Rigid Pavement Condition Surveys

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•BEFORE rigid pavement condition surveys can be discussed intelligently, "pavement condition" should be defined.

To the general public—the average user—a definition might include such elements as the kind and degree of surface roughness, noise level, visibility, slipperiness, general appearance and the ability to handle the daily traffic demands. In other words, the average motorist is interested in those elements which affect his comfort and safety while he is on the road. Thus, an assessment of these and similar factors might constitute a satisfactory condition survey as far as the user is concerned.

For the engineer who specializes in traffic control, design, construction, maintenance, or safety, pavement condition may suggest many other measurable factors, the sum of which will help him make the right decisions in the future. Similarly, the administrators and operators of various highway systems must set policies which reflect the effect of overall economics, relating costs to capacities and land uses and needs. For example, placing restrictions on axle loads has the effect of prolonging the useful life of a pavement. Knowing the rate at which pavement life is diminished allows them to predict the future maintenance costs and to obtain the greatest returns from the initial investment.

Finally there are the researchers—people assigned to develop new methods and materials and who, through careful evaluation, provide information which will tend to hold costs to a minimum while supplying an adequate facility for the situation.

In general, each category would be satisfied with somewhat different information obtained from a pavement condition survey. So it is necessary to first establish the type and extent of information needed. The means available for obtaining this information and how much it will cost must be determined. Also, how often the surveys should be repeated and how the information should be reported must be anticipated.

Once these factors have been determined, the type of condition survey made will fall within one of the following classifications:

1. Reconnaissance. —This is a rather casual survey and requires a minimum of personnel and time. Such a survey usually precedes a more detailed study. Also, during periods of unusual weather it provides rapid information for estimating the amount and type of emergency maintenance work required.
2. Rating panels. —This classification requires a number of individuals working together under some established ground rules and subjectively rating pavements. The technique developed for the AASHO Road Test represents such a method.
3. Statistical. —This type of survey can be handled by a few persons equipped with counters and totalizing the number of times some pavement characteristic is observed. This can be done by driving slowly over a pavement. A crew can cover several miles of survey per day. Data thus accumulated are usually summarized as an average number of observations per unit of length of pavement, or the average distance between observations.
4. Semi-detailed. —In addition to the above information, this type of survey would include some general sketches of any unusual observations or conditions giving the approximate locations.
5. Detailed strip maps.—All observed details are plotted to scale and accurately located. Requires considerable time and effort.
6. Pictorial or photographic. —Takes special equipment but is relatively rapid. The data can be analyzed in the office.
7. Surface roughness measuring devices. —A number of various systems are available.

8. Investigational. —Permits a determination of causes of malfunctions of pavements. It usually requires detailed measurement and testing programs.

Obviously, each type of survey can be more or less complete. Most reasonably complete surveys of portland cement concrete pavements would include some measure of surface roughness, skid resistance, durability, adequacy of any special design features, and an indication of the structural adequacy of the design relative to the current traffic conditions.

Under "durability" would be noted the frequency and degree of such items as scaling, spalls, popouts, and "D" line and map cracking. Under "design" would fall such items as various types or kinds of joints, such as contraction, expansion, construction and longitudinal; type of load transfer units; and type and quantity of distributed reinforcement and the spacing between joints. With the various types of joints would be some indication of their condition. This would include such items as faulting, restraint cracking, condition of the seal, dowel condition, width of joint opening, and type and degree of pavement disintegration relative to spalling, scaling, raveling, "D" line cracking, or other manifestations of concrete disintegration. An indication of design and structural adequacy would be the presence or absence of some types of cracks, pumping or blowing, and faulting at joints and cracks.

In many instances, general condition surveys might result in scheduling special investigational surveys. These surveys would be conducted to develop sufficient data or information to isolate the cause or causes of unusual pavement performance. This might include a whole host of measurements of the concrete and underlying materials. These investigations can become quite laborious and expensive, and do not always result in an answer.

Unfortunately, the accumulation of field notes and data in themselves is not enough. These must be summarized and analyzed, and the results placed in the hands of individuals who can put them to use. Lack of communication all too often results in much useful and valuable information becoming lost or laid aside.

It is necessary to continually evaluate pavements in service, primarily to help determine their adequacy under continually changing conditions. The real test of new designs, new construction techniques, new materials and changing loading patterns, is how well full-scale models incorporating these elements perform under actual field conditions. Condition surveys thus become an important tool for evaluating these full-scale projects, and for providing the information necessary to make sound decisions.