

VALUE ENGINEERING PROPOSAL

PROPOSAL NO: S-6

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DESCRIPTION Eliminate Dewatered Condition From Lock Design

ORIGINAL DESIGN:

The existing lock design calls for the entire lock to be dewatered periodically. The primary reason for lock dewatering is to allow inspection of the concrete surface and to perform repairs in the dry. The necessity for inspection of concrete surfaces is more critical for lock chambers that contain filling and emptying systems than those that do not. The added expense for a dewatered condition is additional piles that resist uplift forces and additional piles at the upstream and downstream bulkhead monoliths to resist the unbalanced lateral load.

PROPOSED DESIGN:

It is proposed that the capability to dewater be eliminated from the design. It is estimated that at least ten percent of the piling can be eliminated since the unbalanced lateral force and tension piles for dewatering are not needed. The reinforcement in the chamber wall and floor required for resisting dewatering forces could also be reduced.

ADVANTAGES:

1. Savings in first cost.
2. Reduced construction time due to reduced pile driving time.
3. Improved concrete consolidation due to reduced reinforcement.

DISADVANTAGES:

1. Cannot inspect concrete surfaces in the dry.
2. Cannot dewater entire chamber for repair.

JUSTIFICATION:

Since the chamber monoliths do not contain a filling and emptying system, deterioration due to high velocity flows or cavitation is not a concern. The greatest potential for damage is the surfaces of the concrete exposed to abrasion from barge traffic. This area is generally above the waterline and can be observed without dewatering. Additionally, repairs can be effected more expeditiously by using a semi-circular cylinder that seals against the lock wall by hydrostatic pressure. Good sound concrete can be ensured by designing the lock walls with adequate cover over the reinforcement and by consolidating the concrete to avoid intrusion of corrosive agents. Deterioration from freeze-thaw cycles is not a concern due to the location of the project. Abrasion can be minimized by the appropriate use of wall armor.

