OPTIMIZING EXPANSION JOINTS FOR HIGH-MOVEMENT APPLICATION

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WHAT TO EXPECT

01 **TYPES OF EXPANSION JOINTS**

02 **FACTORS TO CONSIDER**

03 **MEDIUM / LARGE MOVEMENT**

04 **SELECTING THE BEST SOLUTION**

05 **Q & A**

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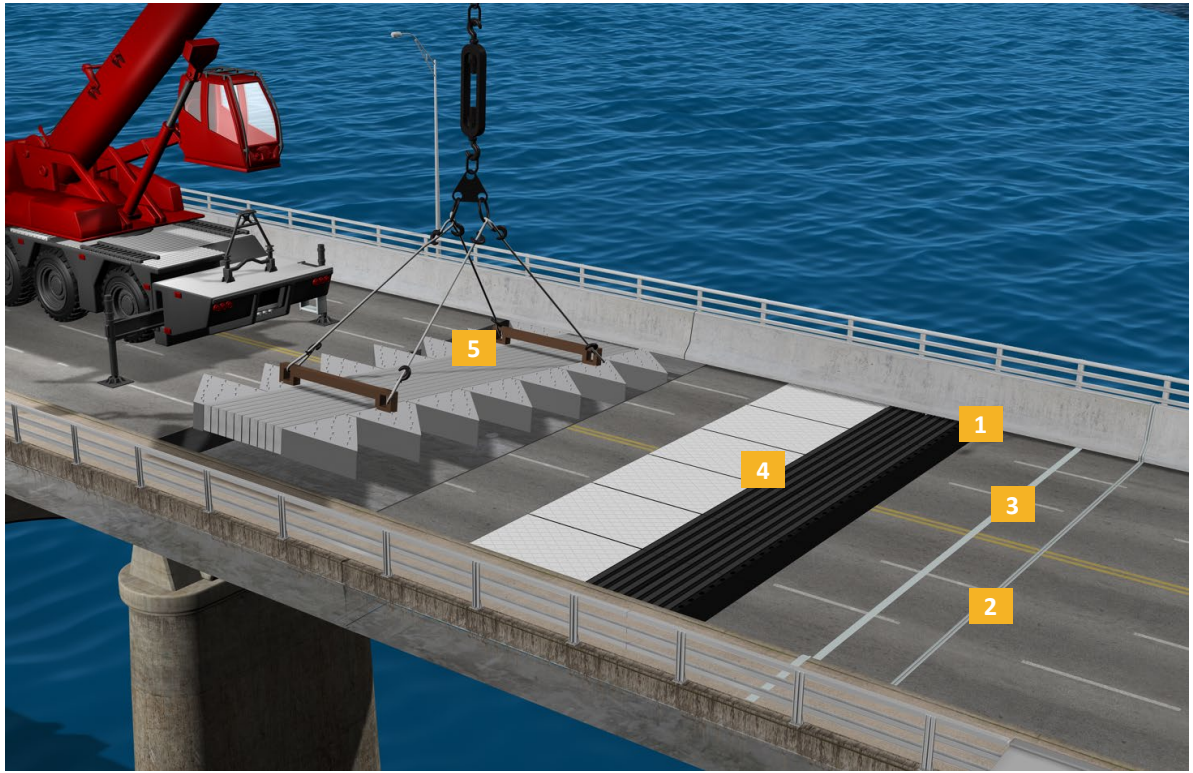
TYPES OF EXPANSION JOINTS



