

Replacement versus Rehabilitation of Pier

Ben Foster
Maine DOT

Pier Deterioration

- Pier in poor condition
- Satisfactory bridge components
- Optimize Remaining Service Life
- Bridges with a series of simple spans
- Typical of our Interstate bridges

Pier Issues



Easterly pier.



Easterly pier.



Middle pier.



Easterly pier, arrow denotes impending spall.

Br. #5794

BANGOR

HAMMOND ST./I-95 BRIDGE

2-5-2009

Impact on Bearing Capacity



Heavy scaling at east pier cap

South end

5798

Bangor

Kenduskeag Ave. over 95

1-18-2007

Pier Rehabilitation

- Support traffic while pier is compromised
 - Support beams
 - Support cap
- How extensive of a rehab?
 - Determined to go below rebar
- How much at a time?

Fairfield I95 / Route 201

- Supported by Jackposts
- Chipped and patched small sections
- Crews were no happy
- Impact on public

Fairfield I95 / Route 201

- COST = \$235k per pier, 2.5 yrs
- How can process be improved?
 - Reduce cold joints
 - Speed work by having larger sections
 - Longer design life
 - Reduce costs

Final Product



Waterville I95 / KMD – Phase 1

- Supported beams by Bailey Bridge
- Chipped and patched larger sections
- Labor intensive

Waterville I95 / KMD – Phase 1

- COST = \$215k per pier, 7 mos.
- How can process be improved?
 - Longer Design Life
 - Reduce Costs
- Still have Cold Joints

Waterville 195 / KMD – Phase 2

- Supported Pier Cap by Bailey Bridge
- Chipped and patched larger sections
- Crews felt this was an improvement from Phase 1

Waterville I95 / KMD – Phase 2

- COST = \$200k per pier, 8 mos.
- How can process be improved?
 - Longer Design Life
 - Reduce Costs
- Still have Cold Joints





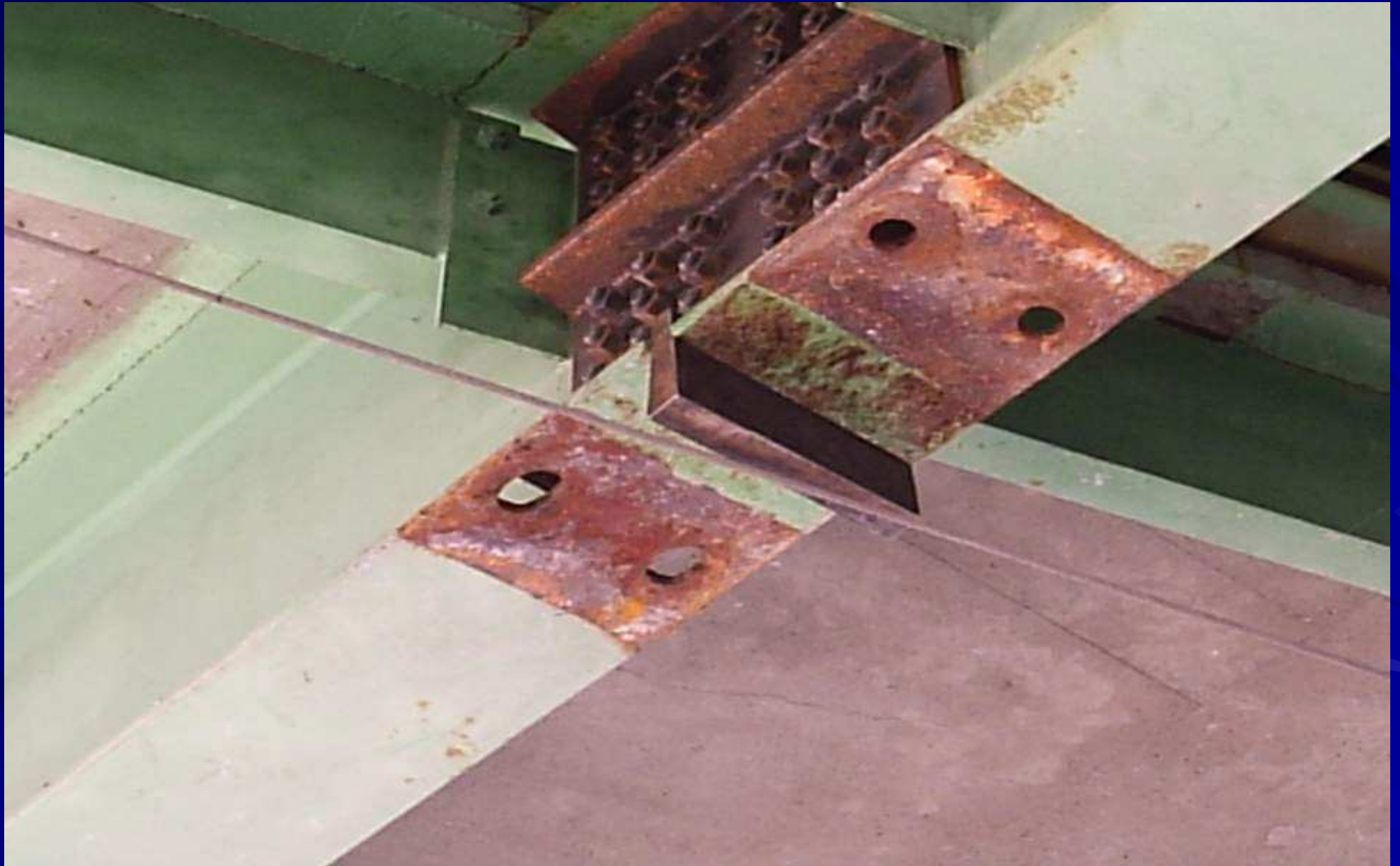
Pier Replacement

- Supported beams by Bailey Bridge
- Splice beams to make them continuous
- Remove pier down to footing
- Place new pier

Jacking Towers



Connection



Hammering Pier



Down to Footing



Pier Cap Prep



New Pier



Costs

- Orono – Kelley Road
 - \$235k per pier, 6 mos.
- Bangor - Kenduskeag Ave
 - \$150k per pier cap, 5 mos.

Costs

- Fairfield – Western Ave
 - Pier 2 (rehab) – \$250k / pier, 7 mos.
 - Pier 3 - \$200k / pier, 5 mos.
 - Pier 1 - \$220k / pier, 4 mos.

Benefits

- New Pier
- No Cold Joint
- Clean and Paint Bearings
- Cost Competitive

Benefits

- Faster Construction
- Less Wear on the Crews
- Sense of Accomplishment

What's Next

- Strengthening Bailey Bridge Panels
 - Allow a 5' section
- Standardize the process
- Use of FRP Column Wraps