Pressure Relief Joints (PRJ)

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Overview

- Background
- Damages
- Material changes
- PRJ Installation
- Closing - Miscellaneous items

Background

Evaluation of the Effectiveness of Pressure Relief Joints in Reinforced Concrete Pavements

Report No: 76-R48

Published in 1976

About the report

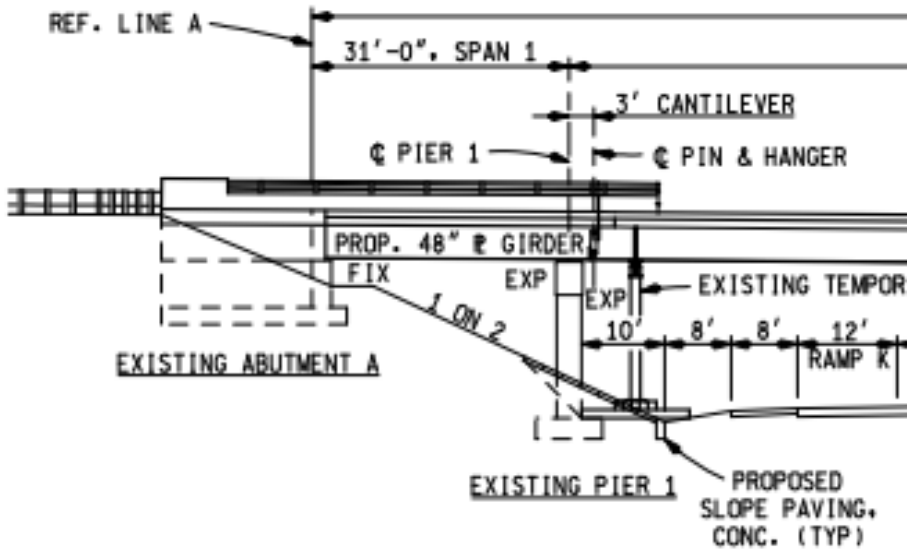
Reported are studies of the effectiveness of a 4-inch (100 mm) wide compressible material installed at 1,000-ft. (305 m) intervals in a jointed, reinforced concrete pavement in reducing pavement blowups. The studies were made on an Interstate highway carrying some 30,000 vehicles per day, including approximately 7,000 trucks and buses. The study contrasts the behavior of the pavement before these pressure relief joints were installed with that observed afterwards. Brief discussions of the factors indicating the need for such joints, the problems associated with their use, and the potential for their use under

