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DEPARTMENT OF THE ARMY  
U.S. ARMY ENGINEER DIVISION, GREAT LAKES AND OHIO RIVER  
CORPS OF ENGINEERS  
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CELRD-PD

Regulation  
No. 1130-2-22

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Navigation Locks and Dams Maintenance Standard

1. Purpose. The purpose of this regulation is to establish the Great Lakes and Ohio River Division (LRD) standard for navigation locks and dams maintenance. Performance measures relating to economic impacts and benefits will be utilized to optimize and distribute available resources to maintain a reliable transportation system.
2. Applicability. This regulation is applicable to all navigation locks and dams within LRD.
3. References. ER 1130-2-1, Project Operations.
4. General Policy. Maintaining and planning for the long-range viability of the U.S. inland waterways transportation system is a primary functional mission of the Corps of Engineers. Accordingly, all LRD navigation locks and dams will be maintained to provide optimum levels of service and safety given resource constraints. Resources will be directed to reduce the risk of unscheduled lock closures to maximize the economic benefits provided by the navigation system. Maintenance resource allocations will reflect sound fiscal management and stewardship consistent with the Corps Environmental Operating Principals.
  - a. As a learning organization, LRD will approach the maintenance of navigation facilities from a regional perspective, leveraging team-based benefits by sharing and consolidating resources between districts.
  - b. It is expected that project features will be maintained in a fully functional condition to maximize the benefits provided by the system given available resources. Any reduction in capacity or service at LRD navigation locks and dams longer than 8 hours in duration will be reported by E-Mail notification to LRD Chief of Operations.
  - c. Design and work practices that reflect sound fiscal management and current industry standards as determined by the LRD Regional Maintenance Team will be incorporated into repairs,

maintenance, and upgrades. LRD will conduct an annual lock and dam maintenance workshop, typically during the months of February or March, to assure that state-of-the-art work practices, lessons learned and institutional knowledge are maintained.

d. A “ Gate Change-Out Oversight Committee “ will assure that standardized best practices are implemented and maintained as regards maintenance of the miter gates for the Ohio River Modern Era Projects – see appendix D for details.

e. All project features, including critical underwater components, will be periodically assessed or inspected/tested. The assessment methodology is included as Appendix A and the risk evaluation is included as Appendix B.

f. The LRD Regional Maintenance Team (chaired and appointed by the LRD Chief of Operations) will annually reevaluate impact levels. The degree of impact will be based on factors such as transportation rate savings provided by the lock and other impact measures deemed appropriate. A full description of this identification procedure can be found in Appendix C. Any changes in impact levels for projects will be reported to the Division Commander by the LRD Chief of Operations.

g. Closure of high impact projects (see paragraph 4.e.) will be considered a critical situation and restoration of services will be given the Division’s highest maintenance priority. Necessary resources will be made available to complete repairs, alleviate emergency situations, and restore service as expeditiously as possible. This might include subordination of other division activities, consolidation of division resources, or utilization of resources from districts outside LRD, depending on the economic impacts of the situation.

h. Critical spare repair parts and materiel will be procured and maintained for each project to the greatest extent possible on a regional basis. Typically, critical spare parts are long-lead time items necessary to return a project to an acceptable level of functionality with minimal downtime. These spare parts will be used to facilitate an acceptable level of maintenance as established by this regulation.

i. LRD navigation locks and dams maintenance activities fulfill a twofold mission. The first is resolution of maintenance problems and accomplishment of repairs. The second is investigation of operational anomalies and determining if problems and irregularities are systemic. Therefore, the Corps of Engineers will remain actively and directly involved in developing innovative approaches and solutions to maintaining the inland waterways transportation system.

j. LRD will maintain sufficient regional in-house capability to respond to emergency situations and to facilitate expedient lock and dam repairs and critical maintenance.

k. Priority will be given to maintaining in-house diving capability for inspecting high impact navigation locks and dams (see Appendices A, B & C), and to support maintenance activities at those projects.

l. Regional supply contracts, blanket purchase agreements and other innovative contracting methods will be utilized for the fabrication and delivery of routinely replaced components.

m. Each district will submit to LRD, by 15 December annually, their proposed schedule of lock closures and delays, for the next two (2) calendar years. A list of major repairs to be accomplished during these closures and delays will also be included.

n. The LRD Regional Maintenance Team will prioritize and maintain the master schedule for division navigation lock dewaterings for inspections and repairs.