1 **Header and Spall Repair**

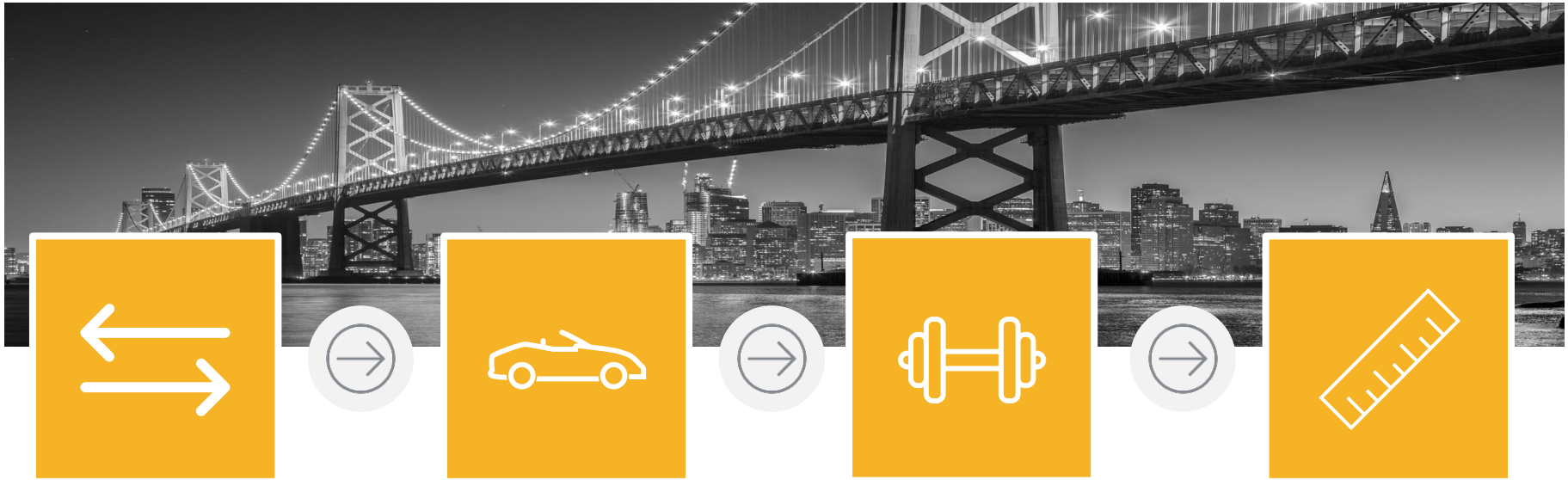
2 **Foam Seals**

3 **Joint Seals**

4 **Segmental Joints**

5 **Armored Joints**

FACTORS TO CONSIDER



Movement

Traffic

Impact and Loading

Slab Thickness

MEDIUM MOVEMENT EXPANSION JOINTS

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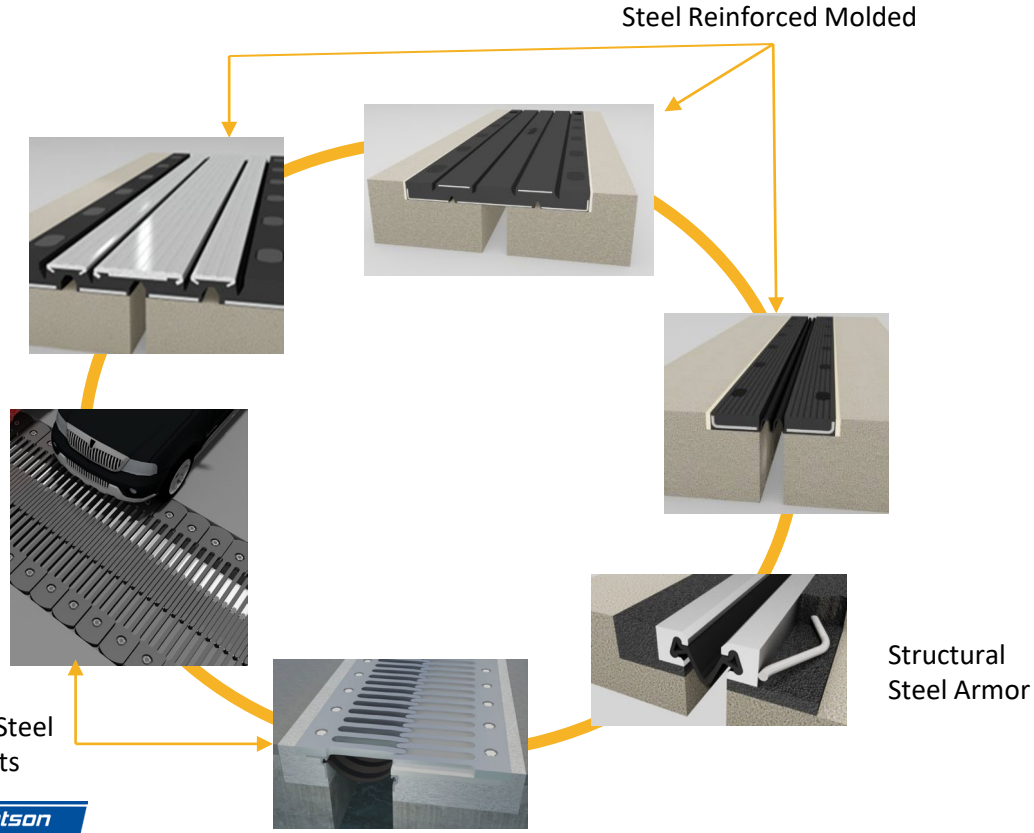
MEDIUM MOVEMENT CAPABILITY
2” TO 13”



- **Steel Reinforced Molded**
- **Structural Steel Armor**
- **Structural Steel Finger Joints**

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STEEL REINFORCED MOLDED
SEGMENTAL EXPANSION JOINTS

Molded Rubber,
Quiet Ride,
Low Profile

Recommended for:

- Light, medium, and heavy traffic
- Sealing joints 2 – 13 “
- Low height applications
- Staged Construction
- New and existing construction
- Walkways, Ramps, and Bridge decks

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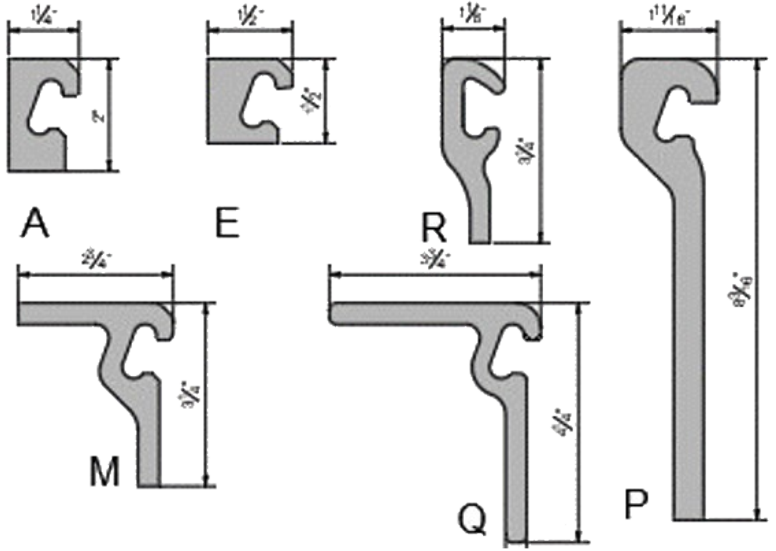
STRUCTURAL STEEL ARMOR
ARMORED EXPANSION JOINT

High Impact, Continuous Seal, Low Profile

Recommended for:

- Ideal for differential slab movements or where skew forces are anticipated
- High impact, heavy duty, and repetitive loading conditions
- Shallow depth overlay projects
- Maximum movement of 5 inches



