

TSB NEWSLETTER

TECHNICAL STANDARDS BRANCH

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Editor's Remarks

The March TSB Newsletter has information about Interchange Exit Numbering, the 84th Annual TRB Meeting, TRB hotlinks, the IECA Conference, and Reflective Transverse Cracks.

The article on Interchange Exit Numbering is of value to all motorists because we will all slowly change our way of thinking to the exit number system.

The 84th Annual Meeting of Transportation Research Board (TRB) provides insight into the magnitude of the largest meeting of transportation officials in North America.

The TRB Hotlinks article will be of value for learners and innovators in keeping up with what is happening in our fields of expertise.

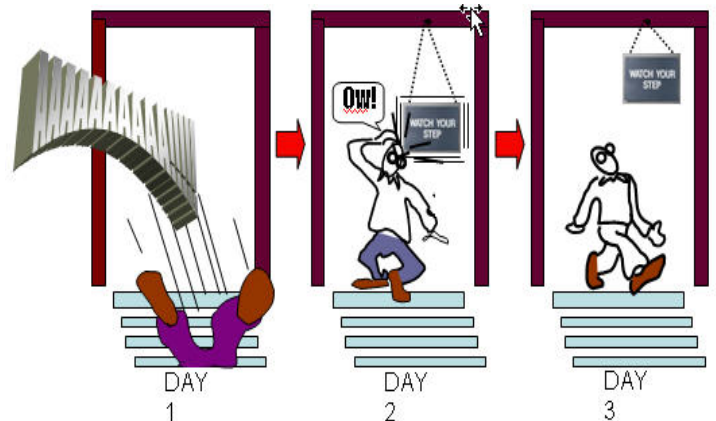
The article on the IECA Conference will be of value to those interested in the erosion related to highway construction.

The article on Reflective Transverse Cracks shows that it is possible to delay reflective cracking.

If you have comments or would like to provide articles for the next edition of this newsletter, please contact one of the newsletter members on page 9.

Allan Kwan
Editor-in-Chief

From Jerry Kail - **Innovation Steps**



*"Everything has both...
... intended and unintended consequences.
The intended consequences may
or may not happen;
the unintended consequences always do."*

.....Dee Hoch.....

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INTERCHANGE EXIT NUMBERING

*Corinna Mulyk
Highway Operations*

Alberta Infrastructure and Transportation has developed a policy to add exit numbers to interchange exit guide signs and to major intersections in response to requests for highway reference markers. Alberta's exit numbering will be similar to the exit numbering used on major routes (freeways) in the United States, Ontario, Quebec, Nova Scotia and British Columbia.

Exit numbers are suitable for use on freeways and expressways with almost complete access control to provide orientation and directional information to motorists and to assist motorists in determining their driving location relative to their target destination. In addition, exit numbers provide reference points to identify disaster locations and emergency incidents. Improved emergency response times will have the potential to save lives.

The exit numbers will be placed on top of the interchange exit signs. This year, motorists will see exit numbers on Highway 2 south of Edmonton and Highway 1 west of Calgary. These stretches of highway are major routes where the density of interchanges is above 10 over a distance of 80 kilometres.

Alberta's policy assigned an exit number to interchanges and major intersections. The exit number represents the distance to the nearest kilometre to the centre of the interchange from the start of the southern origin of the north-south highway in Alberta. This means that exit numbers increase as motorists drive from south to north. Similarly, for the east-west roads, exit numbers start at the western origin of the highway and increase as the highway goes east.

Motorists might notice that some exits have a suffix A, B, etc. displayed with the exit number. Interchanges with more than one exit in a given direction, or interchanges located in the same kilometre need to have exits labelled with such suffixes to make them unique. The suffix progression follows a consecutive order south to north or west to east without gaps, beginning with the letter A. Assigned exit numbers now appear on the 2005 Travel Alberta road map.

A rectangular tab sign which says "EXIT XXX" is attached to the top corner of the large interchange guide signs in advance of the exit. The exit number has also been added to the irregularly shaped gore signs where the interchange ramps separate from highways.

The side of the highway on which your exit is to occur will correspond to the corner of the sign that the exit number tab sign is installed. Most exit number tab signs will be in the top right corner since most exits in Alberta are on the right side of the highway.

The photograph below shows an exit number directional sign on Deerfoot Trail. The number 268 on the exit sign in the photograph tells motorists that the Country Hills Blvd interchange is 268 km north from the origin of Highway 2 at the US border. Please note that the exit numbers are not associated with highway numbers.



