1. Report No.	2. Government Accession No.	3. Recipient's Catalog No.
FHWA/OH-2000/017		3 1980 00021 9598

4. Title and Subtitle	5. Report Date
PERMEABILITY AND STABILITY OF BASE AND SUBBASE MATERIALS	August, 2000
	6. Performing Organization Code
7. Author(s)	8. Performing Organization Report No.
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9. Performing Organization Name and Address The University of Toledo Department of Civil Engineering 2801 West Bancroft Street Toledo, OH 43606-3390	11. Contract or Grant No. State Job No. 14512(0)
	13. Type of Report and Period Covered Final Report
12. Sponsoring Agency Name and Address Ohio Department of Transportation 1980 West Broad Street Columbus, OH 43223	14. Sponsoring Agency Code

15. Supplementary Notes

Prepared in cooperation with the U.S. Department of Transportation, Federal Highway Administration

16. Abstract This study determined the hydraulic conductivities, effective porosities and resilient moduli of several current and proposed drainable base materials. The materials studied were AASHTO No. 57, AASHTO No. 67, ODOT No. 304, ODOT No. 310, Iowa DOT No. 41-21 ('IA mix') and the 'New Jersey mix' studied by Baumgartner (1992). An in situ hydraulic conductivity test was developed for coarse grained materials under existing pavements. This device was tested on test sections of St. Rte. 2 for drainable bases composed of asphalt and Portland cement stabilized AASHTO No. 57, ODOT No. 304, ODOT No. 310, Iowa DOT No. 41-21 and the New Jersey mix. A large scale, horizontal laboratory permeameter and testing procedure were developed to simulate in situ conditions under a pavement. This was used to determine the range of hydraulic conductivities and effective porosities of several drainable bases made up of gravel, limestone and air cooled blast furnace slag over the range of gradations permitted by their specifications. The specifications studied were AASHTO No. 57, AASHTO No. 67, ODOT No. 304, ODOT No. 310, Iowa DOT No. 41-21 and the New Jersey mix. AASHTO No. 57 and AASHTO No. 67 were also stabilized with asphalt or Portland cement and tested. The resilient moduli of both stabilized and unstabilized base and subbase materials as a function of material variation were also investigated for this study. Wide variations exist in the hydraulic conductivities and effective porosities within gradation envelopes. All of the specifications tested can provide hydraulic conductivities in excess of 0.353 cm/s (1000 ft/day) in some portion of their gradation envelope. The lower limit of the gradation envelope (coarser) should be followed for ODOT 304 and ODOT 310. Stabilization reduces the hydraulic conductivity and effective porosity. The effective porosities suggest that most freely drained bases exist in a partially saturated state. Unstabilized No. 57 was found to have an equal or higher resilient modulus than the dense graded bases tested (ODOT 304, 310 and IA mix) for these moist conditions. Gravel generally provided the highest moduli, followed by limestone and air cooled blast furnace slag. Test procedures, equipment lists, data table worksheets, computer codes, field test results and laboratory test results are reproduced in Appendices A through Q, in an accompanying volume.

17. Key Words	18. Distribution Statement
Permeability, Hydraulic Conductivity, Drainage, In Situ Testing, Stability, Resilient Modulus, Drainable Base, Effective Porosity	No Restrictions. This document is available to the public through the National Technical Information Service, Springfield, Virginia 22161

19. Security Classif. (of this report)	20. Security Classif. (of this page)	21. No. of Pages	22. Price
Unclassified	Unclassified	186 (Appendices 338)	

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