WELCOME

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OACES
OREGON ASSOCIATION OF COUNTY ENGINEERS AND SURVEYORS

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Expansion Joints

Learning Objectives

- What are Expansion Joints?
- Where are they?
- What do they look like?
- What they do and how to maintain them

Expansion Joints are…

A mechanical device in a bridge deck designed solely for the purpose of making a Bridge maintenance workers life miserable.

Expansion Joints, What are they?

Bridge expansion joints are a mechanical device installed in a bridge to allow for continuous traffic between structures while allowing for expansion and contraction due to temperature changes, deflections caused by live loads, and longitudinal forces caused by vehicular traffic.

Expansion Joints, What are they?

Joint Header

Common Header Failures

Header in need of repair

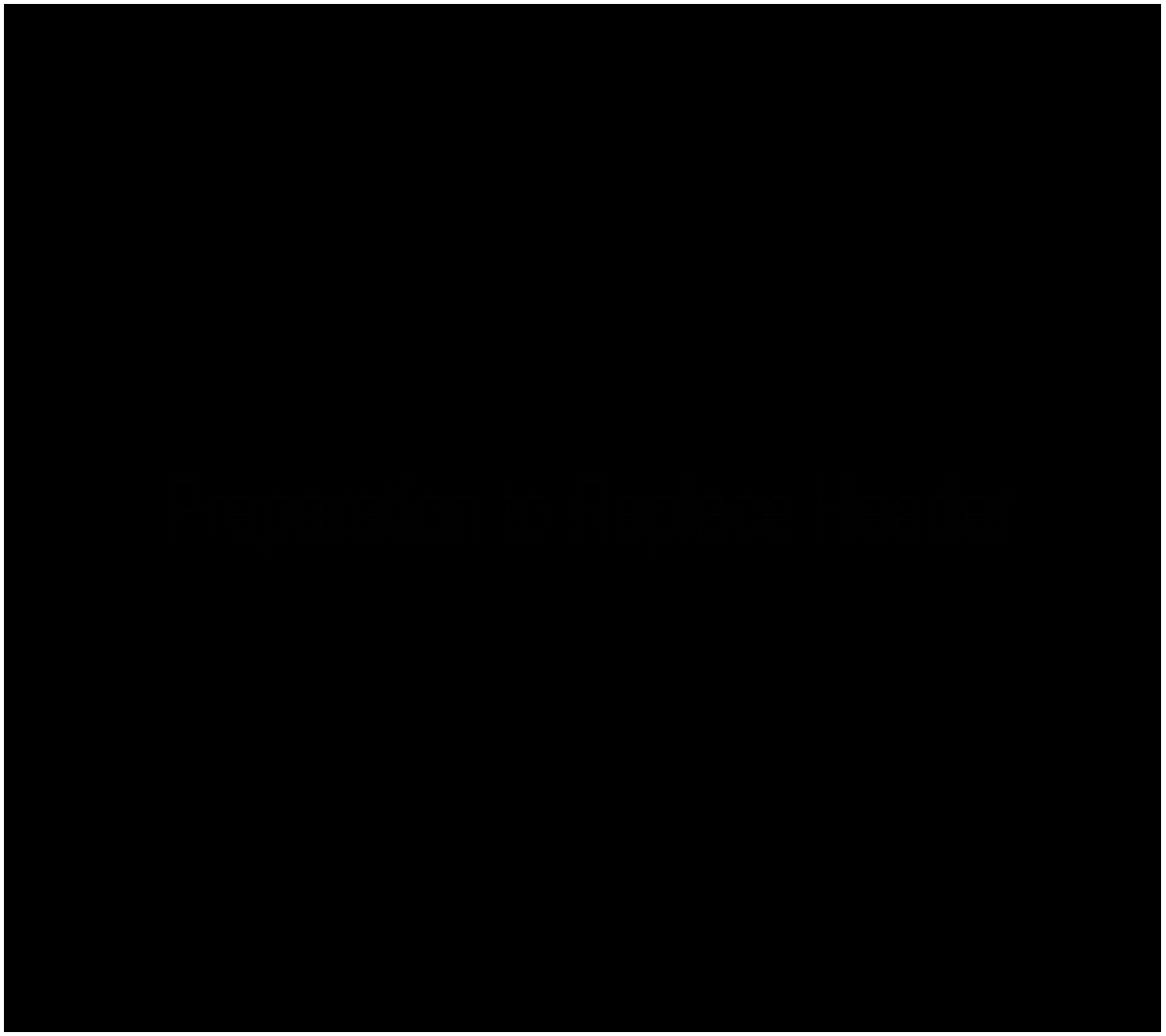
Repairing Joint Headers

Repairing a Joint Header with Concrete, or Elastomeric Concrete

Repairing Headers

1. Remove existing header using 60lb jackhammer
2. Mark and saw cut clean edge
3. Clean block out
4. Form the joint

Preparation to Replace the Header Video



If Using Elastomeric

1. Coat substrate with primer
2. Place polymer concrete header and allow to cure in accordance with manufacturer's recommendations
3. Seal header