Some challenges have been encountered as this project has progressed. The largest challenge has been accommodating aged overhead sign structures along Deerfoot Trail in Calgary. Due to the age and seemingly frail nature of five aluminum truss overhead sign structures, changes cannot be made to these overhead signs at present. The planned exit number tab signs cannot be installed at the five locations until the sign structures are replaced in 2006.

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84th ANNUAL MEETING OF THE TRANSPORTATION RESEARCH BOARD

Wei He
Surface Engineering and Aggregates

Roy Jurgens, Roger Clarke and Wei He from Alberta Infrastructure and Transportation (INFTRA) along with approximately 10,000 delegates attended the 84th Annual Meeting of the Transportation Research Board (TRB) held in January 9–13, 2005 in Washington, D.C.

Conference activities fell into five areas: pre-conference workshops, committee meetings, papers, poster sessions, and exhibitions. Upon registration delegates received a participant's workbook and a CDROM containing accepted papers. Approximately 1,500 papers in 30 topic areas were presented and most of the papers will be published as journal articles in a series of Transportation Research Record (TRR). The department will receive printed papers as they are published.

Pre-Conference Workshops:

The topics included material studies, soil mechanics, data and IT issues, pavement/structural designs, management systems, operations, planning and policies. The lectures were typically by university professors organized by the US National Academy of Science.

Committee/Subcommittee Meetings:

There were committee meetings related to pavement engineering and pavement management.

Some special committee meetings were by invitation only. The subcommittee on International Conference on Managing Pavements (ICMP), chaired by Dr. Ralph Haas of University of Waterloo, on January 9th held a closed by invitation only meeting to select a hosting organization for the 7th ICMP.

Two teams were invited to present the bid: the first was Virginia Department of Transportation and the Virginia Technical Institute, and the second was INFTRA and the University of Calgary (U of C). Alberta was the winner thanks to the hard work by Dr. Lynne Cowe Falls and the excellent joint presentation by Lynne, Roy Jurgens and Wei He. Alberta will hold the 7th ICMFA ("A" for Assets) in June 2008 in Calgary. It will be co-hosted by INFTRA (led by Rob Penny) and the U of C (led by Dr. Lynne Cowe Falls).

A committee meeting on Pavement Management Systems (AFD10) was chaired by Mr. Tom Kazmierski of the Ministry of Transportation of Ontario. The committee consists of 2 dozen members of academia, federal US agencies such as USDOT and FHWA, AASHTO, representatives of state DOTs and Provincial Transportation Ministries active in the area. The meeting concentrated on issues relating to pavement management and the steering subcommittees including: a) Pavement Management in Local Governments, b) Airport Pavement Managements and c) ICMP. Typically the committee also invites guest speakers to present their work on current issues that are not included in the paper sessions. This year the winner of the bid for hosting the 7th ICMFA was asked to showcase the bid (done by Lynne). A 2nd presentation was given by a professor from the University of New Brunswick on "Developing Technical Components in Asset Management".

In addition to the above, committee meetings were held during the TRB, to name a few:

- Roadway Pavement Preservation Task Force
- Transportation Asset Management Committee
- Bridge Management Systems Committee
- Highway Capacity and Quality of Service
- Environmental Analysis in Transportation Committee

A complete list of the TRB committee meetings can be found at <http://www.trb.org/meeting/>.

Paper Sessions:

There were over 500 paper and poster sessions at this year's TRB, covering a wide range of topic areas, including:

- Materials
- Design and Construction
- Data and Information Systems
- Environment and Energy
- Management and Leadership
- Maintenance and Operations
- Pavement Management
- Pedestrians and Cycles
- Public Transportation
- Research and Education
- Safety and Security
- Social, Economic, and Cultural Issues
- Soil Mechanics
- Structures
- Systems Planning/Policy/Process
- Transportation Policy
- Travel Analysis Methods

- Trucking and Rail, etc.

Most of the sessions specific to the areas of pavement engineering and pavement management were attended which included:

- Current Issues and Challenges Facing Pavement Management Systems
- Long-Term Pavement Performance and New Mechanistic-Empirical Design Guide
- Recent Developments in Pavement Management Systems
- Pavement Design, Analysis, and Performance I
- Pavement Evaluation
- Award Papers from 6th International Conference on Managing Pavements
- Implementation Issues for Mechanistic-Empirical Design
- Integrating Pavement Preservation and Pavement Management
- Roughness of Pavement Surface Characteristics
- Application and Evaluation of Pavement Preservation Activities

A collection of the papers for the sessions is on the TRB preprint CD-ROM.

