PAVEMENT SURFACE HYDRODYMANIC DRAINAGE[22]

by
J. W. Hutchinson
Professor of Civil Engineering
University of Kentucky

The purpose of this research is to develop a *measure* of the hydroplanning susceptibility of wet pavement surfaces which, in combination with viscous sliding friction information, can be used to predict hydrodynamic reduction in skid number at various travel speeds. The work thus far has demonstrated the feasibility of measuring dynamic permeability of pavement surfaces within the range of pressure-dwell time relationships existing at the tire-pavement interface. A method of measuring other hydrodynamic drainage characteristics of pavement surfaces has been devised for use in investigating the relationship between 1. hydrodynamic reduction in viscous sliding friction and 2. the number of cubic inches of water per square inch of tire footprint area per inch of water depth that can be hydrodynamically drained from a simulated tire-pavement interface. If this relationship can be quantified, the hydrodynamic drainage information, combined with a measure of skid resistance at any one sliding speed, will probably be sufficient to predict frictional performance over a range of speeds. This would 1. provide a laboratory means of predetermining hydrodynamic reduction of viscous sliding friction of experimental surfaces, 2. serve as a basis for calibrating skid test devices over a range of speeds on various types of surfaces, and 3. supplement, if not replace, some currently expensive and time consuming methods of maintaining up-to-date survey friction records for street and highway systems.

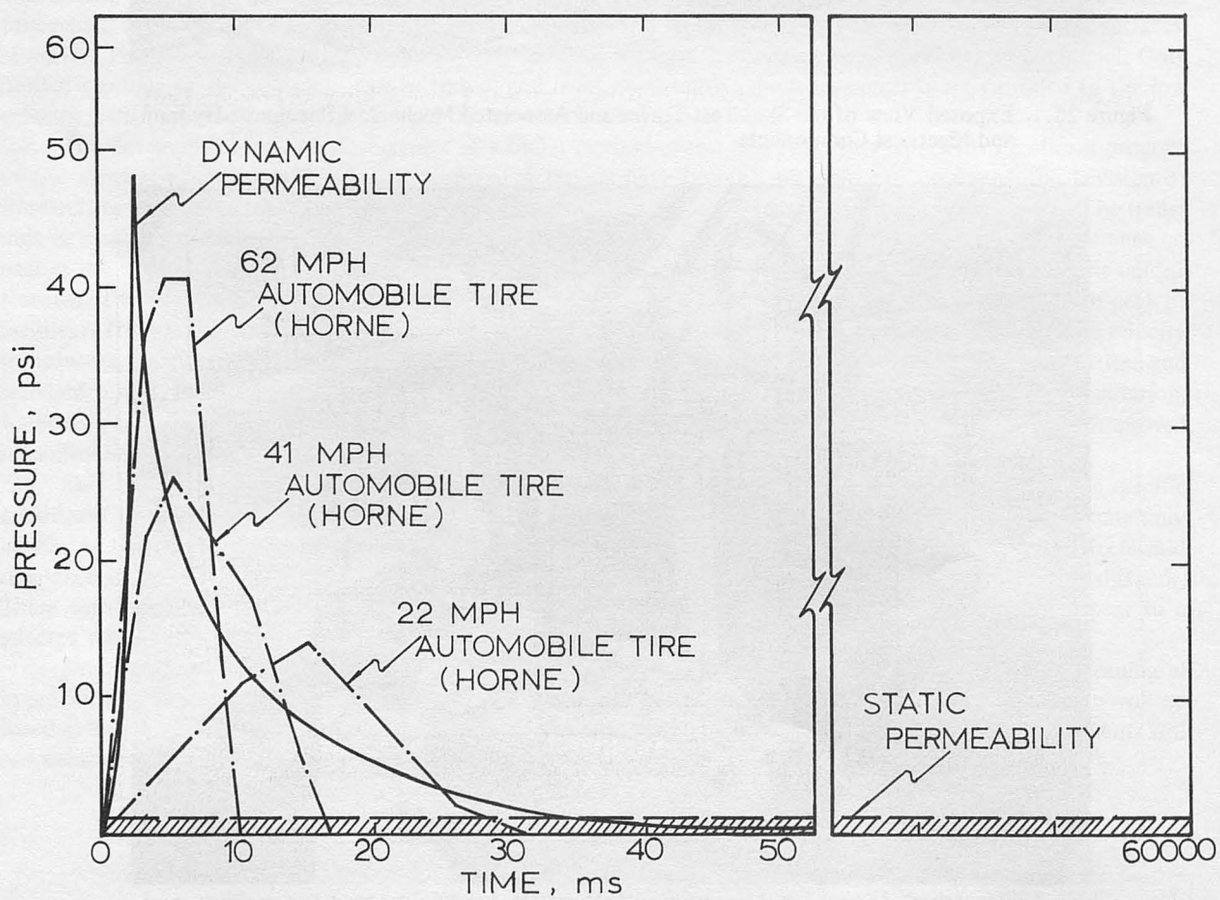

Figure 27. Comparison of Pressure-Time Traces for a Moving Automobile Tire, the Dynamic Permeability Testing Device, and an Ordinary Static Permeability Test