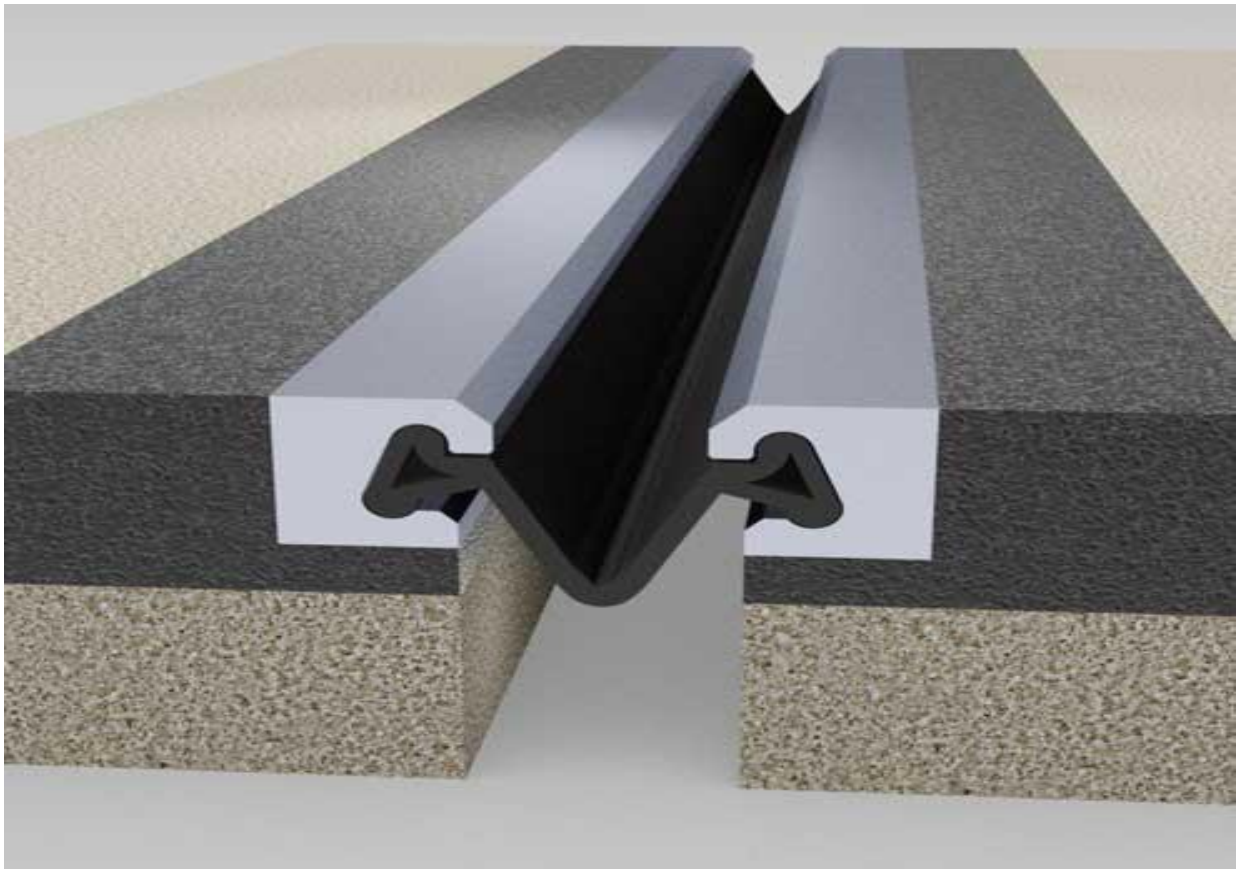
If Using Concrete

1. Use an approved concrete from the QPL, (Qualified Products List).

2. Match concrete surface to deck grade

Anatomy of a Joint

Joint Bars - Extruded

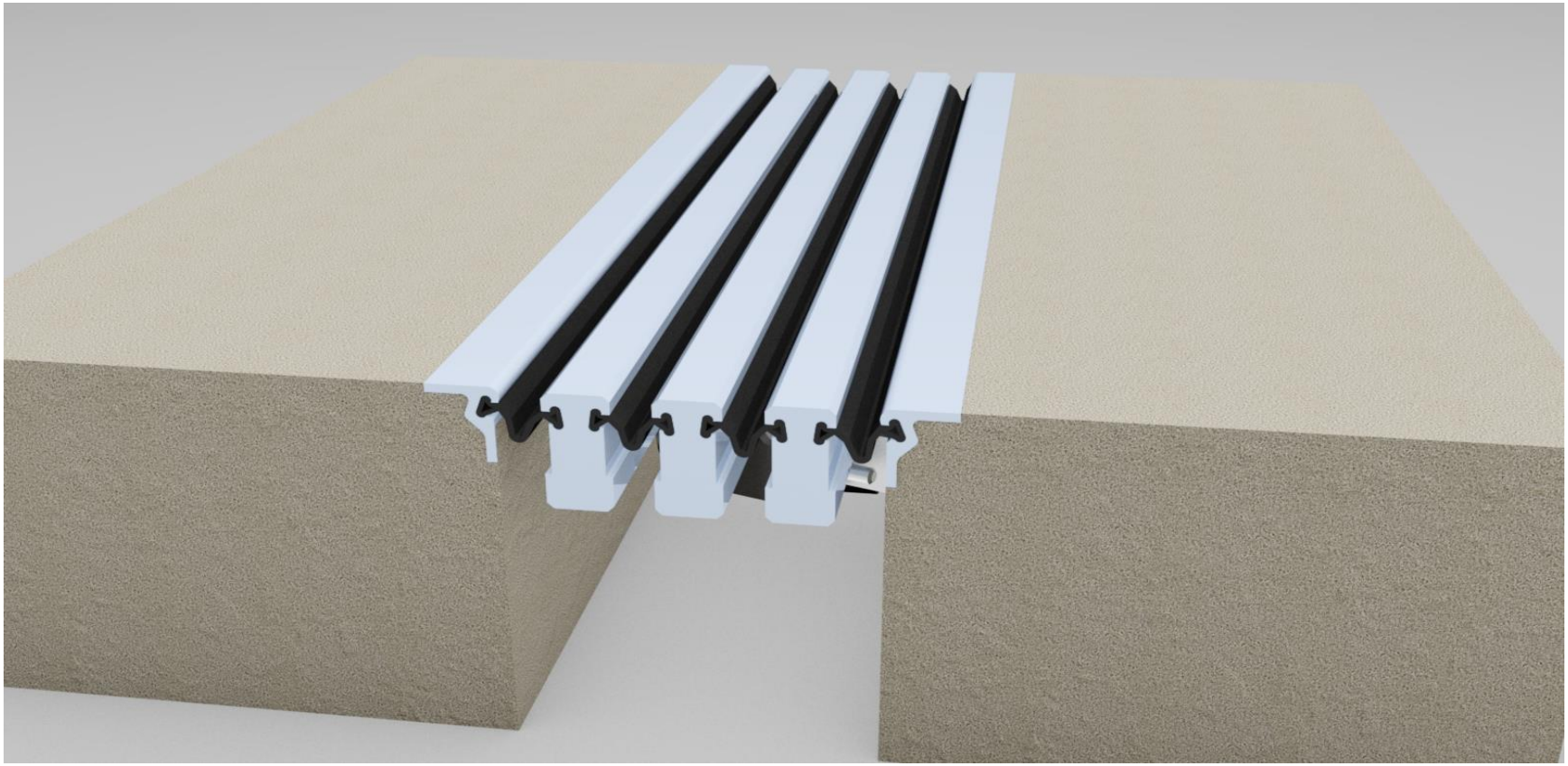


Anatomy of a Joint

Joint Bars – Armored Corner

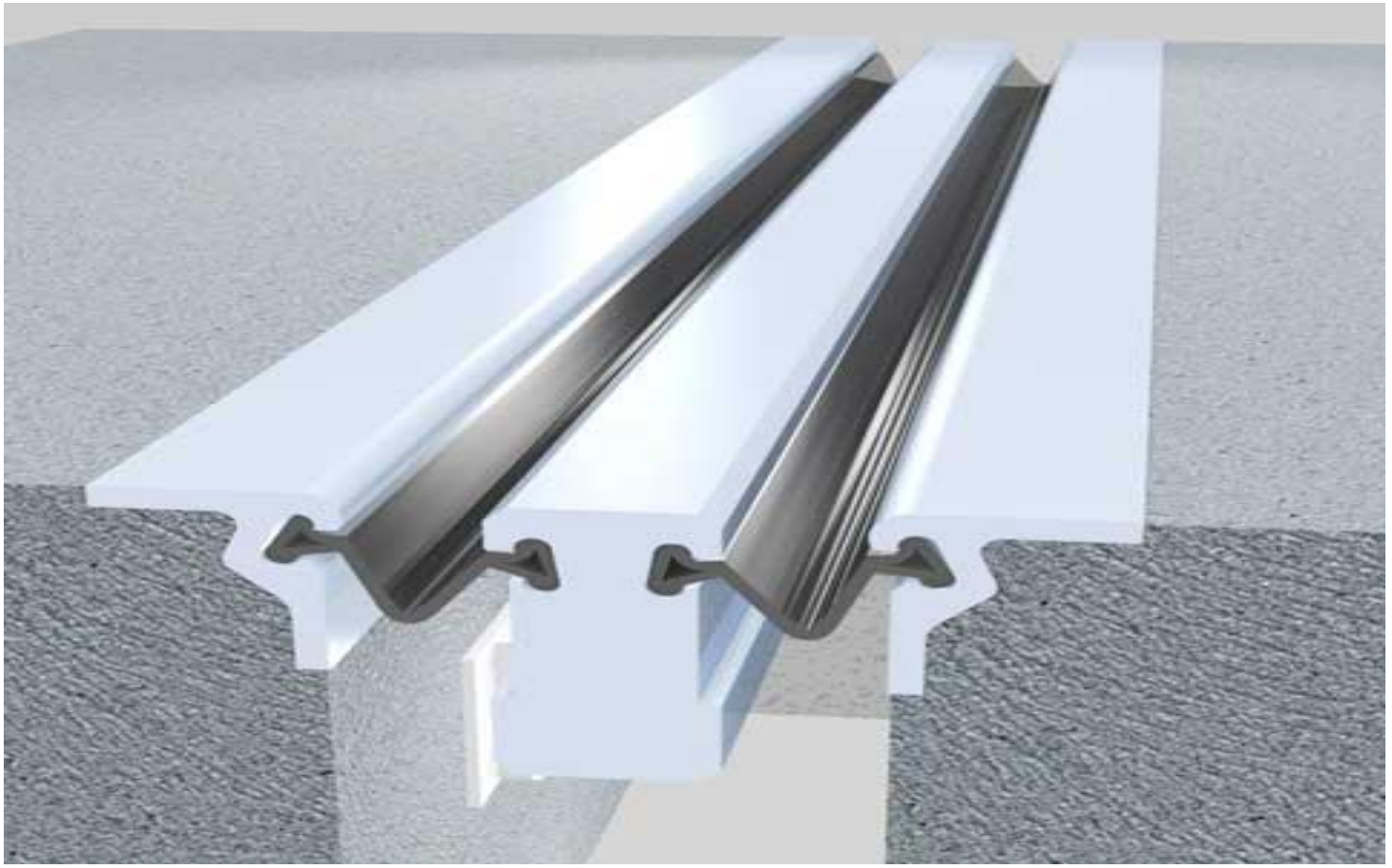
Anatomy of a Joint

Joint Bars- Modular



Anatomy of a Joint

Joint bars-Modular



Anatomy of a Joint

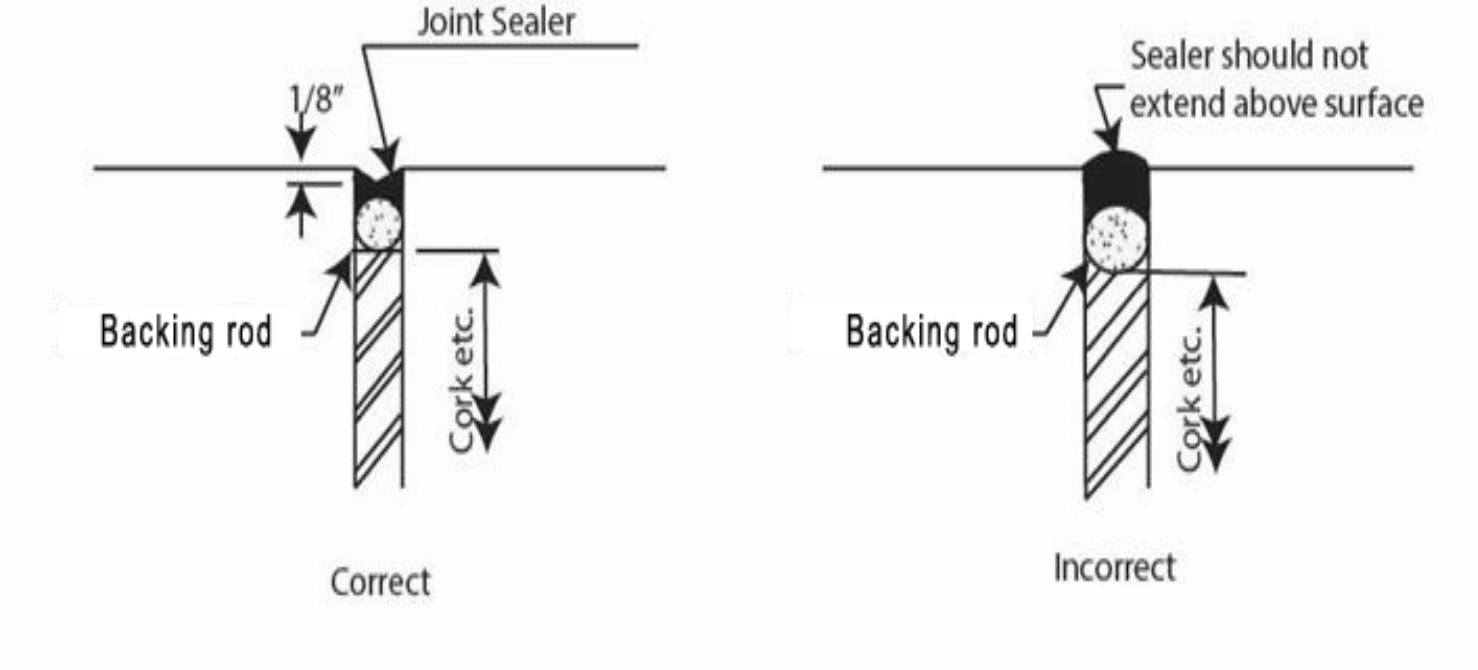
