Supplemental Pavement Skidding Resistance Tests in Virginia

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● THE stopping distance method of determining skid resistance of pavement surfaces has been used for approximately ten years in Virginia. During that time Virginia has made great progress in providing skid resistant roads despite the fact that one of the major aggregates used in the state is susceptible to polishing. The experience accumulated with the stopping distance method during this period of time indicates that the method has many advantages as well as many disadvantages. The advantages are outlined below:

1. The test is realistic—a standard vehicle is involved in an emergency skid and the consequence observed.
2. Since late model cars are used for the test, the test results reflect the modifications in vehicular and tire design that take place in the automotive industry.
3. The coefficient of friction is an integrated value obtained from a vehicle beginning a skid at 40 mph and ending at 0 mph.

The disadvantages are:

1. Many uncontrolled variables are operating and it is difficult to analyze the data precisely.
2. The old vehicles are replaced with newer models and it becomes difficult to compare the new data with the old.
3. It is difficult to utilize data obtained by other states that use stopping distance test vehicles of a different model.
4. Tests are time consuming and fairly costly.
5. The number of sites that can be tested are limited—both grades and dangerous curves must be avoided. Also, only sites can be tested, it is not practical to test a section over its entire length.

In general it is our belief that the advantages of a stopping distance method can be made available in other test procedures that can also overcome the disadvantages. The General Motors trailer method shows considerable promise in being able to accomplish this.

Experiences With The General Motors Test Trailer

In August 1957 approximately 2,500 measurements were made on over 150 sections of road in just two weeks using the General Motors' test trailer. Since the trailer was available for only two weeks, time was an important factor and under normal conditions we would not anticipate being able to match this performance. However, the potential of the equipment to make tests quickly is certainly an important aspect. We can summarize our experiences with the General Motors trailer as follows:

1. The method is very rapid.
2. The method permits a testing of an entire section throughout its length rather than localized testing.
3. The reproducibility seems to be excellent.
4. The cost of conducting the test is very low; we estimate that testing will cost about $\frac{1}{4}$ as much with the GM test trailer as with our conventional stopping distance equipment.
5. The side sway is rather severe and might be dangerous; this was brought out in Skeel's paper and it has been observed by others also.

Correlation With The Stopping Distance Method

Since there are several significant differences, namely, speed of test, water application, and tire design, between the stopping distance method and the trailer method, we were interested in seeing what correlation existed between the two. After making the General Motors trailer test, stopping distance measurements were made on some of the same sections. Only a limited amount of time was available for the tests and therefore the correlation is very incomplete but it is interesting. The correlation data is shown in Figure 1. Unfortunately few measurements were made where the coefficient of friction was above 0.5. The data suggest that in the critical range (approximately 0.4) coefficients obtained by the GM results are lower than those obtained by the stopping distance method. The significance of this should be noted. If, as is done in Virginia, any pavement where the coefficient of friction is lower than 0.4 is considered unsafe then the two methods would disagree on many miles of pavement in Virginia.

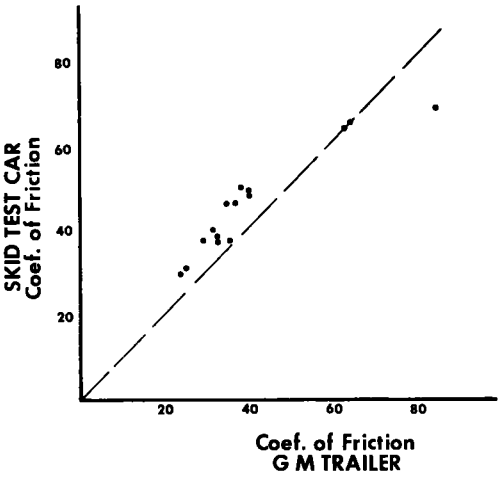

Figure 1. Comparison-Coefficient of Friction, GM Trailer and Skid Car.

These differences, while not extreme, do point out the need for the standardization of equipment. It is becoming apparent that great confusion will follow in the next ten years unless a standard method of measuring road surface slipperiness is adopted.

In summary, then, experience with the GM trailer showed that it is an excellent method of measuring road surface friction, possessing many advantages over existing methods, and further, it is essential that a move to standardize testing equipment for measuring road surface slipperiness be initiated immediately.