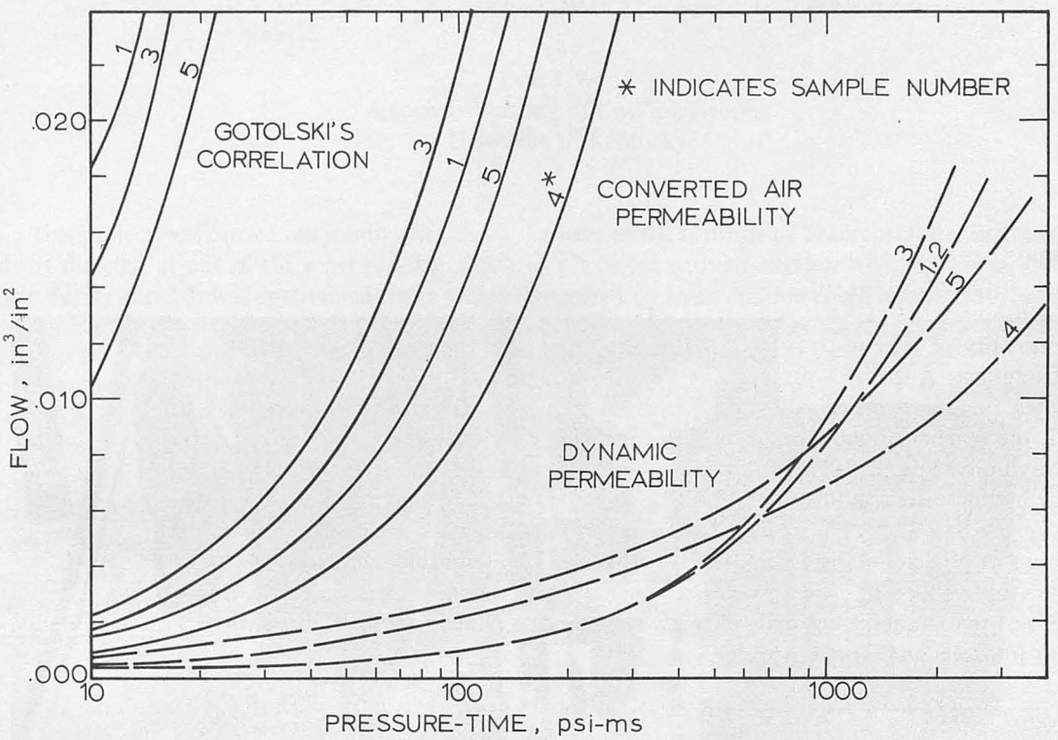

Figure 28. Variation in the Relation between Static and Dynamic Permeability with Pressure-Time Increase