**BRUCE A. BERWICK**  
Brigadier General, Corps of Engineers  
Commander

## Appendix A – LRD Standard Assessment and Inspection

1. Purpose. To maintain the reliability and continued safe operation of LRD navigation locks and dams it is critical that every facility be regularly inspected and its maintenance needs assessed. These assessments will be used to budget, plan and schedule all future major maintenance needs.
2. Inspections. Inspections and assessments at LRD Navigation Projects (locks and dams) shall as a minimum include annual condition assessment inspections, underwater inspections and lock dewaterings. The type and frequency of inspection will be scheduled based upon the relative impact and potential risk of failure for the facility. A brief description of the minimum requirements of these inspections as well as the scheduled frequency of the inspections is shown below.
3. A District Navigation Maintenance Program Manager will be appointed by the District Chief of Operations and approved by the LRD Chief of Operations. As a minimum, responsibilities will include coordinating the annual condition assessment inspections, underwater inspections and lock dewaterings, as well as long range program management.
  - a. Annual Condition Inspection – A condition inspection, assessment, and report is required to be made for every LRD navigation facility annually. This inspection shall be made annually regardless of the use level of the facility.
    - i. At a minimum, the review and inspection team should be composed of the following team members:
      1. Lockmaster
      2. Lock Maintenance Leader
      3. Operations Manager or Assistant
      4. District Navigation Maintenance Program Manager as stated in paragraph 3 above.
      5. Project Engineer responsible for previous and future repairs as applicable.
      6. Interdivision participation by additional members as appropriate.
    - ii. At a minimum, overall inspection procedure will be as follows:
      1. Recap of previous year's inspection / assessment report to include status of previously defined items.
      2. Review of most recent underwater inspection and findings.
      3. Review of most recent Periodic Inspection (P.I) or intermediate P.I., and findings.
      4. Physical walkthrough of entire facility (navigation locks and dams and appurtenant structures) with emphasis on major maintenance items found that were not previously identified in the review session.
      5. Group will recap list of maintenance items.
      6. Adjourn inspection meeting.

- iii. The District Navigation Maintenance Program Manager and Operations Manager(s) will be responsible for assembling the team to rank the District's navigation maintenance items.
  - iv. Final District Operations ranking will be approved by the District Chief of Operations. Final Division operations ranking will be developed & approved by the Regional Maintenance Team.
- b. Dive Inspections. As part of a complete inspection program, each District shall assure that regularly scheduled underwater inspections are conducted. Each District shall staff and maintain a fully functional dive team capable of conducting underwater inspections at each District navigation facility under the following guidelines.
  - i. Lock chambers at high impact projects (greater than impact value 1 on the Division Baseline Impact Curve) should receive an underwater inspection at a minimum of one per year.
  - ii. The remaining LRD lock chambers should receive an underwater inspection at least every 4 years.
  - iii. Navigation dam structures should receive an underwater inspection on a five (5) year rotation. Where possible this will coincide with scheduled Periodic Inspections.
  - iv. Based upon previous condition assessments and inspections, underwater inspection frequency may be increased if a critical condition is discovered which may adversely affect the operability of the facility and is unable to be corrected in the near future.
  - v. Final reports from all dive inspections are due within thirty (30) days of inspection completion. Copies of the Inspection reports are to be provided to the Navigation Maintenance Coordinator, Lockmaster, appropriate Operations Manager or assistant and Chief of Operations at LRD.
- c. Lock Dewatering Inspections (LDI's). Due to the high cost of dewatering chambers for inspection, LDI's should only be conducted when no other alternative is practicable. The following intervals should be considered if no practicable alternative exists:
  - i. Main lock chambers at projects with an impact level greater than 2, on the Division Baseline Impact Curve, shall have an LDI at least once every 7 years.
  - ii. Main lock chambers at projects with an impact level between 1 and 2, on the Division Baseline Impact Curve, shall have an LDI at least once every 10 years.
  - iii. Main lock chambers at projects with an impact level less than 1, on the Division Baseline Impact Curve, shall not be performed unless special circumstances exist which adversely affect the safe and continued operation of the facility.
  - iv. Auxiliary lock chambers shall have an LDI performed at the discretion of the District based on site specific conditions.

- d. Final Reports from all dewatering inspections / repairs are due within ninety (90) days of completion of a dewatering. Copies of the Inspection reports are to be provided to the District Navigation Maintenance Program Manager, Lockmaster and appropriate Operation Manager or assistant.

## Appendix B — LRD Risk Assessment/Assignment

(Ideas to be considered for Appendix B of LRD Assessment and Inspection Process for Navigation Locks and Dams)

1. Risk Factors. For the purpose of this assessment, risk factors will be based upon the overall condition of critical components. The risk factor will be defined by the potential for unscheduled closure, decreased service level or failure of a critical operating component. The risk factor value will be based on the following factors:

- a. Number of operating cycles since last major maintenance event, last inspection.
- b. The affective age of facility (since the last major rehabilitation/replacement)
- c. Historical maintenance/inspection/performance

2. Risk will be classified as follow:

a. **High** - probable failure of components, will result in unscheduled closure within next three years

b. **Medium** - probable failure of components should not result in an unscheduled closure but would degrade the service or efficiency of the facility within the next three years.

c. **Low** - a deficiency is identified which should not degrade the service or efficiency of the facility within the next three years