ODOT BRIDGE PRESERVATION
THE BEGINNING

- The Conde McCullough-designed 1936 Alsea Bay Bridge was replaced due to extensive corrosion damage in 1991.
- Backlash in the Waldport community over losing their McCullough bridge.
- ODOT started the Bridge Preservation Engineering unit to apply Impressed Current Cathodic Protection and preserve the remaining coastal McCullough bridges.
• Arc-sprayed zinc anode technology was adapted from CalTrans research.
  • Excellent anode properties
  • Gray concrete-like appearance

• In 1991, impressed current cathodic protection of Cape Creek Bridge was the first project for the unit.
  • Concrete repairs
  • Impressed-current cathodic protection – electrically driven reversal of driving forces of corrosion

• In 1995 the unit became known as Bridge Preservation Engineering unit

• The Cape Creek Bridge project was successful, and Preservation focused on the most at-risk of the McCullough coastal concrete bridges:
  • Depoe Bay Bridge 1996
  • Yaquina Bay Bridge 1997
  • Big Creek Bridge 1997
  • Cape Perpetua Half-Viaduct 1998

• The engineers ODOT used to deliver the cathodic protection projects began to be tapped for other types of specialty work:
  • Movable bridge maintenance and mechanical/electrical rehabilitation
  • Steel bridge painting
  • Covered bridge preservation
ODOT BRIDGE PRESERVATION

WHY WE DO WHAT WE DO

ODOT BRIDGE PRESERVATION

WHAT WE DO

- Cathodic Protection
- Bridge Painting
- Movable Bridges
- Covered Bridges
- Historic Bridge Rehabilitation
- Structural Health Monitoring
- Bridge Decks
- Specialty Engineering
ODOT BRIDGE PRESERVATION
WHAT WE DO...........

- Civil/Structural Engineers (4)
- Mechanical Engineers (3)
- Electrical Engineers (1)
- CADD Tech (2)
- Chemical Engineers (formerly)
- Metallurgical Engineers (formerly)
- Statewide focus
- Hands-on engineers with lots of field exposure
  - climbing
  - UBIT and bucket truck
  - confined spaces
  - respirator use

---

ODOT BRIDGE PRESERVATION
WHO WE ARE............

<table>
<thead>
<tr>
<th>STIP Name</th>
<th>CP</th>
<th>Movable</th>
<th>Paint</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010-2013 STIP</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>2012-2015 STIP</td>
<td>5</td>
<td>11</td>
<td></td>
<td>16</td>
</tr>
<tr>
<td>2015-2018 STIP</td>
<td>2</td>
<td>4</td>
<td>4</td>
<td>6</td>
</tr>
<tr>
<td>2018-2021 STIP</td>
<td>6</td>
<td>3</td>
<td>14</td>
<td>23</td>
</tr>
<tr>
<td>2021-2024 STIP</td>
<td>2</td>
<td>4</td>
<td>4</td>
<td>6</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>15</td>
<td>4</td>
<td>34</td>
<td>53</td>
</tr>
</tbody>
</table>
ODOT BRIDGE PRESERVATION
WHAT IT TAKES..........  

• Field measurements
• Good as-builts
• Historical research (historic photo collection)
• Accurate condition data
• Core samples & petrography
• Advanced investigation
• Refined load ratings
• Flexible designs that can adapt to conditions revealed during construction
• Heavy attention to temporary works
• Lots of construction support
• Adept handling of calculated risks

ODOT BRIDGE PRESERVATION
WHAT IT TAKES..........  

• Coast Guard permits
• SHPO coordination
• NMFS/USFW permits
• Hazmat surveys
• Utility coordination
• Staging Areas
• Containment
• Design exceptions for elements such as “Stealth Rail”
• Letters of Public Interest Finding (this requirement for patented, proprietary and sole-source products is being relaxed)
• Buy American Act waivers
• Third-party inspection
ODOT BRIDGE PRESERVATION
WHAT OREGONIANS GET

• Historic and aesthetic values
• Cost savings
  • Some non-historic bridges preserved for cost savings
• Reduction in traffic impacts
• Reduction in community impacts
• The right action at the right time
• Environmental benefits
  • “Reduce, Reuse, Recycle” applies to bridges too

PROJECT PHOTO GALLERY
COSTS SHOWN NOT INFLATED
ODOT BRIDGE PRESERVATION
PROJECT PHOTO GALLERY

• Coos Bay (McCullough) Bridge No. 01823
  • Replacement is not planned, would cost on the order of $1B
  • This bridge is over 1 mile long
  • Built in 1936, historic
  • Conde McCullough design
  • As a steel bridge in a marine environment, it requires repainting on a 20 year cycle
    • Painting cost is about $1.6 Million per year
  • Concrete portions of the bridge require cathodic protection, on a 20 year cycle
    • Cathodic protection cost is about $2.2 Million per year