Other notes:

- The exhibitors are limited to educational, non-commercial organizations. As a result vendors such as Dynatest, ICC, Roadware and Fugro etc. could not display their FWD, IRI, and automated distress data collection equipment. Nevertheless, the exhibition booths manned by FHWA, AASHTO, LTPP and some TRB associated organizations provided lots of information, including SHRP-LTPP reference materials, NHI training courses and ProVal 2.5 (latest software developed by the FHWA for calculation IRI from pavement profile data).
- Noticeable on the CD-ROM is that there is a section called “Practical Papers” with papers dealing with issues such as material, design, construction, pavement management, structures.
- The two PPT presentations made at the committee meeting on Pavement Management Systems (AFD10) are available at N:\Highways\Staff Folders\Wei He\2005TRB

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TRANSPORTATION RESEARCH BOARD HOTLINKS

*Ron Stoski
Geotechnical and Materials*

One important activity of the Transportation Research Board (TRB) is the dissemination of research results. A primary goal of the publications program is to circulate current information and research on transportation policy and practice as broadly as possible.

The books, reports, and miscellaneous publications of the Transportation Research Board cover nine subject categories: planning, administration, and environment; design; materials, construction, and maintenance; operations and safety; aviation; public transit; rail; freight transportation (multi-modal); and marine transportation.

Reviewing TRB publications is a great way to keep up with what has happened and the research that is going to happen in our industry.

The following TRB hotlinks should be of value to Alberta Infrastructure and Transportation (INFTRA) employees:

Publication Series - NCHRP Reports

http://trb.org/news/blurb_browse.asp?id=2

TRB Publications

<http://www4.trb.org/trb/onlinepubs.nsf>

TRB Research in Progress

<http://rip.trb.org/>

2005 Technical Activities e-Sessions

The objective of this series is to bring TRB conference and meeting presentations to those who were not able to attend. This series takes a long time to download.

<http://www.trb.org/conferences/e-session/2005am.htm>

TSB receives copies of most TRB publications shortly after they are posted on the website. Copies are available “for loan” by contacting Technical Standards Branch:

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INTERNATIONAL EROSION CONTROL ASSOCIATION 2005 ANNUAL CONFERENCE

*Fred Cheng
Geotechnical and Materials*

In February 2005 I attended the 36th International Erosion Control Association (IECA) Annual Conference and Expo (EC05) at Dallas, Texas. The IECA is an international organization devoted to erosion and sediment control. IECA's interests include highway construction, subdivision construction, storm water management, reclamation, conservation, forestry, mining, and also environmental concerns such as pollution, water quality and fish habitat control.

The conference included: training, presentations of case studies, panel discussions on policy and regulations, research papers, an exposition of erosion and sediment control products, and awards. I met people of like interests and networked with government regulators, consultants, contractors, material manufacturers and suppliers and academia. The number of registrants reached 2150, the second largest in IECA's 36-year history. Several areas of interest are described below.

Training - Technical training opportunities were provided before the formal start of the conference.

I attended RUSLE2 (Revised Universal Soil Loss Equation, version 2); a 2-day course on the estimation of soil loss on highly disturbed lands. RUSLE2 is a computer program developed by the U.S. Department of Agriculture. It was co-instructed by Drs. G. Foster and C. Toy, the acknowledged gurus of RUSLE2. Soil loss from construction activities can be estimated by inclusion of variables such as: rainfall intensity, frequency and duration; soil erodability and erosivity; topography (slope and grade); cover and management practices. RUSLE2 is widely accepted in the US among construction, land use and highway circles because it helps ESC designers obtain estimates of soil loss during construction. INFTRA uses a similar approach called RUSLE-FAC (Revised Universal Soil Loss Equation for Application in Canada) that was developed from RUSLE by Agriculture and Agri-Food Canada. About 20 regulators, DOT staff, consultants, professors and graduate students attended RUSLE2. RUSLE2 can be applied to INFTRA projects provided appropriate Canadian data are inputted.

