Concrete Pavement Joint and Crack Sealing

Market Trends, Current Research and Best Practices

Presented by

Seal / No Seal GROUP

INTERNATIONAL GROOVING & GRINDING ASSOCIATION®

Introduction

- John H. Roberts - Executive Director, International Grooving and Grinding Association
- Scott Eilken – Quality Saw and Seal, Co-Chairman of Seal/No Seal Group
- Charley Grady – Crafco Inc.,
  Co-Chairman of Seal/No Seal Group
- Kari Moosmann – Constructive Communications Inc.

Presentation Outline

- Market trends and issues affecting the joint and crack sealing marketplace
- SNS Group origin, organization and Mission
- SNS Group activities and initiatives
  - TTI research effort
  - Development of new methods to test cleanliness, dryness, and adhesion
  - Backer rod manufacture and use
- SNS group communications and media efforts
- 2012 Opportunities
- Proper joint sealant installation techniques
- Questions and Answers
- IGGA Hospitality Suite!!!!!

Marketplace Trends and Key Issues

- Conflicting information regarding sealant effectiveness and performance
- Focus is initial construction costs and not long term value of sealant
- Joint associated distress issues are becoming more prevalent—What is the cause?
- Proper construction and inspection
- Development of better test procedures
- Defining when to reseal

Is Sealing Joints Cost Effective?

- Multiple sealant test sections have been constructed across the USA by State Departments of Transportation
- The FHWA engages in several research initiatives in an effort to determine sealant cost effectiveness
- AASHTO undertakes development of new pavement design guide (MEPDG) where sealant effectiveness is considered

The Experts Don't Agree!

FHWA Sealant Effectiveness Study

CONCRETE PAVEMENT
CPTP
TECHNOLOGY PROGRAM

TechBrief

The Concrete Pavement Technology Program (CPTP) is an integrated, national effort to improve the long-term performance and cost-effectiveness of concrete pavements. Managed by the Federal Highway Administration through partnerships with State highway agencies, industry, and academia, CPTP's primary goals are to reduce congestion, improve safety, lower costs, improve performance, and foster innovation. The program was designed to produce user-friendly software procedures, methods, guidelines, and other tools for use in materials selection, mixture proportioning, and the design, construction, and rehabilitation of concrete pavements.

www.tfhrc.gov/pavement/concrete

U.S. Department of Transportation
Federal Highway Administration

Performance of Sealed and Unsealed Concrete Pavement Joints

This TechBrief presents the results of a nationwide study of the effects of transverse joint sealing on performance of jointed plain concrete pavement (JPCP). This study was conducted to assess whether JPCP designs with unsealed transverse joints performed differently from JPCP designs with sealed transverse joints. Distress and deflection data were collected from 117 test sections at 26 experimental joint sealing projects located in 11 states. Performance of the pavement test sections with unsealed joints was compared with the performance of pavement test sections with one or more types of sealed joints.

BACKGRO

The sealing transverse cont joints in JPCP has been standard practice throug t much of the Uni States for many years. Its widespread use is due to th mmon belief that ing joints improves concrete pavement p rmance wo ways: by red g water infiltration into the pavement str re, thet educing the o rrence of moisture-related distresses such as pu g and preventing the infiltration of incompressibles (i.e. nd and small stones) into the joints, thereby reducing the likeli- of mo e-related joint distresses such as joint spalling and blowups.

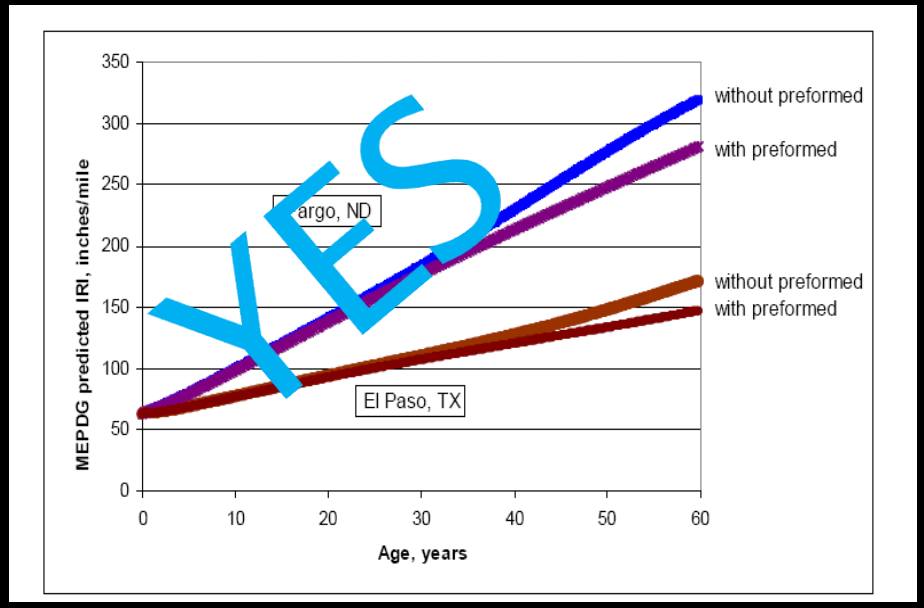
ts in jointed concrete pavement (JCP) are typically created by making an itial saw cut to force controlled cracking, followed by a second, wider saw cut to produce a reservoir for the joint sealant material. This ditional approach of sawing and sealing transverse contraction joints is est ated to account for between 2 and 7 percent of the initial construction cost of a JCP. Moreover, these sealed transverse joints require resealing one or more times over the service life of the pavement, leading to additional costs in terms of labor, materials, operations, and lane closures.

Recently, several State departments of transportation (DOTs) have been questioning conventional transverse joint sawing and sealing practices. These agencies contend that the benefits derived from sealing do not offset the costs associated with the placement and continued upkeep of the sealant over the life of the pavement. As a result, they have been experimenting with different sawing and sealing alternatives, for example:

- Narrow unsealed joints, consisting of single saw cuts that are left unsealed.
- Narrow filled joints, consisting of single saw cuts that are filled with sealant that adheres to the sides and bottom of the saw cut.
- Narrow sealed joints, consisting of single saw cuts that contain a narrow backer rod and sealant material.

NO

AASHTO Pavement Design Guide



YES

What Is the Compelling Issue?

- As cost pressures continue, there is increased interest in eliminating joint sealants as a means of lowering the cost of concrete pavements. However, there is a lack of data in the industry to help guide owners about sealant effectiveness and the long-term impact of using or not using such sealants
  - **Alternate Bid Projects (AC versus Concrete)**
  - **Concerns for Low Initial Cost Due to Budget**

Defining Sealant Life - CALTRANS

Table 2: Crack Sealer and Filler Specifications

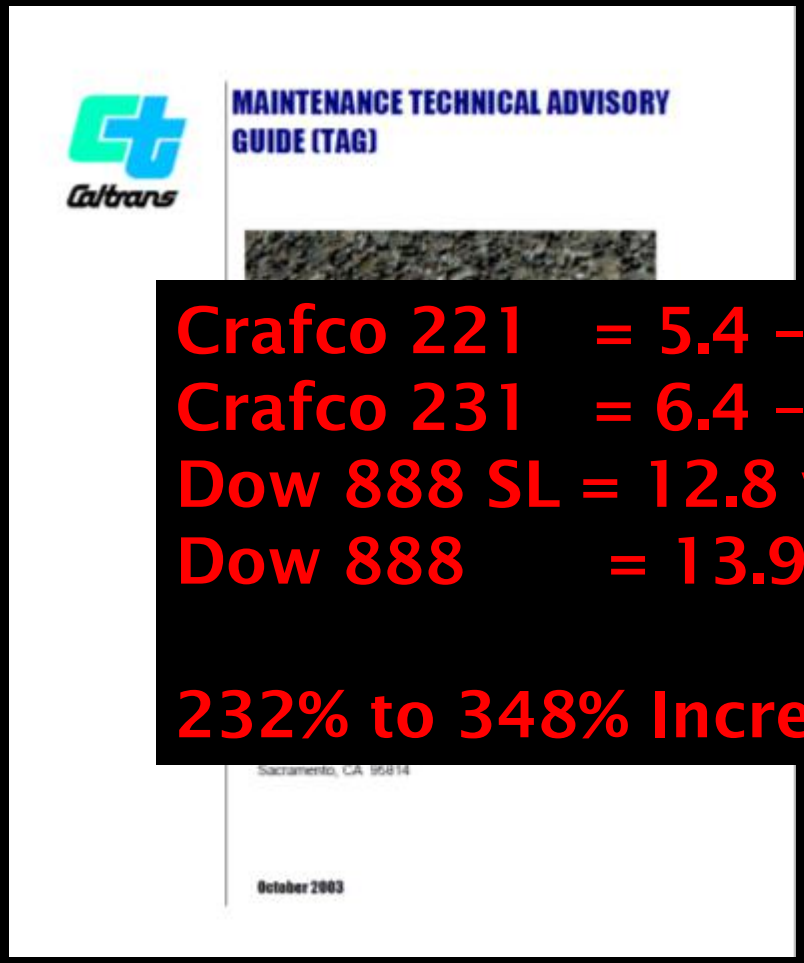
Material	Specifications (CT/ AASHTO)	Application Type	Approx. Costs ($/kg)	Approx. Life (Years)
Asphalt Emulsion	CT section 94/ M140, M208	Filling	0.15-0.30	2-4
Asphalt Cements	CT section 94/ M20, M226	Filling	0.03-0.15	2-4
Fiber Modified Asphalt	No Specification	Filling	0.35-0.60	6-8
Polymer Modified Emulsion (PME)	CT section 94/ M140, M208	Filling (minor sealing)	0.80-1.20	3-5
Asphalt Rubber (AR)	CT SSP 37-400	Sealing	0.45-0.60	6-8
Specialty AR Low Modulus	CT SSP 37-400	Sealing	0.75-1.40	5-9
Silicone	CT SSP 41-200, SSP 51-740	Sealing	5.75-6.75	4-6

