



Investigating Direct-Connect Cylinder Operating Equipment at Mel Price Lock and Dam

ERDC Dredging Operations Technical Support Program (DOTS)

U.S. ARMY CORPS OF ENGINEERS

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Response Summary:

This response involved attending a meeting at Mel Price Lock and Dam in support of USACE St. Louis district (MVS) and the Inland Navigation Design Center (INDC). Throughout the USACE Navigation mission, there is concern about the latest trend to utilize so-called direct connect cylinders to operated miter gates at navigation projects. These direct connect cylinders are typically installed with a substantially different geometry than the previous operating equipment, leading to increase in operating loads to the miter gate and the miter gate anchorages. A number of recent issues at navigation projects where the equipment was changed to direct connect have further heightened concerns.

Mel Price Lock and Dam is in a unique position to enable collection of data to perform a direct comparison of the change in loads experienced by a miter gate due to swapping the operating equipment to the direct connect variety. Currently, the miter gates on the auxiliary chamber at Mel Price Lock and Dam are operated with the Ohio River Sector Gear, but the equipment will be changed to the direct connect variety. Thus, there is a desire to instrument the miter gate and current operating equipment at the project to collect data on the operating loads before and after the equipment is changed. It is expected that this data would inform optimal equipment configurations and inform the USACE whether or not direct connect cylinders are appropriate and viable alternatives to the typical sector-gear type equipment historically used. In preparation for instrumentation, this DOTS response enabled an on-site meeting to discuss the equipment change with the project engineers and operations personnel and to determine a feasible instrumentation plan that would provide the information necessary to determine the change in operating loads experienced by the miter gate due to the change in operating equipment.

Period of Performance:

This DOTS request was in support of a meeting that took place 11-12 DECEMBER 2024. The instrumentation and testing planned during this meeting is expected to take place throughout FY25.

Benefits of the Response to the USACE Dredging/Navigation Program:

This response is in direct support to USACE Civil Work Navigation R&D Statement of Need 2090: "Operating Forces Revisited and Optimized Geometry for Miter-Type Lock Gates". The meeting supported by this DOTS request was essential to plan for the instrumentation necessary to determine the change in operating forces imparted on miter gates and miter gate anchorages due to the different geometry and higher potential forces caused by switching the miter gate operating equipment from an Ohio-River-style sector gear to a direct connect cylinder.

Deliverable:

The deliverable from this response was a meeting held at Mel Price Lock and Dam to plan for instrumentation in the immediate future. This meeting included a site visit to determine the most appropriate types and locations of sensors to install, and a rigorous instrumentation schematic plan is forthcoming.



Providing environmental and engineering technical support to the U.S. Army Corps of Engineers
Operations and Maintenance navigation and dredging missions

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