Conference - After the 2 days of pre-conference courses the conference began and consisted of case studies, technical papers, workshops, and discussion forums. Presenters included university researchers, graduate students, materials experts, consultants, contractors, regulators and government staff. A variety of erosion and sediment control papers were presented. Topics included: Gully Analysis and Treatment, Bench-scale Performance Testing of RECPs, Construction Inspection, Reclamation Channel Using Organic Amendments, Introduction to the Sediment Control Facility, and E-SenSS, BMPs for Linear Construction. The papers and case studies have helped to broaden my knowledge of ESC topics, and will bring new ideas to our ESC reviews and projects. New ideas such as compost usage and bio-engineering stabilization of stream banks will be introduced to INFTRA at a training course this September.

Trade Show - There were about 140 ESC exhibitors under one roof. They ranged from material and equipment manufacturers, consultants, contractors, water management and software companies and regulatory bodies. Companies familiar to Canada are Nilex, North American Green, Mirafi, Layfield, Filtrexx, Maccaferri, Rexius, Portadam, Presto, Sacramento Bag, American Excelsior, and Western Excelsior. I had the opportunity to visit many booths and asked questions on old and new products that show promise and are applicable to INFTRA uses. The exhibitors were very eager to provide assistance. This part of the conference was very useful since I provide the expert review of ESC products for the New Products Evaluation Standing Committee and have been evaluating and making recommendations on these types of products for some time.

Field Trip - I attended a field trip of the Furneaux Creek Channel Restoration project at Carrollton, a suburb of Dallas. The banks of Furneaux Creek have eroded due to increased water runoff from urbanization. The erosion has resulted in uncontrolled migration of the stream, loss of useable lands and landscape, and exposure of sanitary sewers. The project stabilized the channel side slopes, controlled channel bed down cutting, protected existing sanitary sewers, and provided other improvements located within the floodplain area. The stabilization solution utilized a combination of 25 channel grade control structures, flattening of channel side slopes, channel armoring, planting of native vegetation and relocation of sewer lines. Slumping and erosion of stream banks near INFTRA highways can be restored and stabilized utilizing ideas from this project.



Furneaux Creek – before restoration



Furneaux Creek Channel Restoration

Networking - I had the opportunity to discuss details of an Alberta bio-engineering project with John McCullah of Salix Applied Earthcare, California. INFTRA has been working with John over the past several months to develop an ESC field training course.

INFTRA staff, consultants and contractors will have an opportunity to learn various techniques both in the classroom and hands-on on two job sites along H734 and Pembina River, south of Hinton. Bio-engineering methods will be emphasized as opposed to structural repair, since these methods are gaining popularity for their life-cycle cost advantages and environmental benefits. The project site will be monitored closely to determine the performance of bio-engineering and compost usage for erosion and sediment control on Alberta highways.

Observations –

- The US is very strict on environmental protection and projects that might affect the environment have to be properly designed by professionals, such as a Professional Engineer (PE) or Certified Professional in Erosion and Sediment Control (CPESC). Strict regulations and approvals have to be met before final approval of construction. INFTRA should follow suit in regulating qualified professionals in the preparation of ECO Plans and permanent ESC designs. As an aside, I am now one of 12 CPESC qualified people in Alberta.
- Use of mulch and compost in the US is ahead of INFTRA. INFTRA will be conducting a pilot project applying compost to our highway in September. We should also be more innovative and not be afraid to try out new products.
- I also had opportunities to network and mingle with Certified Professional in Erosion and Sediment Control (CPESC) and Erosion Control Technology Council (ECTC) people. They were very eager to share their experiences and provide encouragement and assistance for my erosion and sediment control questions.

Finally I thank the department for providing me such an opportunity to attend such a great conference.

I have picked up brochures, samples, software, CDs and conference proceedings. If anyone is interested in additional information or would like to borrow any of the above please come to see me.

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REFLECTIVE TRANSVERSE CRACKING HIGHWAY 2 TEST SECTIONS

Vijay Ghai
Surface Engineering and Aggregate Section

Problem: Highway 2 between Leduc and Lacombe has had severe transverse cracking since it was built in the mid-sixties. In the past the rehabilitation strategy was an asphalt pavement overlay. However, overlays did not solve the problems as transverse cracks reappeared and within a few years the cracks deteriorated and resulted in rough riding pavement. Rough riding pavements called for additional (premature) rehabilitation on a structurally sound highway.

Test Section: In 1994 the southbound lanes of Highway 2:28 North of Ponoka required rehabilitation. The riding quality was unacceptable due to the depressions at the transverse cracks which occurred at 7 to 10 meter intervals. The rehabilitation strategy called for a 70 mm ACP overlay placed in two lifts. From experience, we knew that the overlay would not solve the reflective transverse cracking problem. In an effort to evaluate the potential of various treatments to delay reflective cracking through the ACP overlay, a 2.5 km test section was designed into the project.