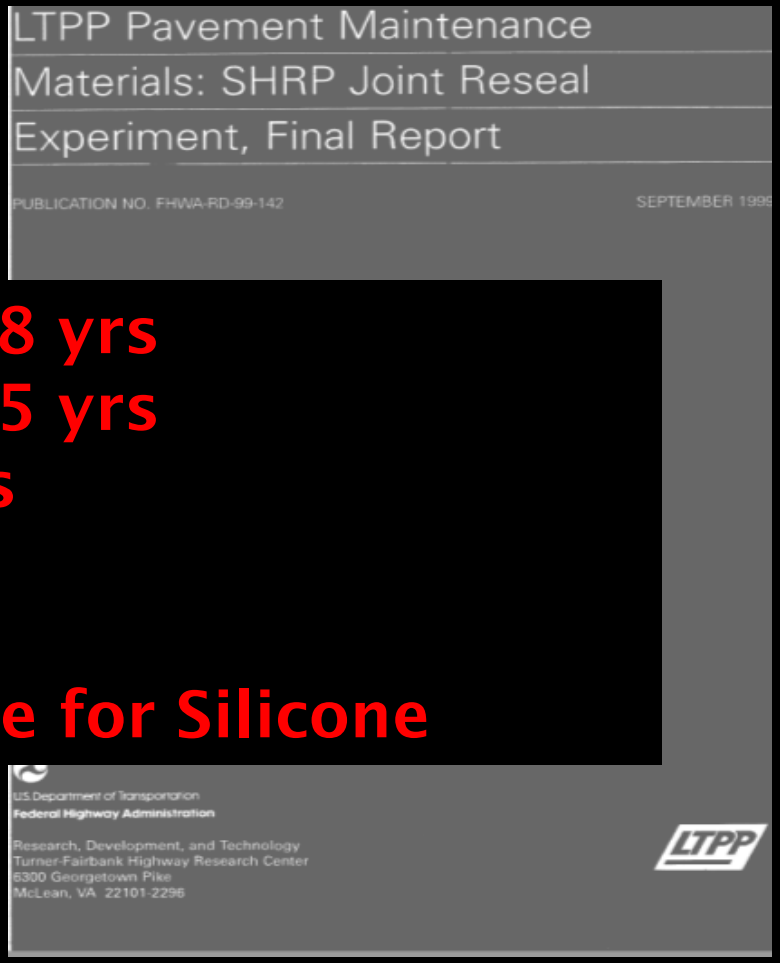
Defining Sealant Life - FHWA

Sealant Material	Config-uration	Time at Which 75% Effectiveness Level Was Reached, months *					
		Arizona	Colorado	Iowa	Kentucky	South Carolina	Average
Koch 9005	1	116	66	94	156	63	99
	2	112	66	91	191	90	110
	3			148	182	49	126
	4	105	61				83
Crafco RS 231	1	52	80	76	86	92	77
	2	135	69	118	108	138	114
	3			103	155	80	113
	4	83	72				78
Meadows Sof-Seal	1		34	40	39	55	42
	2		40	51	64	46	50
	3			57	161	31	83
	4		43				43
Koch 9030	1		31	50	60	41	46
	2		32	63	50	58	51
	3			59	143	15	72
	4		37				37
Meadows Hi-Spec	1	43					43
	2	94					94
	4	76					76
Crafco RS 221	1	65					65
	2	105					105
	4	117					117
Dow 888	1	198	145	130	186	178	167
Dow 888-SL	1	183	110	125	164	186	154
Mobay 960-SL	1	194	93	65	115	168	127
Mobay 960	1			143			143
Crafco 903-SL	1	194					194
Koch 9050	1		19		136		78
Dow 888 w/primer	1			151			151
Dow 888-SL w/primer	1			143			143
Koch 9005 w/primer	1				173		173

* Times greater than 82 months are extrapolated to a maximum of 200 months.

Our Customers Disagree–Who is Correct?





Crafco 221 = 5.4 – 9.8 yrs
Crafco 231 = 6.4 – 9.5 yrs
Dow 888 SL = 12.8 yrs
Dow 888 = 13.9

232% to 348% Increase for Silicone

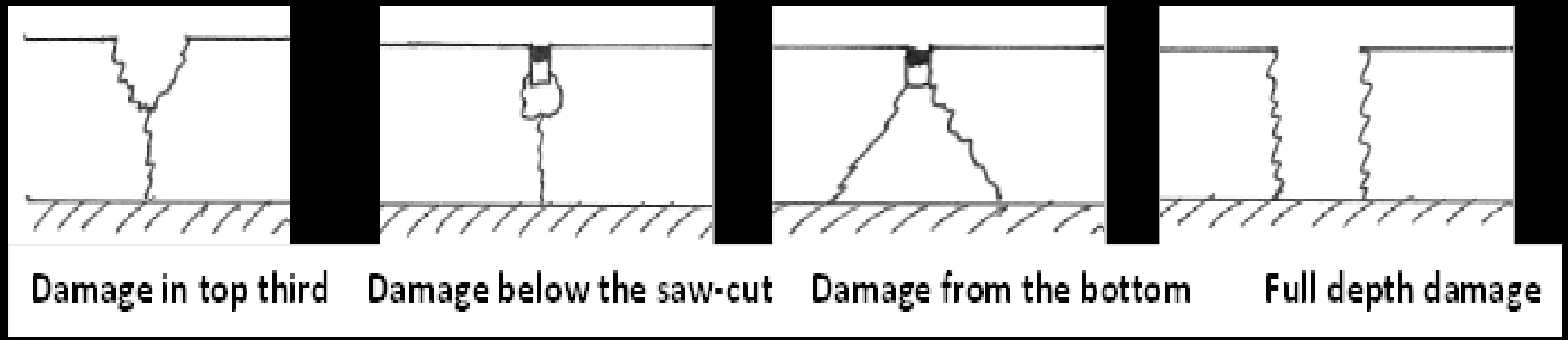
New Challenges For the Industry

Joint Associated Distress (JAD)