Authors

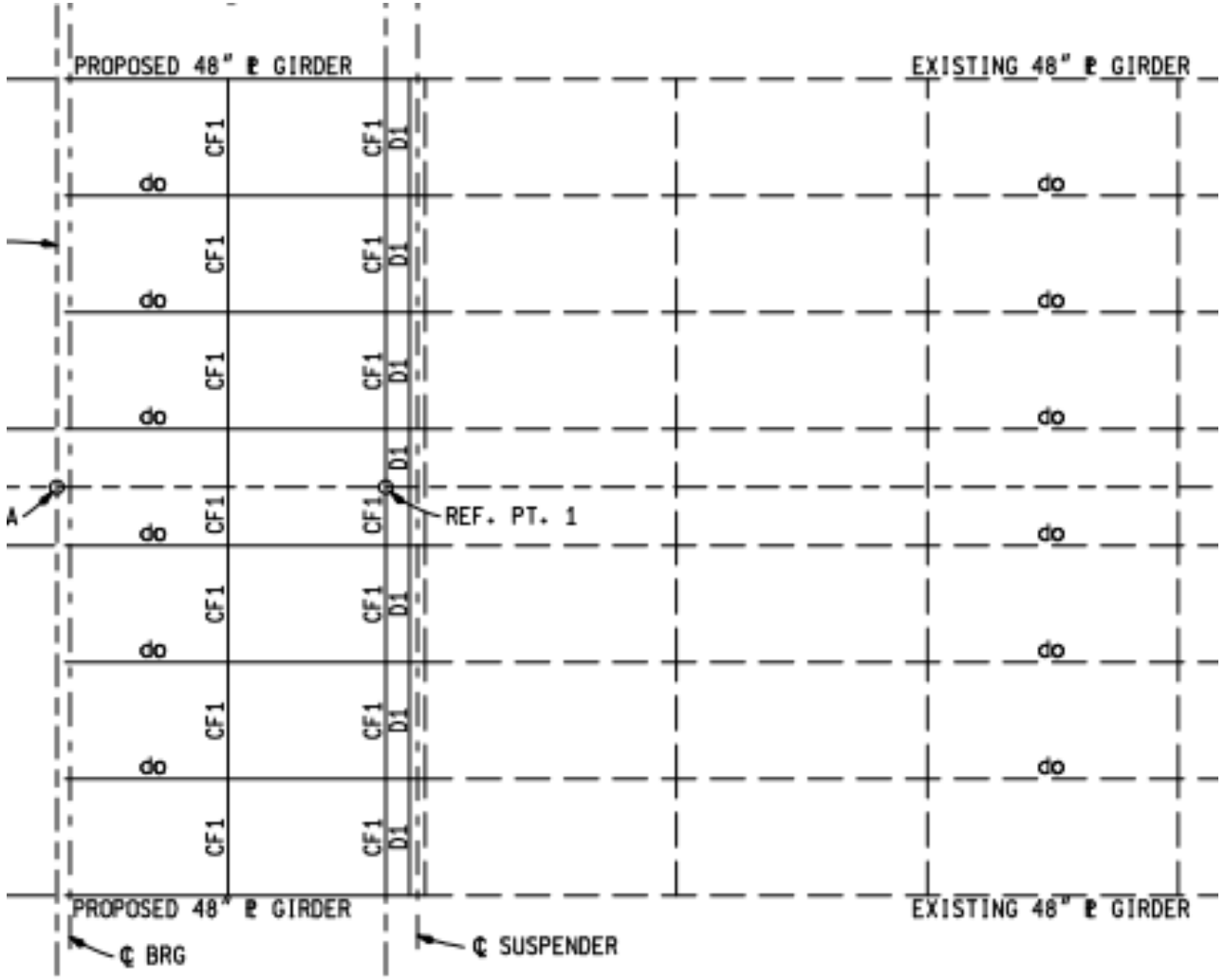
Kenneth H. McGhee

- One of the first documented studies of PRJ in reinforced concrete highways.
- The study installed 4” compressible joints at 1000 ft intervals on an interstate highway.
- Concluded that PRJ were effective in reducing blow ups.

Background



- We had to do an emergency temp support.
- Tail span beams started to buckle



Background

- After this situation - We started to looking into doing PRJ in Maintenance

2008 Pavement Relief Joints

Region	C.S.	Structure No.	Facility Carried	Feature Intersected	Date	Material
Metro	82125	S05	6 Mile Road	I-96/I-275	5/1/2008	Flex-Loc

Lanes	4	**Charachteristics of Pavement Growth**
Width	78.5	Diagonal deck cracking, substructure
Number	2	**Post Installation Observations**
Curb Cuts	4	1/26/09: E End 4.25", W End 4.375" 2/02/09: Pourable joint spring 2010
Sawing Qty	314	8/10/10: E End 4", thinnest-3.125"; W End 4.25", thinnest-3.25"