Seal Material – Poured Seal

Poured Seal

- Allows small movement, up to 1\2”
- Easily repaired by removing the damaged, cleaning and re-pouring the seal.

Replacing Poured Seals

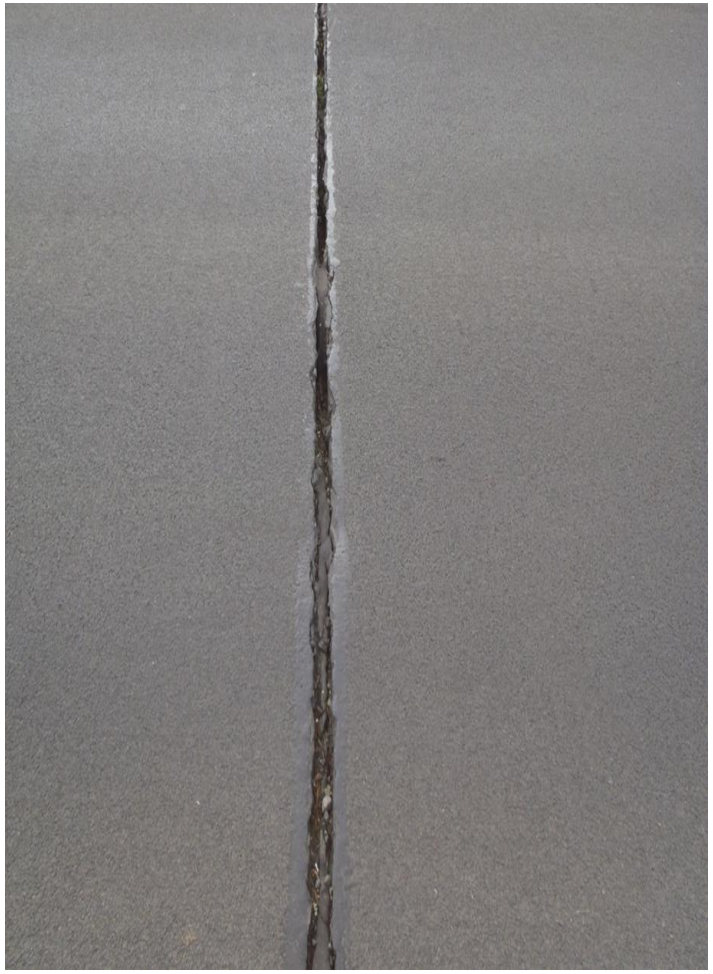
- Hot poured sealants
- Cold poured sealants



Pourable Sealant Installation

1. Remove old sealants and debris from joint
2. Sandblast the joint surfaces
3. Inspect the joint surfaces to assure complete removal
4. Install backer rod
5. Pour sealant over the backer rod
6. Allow sealant to cure

