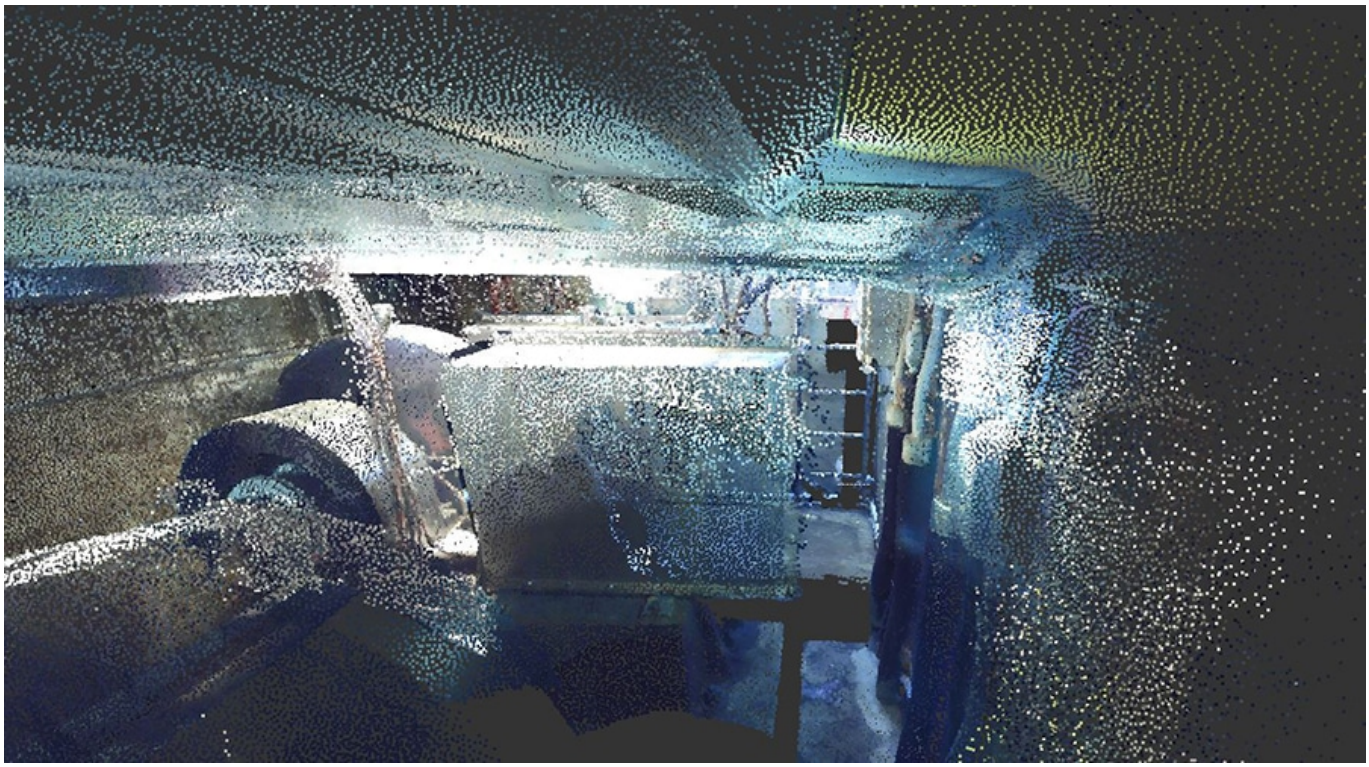
Soo Locks – MacArthur Lock Modernization