Background

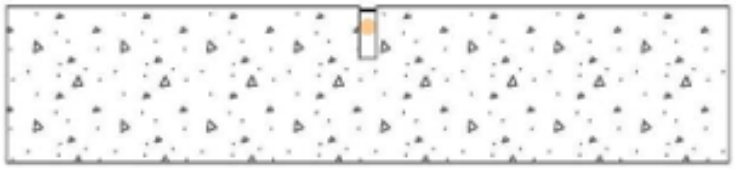


Figure 1. Saw cut and sealed green concrete pavement

Figure 2. Shrinkage crack forms at contraction joint

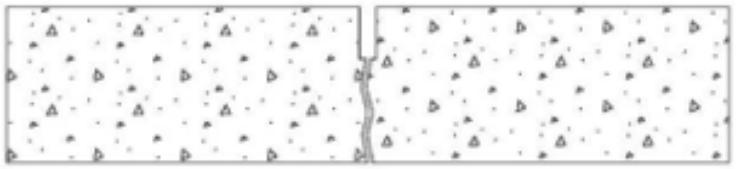


Figure 3. *Joint seal lost*

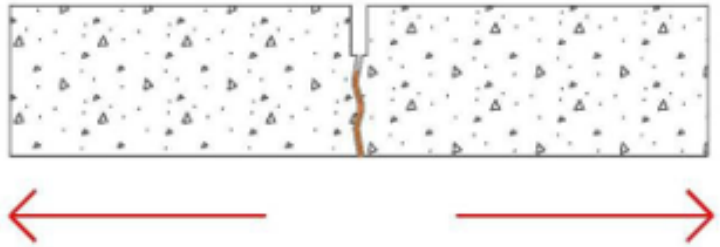


Figure 4. Fine particles infiltrate joint and expansion occurs

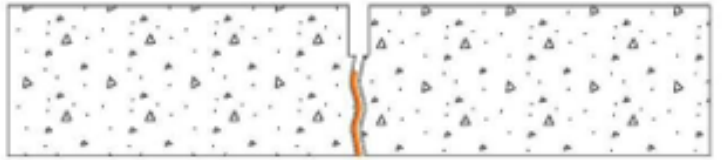


Figure 5. Concrete contracts

Background

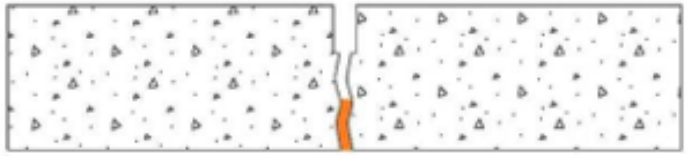


Figure 6. Incompressible particles settle

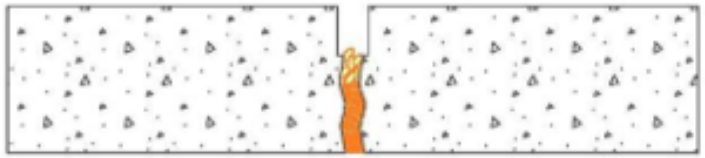


Figure 9. Incompressible particles settle

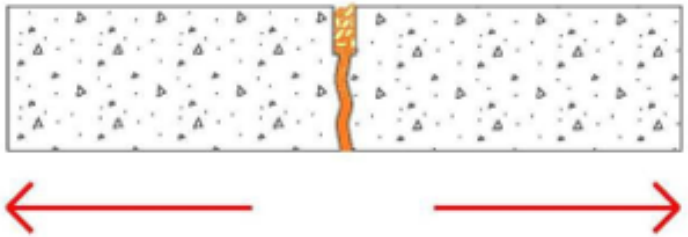


Figure 7. Coarse particles begin to infiltrate joint and expansion occurs

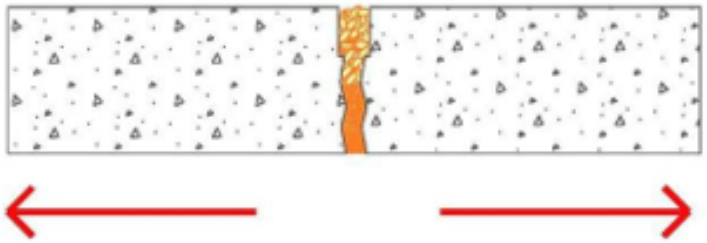


Figure 10. *Coarse particles infiltrate joint and expansion occurs*

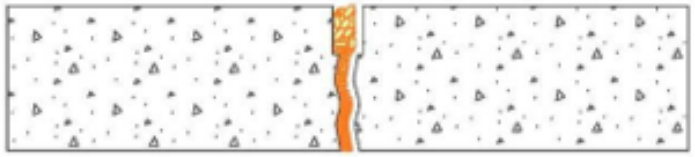


Figure 8. Concrete contracts

Damages

Damages

Damages

Damages


Sp 3s
Bearing bw
Completely Sheared
Both Flanges buckled


Sp 3s
Beam 8w
E Face

Material Changes – Ceramar

DESCRIPTION

CERAMAR is a flexible foam expansion joint filler composed of a unique synthetic foam of isomeric polymers in a very small, closed-cell structure. Gray in color, CERAMAR is a lightweight, flexible, highly resilient material offering recovery qualities of over 99%. The compact, closed-cell structure will absorb almost no water.

Thickness	Approx. Wt./100 ft.^{2}
1/4" (6.4 mm)	3.13 lb.
3/8" (9.5 mm)	4.70 lb.
1/2" (12.7 mm)	6.25 lb.
3/4" (19.1 mm)	9.40 lb.
1" (25.4 mm)	12.50 lb.

Material Changes – Ceramar

The following are typical test results for W. R. MEADOWS CERAMAR® 4 ½" Flexible Foam Expansion Joint:

PROPERTY		TEST METHOD	TYPICAL TEST RESULTS
Compression Strength, psi:	25%	ASTM D3575 – Suffix D	≥15