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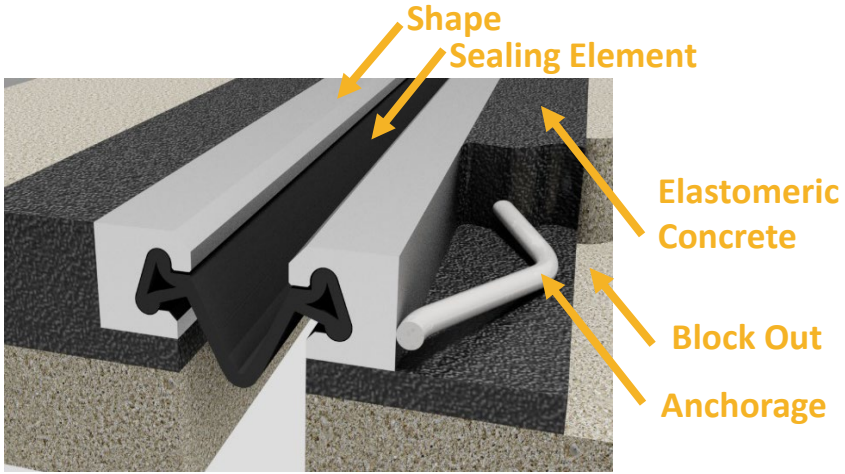
STRUCTURAL STEEL ARMOR
ARMORED EXPANSION JOINT

TYPE OF SEALS



Benefits:

- Anchorage aids to transmit and distribute impact forces
- Wabo®Crete uniformly fill all voids
- Excellent elasticity and bonding capabilities
- Rapid installation and limited downtime
- Continuous elastomeric sealing
- Manufactured to projects specific applications
- Multi-directional movement capacity

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INNOVATIVE BRIDGE EXPANSION SOLUTIONS

US Highway 101 NB – Russian River

- **Owner:**
  - California Department of Transportation (Caltrans), District 1 State Highway Agency
- **Bridge Stats:**
  - Sonoma County, California Russian River Abutment of a Bridge
  - Structure Length: 772 ft (235 m)
  - Average Daily Traffic: 23,000 (+) vehicles, 13% truck traffic
- **WBA Custom Solution:**
  - Wabo®Flex – Model SR 4A

LARGE MOVEMENT EXPANSION JOINTS

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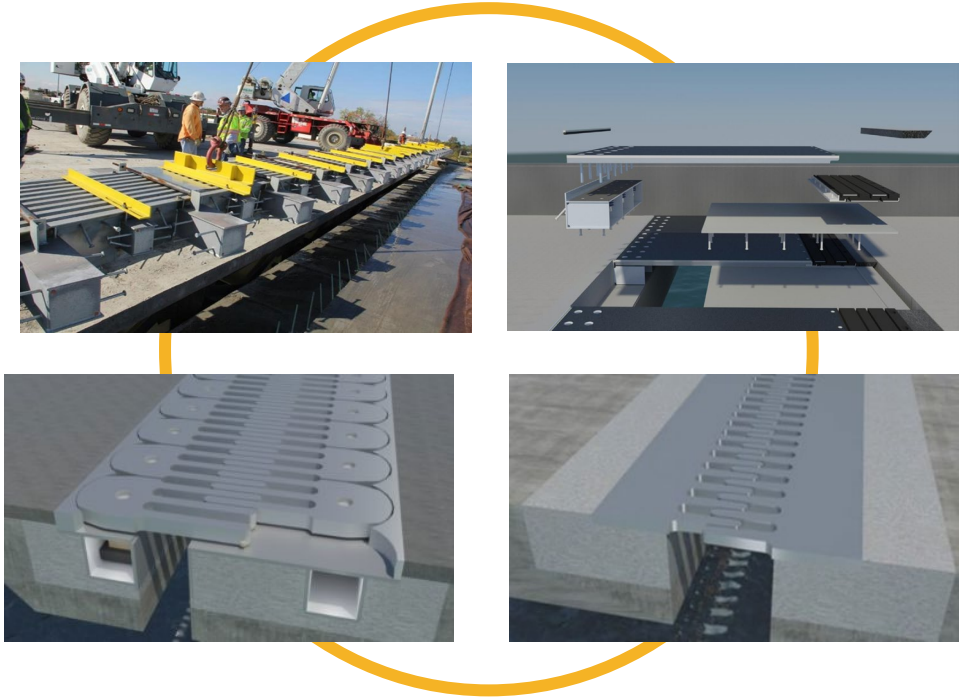
LARGE MOVEMENT CAPABILITY
6” TO 75” AND BEYOND



- **Structural Steel Modular**
- **Structural Steel Finger Joints**
- **Steel Reinforced Molded (Segmental)**