Industry

- Transportation

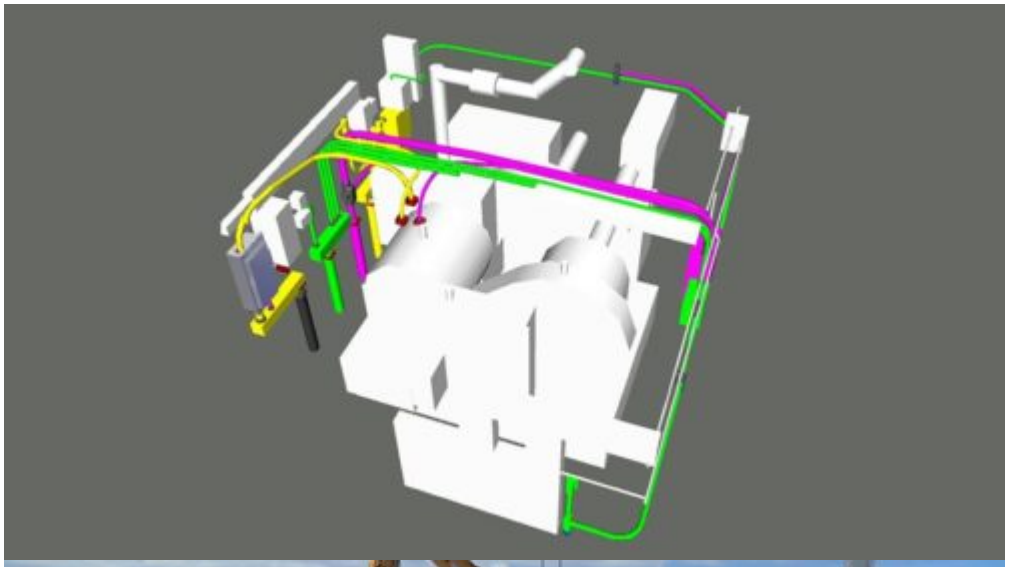
Details

- **Location:** Sault Ste. Marie, Michigan
- **Project Size:** $7.6 million



The Challenge

After a competitive bid process, Windemuller was selected by the U.S. Army Corps of Engineers to tackle the MacArthur Lock modernization. Updating a system of this magnitude required innovation to automate a manual process, while maintaining the integrity and vision of the original engineers. Not many contractors are equipped to handle a project of this scope and scale, but Windemuller’s experience and depth of services – including electrical, automation and communications – made us an ideal partner for the challenge.



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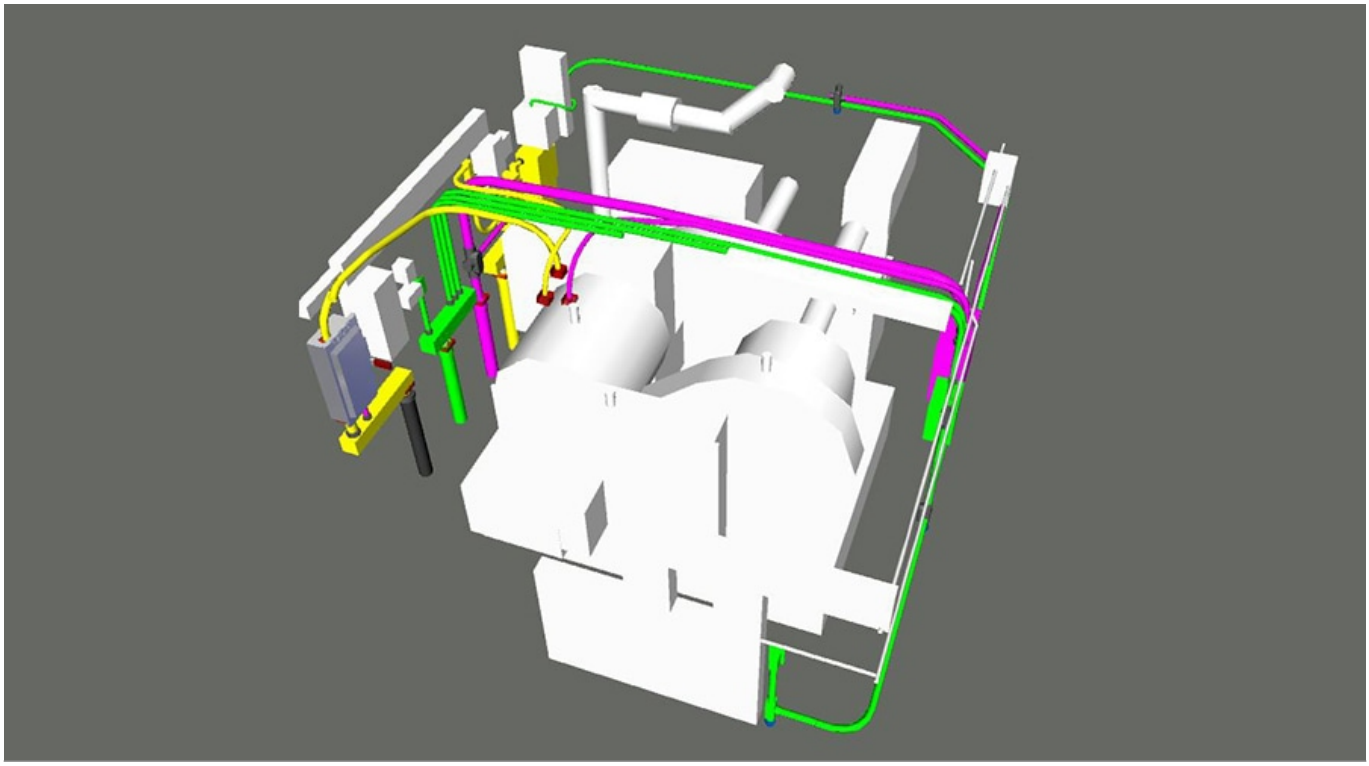