Joint Associated Distress- Bottom up

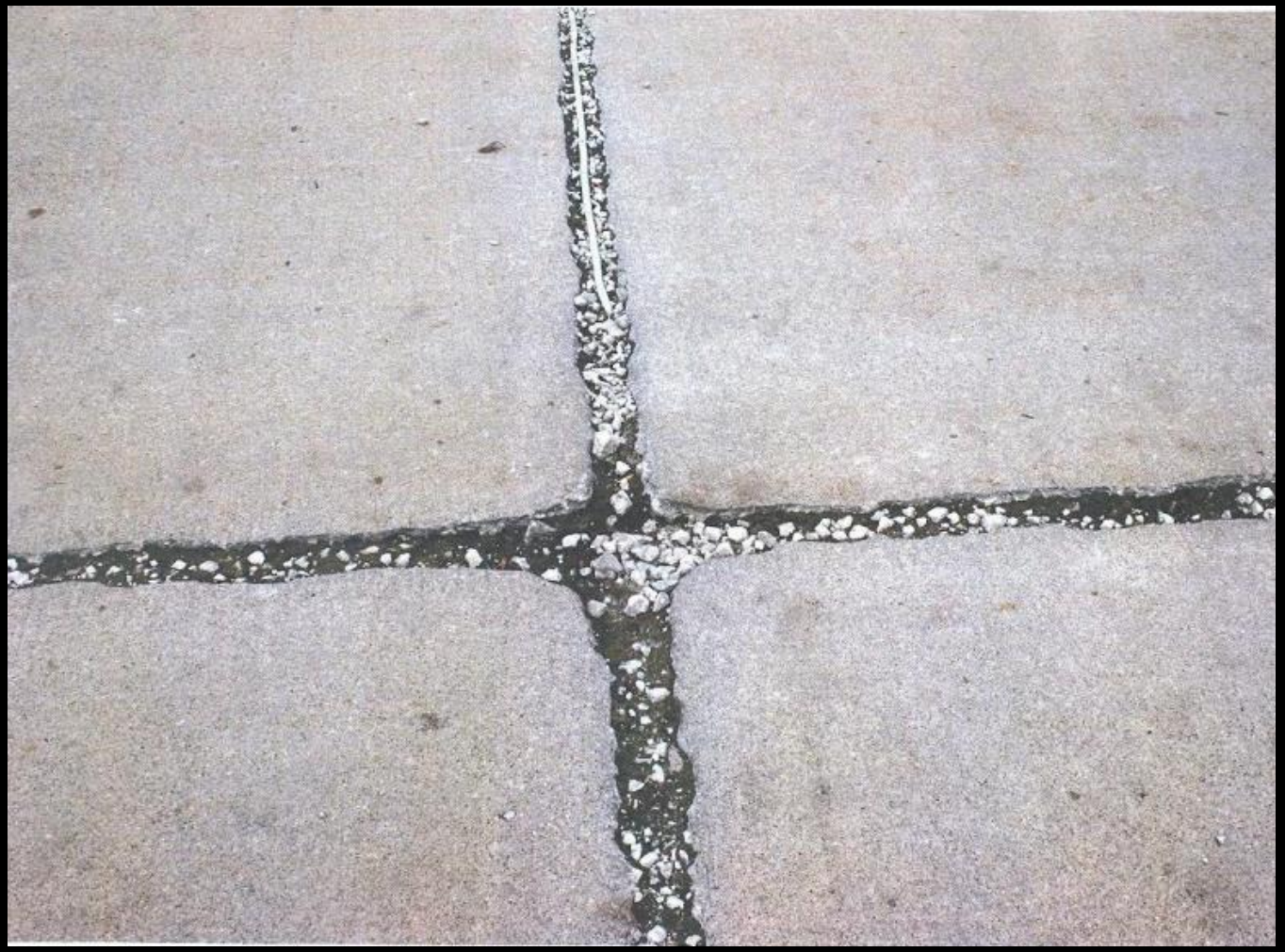
Joint Associated Distress- Bottom up

Common Joint Associated Distress Types



Distress From Curb Out - JAD

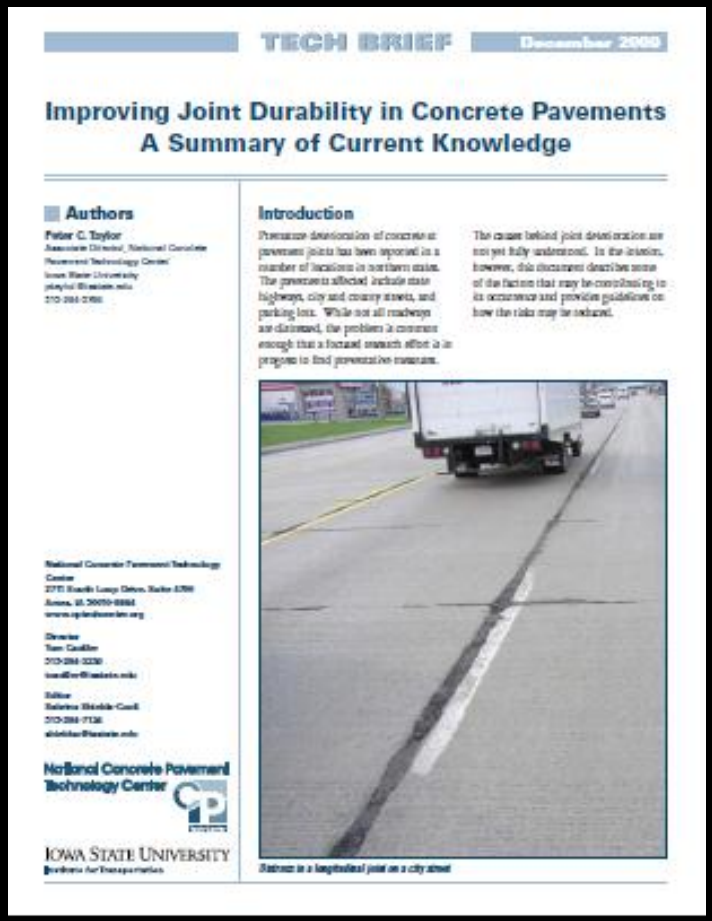
Parking Lots Affected Also - JAD



Interim Guide Specifications

Initial Culprit…

Joint sealant and backer rod!



TECH BRIEF

Improving Joint Durability in Concrete Pavements
A Summary of Current Knowledge

Authors

Peter C. Taylor

Introduction

National Concrete Pavement Technology Center

Iowa State University

Investigative Questions Regarding JAD

- Does salting increase or decrease the number of freeze thaw cycles?
- What are the temperatures in a slab?
- Construction traffic loading?
- Can we reproduce this in the lab?
- What can we learn from the field?

Ponding of Water In Pavement - JAD

Distress Below Sealant - JAD

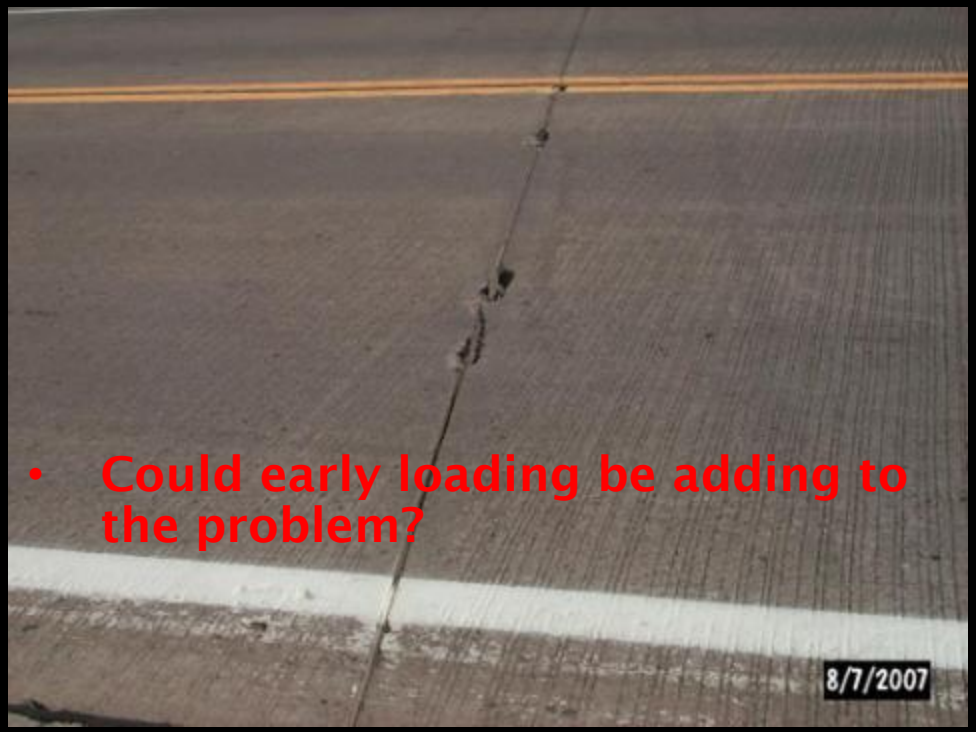
Investigative Cores - JAD

Mortar Distress - JAD

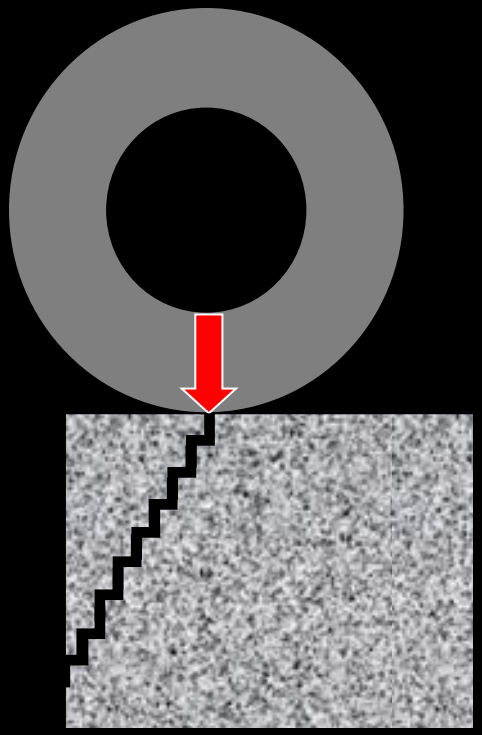
Sealant Durability Despite JAD

13th Street, Ames Iowa - JAD

Construction Traffic Loading - JAD



- Could early loading be adding to the problem?



Max Prokudin

State DOT Survey Related to JAD

- States that provided detailed response:
  - Iowa (transverse and longitudinal)
    - 15 years – major distress
  - Minnesota (transverse, 2 instances)
    - 13 years – major distress
  - Michigan (transverse and longitudinal, 4 instances)
    - 6 years – staining
  - Indiana (primarily longitudinal, 3 instances)
    - 9 years – some deterioration

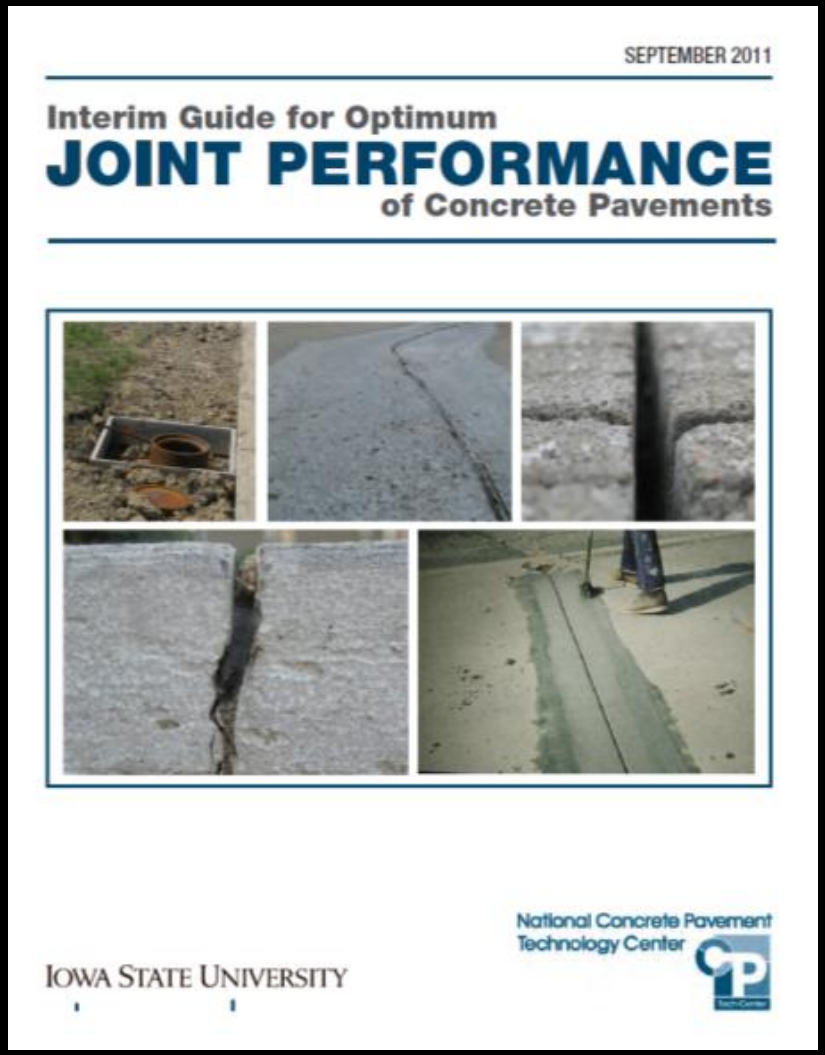
Max Prokudin

Purdue Work on JAD

- Damage depends on saturation
- Saturation depends on air content in the concrete and water/cement ratio of the concrete
- Some salts prevent drying

Jason Weiss

Joint Associated Distress - Guidelines



Environmental Issues (e.g. Illinois)

"The general contractor is required to hire an environmental firm with at least five (5) documented leaking underground storage tank (Lust) cleanups or that is prequalified in hazardous waste by the Department to remediate the soil contamination and monitor for worker protection"

This ties back to TTI Research funded by the SNS Group!

FHWA Selant Effectiveness Report

To address the question of the effect of joint sealing on JCP performance, the FHWA sponsored a study to collect and examine field performance data from a wide variety of in-service concrete pavement joint sealing experiments across the United States. This TechBrief presents the results of this nationwide study

TechBrief

CPTP

Performance of Sealed and Unsealed Concrete Pavement Joints

This TechBrief presents the results of a nationwide study of the effects of transverse joint sealing on performance of jointed plain concrete pavement (JPCP). This study was conducted to assess whether JPCP designs with unsealed transverse joints performed differently than JPCP designs with sealed transverse joints. Distress and deflection data were collected from 117 test sections at 26 experimental joint sealing projects located in 11 states. Performance of the pavement test sections with unsealed joints was compared with the performance of pavement test sections with one or more types of sealed joints.