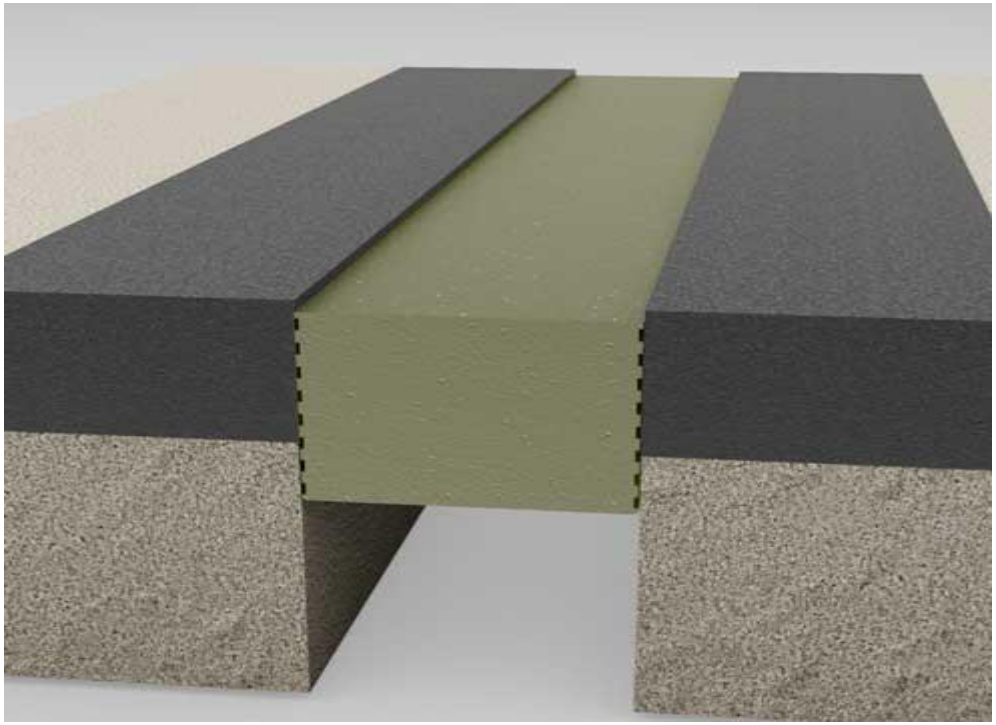
Failing Poured Joint Seal



Poured Seal

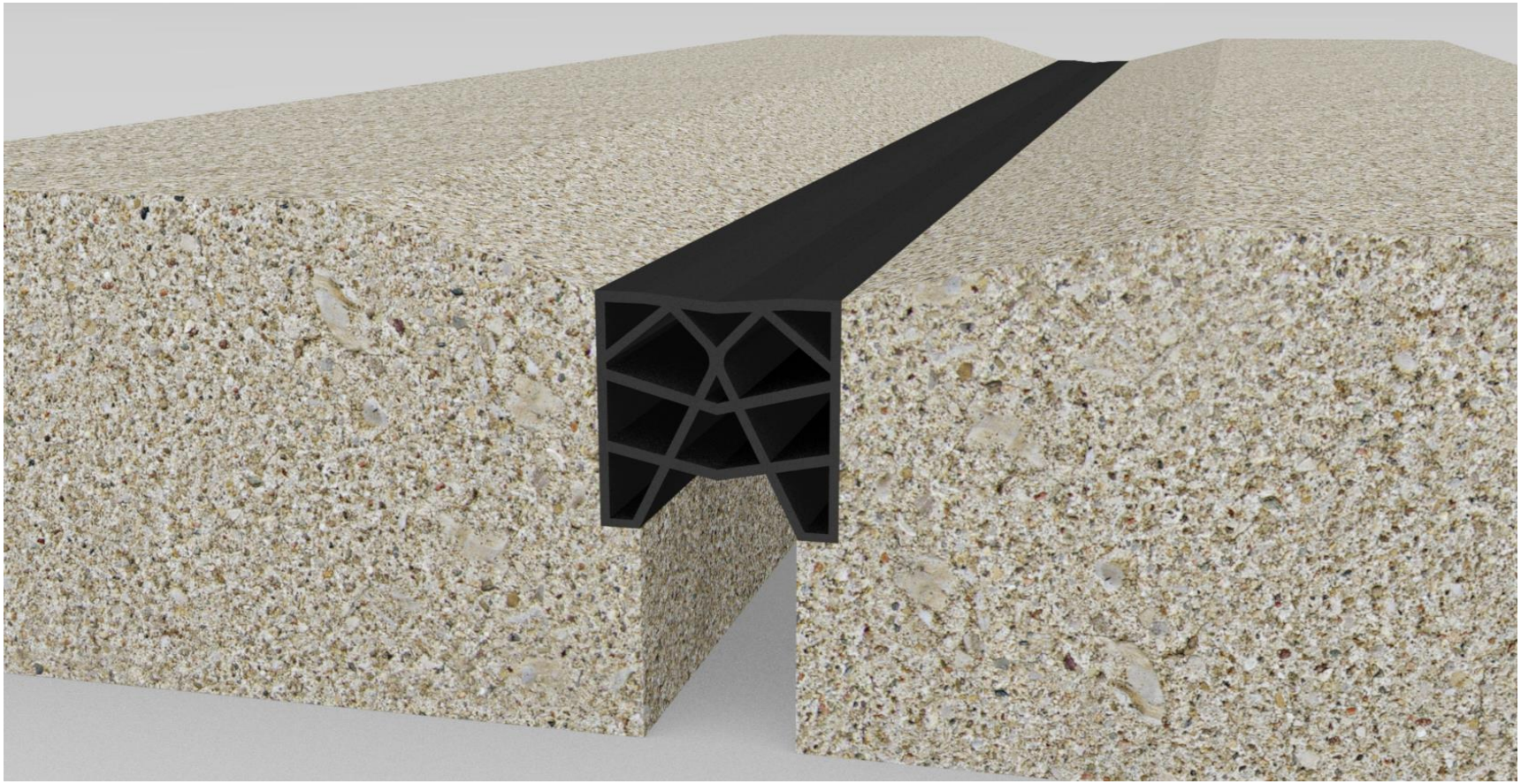
Anatomy of a Joint

Seal Material – Compression Seal



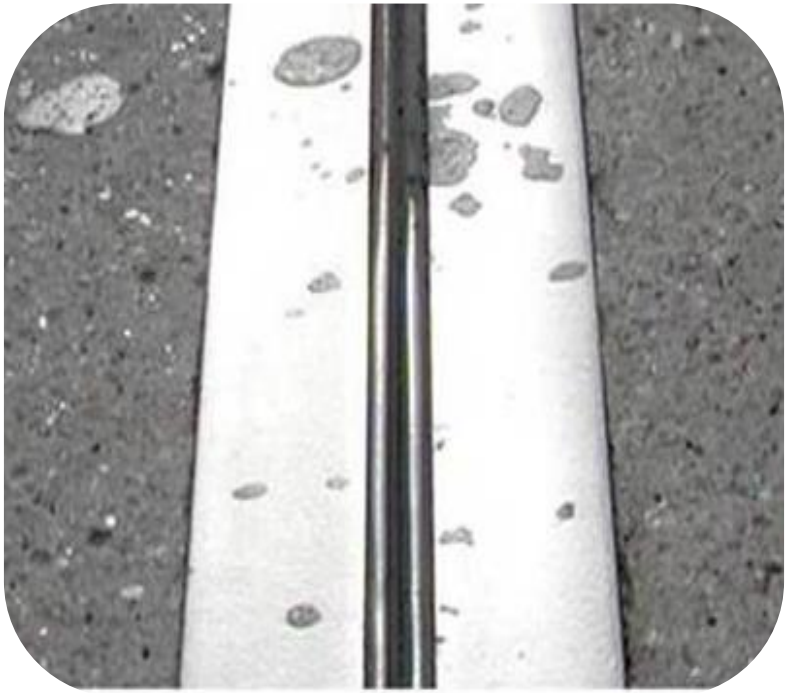
Anatomy of a Joint

Seal Material – Compression Seal



Compression Joint Seal

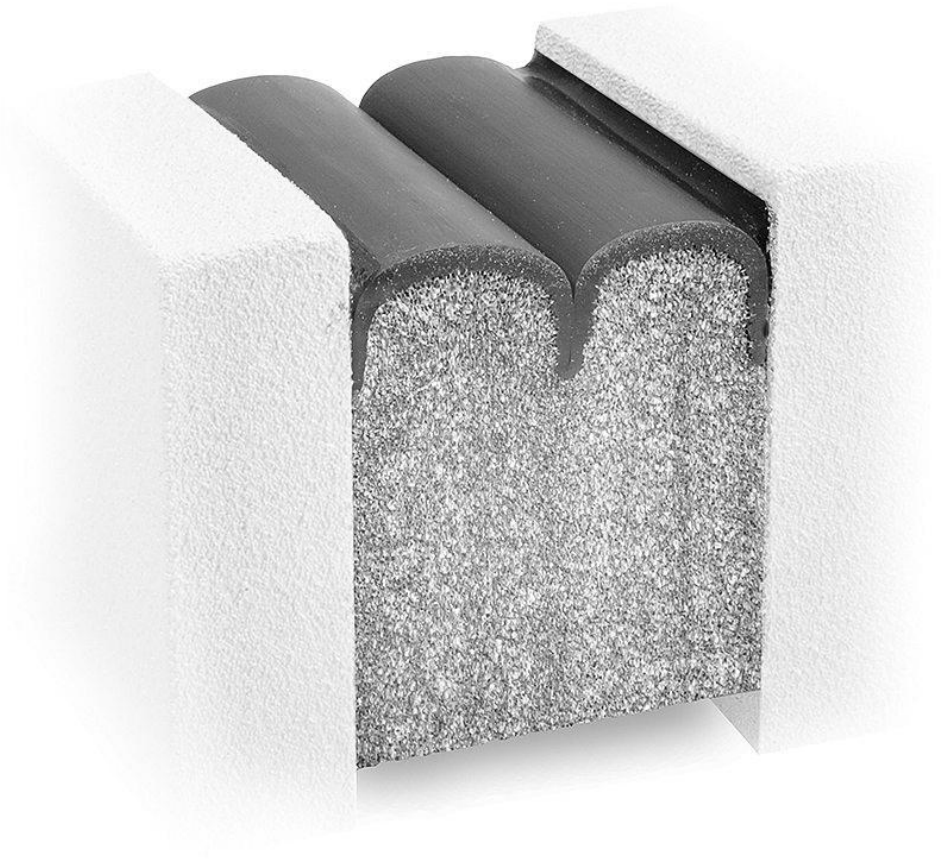
- Relies on compression to maintain water tightness
- Is inserted into the joint using lubricants which may also serve as adhesives



Compression Joint Seal

Compression Joint Seal

Compression Joint Seal



Replacing Foam Compression Seal Video

Asphaltic Plug Joint