Compression Strength, psi:	50%	ASTM D3575 – Suffix D	≥30
Compression Strength, psi:	75%	ASTM D3575 – Suffix D	≥45

Iso-Flex SILFAST XL

Expansion Joint Sealing System

PRODUCT OVERVIEW

Iso-Flex SILFAST XL is a revolutionary, silicone faced, polymer impregnated foam expansion joint seal that is supplied in "Xtra Long" piece lengths compared to other products on the market. It is used to fill horizontal and vertical control joints, expansion joints, pressure relief joints, abutment joints, and joints in jersey barriers. SILFAST XL has a broad range of applications allowing it to seal against weather, moisture, vapor, air, sound and dust. The internal recovery force allows it to function in stationary and movement joints between similar and dissimilar materials in a wide range of temperatures. SILFAST XL adjusts to variations of contour of materials forming the joint, provided such changes are not too abrupt. The full width of seal must remain under compression in order to provide for a watertight seal. SILFAST XL uses a traffic grade silicone surface coating thus it is resistant to gasoline, diesel fuel, solvents, salts, and acids. Contact manufacturer for specific chemical resistance requirements.

PRODUCT ADVANTAGES

- Supplied in Xtra Long 39' lengths, which dramatically reduces splice locations
- Designed to meet the requirements of horizontal and vertical applications
- Allows +50/-50% joint movement (based on midrange installation width)

INSTALLATION

Surfaces to be sealed must be sound, dry, clear free of oil, grease, laitance, rust and other fo material that would prevent proper adhesion. Bor surfaces should be sandblasted or abraded mechanical grinders. SILFAST XL is bonded in using a combination of a specially developed e

