IDOH Research Committee Report

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The Research Committee is a committee that was established by the director of the Indiana Department of Highways.

Currently, the Research Committee is comprised of:

1. The Deputy Director of Engineering and Management Services, Mr. Paul L. Owens (who is also the chairman of the committee),
2. The Chief of the Division of Materials and Research, Mr. R. L. Eskew,
3. The Chief of the Division of Field Operations, Mr. Murray Cantrall,
4. The Chief of the Division of Design, Mr. Stanley Yoder,
5. And the Director of the Research and Training Center, Mr. Barry Partridge, (who is also secretary of the committee).

The Research Committee was established to:

- Provide direction and guidance on all IDOH research activities,
- Study the need for specific research projects,
- Initiate and coordinate research activities of the IDOH.

The Research Committee does the above by offering several services to the IDOH divisions and districts.

Under special circumstances, these services may be offered to persons outside the IDOH.

1. The first of these is the Research Summary. The Research Committee, through the Research and Training Center, maintains a running four-year summary of all IDOH-sponsored research. This research may be that conducted by divisions, districts, the Joint Highway Research Program, cities or counties. The summary contains large and small research projects, both formal and informal.
2. Next is the HRIS, the Highway Research Information Service. This service is paid for by the state's TRB program. This is also a listing of research projects, but very extensive. At your

disposal is information on findings on over 12,000 subjects. A flat fee is paid for the HRIS, so the service can be used any number of times.

So, when research is being considered for an Experimental Features Study, a Highway Planning and Research Study, a JHRP Study; or when information is simply required on a subject, the HRIS can be used to find information on the topic. And duplication of effort can thus be avoided. Use of the Highway Research Information Service for these purposes can be obtained through the Research and Training Center, which is the HRIS state contact. The HRIS can also be used by IDOH personnel to examine legislative requests channelled through the IDOH Public Information Office. This way, information can be gotten to substantiate bills beneficial to the highway industry.

3. Questions left unanswered or problems remaining unsolved after use of the above two services can be submitted to the committee in the form of a statement of research needs.

   Now, periodically, the Research Committee, through the Research and Training Center, asks the divisions and districts for research needs they may have. But statements for immediate research needs can be submitted to the committee through the chairman or secretary at any time. The committee then evaluates, prioritizes, and allocates resources to fulfill the research needs. And often recommends who should conduct the research, from among department forces, colleges or universities, other consultants, or may suggest other practical and economical means.

4. Many are familiar with the federal-aid projects previously known as Category II studies. These projects have been renamed Experimental Features Studies. Their objective is to encourage individuals and agencies of the IDOH to evaluate new, or alternative highway technology under actual construction and operating conditions. The result of these studies are both widely distributed and widely applied. The Research Committee has has a set of guidelines developed for these studies. The purpose of these guidelines is to provide a uniform procedure for initiating, evaluating, and reporting experimental type studies. (These guidelines have been approved, published, and distributed. Copies are made available through the Research and Training Center.) Scores of research projects have been handled by the Research Committee in 1982. Following is a brief overview of a few of them.

PIPE COATING STUDY

This study was undertaken to help solve the following problems of:

What kind of pipe could best be used in the coal-mining region of Southern Indiana.

Acidic run-off in the area causes rapid corrosion:
Plain galvanized pipe rusts out in less than one year, and bituminous coated pipe deteriorates in less than two years.

And while asbestos-bonded bituminous coated pipe has good performance, it is expensive, and its future is uncertain due to its asbestos content.

The study involved a field investigation of existing pipe structures in the corrosion conditions of southern Indiana.

In addition, a laboratory investigation was conducted.

Twenty pipe samples were exposed to a 2 PH acid solution, (the acidity of lemon juice), in order to compare the different pipe among themselves, and to estimate service life.

The results show that the polymeric coated pipe undergo severe disbondment of the coating in a 2 PH solution.

Its service life is equivalent to that of plain bituminous coated pipe.

And both are unsatisfactory for use in southern Indiana.

Galvanized-aluminized-aluminum- and concrete-pipe samples all showed severe deterioration, and was otherwise expected, and cannot be recommended for use in a highly acidic environment.

Types that appear able to perform well, (from the results of this study), are vitrified clay, epoxy coated polymeric-bituminous coated, and the asbestos bonded bituminous coated which are already known to perform well.

Although the vitrified clay pipe has excellent performance, this pipe is not available in large size diameters.