A detailed layout of the rehabilitation strategies is shown in Figure 1. The test section treatments were:

Section 1	Conventional surfacing 70 mm ACP O/L control section
Section 2	Cold mill and fill cracks with ACP and place 70 mm ACP O/L
Section 3	Cold mill and fill with ACP and place 100 mm ACP O/L
Section 4	Rout and seal cracks and place 100 mm ACP O/L
Section 5	Place 100 mm ACP O/L with no pretreatment
Section 6	Cold mill 20 mm of full pavement width and place 70 mm ACP

In order to monitor long term performance, a pre-construction investigation was carried out to map transverse cracks, measure roughness, and core test sections prior to August 1994 construction.

Findings: Six inspections have been carried out to document cracking in each section. Cracks were mapped during each inspection. Figure 2 shows the percentage of reflection cracks for each rehabilitation strategy.

Ten years of service life indicates that all pavement cracks are reflective: in that the cracks are replicas of the cracks in the original pavement. There is also no evidence of new thermal cracks. The September 2004 observations are:

- All reflective cracks have been sealed and are in good condition, with no dipping or spalling.
- The section where the cracks received no treatment, all cracks have reflected through.
- The section where the pavement was cold milled for the full width of the roadway and overlaid, all cracks have also reflected through.
- Placing a thicker 100 mm overlay with no pretreatment of cracks, has some effect on incidence of reflective cracking, as only 66% cracks have reflected through.
- Routing and sealing cracks prior to overlay and placing a 100 mm overlay, has not performed better than the untreated section.
- Repairing transverse cracking by cold milling and filling prior to overlay has reduced the incidence of reflective cracks. The incidence of reflective cracking is only 49% in the 70 mm overlay and 36% in the 100 mm overlay.
- The 2004 International Roughness Index (IRI) plot shows no difference in IRI values from one section to the other. The average IRI is 1.20.
- The 2004 Rut Plots show that rutting is negligible.

Conclusions: Ten years of monitoring indicates that milling and filling transverse cracks prior to the overlay retards the incidence of reflective cracking. There is no discernible difference in pavement roughness and the distress condition of cracks for the various treatments. It is not possible as of today to establish the service life and the cost effectiveness of each treatment.

As roughness has a dominant influence on the decision to rehabilitate highways in Alberta, it will be monitored. It will also be necessary to assess the condition and deterioration of cracks in the test sections and to keep track of maintenance costs. It is recommended that monitoring be continued to establish the service life and cost effectiveness of different crack treatments.

The above observations update my paper "Rehabilitation of Transversally-Cracked Asphalt Pavement - Alberta Experience" presented at the 4th International RILEM Conference in 2000 in Ottawa.

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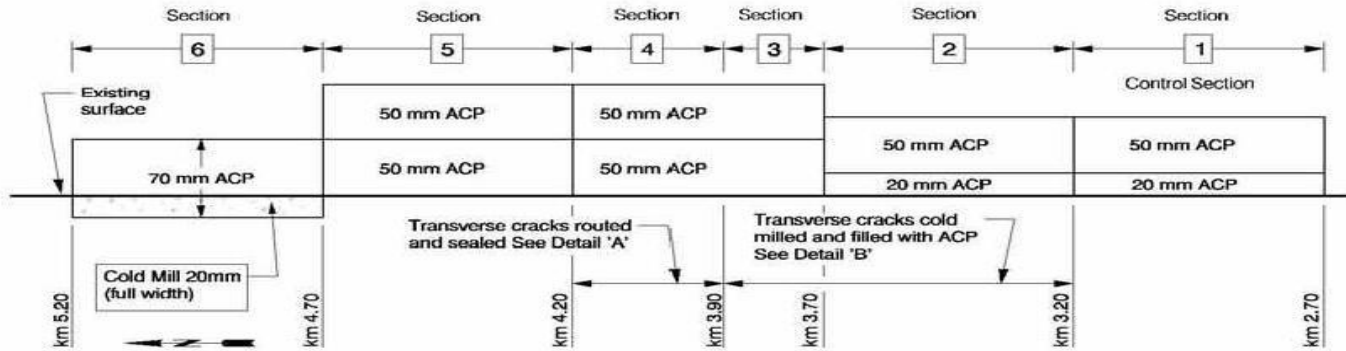
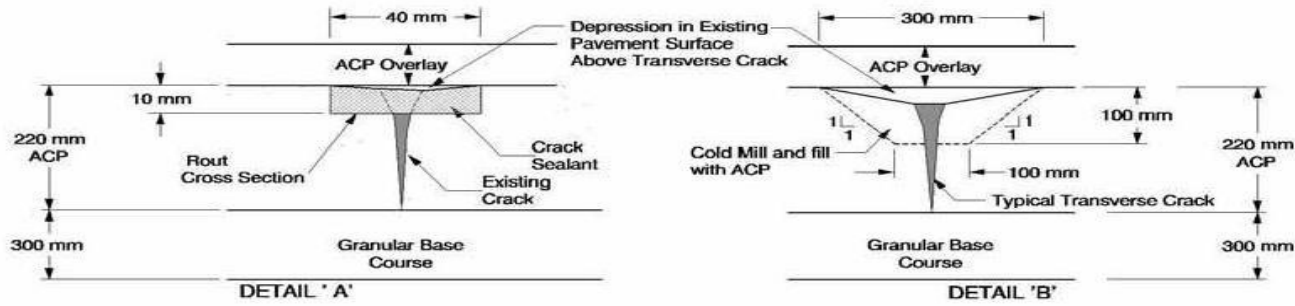


