

LEVEES

Levees are defined as man-made structures, usually an earthen embankment, designed to contain, control, or divert the flow of water in order to reduce the risk from temporary flooding. Levee systems consist of levees, floodwalls, and associated structures, such as closure and drainage devices, which are constructed and operated in accordance with sound engineering practices. All of these elements work together to form a system for reducing flood risk.

References:

Engineering Regulations

- ER 1105-2-101 Planning - Risk Analysis for Flood Damage Reduction Studies
- ER 1110-2-1150 Engineering and Design for Civil Works Projects
- ER 1110-2-1806 Earthquake Design and Evaluation for Civil Works Projects

Engineering Manuals

- EM 1110-1-1804 Geotechnical Investigations
- EM 1110-1-1904 Settlement Analysis
- EM 1110-1-1905 Bearing Capacity of Soils
- EM 1110-1-3500 Chemical Grouting
- EM 1110-2-301 Guidelines for Landscape Planting at Floodwalls, Levees & Embankment Dams
- EM 1110-2-1205 Environmental Engineering and Local Flood Control Channels
- EM 1110-2-1416 River Hydraulics
- EM 1110-2-1417 Flood Run-off Analysis
- EM 1110-2-1421 Groundwater Hydrology
- EM 1110-2-1619 Risk-Based Analysis for Flood Damage Reduction Studies
- EM 1110-2-1902 Slope Stability
- EM 1110-2-1908 Instrumentation of Embankment Dams and Levees
- EM 1110-2-1913 Design & Construction of Levees
- EM 1110-2-1914 Design, Construction and Maintenance of Relief Wells
- EM 1110-2-2000 Standard Practice for Concrete for Civil Works Structures
- EM 1110-2-2002 Evaluation and Repair of Concrete Structures
- EM 1110-2-2006 Roller-Compacted Concrete
- EM 1110-2-2100 Stability Analysis of Concrete Structures
- EM 1110-2-2102 Waterstops and Other Preformed Joint Materials for Civil Works Structures
- EM 1110-2-2104 Strength Design for Reinforced - Concrete Hydraulic Structures
- EM 1110-2-2105 Design of Hydraulic Steel Structures
- EM 1110-2-2302 Construction With Large Stone
- EM 1110-2-2502 Retaining and Flood Walls
- EM 1110-2-2503 Design of Sheet Pile Cellular Structures Cofferdams & Retaining Structures
- EM 1110-2-2504 Design of Sheet Pile Walls

- EM 1110-2-2611 Engineering for Prefabricated Construction of Navigation Projects
- EM 1110-2-2902 Conduits, Culverts and Pipes
- EM 1110-2-2906 Design of Pile Foundations
- EM 1110-2-3400 Painting: New Construction and Maintenance
- EM 1110-2-3506 Grouting Technology
- EM 1110-2-4000 Sedimentation Investigations of Rivers and Reservoirs
- EM 1110-2-5025 Dredging & Dredged Material Disposal
- EM 1110-2-6053 Engineering and Design - Earthquake Design and Evaluation of Concrete Hydraulic Structures
- EM 1110-2-6054 Inspection, Evaluation and Repair of Hydraulic Steel Structures

Additional Corps Guidance

- EC 1110-2-247 Hydrologic Analysis of Interior Areas
- EC 1165-2-209 Civil Works Review Policy
- ETL 1110-2-571 Guidelines for Landscape Planting and Vegetation Management at Levees, Floodwalls, Embankment Dams, and Appurtenant Structures
- TM 5-820-4 Drainage for Areas Other than Airfields
- TM 5-822-2 General Provisions and Geometric Design for Roads, Streets, Walks, and Open Storage Areas
- TM 5-822-5 Pavement Design for Roads, Streets, Walks and Open Storage Areas

Additional Corps Resources

- Waterways Experimental Station (WES), Corps of Engineers Computer Program, "Design or Investigation of Orthogonal Culverts (CORTCUL)", February 1995.
- Waterways Experimental Station (WES), Corps of Engineers Computer Program, "Concrete Strength Investigation and Design (CASTR)", May 1987.
- Technical Report ITL – 90-3 "Investigation and Design of U-Frame Structures Using Program CUFRBC", Waterways Experiment Station, Vicksburg, Mississippi, May 1990.
- Instruction Report ITL – 91-1 "User's Guide: Computer Program for Design and Analysis of Sheet-Pile Walls by Classical Methods (CWALSHT) including Rowe's Moment Reduction", Waterway Experiment Station, Vicksburg, Mississippi, October 1991.
- Technical Report ITL – 92-11 "The Seismic Design of Waterfront Retaining Structures", Waterway Experiment Station, Vicksburg, Mississippi, November 1992.

Non - US Army Corps of Engineers Publications:

- American Association of State and Highway Transportation Officials (AASHTO), "Standard Specifications for Highway Bridges", 2002 (Errata dated March 2005)
- ACI 318-08 American Concrete Institute, "Building Code Requirements for Structural Concrete and Commentary"
- AWWA C300-04 American Water Works Association (AWWA), "Reinforced Concrete Pressure Pipe, Steel-Cylinder Type"
- AWWA C301-07 American Water Works Association (AWWA), "Prestressed Concrete Pressure Pipe, Steel-Cylinder Type"
- AWWA C304-07 American Water Works Association (AWWA), "Design of Prestressed Concrete Cylinder Pipe"
- ACI 318-08 American Concrete Institute, "Building Code Requirements for Structural Concrete and Commentary"
- FHWA publication, Gravel Roads Maintenance and Design Manual, dated November 2000
- "A Policy of Geometric Design of Rural Highways" by the American Association of State Highway and Transportation Officials (AASHTO)

Please note that some Engineering Manuals supersede each other, hence care must be used applying requirements of the Engineering Manuals. In addition, engineering judgment is required in the application of these manuals to certain structures. The Corps of Engineers publications listed above can be obtained at <http://publications.usace.army.mil/publications/eng-manuals/>