BACKGROUND

The sealing of transverse contraction joints in JPCP has been standard practice throughout much of the United States for many years. Its widespread use is due to the common belief that sealing joints improves concrete pavement performance in two ways: by reducing water infiltration into the pavement structure, thereby reducing the occurrence of moisture-related distresses such as pumping and faulting; and, by preventing the infiltration of incompressibles (i.e., sand and small stones) into the joints, thereby reducing the likelihood of pressure-related joint distresses such as joint spalling and blowups.

Transverse joints in jointed concrete pavement (JCP) are typically created by making an initial sawcut to force controlled cracking, followed by a second, wider sawcut to produce a reservoir for the joint sealant material. This traditional approach of sawing and sealing transverse contraction joints is estimated to account for between 2 and 7 percent of the initial construction cost of a JCP. Moreover, these sealed transverse joints require resealing one or more times over the service life of the pavement, leading to additional costs in terms of labor, materials, operations, and lane closures.

Recently, several State departments of transportation (DOTs) have been questioning conventional transverse joint sawing and sealing practices. These agencies contend that the benefits derived from sealing do not offset the costs associated with the placement and continued upkeep of the sealant over the life of the pavement. As a result, they have been experimenting with different sawing and sealing alternatives, for example:

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Purpose of the Study

"This TechBrief presents the results of a nationwide study of the effects of transverse joint sealing on performance of jointed plain concrete pavement (JPCP). This study was conducted to assess whether JPCP designs with unsealed transverse joints performed differently from JPCP designs with sealed transverse joints. Distress and deflection data were collected from 117 test sections at 26 experimental joint sealing projects located in 11 states. Performance of the pavement test sections with unsealed joints was compared with the performance of pavement test sections with one or more types of sealed joints."

Sealant Study Site Locations

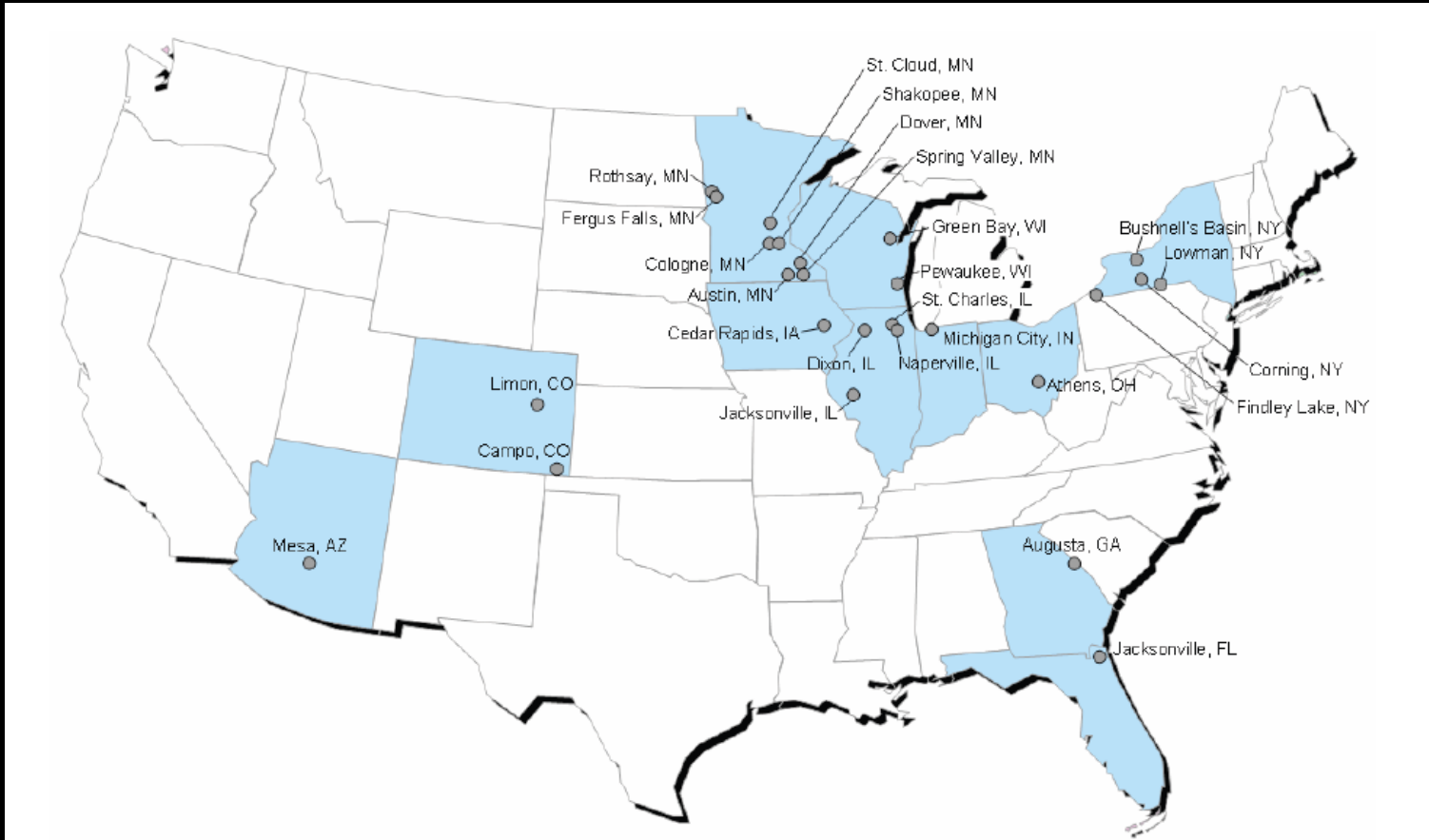


Figure 1. Location of joint sealing experimental sites.

Sealant Study Preliminary Findings

- The presence or absence of dowels in the transverse joints was far more important a factor in joint faulting than whether the joints were sealed or unsealed.
- The faulting in some sealed-joint sections were slightly higher than the faulting in the unsealed section
- The data detected no significant difference between average joint faulting in the sections sealed with the average joint faulting in the corresponding unsealed test sections

Sealant Study Preliminary Findings

- The narrow width of unsealed joints (usually single sawcut) limited the infiltration of coarse incompressibles to a degree comparable to that of any of the three types of sealed joints
- Slab edge support tended to be either adequate or inadequate regardless of joint sealing treatment, which suggests that the joint sealing treatment has a fairly minor influence, if any, on the quality of slab support

Industry Concerns With Findings

- Since the average age of the sections evaluated in this study is approximately 12 years, the findings represent performance based on typical mid-term service lives for dowelled concrete pavements; particularly those located in wet-freeze environments.

Industry Concerns With Findings

- When interpreting the findings, the limitations of the study should be considered. As indicated previously, the age of the test sections does not permit a complete analysis of the long term effects. Additionally, the results are most applicable to dowelled pavements in the wet freeze environment.

Seal/No Seal Group is Formed

The joint sealing industry could no longer survive without dedicated, membership driven representation at the national level!

The **Seal/No Seal Group** was formed to respond to the challenges, bias and misinformation facing this vital industry.

SNS Group – Mission

The SNS Group's Mission is to develop a committed membership that takes responsibility for determining the long-term effectiveness of sealants in concrete pavements.

SNS Group – Initial Charter

- Develop membership base and funding mechanisms
- Promote, develop and monitor test section construction
- Promote, fund and conduct sealant research
- Prepare Updates and Tech Briefs on findings and relevant information

Current Sponsors

How SNS Group is Organized

Management Group

- Scott Eilken
- Charlie Grady
- John Roberts
- Matt Ross

Technical Committee

- Mike Darter
- Dan Zollinger
- Katie Hall
- Wouter Gulden
- Imad Al Qadi
- Robert Rodden
- Larry Scofield

SNS Early Successes

- Developed committed membership base
- Enlisted a consultant (SME) to re-evaluate 58 of the 93 FHWA sealant sections
- Established and maintain SNS website
- Constructed 10 new sealant test section's
- Provided numerous presentations to Specifiers and industry partners
- Invited to speak at powerful TRB Sealant Committee Meeting in DC
- Consistent media exposure (Better Roads, Roads and Bridges, Pavement Pres Journal)

SNS 2011 Activities

- Sponsor sealant research with TTI
- Work with Caltrans on sealant strategy
- Fund WJE research on Clean, Dry, Sticky
- Develop *Sealant Specifications for General Use*
- Respond and contribute to NCPTC Joint Deterioration Research effort.

SNS 2011 Activities

- Promote ACPA's Joint Noise Estimator
- Participate on ACPA's Jointing task force
- Canvass Agencies for experience on blow ups and abutment encroachments
- Conduct backer rod absorption research
- Promote quality sealant installation
- Develop and distribute Tech Briefs

Texas Transportation Institute Study

Who is TTI?

- Texas Transportation Institute
- A member of the Texas A&M University System
- Established in 1950
- Annual research budget $50 million
- TTI is recognized as one of the finest higher education-affiliated transportation research agencies in the nation and helps prepare students for transportation careers.