DYNAFLECT STUDIES

A variety of research is being conducted under this heading. The common feature of all these studies is in the use of the dynaflect, and its ability to measure pavement strength.

The dynaflect is a relatively simple apparatus. Its basic elements are two eccentric flywheels that apply a peak-to-peak dynamic force of 1000 lb. at a frequency of eight cycles per second. An array of five sensors, spaced at one-ft. intervals, sense the amount of deflection in the pavement.

The dynaflect is being used:

- To determine and refine the criteria for undersealing concrete pavements
- To determine overlay needs and establish guidelines for overlay thickness
- To determine deflection characteristics of recycled pavements
- To determine any seasonal variations in deflection readings.

In 1982, over 200 miles of rigid pavement were tested to determine areas needing undersealing.

Use of the dynaflect for the rehabilitation of rigid pavements has become standard procedure.

Special provisions now require dynaflect-testing prior to any undersealing.

Follow-up testing proves that the dynaflect is effective in locating areas for undersealing.

1. Over 90% of the sections undersealed by this method have shown improvement.
2. Over 1,600,000 dollars have been saved in 1982 alone.

Again in 1982, 22 miles of CRC pavement was tested with the dynaflect to determine overlay needs based on pavement deflection.

Indications are that this method can be used in developing a procedure to determine whether or not to overlay, as well as to establish overlay thickness.

Over 20 miles of bituminous pavement was tested before and after recycling.

This data will be analyzed in 1983. Any discernable differences will be reported.

Monthly dynaflect testing of 24 selected test points will begin this month. These points are located on the test road at the IDOH Research and Training Center here in West Lafayette, and include both rigid and bituminous pavement.

The data collected will be used to examine trends in deflection due to seasonal variations in Indiana.

And finally, I would like to speak on the topic—pavement management.

Pavement management is more or less that point towards all roadway research and testing convenes.

By definition, a pavement management system is a set of tools or methods that assist decision makers in finding optimum strategies in providing for and maintaining pavements in a serviceable condition over a given period of time.

One indicator of a road's condition is its ride quality.

Ride quality in Indiana is measured with a Cox Roadmeter and reported as roughness, (in inches/mile), or as a PSI number. (The PSI rating scale goes from zero to five, and zero being that given to a pavement having extremely poor rideability, and five, given to a pavement with excellent rideability).

Currently, a PSI value of equal to or less than 2.5 shows a problem pavement, be it asphalt or concrete. Annual roadmeter inventories include: 100% of the Interstate System, 75% of the Federal-Aid Primary System and 50% of the Federal-Aid Secondary System.

From this data, equations are developed and plots drawn showing the rate of deterioration in pavement smoothness.

The Indiana interstate highways resurfacing program through 1985 is making active use of these results; the proposed sections for resurfacing have been prioritized by roughness remaining life.

A second indicator of a road's condition is its frictional resistance to skidding.

This is measured, (again in Indiana), with an ASTM standard device which measures the coefficient of wet sliding friction between the pavement surface and a standard test tire.

This number times 100 gives the friction number.

Friction numbers theoretically range on a scale of 0 to 100. A friction number of 30 or less shows a potential problem pavement.

Each year roads inventoried include: 50% of the Interstate System, 33% of the Federal-Aid Primary System, and 25% of the Federal-Aid Secondary System.

Friction life curves are developed from this data. These show the rate of loss in friction.

A third indicator of a road's condition is pavement strength.

Pavement type, age, thickness of layers, and type of traffic load supply this information.

In special cases, the dynaflect is used to ascertain pavement and subgrade conditions. The dynaflect locates areas needing underseal, determines overlay requirements and evaluates performance of recycled pavements.

There is a certain value for roughness (PSI equal to or less than 2.5) and a certain value for friction resistance (FN_{40} equal to or less than 30) below which pavements are considered problem pavements.

When either of these boundary values occur in a section of roadway, that section must be visually inspected and rated by district forces.

The rating form in use for sections exceeding the roughness bound is called the Condition Survey.

The rating form in use for sections having a friction number of 30 or less is called a Road Condition Follow-Up Form.

On the previously mentioned forms, the causes of the poor friction

or roughness ratings are ascertained and their extent noted.

The appropriate corrective action can then be determined and scheduled.

Current publications of the Research and Training Center specifically pavement management oriented are:

- The annual friction inventory report
- The annual roughness/PSI inventory report and the following annual reports:
- The surface changes report
- The summaries of road condition follow-ups
- The executive summary of friction trends
- The executive summary of pavement management results.