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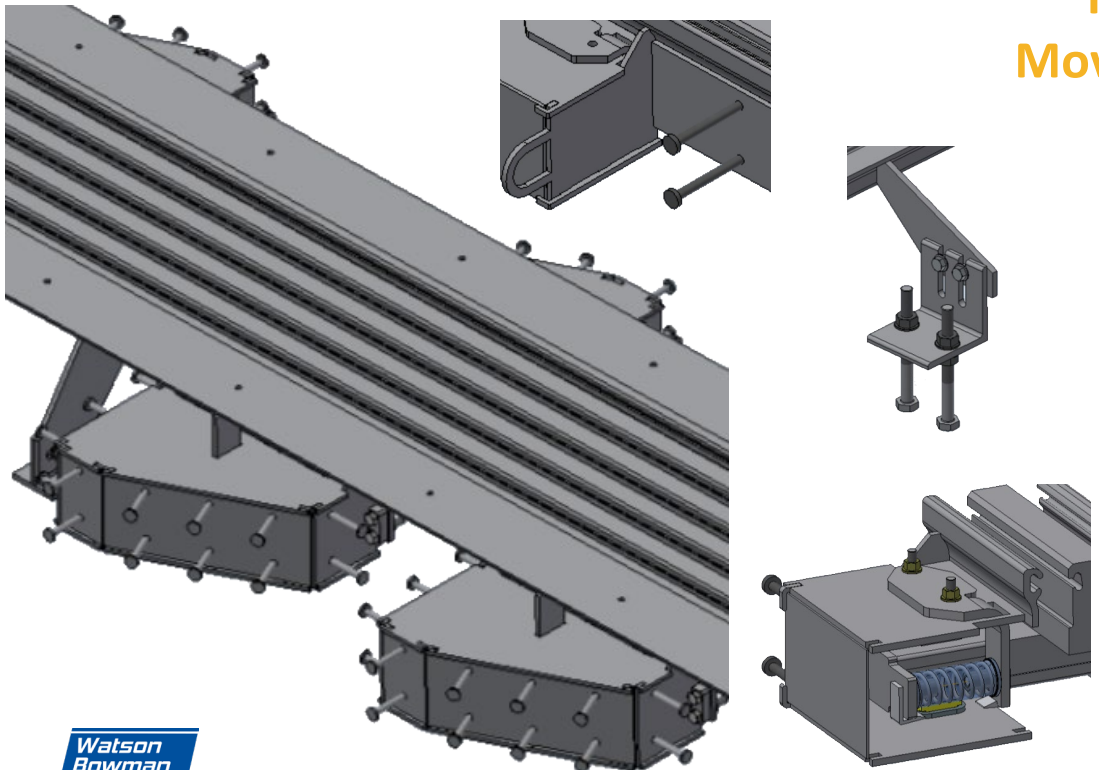
STRUCTURAL STEEL MODULAR
MULTIPLE SUPPORT BAR (STM)

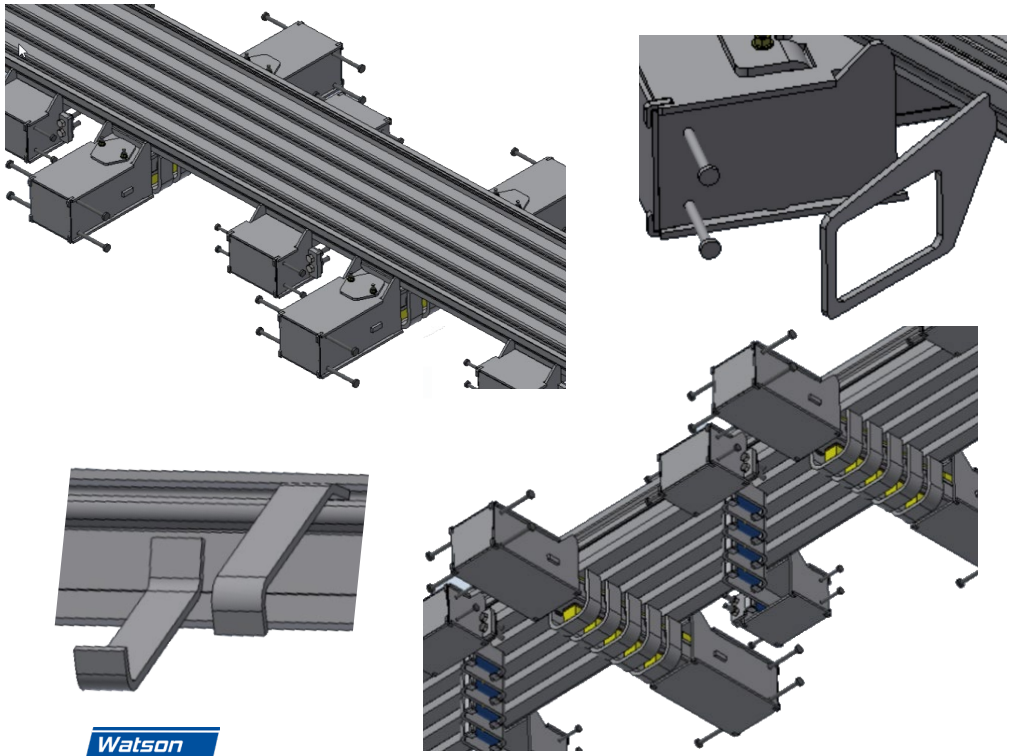


Industry Standard for Large Movement Expansion Joints, with Longitudinal Movement

Recommended for:

- Sealing joints on bridges with movements greater than 4 inches
- New construction or repair of existing expansion joint systems
- High impact conditions

STRUCTURAL STEEL MODULAR
SINGLE SUPPORT BAR (BETA)



Industry Standard for Large Movement Expansion Joints, with Transverse Movements and Skews

Recommended for:

- New bridge construction requiring large longitudinal movements
- Fully customizable components can be designed to fit adjacent construction blockout depths as shallow as 9” (228 mm)
- Rehabilitation projects where specially designed systems can be supplied to connect to complex existing superstructure framing