TTI Test Plan

- Project initiated in 200?
- Project cost $35,000
- Completion in 2012
- Measure flow through sealed, partially sealed and unsealed joints
- Develop infiltration test procedures
- Develop Ground Penetrating Radar test procedures
- Project funded by industry contributions to the SNS Group

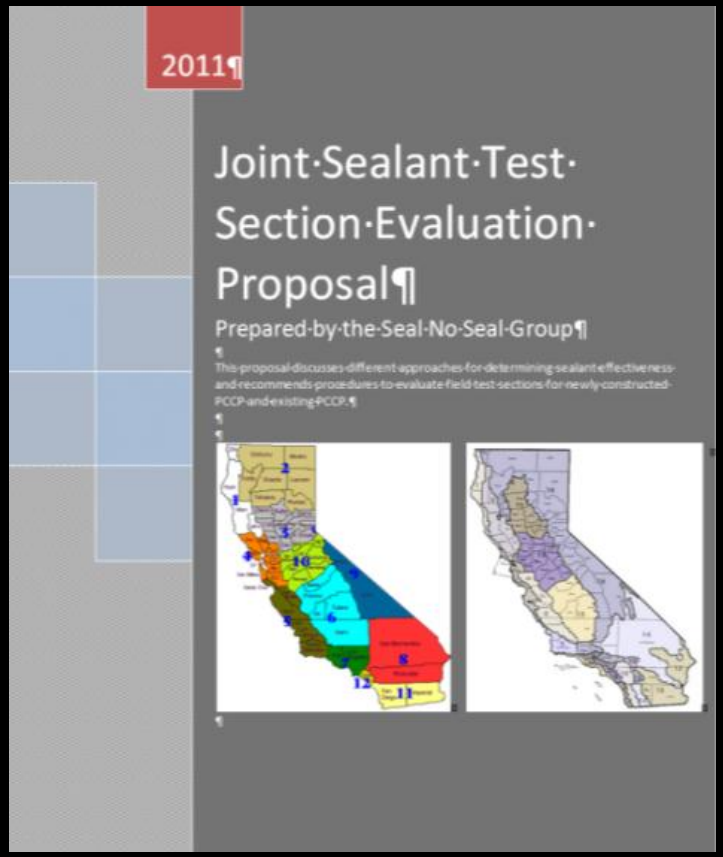
Laboratory Joint Opening Device

Field Movable Joint Opening Device

Field Movable Slab Locations

California DOT (Caltrans)

- Started with Caltrans involvement June 2010
- Field review August 24/25 in So Cal
- Follow on meeting January 10, 2011
- Developed Proposed Sealant Evaluation Test Plan for Caltrans Consideration April 1, 2011
- Final Product is a universal Test Section Plan



Joint Reservoir Moisture and Contamination Test Procedure Development

- Research conducted by Wiss Janney Elstner (WJE), Glenview Illinois
- Established 1956
- Project initiated 2010
- Project budget $6,000
- Completion 2012
- Funded through industry contributions to the SNS Group

WJE Study (Clean, Dry, and Sticky)

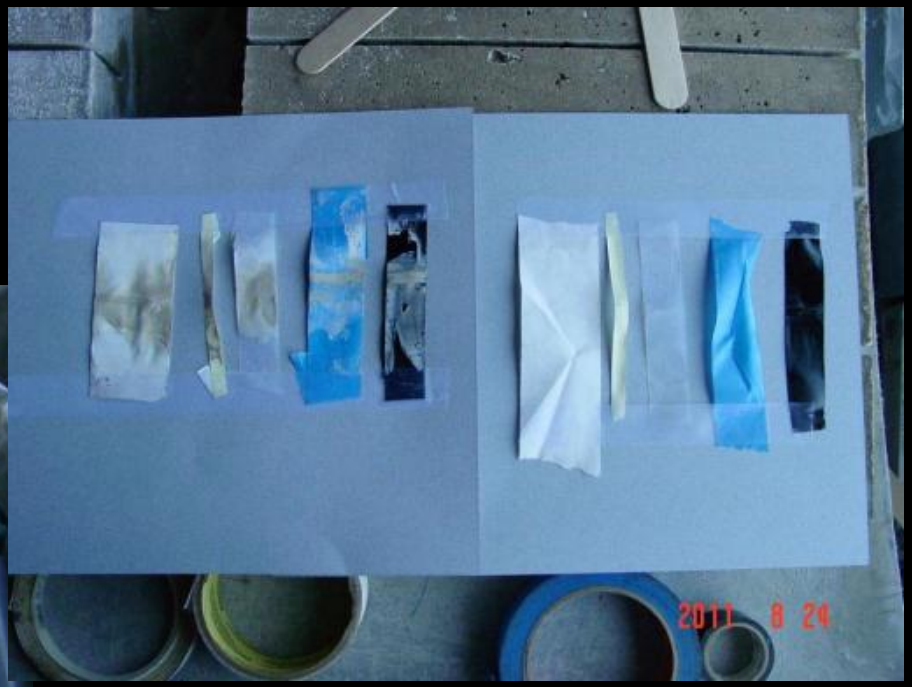
- Contamination (Clean & Sticky)
  - Tape Contamination and Wipe Test
  - Tape Adhesion Bond Strength Pull Test
  - UV Light Inspection
- Moisture Content (Dry)
  - Moisture Paper
  - Resistivity Meter
  - Relative Humidity Gauge
  - Electromagnetic Moisture Meter

Cast and Sawn Samples

Moisture Tests

Moisture Paper

Contamination Tests



WJE Research Results – Cleanliness Test

DRAFT TEST METHOD v. 1.0 (January 2012)

TEST METHOD: Tape Contamination Test (Cleanliness)

STANDARD REFERENCES: Section 5.4 and 6 of SSPC-SP 13/NACE No. 6

USAGE: Measure of the cleanliness of the prepared concrete joint prior to application of joint sealant.

EQUIPMENT / MATERIALS:
1. 3/4-inch wide black electrical tape
2. Tongue depressor or other flat tool made of wood, metal, or stiff plastic. Length of the depressor should be sufficiently long to extend to the bottom of the cut joint with room to hold it above the surface of the concrete.

PROCEDURE:
1. Cut a strip of black tape. The length of the strip should be at minimum two times the depth of the joint plus two (2) inches.
2. Wrap the tape around the depressor with the adhesive side of the tape facing away from the depressor.
3. Insert the tape and depressor into the joint, perpendicular to the surface of the concrete slab/pavement.
4. Firmly rub the tape against the surface of the joint with the tongue depressor. Rub both vertical surfaces and the bottom of the joint. Sufficient pressure should be applied so the level of contaminant removal is not affected by slight variations in pressure.
5. Remove the depressor and tape.
6. Examine the tape for contaminants. Grade level of contaminates per the visual standard.
7. Repeat the procedure at one additional location within 12 inches of the first test.
8. Report the contamination level of the two tests and determine if the level of contamination is below the predetermined acceptance threshold. (if applicable).

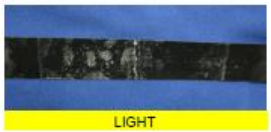
REPORT:
1. Sawcut width and preparation method
2. Time and date of the test
3. Test location
4. Length of sawcut joint represented by the test
5. Test result of the two tests by visual standard level (Trace, Light, Moderate, Heavy).

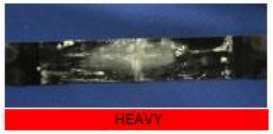
TEST METHOD (VISUAL)

EQUIPMENT

PROCEDURE

VISUAL STANDARD





COMMENTS CAN BE DIRECTED TO PAUL KRAUSS at Wiss, Janney Elstner Assoc., 847-753-6517, pkrauss@wje.com

WJE Research Results – Moisture Test

DRAFT TEST METHOD v. 1.0 (January 2012)

TEST METHOD: Moisture Sensitive Paper (Moisture)

STANDARD REFERENCES: None

USAGE: Test to determine the presence of moisture in concrete joints prior to applying sealant.

EQUIPMENT / MATERIALS:
1. One-time use moisture sensitive paper (Hydrion water finding test pater, CAT#WF-130, Micro Essential Laboratory, Inc., Brooklyn NY, or equal).
2. Tongue depressor or other flat tool made of wood, metal, or stiff plastic. Length of the depressor should be sufficiently long to extend to the bottom of the cut joint with room to hold it above the surface of the concrete.

PROCEDURE:
1. Cut the moisture sensitive paper into strips. The length of the strips should be at minimum two times the depth of the joint plus two inches.
2. Place the moisture sensitive paper strip around the tongue depressor and insert into the joint, perpendicular to the surface of the concrete slab/pavement.
3. Press the paper against the surface of the joint with the tongue depressor. Press against both vertical surfaces and the bottom of the joint. Hold paper down against each surface for 10 seconds.
4. Remove the depressor and tape. Examine if the tape indicated significant moisture. Grade moisture per the visual standard.
5. Repeat the procedure at one additional location within 12 inches of the first test.
6. Report the highest moisture level of the two tests and determine if moisture content is below the predetermined acceptance threshold (if applicable).

REPORT:
1. Sawcut width and preparation method
2. Time and date of the test
3. Test location
4. Length of sawcut joint represented by the test
5. Test results of the two tests by visual standard level (None, Light, Moderate, Heavy).

TEST METHOD (VISUAL)

EQUIPMENT

PROCEDURE

VISUAL STANDARD

COMMENTS CAN BE DIRECTED TO PAUL KRAUSS at Wiss, Janney Elstner Assoc., 847-753-6517, pkrauss@wje.com

WJE Research Results – WipeTest

DRAFT TEST METHOD v. 1.0 (January 2012)

TEST METHOD: Wipe Test (Cleanliness)

STANDARD REFERENCES: Section 5.4 and 6 of SSPC-SP 13/NACE No. 6; ASTM D 5295

USAGE: Measure of the cleanliness of the prepared concrete joint prior to application of joint sealant.

EQUIPMENT / MATERIALS:
1. Black 100% cotton cloth
2. Tongue depressor or other flat tool made of wood, metal, or stiff plastic. Length of the depressor should be sufficiently long to extend to the bottom of the cut joint with room to hold it above the surface of the concrete.

PROCEDURE:
1. Cut the cloth into 2-inch wide strips. The length of the cloth strips should be at minimum two times the depth of the joint plus two inches.
2. Place the cloth strip around the tongue depressor and insert into the joint, perpendicular to the surface of the concrete slab/pavement.
3. Firmly rub the entire width of the cloth against the surface of the joint with the tongue depressor over a 2 in. length of the joint. Rub both vertical surfaces and the bottom of the joint. Sufficient pressure should be applied so the level of contaminant removal is not affected by slight variations in pressure.
4. Remove the depressor and cloth. Use caution when handling the cloth to avoid dislodging contaminants by shaking the cloth.
5. Examine the cloth for contaminants. Grade contamination per the visual standard.
6. Repeat the procedure at one additional location within 12 inches of the first test.
7. Report the contamination level of the two tests and determine if the level of contamination is below the predetermined acceptance threshold (if applicable).