ODOT BRIDGE PRESERVATION
PROJECT PHOTO GALLERY

• Yaquina Bay Bridge No. 01820
  • Replacement is not planned, would cost on the order of $1B
  • Built in 1936, historic
  • Conde McCullough design
  • As a steel bridge in a marine environment, it requires repainting on a 20 year cycle
    • Painting cost is about $1.6 Million per year
  • Concrete portions of the bridge require cathodic protection, on a 20 year cycle
    • Cathodic protection cost is about $1.3 Million per year
ODOT BRIDGE PRESERVATION
PROJECT PHOTO GALLERY

• Siuslaw River (Florence) Bridge No. 01821
  • Replacement is not planned, would cost on the order of $500 Million
  • Built in 1936, historic
  • Conde McCullough design
  • As a steel bridge in a marine environment, bascule spans require repainting on a 20 year cycle
    • Painting cost is about $120,000 per year
  • Concrete portions of the bridge require cathodic protection, on a 20 year cycle
    • Cathodic protection cost is about $650,000 per year
  • Movable bridge mechanical, electrical and traffic systems require major rehabilitation on a 40 year cycle, hardware and software upgrades on about a 8 year cycle

ODOT BRIDGE PRESERVATION
PROJECT PHOTO GALLERY

• Lint Creek (Indian Slough) Bridge No. 04166, in Waldport
  • Replacement planned for $9.7 Million to address corrosion damage
  • 2010 concrete repair with passive zinc anodes bid cost $499,000
  • Project allows ODOT flexibility to schedule replacement when this section of highway is expanded to four lanes
  • Repairs remain in excellent condition
**ODOT BRIDGE PRESERVATION**

**PROJECT PHOTO GALLERY**

- **Pistol River Bridge No. 08719 between Brookings and Gold Beach**
  - Replacement planned for $30 Million to address extensive corrosion damage
  - Endangered plants at 3 corners
  - 2013 concrete repair with impressed current cathodic protection bid cost $3.6 Million
    - Life cycle for cathodic protection is 20 years
  - Even with change orders, claim settlement, and over 2000 hours of CE the total cost is less than $4.7 Million
  - Project allows ODOT flexibility to schedule replacement when or if this section of highway is expanded to four lanes

- **Ashland Creek Bridge No. OM274**
  - Replacement planned for $1.9 Million to remove load posting
  - Urban site
  - Built in 1911, historic
  - Unreinforced concrete
  - Load rating was incomplete due to unreinforced concrete and lack of as-built plans, and assumed to be deficient
  - Preservation found a British technique for unreinforced arch load rating – rating factors improved to 6 or 7
  - No work necessary
• Dry Canyon Bridge No. 00524
  - 1920 Conde McCullough design, historic
  - In Columbia Gorge Scenic Area on Historic Columbia River Highway
  - Replacement cost based on deck area was estimated at $1.3 Million
  - Spalling concrete was investigated, determined to be due to 2" to 4" of carbonation
  - Alternatives analysis suggested re-alkalization
    - Electrochemical process similar to impressed current cathodic protection – therefore low-risk
  - Re-alkalization project was performed
    - Damaged concrete and reinforcement was repaired
    - Bid cost was $375,000 for re-alkalyzation
    - Project included the first re-alkalization of a bridge in the United States
    - Concrete was coated with a skim coat product to add a degree of protection and provide uniform appearance

• St. Johns Bridge No. 06497
  - Built in 1931, historic
  - Replacement is not planned, would cost on the order of $2 Billion
  - Rehabilitation with new deck, painting, and cable protection completed in 2005
  - Main cables need corrosion monitoring
  - Deck issues, approximately $26 Million needed for overlays in the future
  - Concrete piers supporting east approach need galvanic cathodic protection on an estimated 30 year cycle
    - Galvanic cathodic protection cost is about $20 Million, or $670,000 per year
  - As a steel bridge, it requires repainting on approximately a 30-40 year cycle
    - Painting cost is about $1.5 Million per year
**ODOT BRIDGE PRESERVATION**
**PROJECT PHOTO GALLERY**

- St. Johns Bridge No. 06497
  - Spalling of pier concrete over structural steel frame

**ODOT BRIDGE PRESERVATION**
**PROJECT PHOTO GALLERY**

- St. Johns Bridge No. 06497 – Project Underway
  - Provide access/containment
  - Clean structural steel
  - Install anchors
  - Install zinc anodes
  - Patch concrete
  - Skim coat