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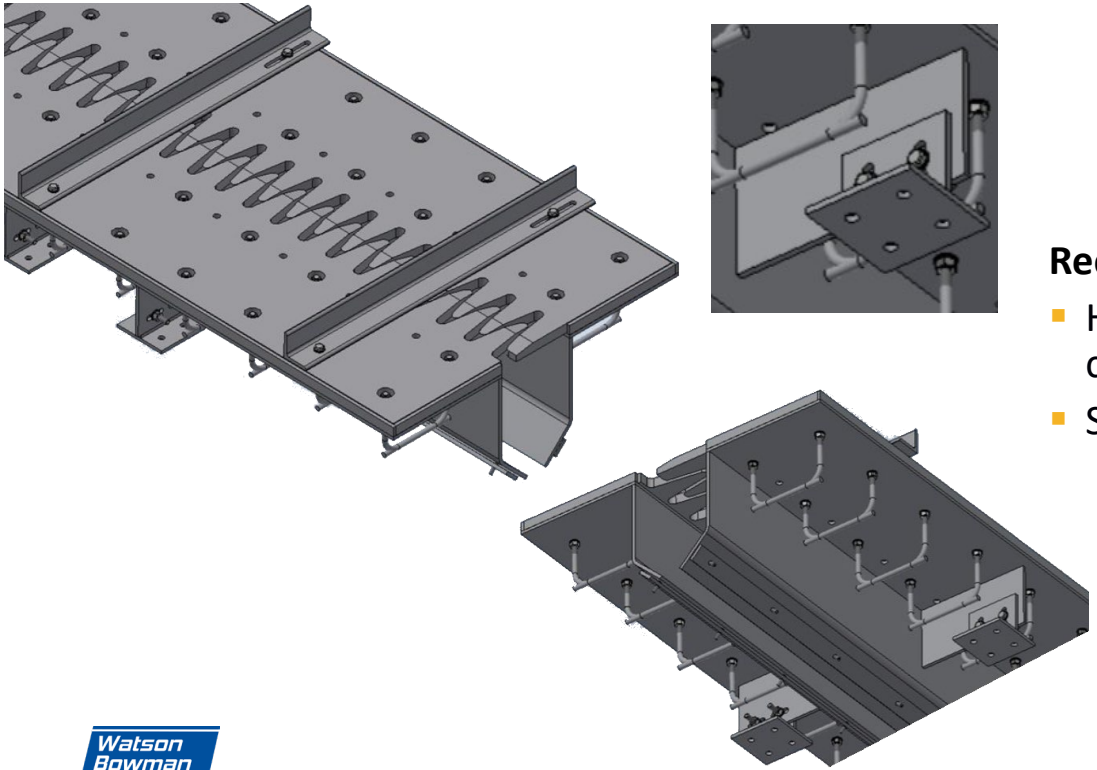
STRUCTURAL STEEL FINGER JOINTS
TRADITIONAL FINGER JOINT



Robust Preference,
Smooth Ride,
Noise Reduction

Recommended for:

- High impact and repetitive loading conditions, requiring robust design
- Simple one-piece installation

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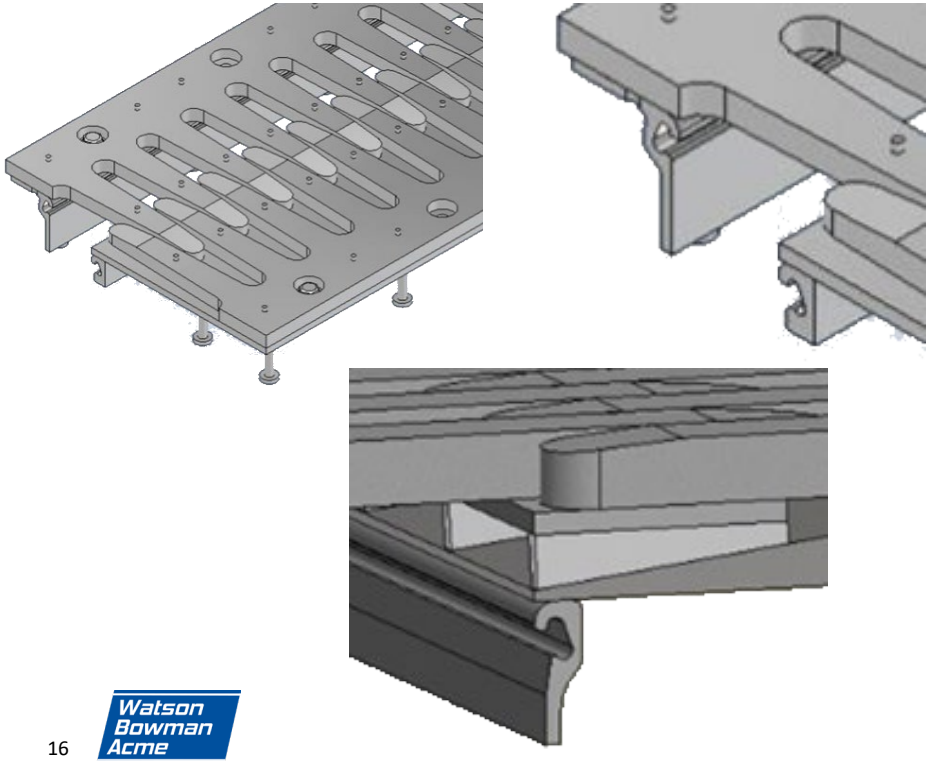
STRUCTURAL STEEL MODULAR
FINGER PLUS FINGER JOINT



Robust Preference, Easy Maintenance, Replaceability

Recommended for:

- Areas where water removal is important and integrally tied into the bridge structure
- Owners looking for easy maintenance and replaceability of damaged parts