REPORT:
1. Sawcut width and preparation method
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TEST METHOD (VISUAL)

EQUIPMENT

PROCEDURE

VISUAL STANDARD

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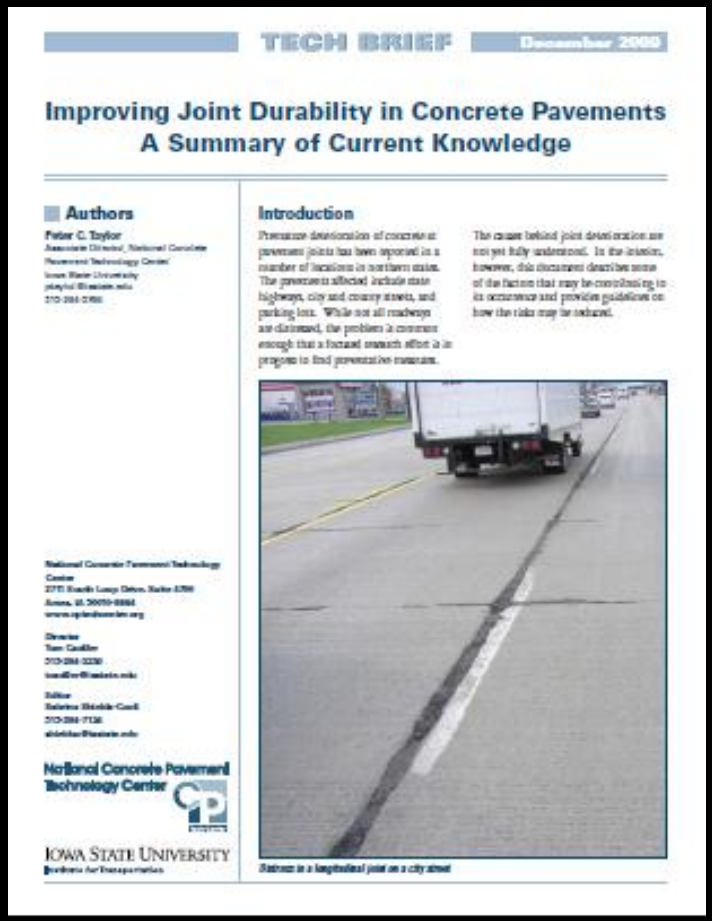
Interim Guide Specifications

Initial Culprit…

Joint sealant and backer rod!



TECH BRIEF

Improving Joint Durability in Concrete Pavements
A Summary of Current Knowledge

Authors

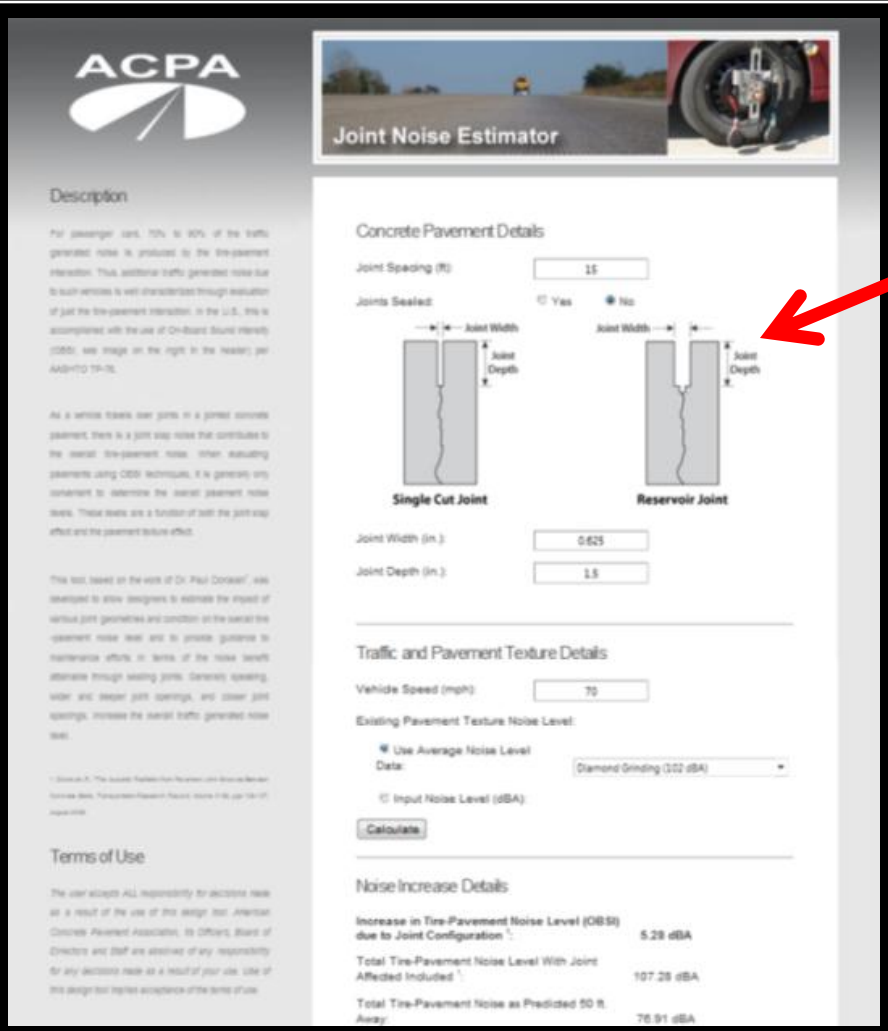
Peter C. Taylor

Introduction

National Concrete Pavement Technology Center

Iowa State University

Pavement Joint Noise Estimator



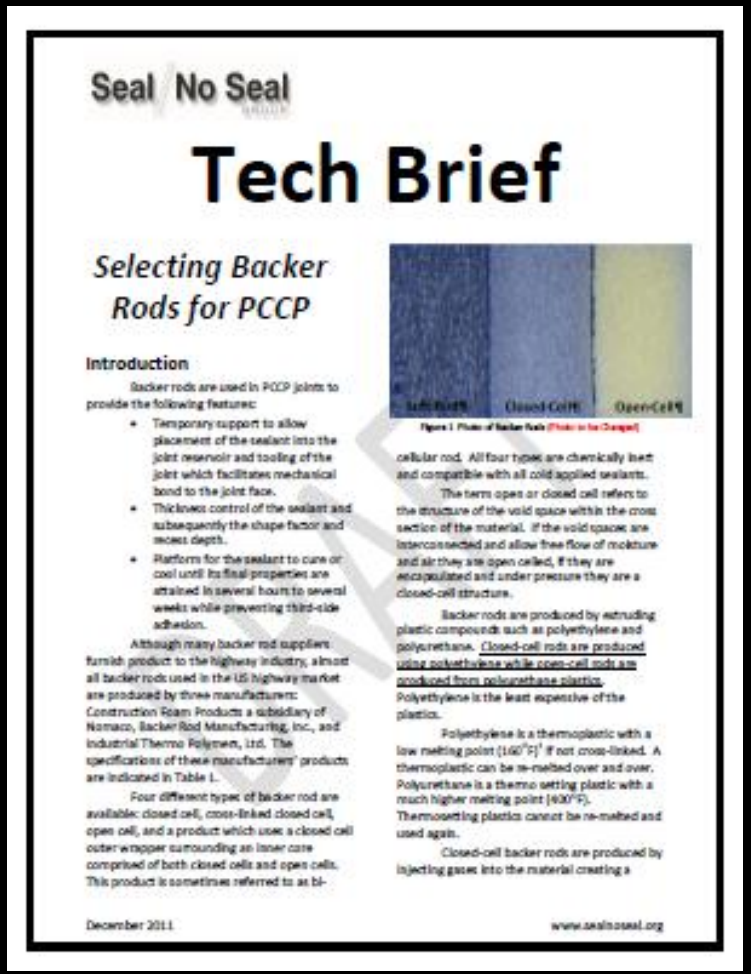
Unsealed vs Sealed Joint is about 5 dBA

ACPA Jointing Task Force

- Formed to address joint related issues including seal/no seal
- Comprised of private and public sector participants
- Co Chairman Scott Eilken of SNS Group
- Results will be used to develop industry policy and positions

Backer Rod Usage Research

- Investigated 4 different types of rod
- Identified proper applications for each
- Identified use patterns by contractors in the field



Seal No Seal

Tech Brief

Selecting Backer Rods for PCCP

Introduction

Backer rods are used in PCCP joints to provide the following features:

- Temporary support to allow placement of the sealant into the joint reservoir and tooling of the joint which facilitates mechanical bond to the joint face.
- Thickness control of the sealant and subsequently the shape factor and recess depth.
- Platform for the sealant to cure or cool until its final properties are attained in several hours to several weeks while preventing third-side adhesion.

Although many backer rod suppliers furnish product to the highway industry, almost all backer rods used in the US highway market are produced by three manufacturers: Construction Foam Products a subsidiary of Nomaco, Backer Rod Manufacturing, Inc., and Industrial Thermo Polymers, Ltd. The specifications of these manufacturers' products are indicated in Table 1.

Four different types of backer rod are available: closed cell, cross-linked closed cell, open cell, and a product which uses a closed cell outer wrapper surrounding an inner core comprised of both closed cells and open cells. This product is sometimes referred to as bi-

cellular rod. All four types are chemically inert and compatible with all cold applied sealants.

The term open or closed cell refers to the structure of the void space within the cross section of the material. If the void spaces are interconnected and allow free flow of moisture and air they are open celled, if they are encapsulated and under pressure they are a closed-cell structure.

Backer rods are produced by extruding plastic compounds such as polyethylene and polyurethane. Closed-cell rods are produced using polyethylene while open-cell rods are produced from polyurethane plastics. Polyethylene is the least expensive of the plastics.

Polyethylene is a thermoplastic with a low melting point (160°F)[1] if not cross-linked. A thermoplastic can be re-melted over and over. Polyurethane is a thermo setting plastic with a much higher melting point (400°F). Thermosetting plastics cannot be re-melted and used again.

Closed-cell backer rods are produced by injecting gases into the material creating a

December 2011

www.sealnoseal.org

Backer Rod Usage Research

- Four types of backer rod identified; closed cell, open cell, cross-linked closed cell and bi-cellular rod.
- All types compatible with cold applied sealants.
- Due to their ability to absorb moisture, open cell rod should not be used in PCCP applications.
- Closed-cell backer rod does not absorb water and is essentially water proof.
- Closed-cell backer rod is only suitable for cold-applied sealants unless the polyethylene has been cross-linked.