Material Changes – Lymtal

Material Changes - Rigid Pour Foam System

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PRJ Installation

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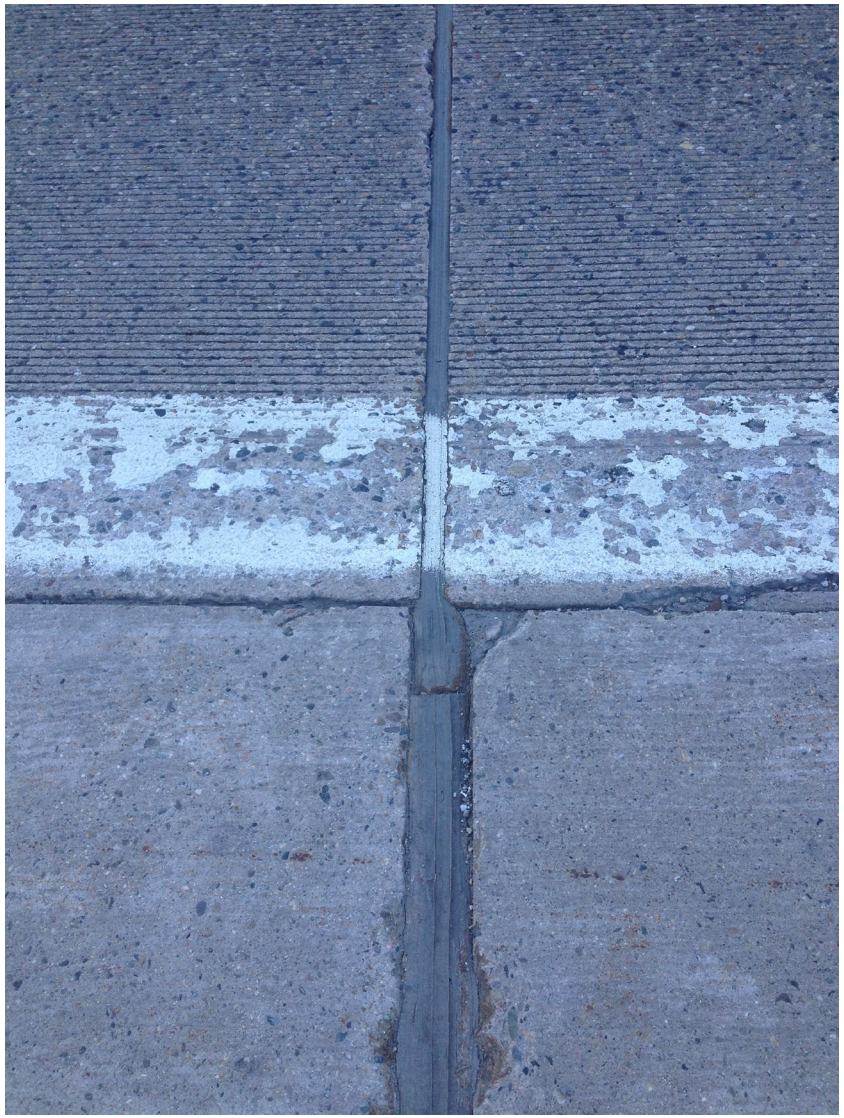
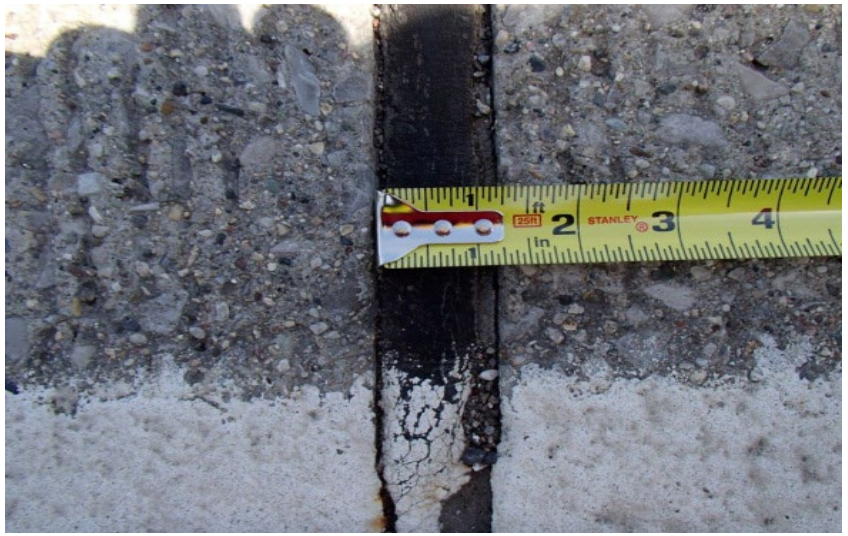


Summary – When to Recut

Condition State 2 →



Condition State 4 ←

Condition State 3 →

Condition State 4 ←

Summary - PRJ with Sleeper Slab

Summary - PRJ with Asphalt

Questions ?