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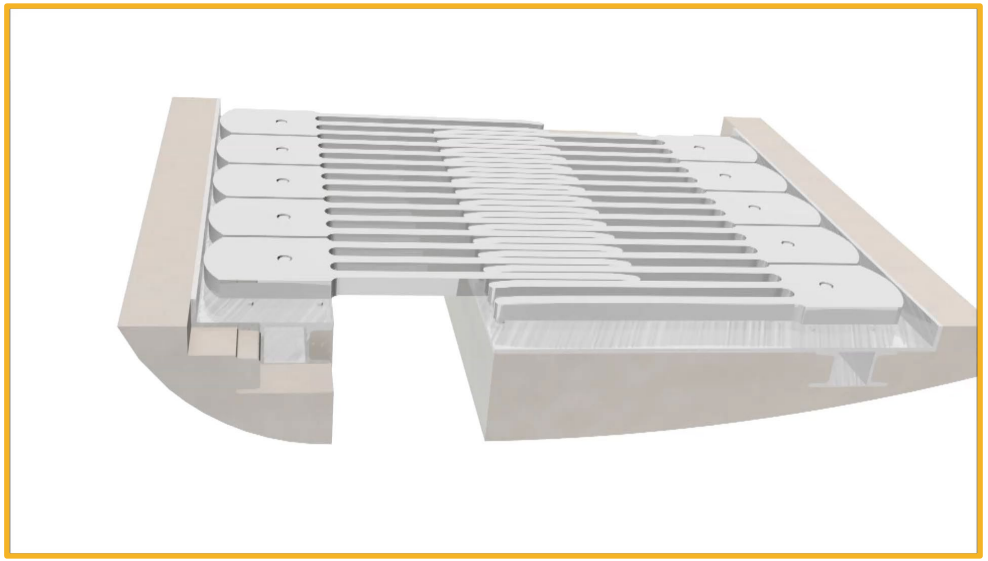
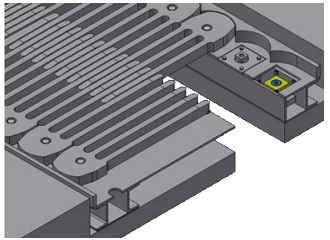
STRUCTURAL STEEL FINGER JOINTS
TRIDENT FINGER JOINT



Robust Preference,
Multi-directional Movement



Recommended for:

- New construction that contains multi-directional movements
- Retro-fit applications where shallow blockout geometry exists, and/or replacement in stages is required
- Capable of accommodating movements

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INNOVATIVE BRIDGE EXPANSION SOLUTIONS

Interstate-74 Illinois/Iowa

- **Owner:**
  - Illinois Department of Transportation/ Iowa Department of Transportation
- **Construction Team:**
  - Lunda Construction Company
  - Civil Constructors
  - HELM GROUP
- **Design Team:**
  - Alfred Benesch and Modjeski and Masters
- **WBA Custom Solution:**
  - Wabo®Modular
  - Wabo®Finger Joint

INNOVATIVE BRIDGE EXPANSION SOLUTIONS

Sarah Mildred Long Bridge

- **Owner:**
  - Maine DOT (lead), New Hampshire DOT and FHWA
- **Construction Team:**
  - Cianbro (construction manager/general contractor)
- **Design Team:**
  - FIGG/ Hardesty & Hanover JV
- **WBA Custom Solution:**
  - Wabo®Fingerjoint

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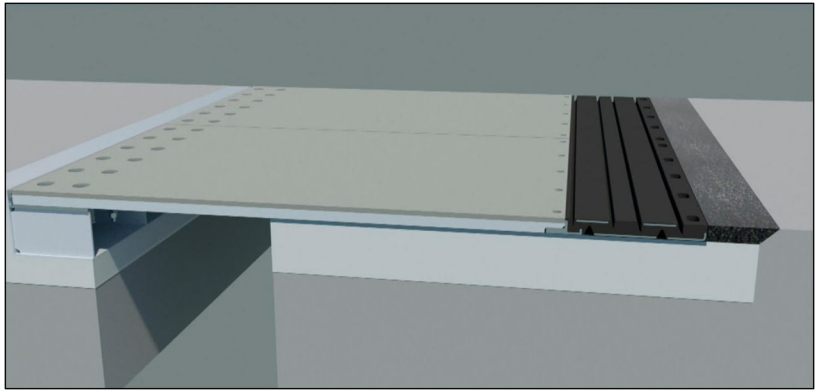
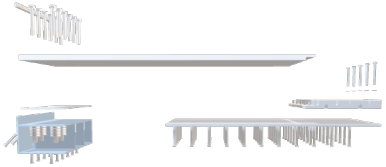
SEGMENTAL EXPANSION JOINTS
STRUCTURAL STEEL W/STEEL REINFORCED RUBBER

Wabo®MDM TransFlex



Recommended for:

- Large movement, large gap with seismic potential
- Rehabilitation or replacement applications where minimizing time and impact to traffic is necessary
- Accelerated bridge construction projects



Robust Design, Quiet Ride
Easy Maintenance, Replaceability, & multi directional movement