FIGURE 1 LAYOUT OF REHABILITATION STRATEGIES

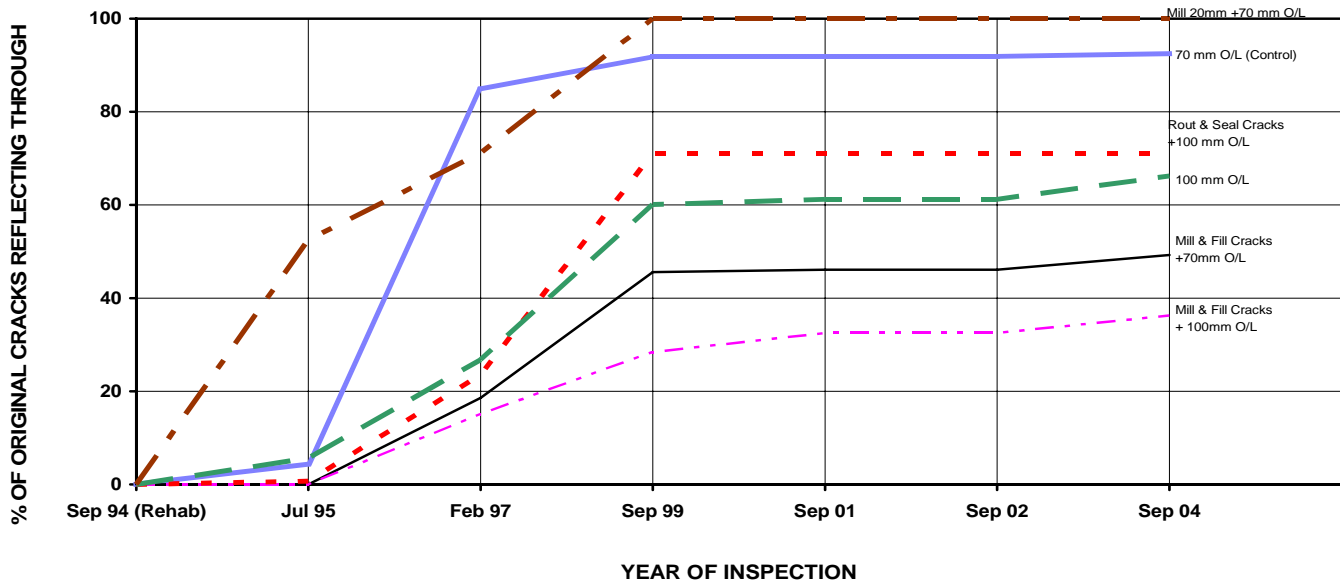


FIGURE 2 - MEASUREMENT OF REFLECTIVE CRACKING FOR VARIOUS REHABILITATION STRATEGIES

Joyce Wycoff - Modified Definition of Innovation

Innovation Requires:

*PEOPLE using new knowledge and understanding
to experiment with new possibilities
in order to implement new concepts
that create new value.*

*This definition emphasizes the importance of gathering
new knowledge and understanding
before trying to find solutions and
then to use the concept of experimenting with possibilities
in order to test against reality.*

If you would like to forward an article
or would like to share
something old or something new
or something nice to know

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Thank You