The Solution

Before any site work could be completed, the project team quickly identified roles and established a timeline.

The Windemuller teams worked closely together for 18 months to upgrade the entire instrumentation and control system for the MacArthur Lock. We also replaced the current electrical system and installed a new Homeland Security-grade camera system on the 800-foot long, 80-foot wide structure.

Windemuller utilized 3D laser scanning to document the existing conditions of the Lock and then developed a BIM model to streamline installation and reduce downtime. Once the room and new electrical system were laid out, our in-house prefabrication department built the necessary electrical components.

The new system included state-of-the art digital controls, cameras and power distribution, with a special emphasis on operator safety and reducing the vulnerability to terrorism and natural disaster.

To bring the Locks into the 21st century, the **Windemuller's electrical construction team**:

- Replaced the switchboards with new, automated ones
- Replaced aging transformer with one that is safer and more efficient
- Updated the motor controls to include Variable Frequency Drives (VFD), which allows for precise control of water flow
- Replaced the electrical distribution subpanels and more than 100,000 feet of electrical cable that provides power to the motors, switches and control system
- Installed new Baldor process motors which operate the Lock gates, valves, sump pumps and fender

Windemuller's communications department also played a key role in updating the technology:

- Installed 12 new Pelco PTZ cameras to improve security and operator vision
- Installed a network switch, video recording and computing equipment so all cameras operate on the Endura IP video management system
- Ran Cat6 and fiber optic cable to support network communication

Windemuller automation department finalized the system conversion. Automating the process not only reduces risk to the operators, but also damage to equipment.

Fifty two new control panels were built in Windemuller's UL Listed panel shop and then installed along the entire length of the Lock – more than 800 feet. Since the controls for the Lock were no longer confined to a designated room, PLC programming connects all of the panels and HMI programming provides operators with real-time information on Lock equipment and a single point of control.

To ensure a flawless installation, every piece of equipment underwent a Factory Acceptance Test (FAT) at our Wayland office.

Thanks to the massive efforts of more than 20 Windemuller technicians, the MacArthur Lock is modernized for top performance, operators are ensured a safe work environment and the Lock’s vulnerability to terrorism and natural disaster is reduced.

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