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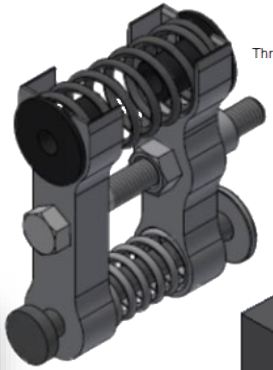
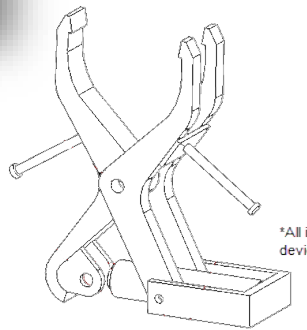
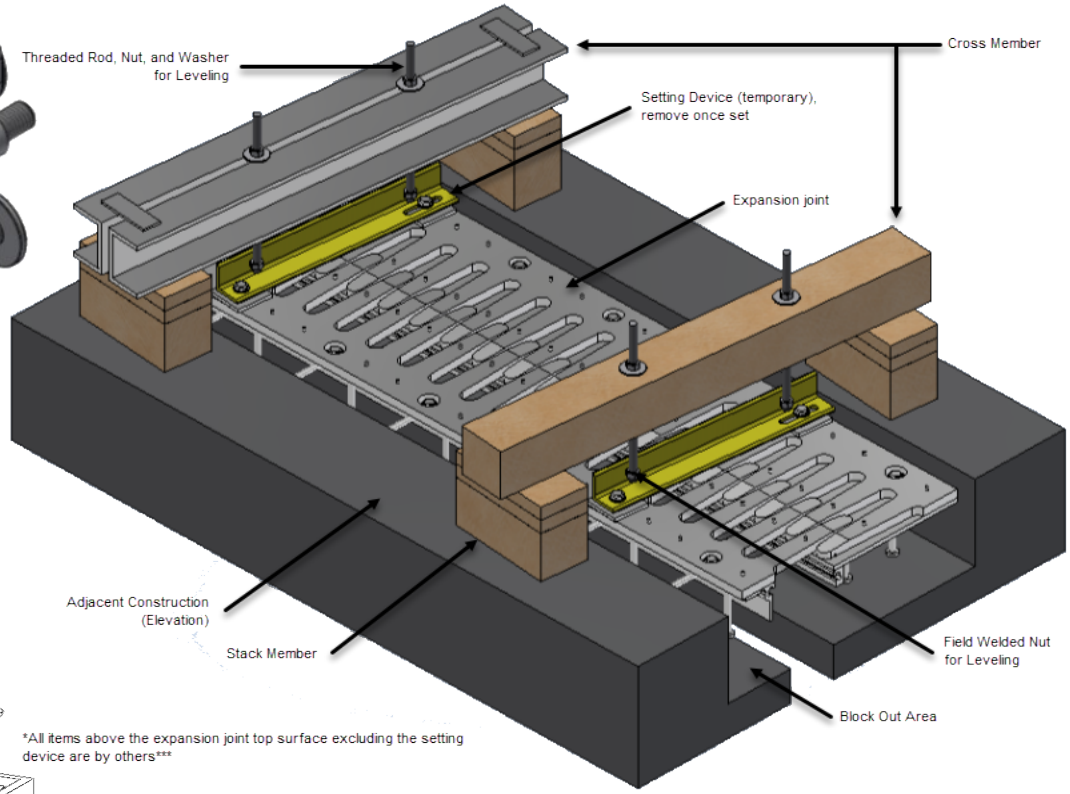
ARMORED EXPANSION JOINTS
INSTALLATION







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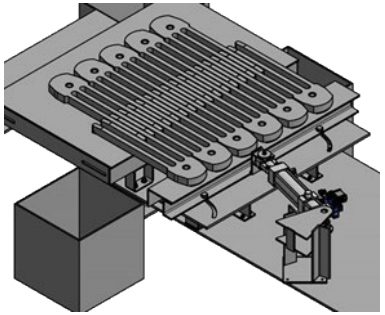
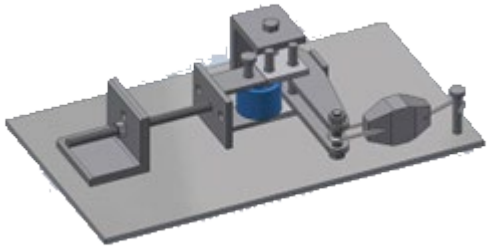
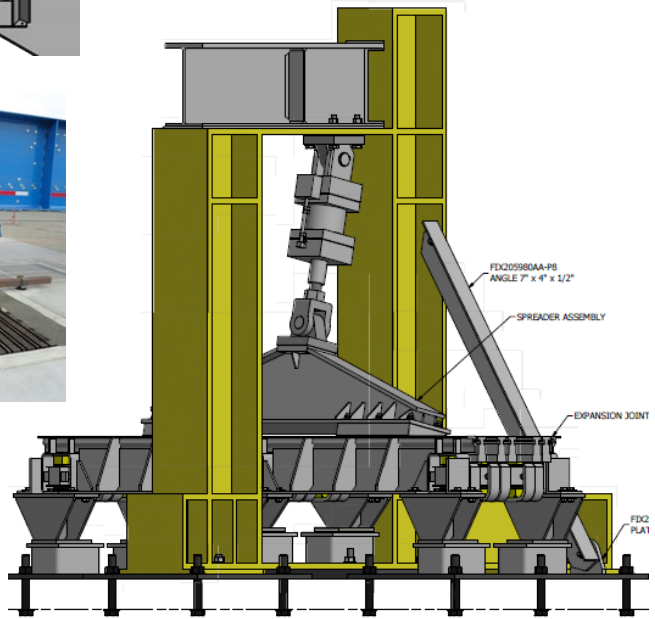
COMPREHENSIVE TESTING