- Generally used when Asphalt Concrete Wearing Surface (ACWS) is applied.
- Can accommodate movement up to 2 1/2”

Good Plug Joint

Failing Plug Joint

Failing Plug Joint

Failing Plug Joint

Replacing Asphaltic Plug Joints

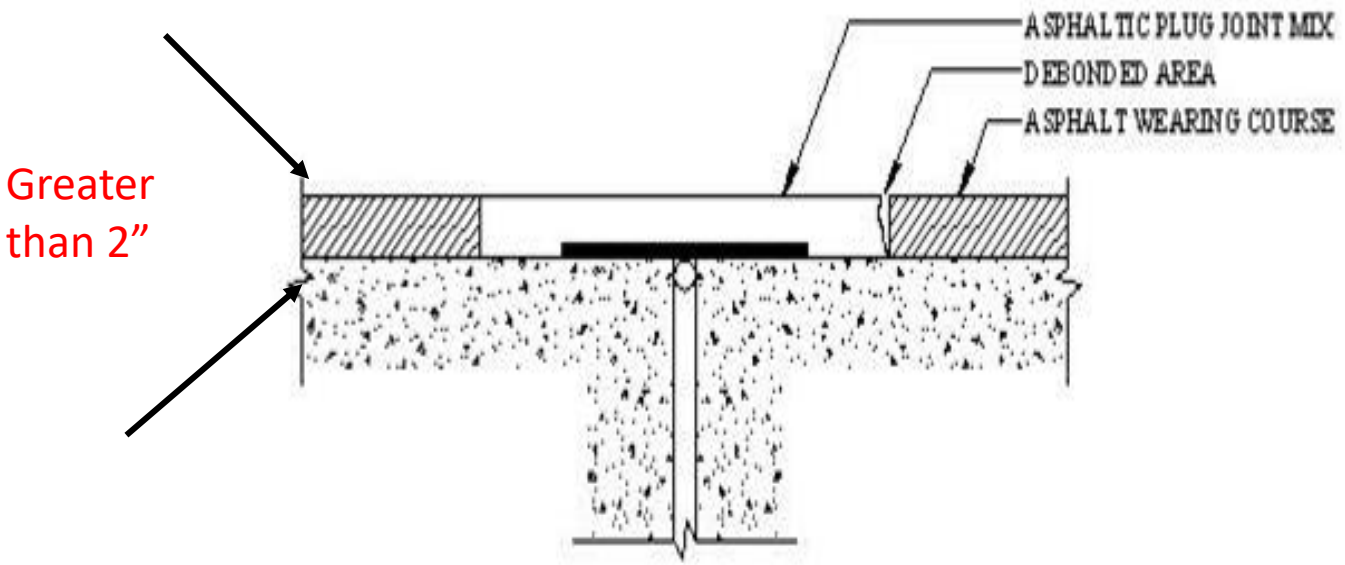
1. Saw-cut and remove the wearing surface
2. Clean and dry block out, and repair concrete
3. Place backer rod
4. Flood joint with heated binder material
5. Install bridging plate, place binder
6. Coat aggregate
7. Place coated aggregate in block out
8. Heat binder, flood block out
9. Repeat until block out is filled
10. Place anti-tracking material