Backer Rod Usage Research

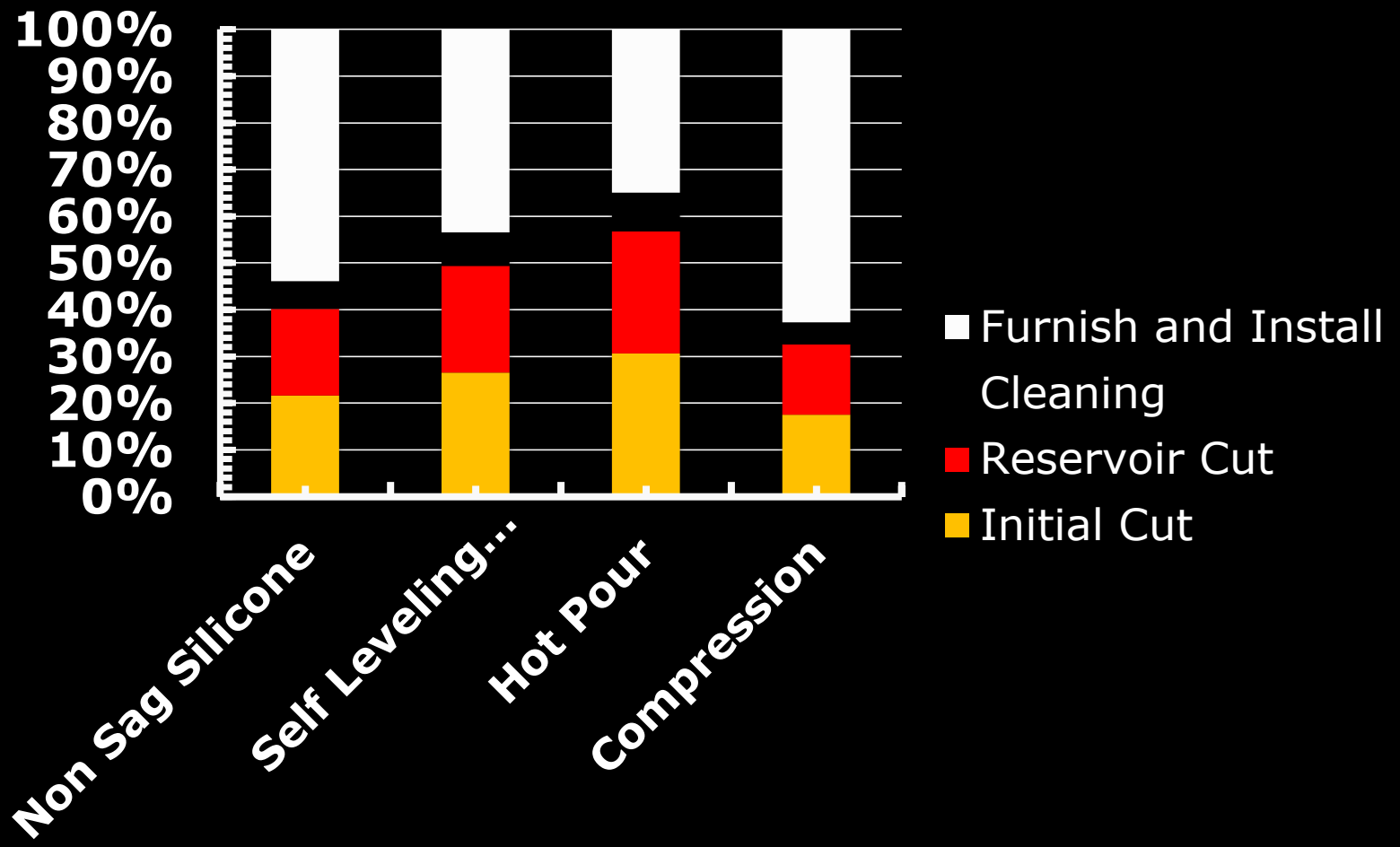
- Closed-cell backer rod is only suitable for cold-applied sealants unless the polyethylene has been cross-linked.
- Open cell rod is being used inappropriately in some PCC paving situations and can be attributed to a number of premature sealant failures in the field and may be responsible for some premature joint associated distresses.
- This misuse of open cell rod is contributing to the negative sealant perceptions in the field and loss of market share for the industry!

Promote Proper Sealant Installation

Joint Preparation and Cleanliness

- Joint preparation and cleanliness is the least costly procedure related to joint and crack sealing yet it is often the most underapplied and omitted part of the process.
- This has let to a very negative perception regarding sealant life and effectiveness!

Percent of Total Cost For Each Operation of Sealing a Joint



Communications and Media Efforts

- Kari Moosmann
  - AEC Editorial Manager
  - Constructive Communication Inc.

Communication and Media Efforts

- Tech Briefs
- Sealant Field Evaluation Reports
- Joint Associated Distress Reports
- Media Placements
- Web Site

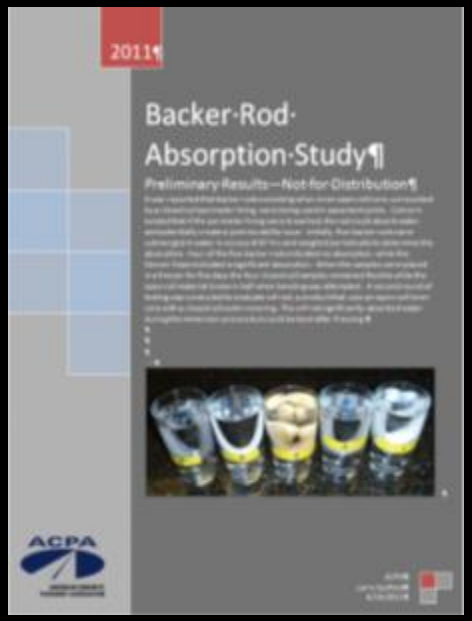
Tech Briefs


Seal No Seal
Tech·Brief
Evaluation·of·Backer·Rod·Absorption
Joint·Movement·Estimator·for·Designing·Transverse·Joint·
Use·of·Silanes·for·Sealing·Joints·in·Concrete·Pavements
Joint·Slap·Evaluation·and·Prevention
Introduction
Concrete·Sealers