- Life cycle fatigue testing
- AASHTO OMV / SPO testing
- Component testing







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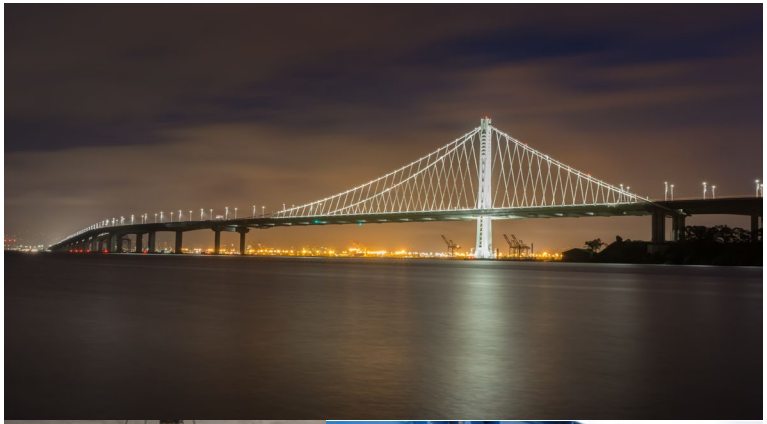
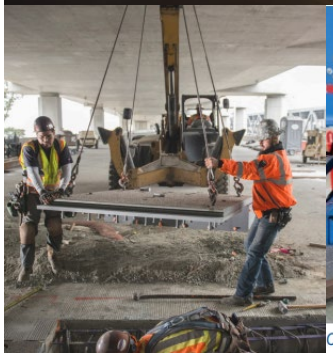
INNOVATIVE BRIDGE EXPANSION SOLUTIONS

San Francisco - Oakland Bay Bridge

- **Owner:**
  - California Department of Transportation (Caltrans), District 4 Toll Bridge Program
- **Bridge Stats:**
  - Bridge Type: Self-Anchored Suspension
  - Height: 526 ft (160 m)
  - Average Daily Traffic: 300,000 vehicles
- **WBA Custom Solution:**
  - Wabo®MDM TransFlex
    - The seismic plate joint systems span 47" (1.2 m) openings in the bridge deck and are able to accommodate 24”(+/- 12”) of movement





Caltrans supervises testing of WBA-supplied expansion joint designs

SELECTING THE RIGHT SOLUTION

Collaboration

Build to Suit

Quality

Reliability

DESIGN FOR OPTIMAL PERFORMANCE

Understanding the Design Needs

- Done between IST and Design Team. Need clear requirements.

Brainstorming with IST, and Discussion with Design Team

- Done with IST and shared with Design Team. Concepts and what IST can offer.

Concept 3D CAD Modeling

- Done by IST, to further conceptualize our offering.

Model FEA and Simulation

- Done by IST to prove loading and loading at range of movement.

Model Animation

- Done by IST to show design and range of motion intent with Design Team.

3D Printed Scaled Proof of Concept

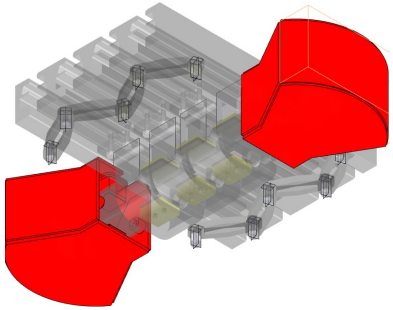
- Done by IST team as a first go proof of conceptual design and presented to Design Team.

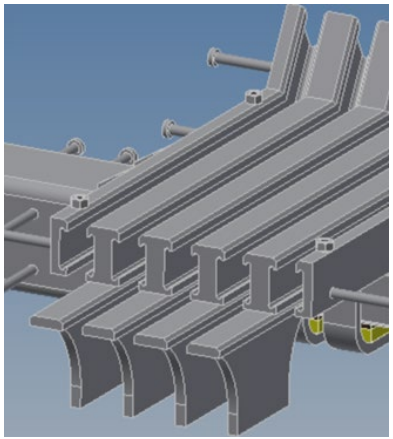
Full Size Mockup Fabrication

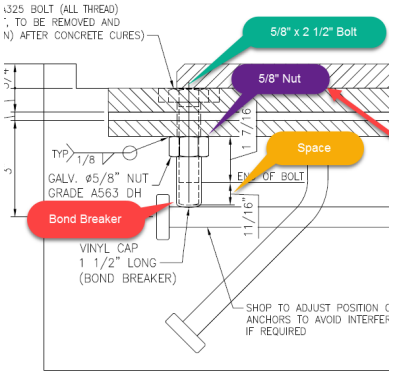
- Done by IST at the direction of Design Team for real life Demonstration.

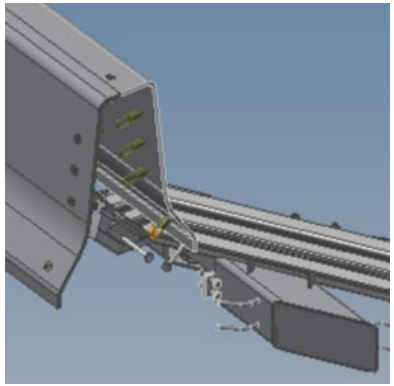
ENGINEERING CAPABILITIES

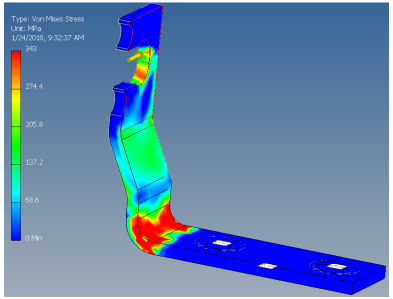
- Autodesk Inventor (IN) 3D Modeling
- IN Model Sharing
- IN Movement Simulations
- IN FEA Analysis
- 3D PDF Models
- 3D Printed Presentation Samples
- Blue Beam / Snagit Overlay tools
- Procore Construction Management
- Custom High Power CPU
- Increased Network Speeds











Using the latest technology to provide best-in-class communication with our customers.

MANUFACTURING CAPABILITIES

40,000 SQUARE FEET OF MANUFACTURING SPACE

Panel

Heather Gifford
Product Manager

Greg Ross
Engineering &
Technical Services
Manager

Thomas Dybas
Northeast
Regional Sales
Manager

Chris Smyth
West Regional
Sales Manager

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