Replacing Asphaltic Plug Joints

Replacing Asphaltic Plug Joints

Replacing Asphaltic Plug Joints

Plug Joint Details



Replacing Asphaltic Plug Joints Video

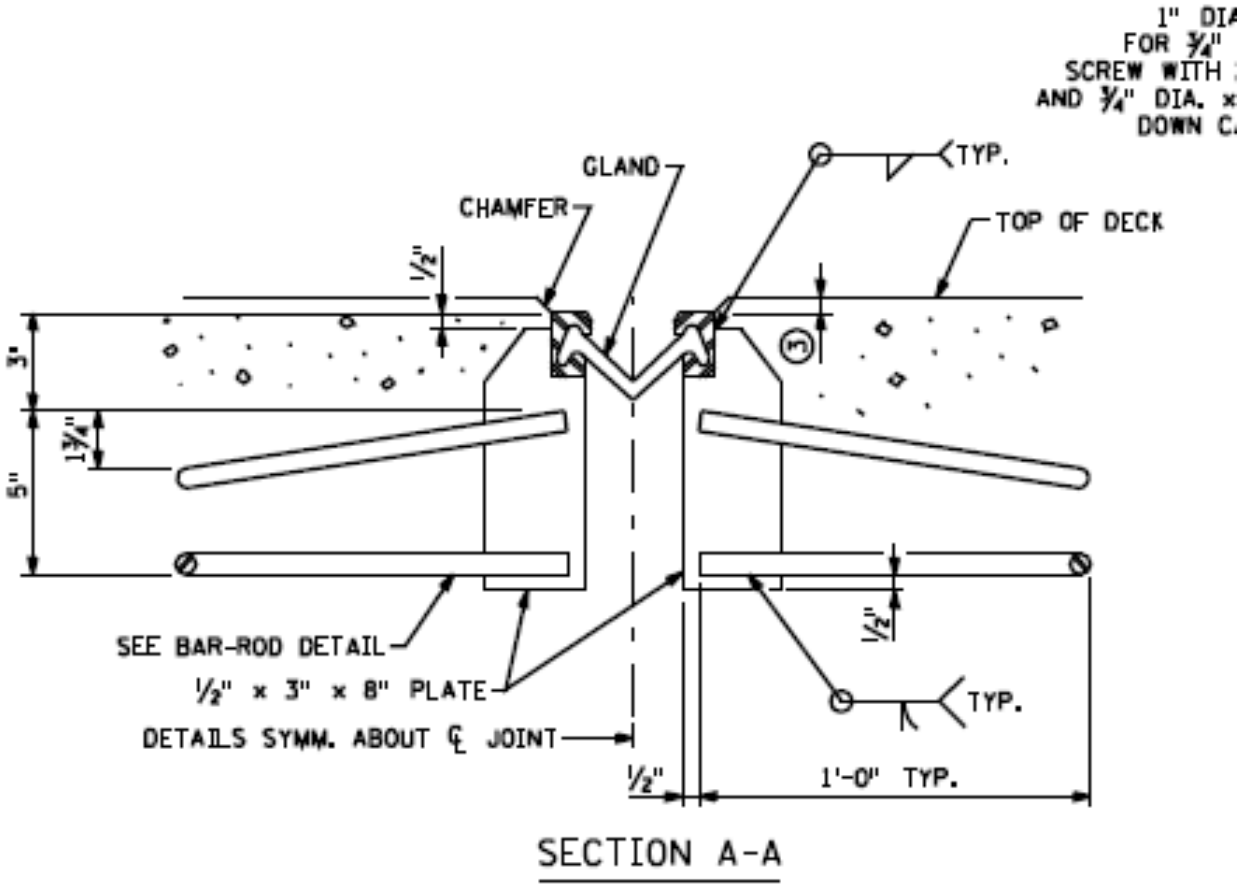
Plug Joint Maintenance

- Seal adhesion
- Seal damage
- Seal cracking

Strip Seal

Extruded steel bars with seal

Strip Seal



SECTION A-A

WATSON-BOWMAN-ACME
TYPE "A2"
WITH S-400 GLAND

USED 1974 - 1990
IN 540 BRIDGES

LEWIS ENGINEERING COMPANY
LENCO TYPE "W"
WITH L-400 GLAND

USED 1978 - 1995
IN 785 BRIDGES

D.S. BROWN "SS"
WITH A-400 GLAND

USED 1980 - 1988
IN 243 BRIDGES

D.S. BROWN "RS3"
WITH A-400 GLAND

USED 1987 - 1989
IN 66 BRIDGES

D.S. BROWN TYPE "SSA"
WITH 400L GLAND

USED 1989 - 1995
IN 163 BRIDGES

WATSON-BOWMAN-ACME
TYPE "A3" WITH
SE-400 GLAND

USED 1989 - PRESENT
IN 44 BRIDGES

COMMERCIAL FABRICATORS INC.
TYPE "CF/ACME A3" WITH
AS-400 GLAND

USED 1990 - 1994 IN 162 BRIDGES
(ACME "A" IDENTICAL - USED IN 45 BRIDGES)