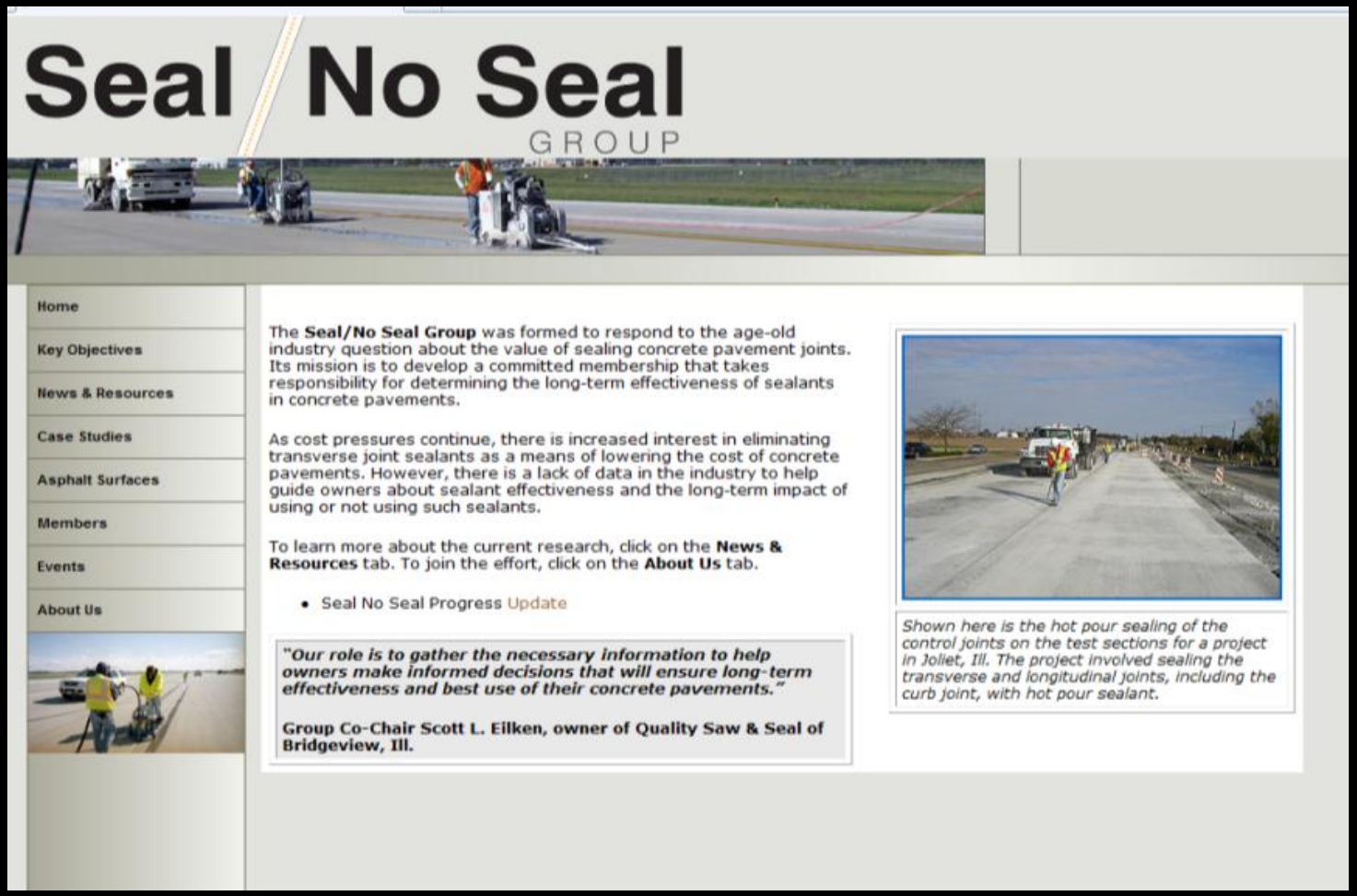
Field Sealant Investigations

Joint Associated Distress Review

Miscellaneous Reports



Web Site

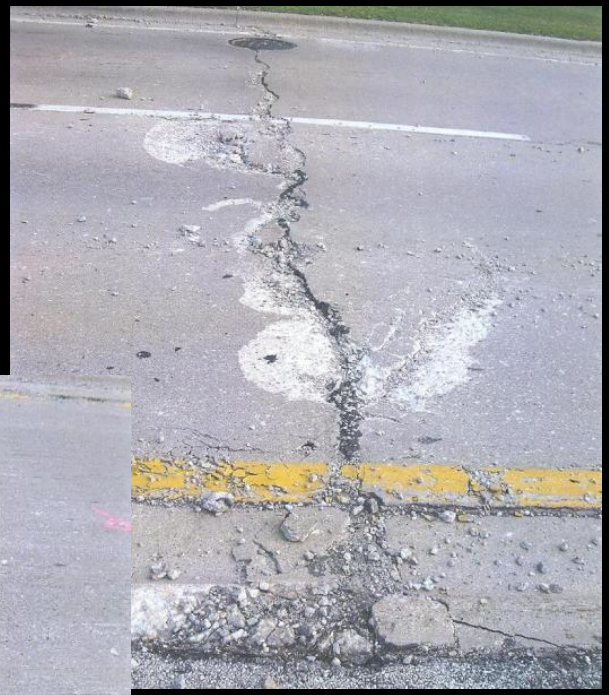

Seal No Seal
GROUP
Home
Key Objectives
News & Resources
Case Studies
Asphalt Surfaces
Members
Events
About Us
The Seal/No Seal Group was formed to respond to the age-old industry question about the value of sealing concrete pavement joints. Its mission is to develop a committed membership that takes responsibility for determining the long-term effectiveness of sealants in concrete pavements.
As cost pressures continue, there is increased interest in eliminating transverse joint sealants as a means of lowering the cost of concrete pavements. However, there is a lack of data in the industry to help guide owners about sealant effectiveness and the long-term impact of using or not using such sealants.
To learn more about the current research, click on the News & Resources tab. To join the effort, click on the About Us tab.
Seal No Seal Progress Update
"Our role is to gather the necessary information to help owners make informed decisions that will ensure long-term effectiveness and best use of their concrete pavements."
Group Co-Chair Scott L. Eilken, owner of Quality Saw & Seal of Bridgeview, Ill.
Shown here is the hot pour sealing of the control joints on the test sections for a project in Joliet, Ill. The project involved sealing the transverse and longitudinal joints, including the curb joint, with hot pour sealant.

2012 Opportunities

- Pursue evidence on damage done by incompressibles
- SPS-2 P2 Experiment
- Development of National P2 Test Bed
- GPR activities
- Field verification of WJE and TTI studies
- Enlist Petrographer to develop independent perspective of Joint Associated Distress cause(s)

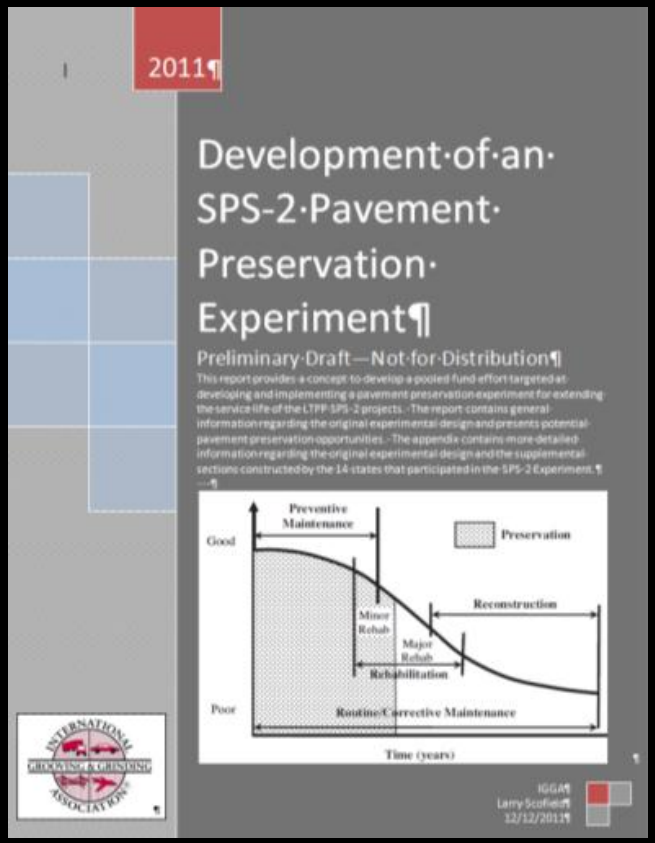
Evidence of Damage due to Incompressibles

- Joint deterioration and increased maintenance
- Blow ups
- Slab Growth Abutment movement



SPS 2 Pavement Preservation Project

- SPS-2 is the largest and most comprehensive ongoing concrete experiment in the US
- Dedicated and consistent evaluation and analysis procedures
- An opportunity to leverage an existing experiment for industry benefit



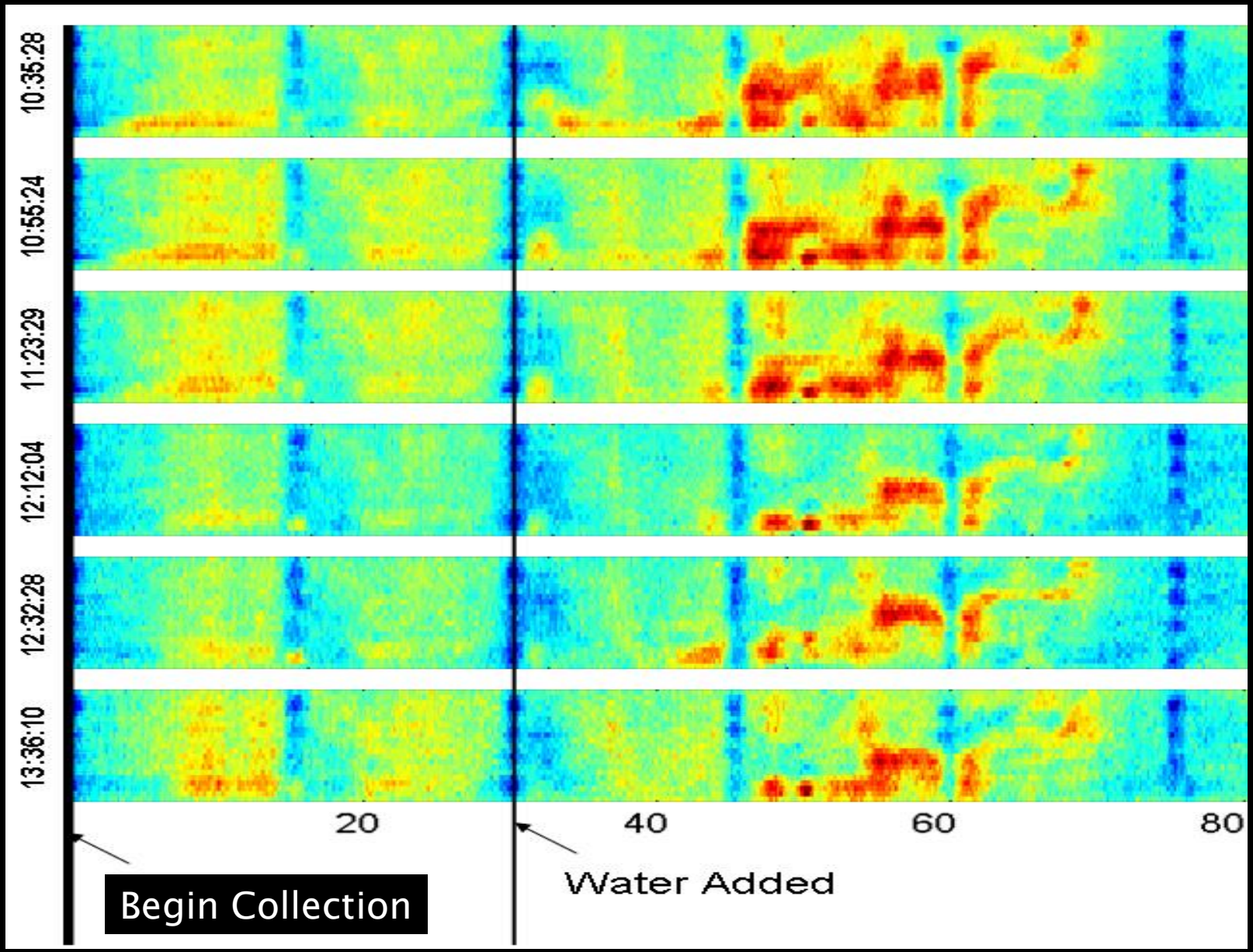
National Pavement Preservation Test Bed

- Potential national Pooled Fund Study
- Leverage resources and manpower
- Opportunity to bring to bear dedicated research facilities and researchers
- Opportunities to answer the unanswered questions
- Opportunities to develop new products and techniques

Ground Penetrating Radar (GPR)

- GPR technology offers unprecedented subsurface three-dimensional (3D) imaging capabilities. Subsurface material deterioration, void imaging, and precise material and geometry measurements are all accurately and efficiently carried out using this specialized device

Frequency -196



T - Time water was added

Field Verification of TTI and WJE

WJE Research

- Evaluate Cleanliness and Moisture Tests on in-service projects
- Establish criteria for acceptable limits for use in construction specifications
- Develop specifications based upon limits

TTI Research

- Conduct Field Infiltration Tests to establish rates of selected pavements
- Use GPR to investigate the moisture levels at joints on in-service pavements—new to old
- Attempt to establish when to reseal projects based on water infiltration rates

Petrographic White Paper- *By Gerard Moulzolf, PG*

Overview

Although necessary in most pavements, joints can be viewed as the "weak link" in pavement design and performance. Distresses often encountered in aged pavements occur only at the joints or the distress mechanisms are more severely exhibited there. The ingress of moisture drives nearly all materials-related distresses. Non-sealed joints or compromised sealants provide that access for moisture. Further, a lack of drainage from un-activated (un-cracked) joints, debris-plugged joints, and in-filled sub-base concentrates moisture and brines (from deicers) in the joints. It is highly likely in certain cases that the adjacent concrete at pavements joints becomes critically saturated – allowing freeze-thaw distress even in high quality concretes.

QUESTIONS/COMMENTS?

Thank You!

Please join us at the IGGA Hospitality Suite at the LVH from 4-6 pm today in Suite ??? XXX Tower

Seal // No Seal GROUP