



## REMR TECHNICAL NOTE GT-SE-1.3

### METHODS OF ANALYZING THE NEED AND REQUIREMENTS FOR LANDSIDE SEEPAGE BERMS

PURPOSE: To identify a source of information on analysis of landside seepage berms.

REFERENCE: Mathematical analyses of landside seepage berms. R. A. Barron. Prepared for US Army Engineer Waterways Experiment Station, Vicksburg, MS, Sep 1984. Technical Report REMR-GT-1.

APPLICATION: This report describes methods of analysis and remedial solutions for embankment underseepage problems. Specifically, it describes analysis methods for various cases of seepage berms which provide adequate safety factors against uplift pressures.

ADVANTAGES: These methods provide easier and more thorough guidance for choosing underseepage control measures than has previously been available.

LIMITATIONS: The analyses require assumptions based on a geotechnical description of the specific site. Thus, development of proper assumptions for the analysis and use of results requires sound engineering judgment.

AVAILABILITY: Copies of the report are available from:

National Technical Information Service  
5285 Port Royal Road  
Springfield, VA 22161

BACKGROUND AND DESCRIPTION: Seepage berms are a low-cost, low-maintenance solution to underseepage problems. They also improve embankment stability. Waterways Experiment Station Technical Memorandum 3-424, "Investigation of Underseepage and Its Control, Lower Mississippi River Levees," and Engineer Manual 1110-2-1913, "Design and Construction of Levees," provide guidance for underseepage analysis and berm design.

Technical Report REMR-GT-1 provides more detailed methods of analysis. The analysis is presented as a closed-form mathematical solution to the seepage problem. The mathematical techniques are presented in detail, and results are given in analytical formulas which can be evaluated on a programmable calculator. Tables and charts also are given for selected values of berm dimension and permeability. The author provides guidance, based on his experience, on practical application and limitations of the mathematical results.

ENVIRONMENTAL CONSIDERATIONS: Construction of seepage berms often requires excavation of borrow pits on either the landside or the riverside of the levee.

Environmental criteria and references for borrow pit design can be found in Ref a, b, and c below.

ADDITIONAL REFERENCES:

- a. Fishery and ecological investigations of main stem levee borrow pits along the Lower Mississippi River. S. P. Cobb, C. H. Pennington, J. A. Baker. Report 1, Lower Mississippi River Environmental Program, US Army Corps of Engineers, Mississippi River Commission, Vicksburg, MS, 1985.
- b. Bird and mammal use of selected Lower Mississippi River borrow pits. M. C. Landin. US Army Engineer Waterways Experiment Station, Vicksburg, MS, 1984, draft prepared for US Army Corps of Engineers, Lower Mississippi Valley Division, Vicksburg, MS.
- c. Environmental features for streamside levee projects. J. E. Hynson, et al. US Army Engineer Waterways Experiment Station, Vicksburg, MS, 1985. In press.