Knowledge of skid resistance properties of existing pavements and current mix designs is essential before meaningful judgement can be made as to their suitability to withstand high volumes of traffic most highway arteries are carrying today. Selection of skid-resistant aggregates and sands, in particular, will insure longer service of wearing surfaces. Careful consideration of the effectiveness of sealing and deslicking treatments should be based on longevity of adequate skid resistance. Too often, short-term remedial maintenance efforts create slippery conditions which may be quite expensive to rectify. Maintenance practices, therefore, as well as mix design specifications, must reflect proper recognition of skid resistance properties and requirements.

The search for improved highway surfaces from the standpoint of slipperiness or skid resistance is greatly dependent upon the ability of the highway engineer to measure and interpret those parameters which accurately portray the frictional characteristics of the tire-surface interface. Considerable effort has been devoted to the development of better methods of skid resistance testing and to the standardization of testing devices. In 1964, the Kentucky Department of Highways selected an interim standard method of test using an automobile, which has been an invaluable tool in ascertaining the frictional characteristics of pavements in Kentucky. Every type of pavement and sealing and deslicking treatment used in the state have been monitored and assessed as to their frictional properties. New insights were gained and applied towards the development and refinements of wearing surfaces. However, the automobile method of test is very time consuming, hazardous, and requires extra personnel. Only limited sections of the pavement can be tested, and most importantly, the measurements are confined to the low velocity end (between 30 mph and 20 mph) of the driving speed spectrum.

The development and standardization of a trailer method of test in recent years represents significant progress in the measurement area. Commercially fabricated trailers have become available and prompted the Division of Research to acquire a General Motors Proving Grounds device, a two-wheeled trailer and towing vehicle. The trailer unit is designed to measure directly the frictional forces developed between the test wheels and the pavement, as well as the vertical load on the wheels, as it is being pulled at a constant velocity up to 100 mph. One of the unique features of the device is the ability to retard wheel lock-up up to 10 seconds, permitting the measurement of peak or incipient friction of pavement surfaces. The trailer is equipped with force measuring transducers, velocity transducers, a water-laying system, pneumatic-hydraulic system used for brake actuation and accessories, and standard test tires. The towing vehicle accommodates the electronic system, indicating and recording instrumentation, water supply and pumps, and a pneumatic supply and control system. The skid trailer will provide a vastly improved reliability and capacity for voluminous testing of pavement skid resistance.

Skid resistance, whether measured with a trailer or an automobile, describes the surface only for the specific conditions of test. Standardization of test methods and procedures insures the repeatability of test results only insofar as the testing device is concerned. Seasons of the year, temperature, road surface film, etc., affects skid resistance of pavements and therefore makes accurate assessment of friction characteristics of pavements difficult. These influences will be independently evaluated. Measured values could then be normalized with respect to a selected point of reference.

Skid resistance requirements for maintenance and mix design purposes must be established if meaningful improvements in highway safety is to be realized. Efforts to derive minimum skid resistance requirements will be based primarily on accident statistics of Kentucky highways. Arbitrary judgements as to minimum requirements will not suffice because the issue is much too important economically and safety-wise to every highway user.
Figure 25. Exposed View of the Skid-Test Trailer and Associated Mechanical, Pneumatic-Hydraulic, and Electrical Components

Figure 26. Cab of Towing Vehicle Accommodating Measurement Instrumentation and Operating Controls