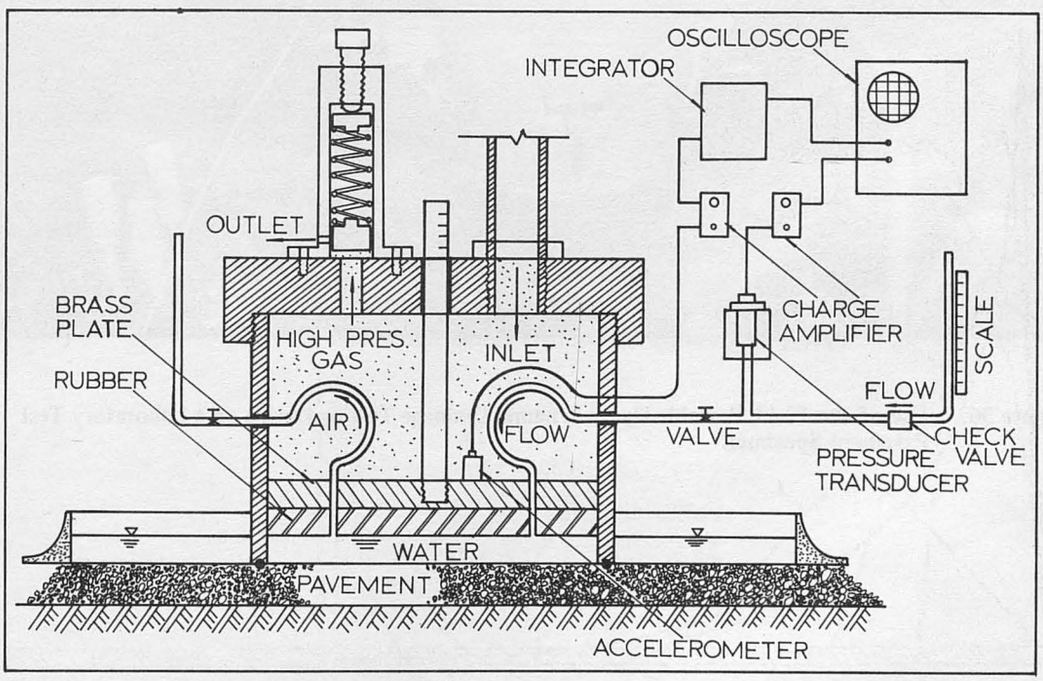

Figure 29. Schematic of Device for Determining Differences in the Dynamic Permeability and Other Hydrodynamic Drainage Characteristics of Pavement Surfaces

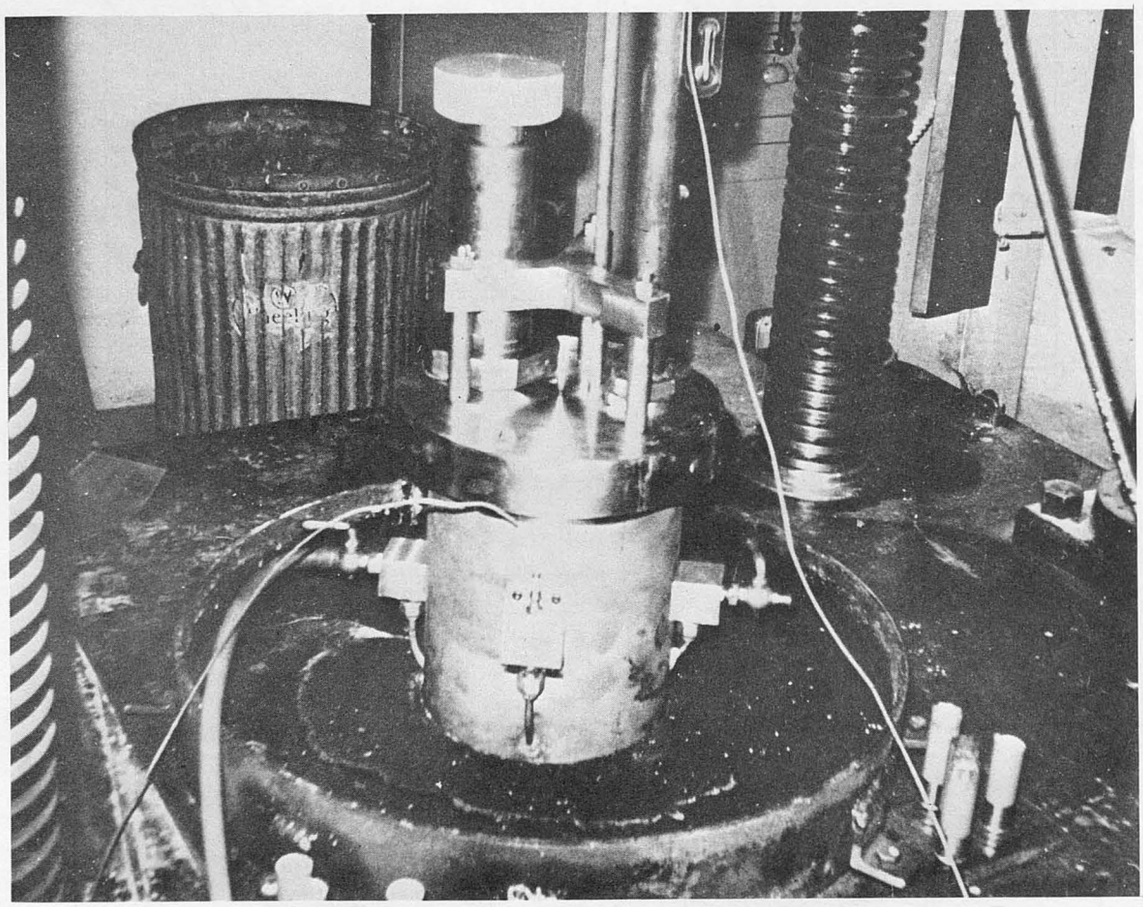

Figure 30. **Use of the Field, Portable Hydrodynamic Drainage Testing Device on a Laboratory Test Pavement Specimen**