

Sill Replacement Projects Black Rock Lock



Buffalo District, Black Rock Lock Sills Replacement



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Sill Replacement Projects Black Rock Lock

- ARRA funded
 - ▶ Required to be obligated NLT end of FY
 - ▶ Required to be expended NLT end of CY
- Projects involved replacement of the sill timbers for the operating and guard gates at the lower end of the lock
- Time frame constraints did not allow for dewatering of the lock, forcing in the wet construction



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Design/Scope of Work

- Basic scheme of SOW was straightforward
 - ▶ Replacement in kind of existing timbers
 - ▶ Original drawings of sill and timbers were available
 - ▶ Sill timbers for the lower operating gates were measured during the last replacement performed with the lock dewatered



Scope of Work Items

- Work to be accomplished
- Time frame available
- Accommodations to be made for vessel traffic
- Safety plans and submittals to include dive plan submittals



Scope of Work

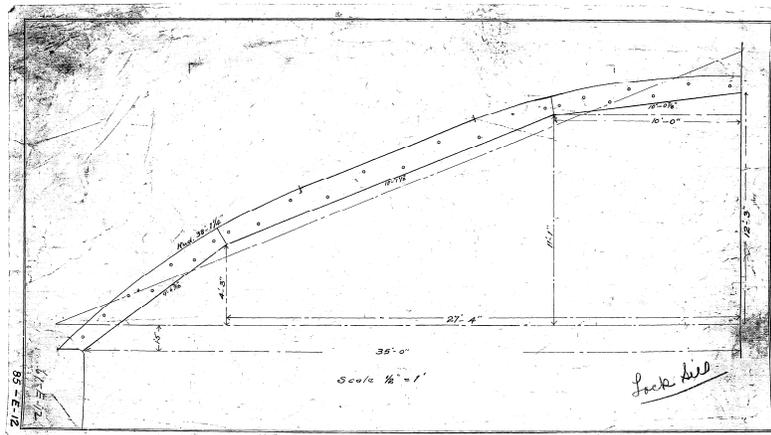
- Replacement in kind of 12" x 15" white oak timbers (approximately 80 ft. per sill)
- Install new 1" threaded rod, 316 stainless steel to retain timbers, epoxy threaded rod in place
- Contractor given until 18 December to complete work (pleasure craft traffic diminishes greatly after Labor Day)



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Drawing of Sill Timbers



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Schedule of Work

- Black Rock Lock is mainly used by pleasure craft
- Commercial lockages primarily consist of tour boats and tugs pushing fuel barges
- Occasional deep draft self unloading ship traffic transits the lock
- Work was required to accommodate all of the above



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Contract Schedule Language

SCHEDULE

The contractor will be required to schedule work so as to minimize interference with ship traffic wishing to utilize the lock. Commercial traffic will generally provide at least a day's notice of their expectation to transit the lock. Pleasure craft may be delayed up to an hour at a time with a minimum of 1 hour between delay times in order to allow for one complete lockage cycle both upbound and downbound.

During vessel transits of the lock all contractor equipment and personnel shall be clear of the channel.



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Time to Play “The Price is Right”

Total price for both items in our Showcase?
(MATOC contract)



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Bid Prices and Time Line

- Bids sent to MATOC contractors
- Low bidder was BIDCO marine group
- Low bids:
 - ▶ Lower Guard Sills- \$100,270
 - ▶ Lower Operating Sills- \$107,377
 - ▶ Showcase Price- \$207,647
- Funds for project start available 6 May
- Funds for contract advertisement 20 July
- Contract awarded 21 September
- Original scope/award work complete early November
- Additional scope work complete mid-November



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Construction

- Contractor's plan was to remove the timbers and use them as a template for the new timbers
- Removal was to be by attaching timbers to a lifting beam with lag bolts and then pulling up and out with a crane
- Burn off the old threaded rod and then grind flush with the sill concrete



Removal

- Original plan was impractical as the wood was punky and the lag bolts just pulled out
- Removal was then accomplished by removing the nuts of the existing threaded rod with an impact gun and then jacking up the timbers with "jaws of life" hydraulic spreader
- Required driving steel wedges under the timbers first in order to get the hydraulic spreader jaws into position



Hydraulic Spreader



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Removal

- Driving the steel wedges in with sledge hammers was impractical
- Old nuts from the threaded rod were welded to the end of the wedges so that jackhammers would have a recess to work in and drive the wedges in
- Once the timbers were driven up the jaws of life were used to free them

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Cutting Radius in Timbers

- Old timbers used as a template
- Chain saw work in the dry to get 95% fit
- Underwater chain saw work to get the final fit



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Installing the new timbers

- Timbers with spreader beam attached were slightly negatively buoyant
- Lowered in place, tacked in place with small angle clips and then holes for new threaded rod were drilled
- Threaded rod then epoxied in place and nuts fitted
- Once the epoxy set the nuts were tightened with an impact gun



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Lowering Timbers into Place



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Time to complete

- Approximately one week for each set of gates
- Single shift operation, M-F
- Two diver operation



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Post Completion Dive Inspection

- Work was completed IAW contract requirements
- Leakage was noted at the heels of the gates
 - ▶ Contract modified to pack these areas with hydraulic cement to cut down on leakage
 - ▶ Hydraulic cement also placed in gaps between the timbers as the concrete sills as the sills were not square and true



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Summary

- Work completed early (mid-November)
- Quality was similar to that of previous efforts done in the dry during dewatering
 - ▶ In the wet work allowed for longer lengths of timbers to be placed, fewer end to end joints
- Cost of dewatering the lock was avoided for the operating gate timbers
- Cost of setting up a temporary closure to dewater the guard gates was avoided



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Questions?



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