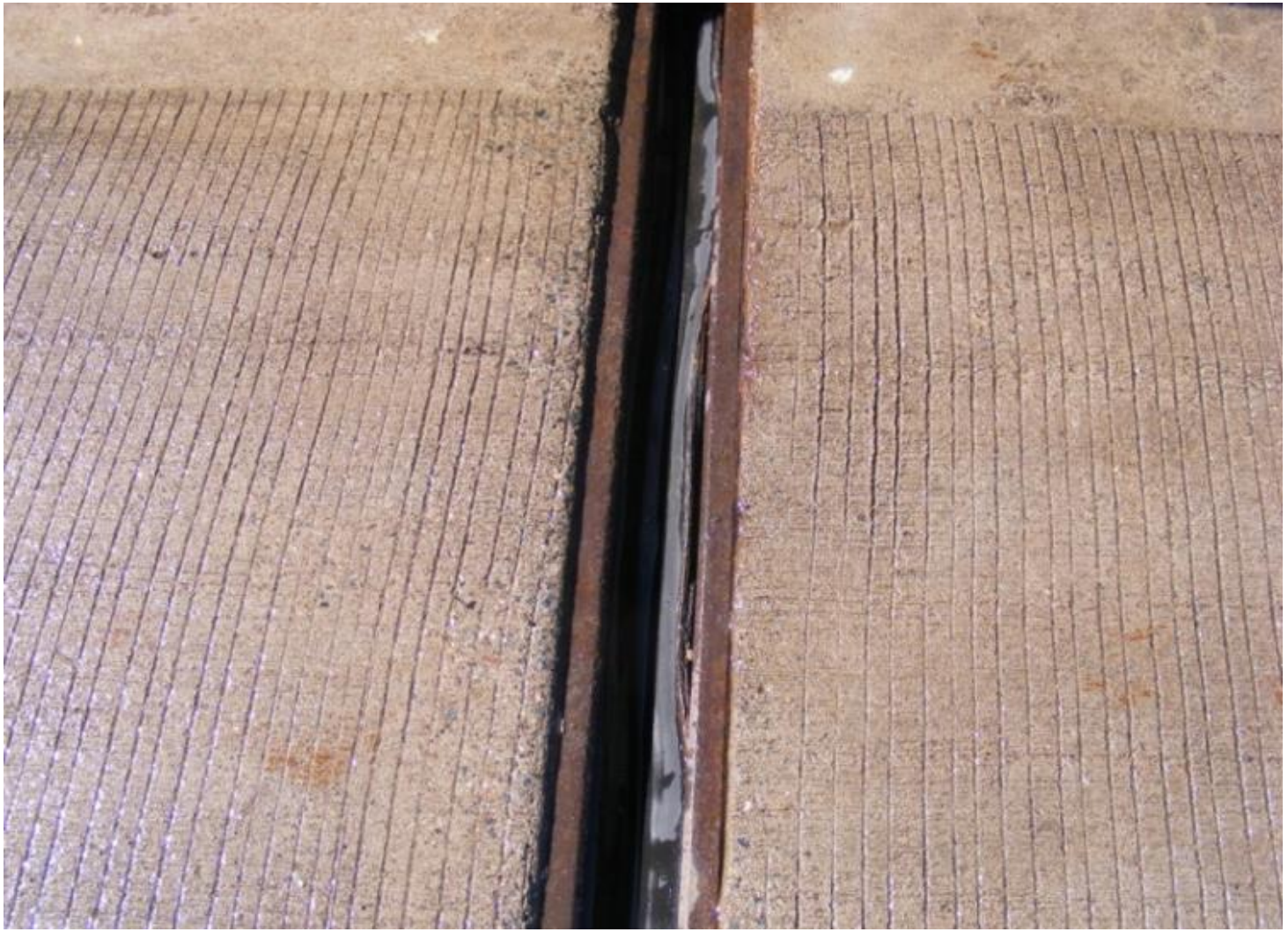
D.S. BROWN "SSA2"
WITH 400A2R" GLAND

USED 1993 - PRESENT

D.S. BROWN
STEELFLEX MODULAR
EXPANSION JOINT SYSTEM
WITH L2-400 GLAND

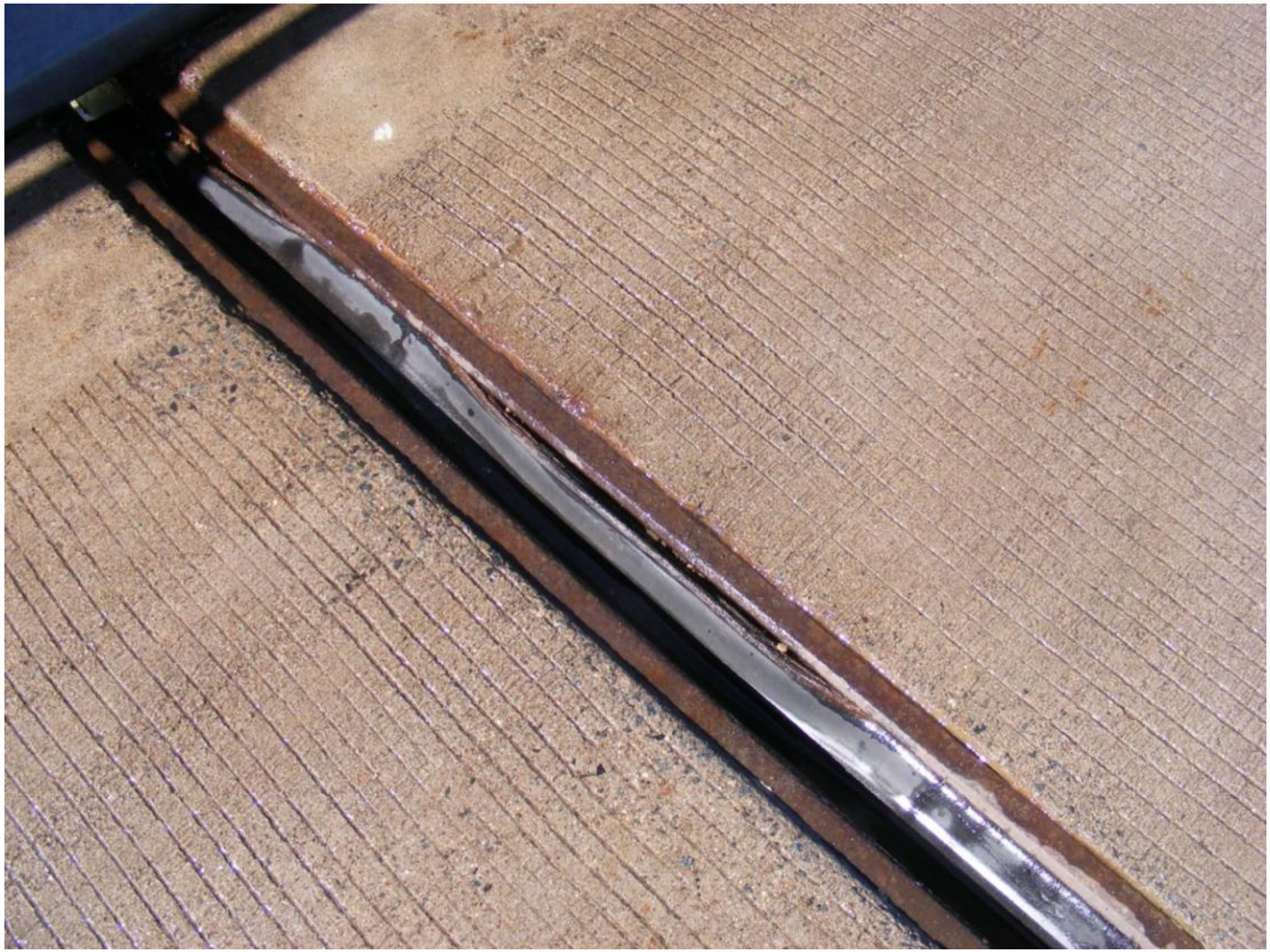
Strip Seal Damage

Failed Strip seal

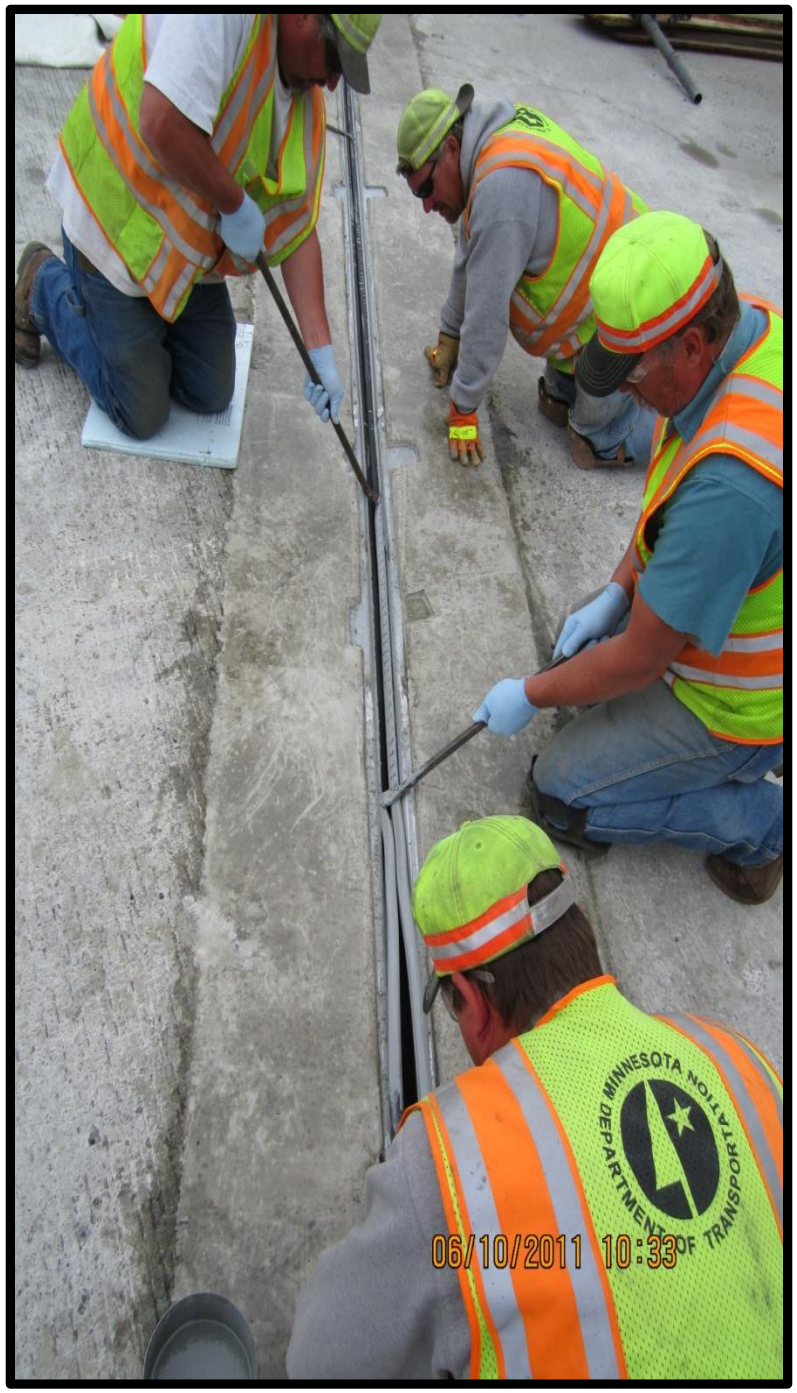


Replacing Strip Seals

Strip Seal Gland Pull Outs, Rips and Tears



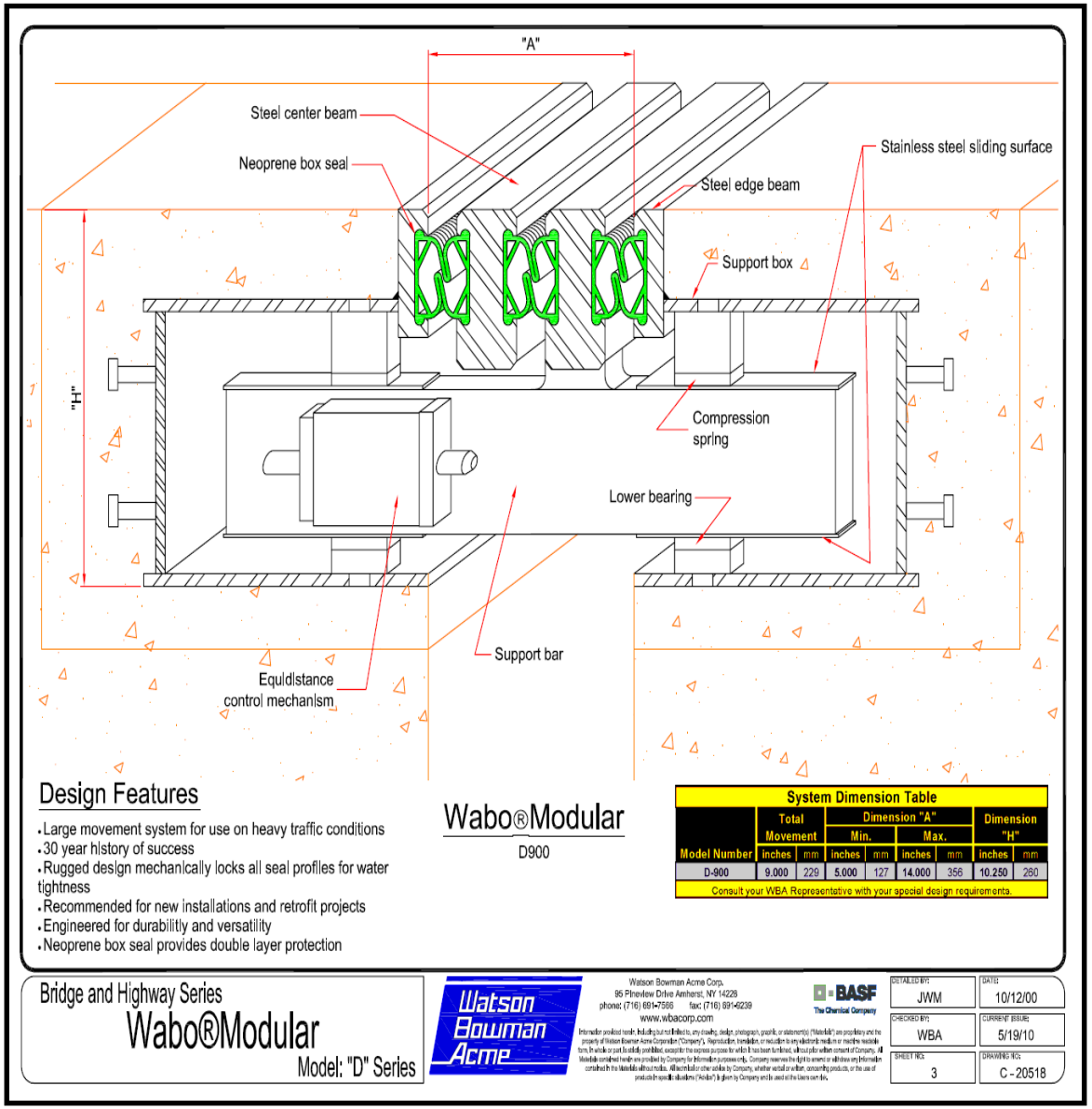
Repair Materials and Procedures



Strip Seal Replacement

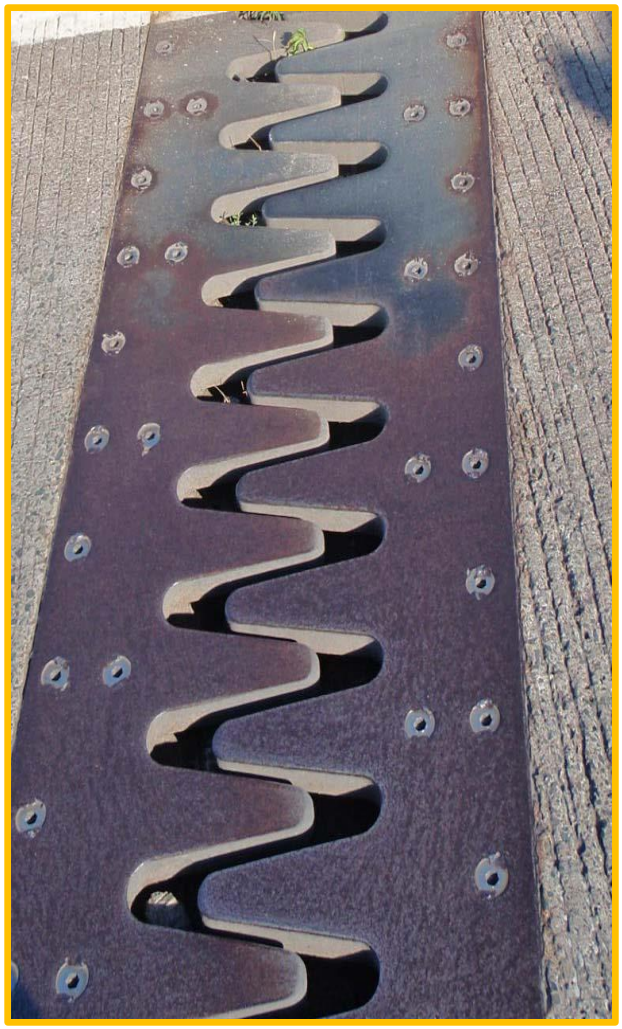
Modular Expansion Joint

Watson Bowman Modular Device



Modular Joint

Finger Joints



Common Expansion Joint Defects

- Impact Damage
- Leakage
- Seal Adhesion
- Seal Damage
- Seal Cracking
- Debris Impaction
- Adjacent Deck or Header
- Metal Deterioration or Damage

Leakage

Locating & Controlling Moisture Threats

Common Maintenance Techniques

- Washing to remove debris
- Cleaning out drainage systems
- Replacing seals

Condition of Seal: What to Look For

- Seal adhesion
- Seal damage
- Seal cracking

Thank you