


# SUBSTRUCTURE INSPECTION AND RATING



1

## Introduction


- Portion of the bridge located below the bearings
  - Abutments
  - Piers
  - Rated separately
- Purpose is to:
  - Receive the loads from the superstructure
  - Transfer forces to the ground
  - Contain the approach fills
  - Withstand other forces on it
    - Ice
    - Debris/drift
    - Earth pressure



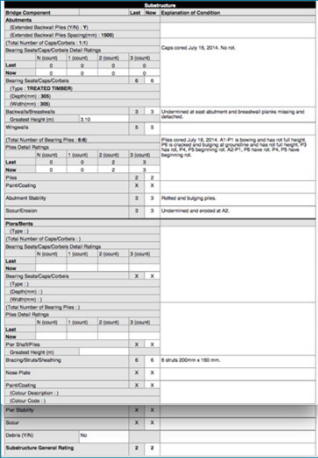
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## Introduction

- Components
  - bearing seats, pile caps
  - piles
  - backwalls
  - wingwalls
  - bracing and struts
- Component materials
  - timber
  - concrete
  - steel




3



The screenshot shows a detailed inspection form with the following sections:

- Abutments:** Includes fields for Total Number of Abutments, Total Number of Caps/Corbel, and various condition ratings (Good, Fair, Poor, Very Poor).
- Piers:** Includes fields for Total Number of Piers, Total Number of Caps/Corbel, and various condition ratings.
- Bearings:** Includes fields for Total Number of Bearings, Total Number of Caps/Corbel, and various condition ratings.
- Other sections:** Includes Abutment Backwall, Abutment Wingwall, and various notes and remarks.



4

## Abutments

- Purpose
  - Support the ends of the girders or stringers
  - Contain the approach fills
- Two types in standard bridges - classified according to their height

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5

## Abutments

The abutment at the left shows a standard concrete abutment with a concrete approach fill. The abutment is cast as a concrete cap. The headwall is shown with wing walls, recorded as X.

Figure 8.15 - Standard concrete abutment (typical)

Figure 8.16 - Timber abutment (typical)

Figure 8.17 - Concrete abutment (typical)

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6

## Full Height & Spill Through Abutments

1. **Full height or closed:** These are usually solid retaining walls that extend for the full height of the bridge with no or minimal headslope. They are susceptible to lateral displacement and scour at the bottom of the breastwall during floods.
2. **Spill-through:** These are abutment caps that intersect the headslopes. They are susceptible to scour / erosion at the toe of the headslope and stumping of the headslope.
3. **Stub:** These are either downward extensions of the abutment cap or a combination of the cap and a backwall that usually does not extend beyond mid-height of the bridge.






Figure 8.1- Full height abutment      Figure 8.2- Spill-through abutment

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7

## Abutments

- Full Height Type
  - Solid retaining walls
  - Extend the full height of the bridge
  - Has wingwalls
  - No headslope
  - Susceptible to lateral displacement from earth pressure
  - Vulnerable to undermining if not protected

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8

## Abutments

Full Height Type



9

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## Full Height Abutment



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## Full Height Abutment



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11

## Abutments

- Spill Through Type
  - Intersect the headslope at the cap height
  - No retaining wall (backwalls) below caps
  - Short wings
  - Vulnerable to undermining if headslope not protected with scour protection
  - Susceptible to slumping if headslope too steep or scour at toe

12

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12

## Spill Through Abutment



13

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## Spill Through Abutment



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14

## Abutments

- Indicate Extended Backwall Piles "Yes" or "No"
- Record Extended Backwall Pile maximum spacing in mm
- Provide Backwall/Breastwall rating—refer to 8.6
- Measure and record greatest height – lowest point to top of deck
- Rate struts on single span bridge in Pier section of form

15

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## Extended Backwall Pile



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16

## Backwalls/Breastwalls

- Applies to abutments only
- The portion of the abutment sheathing between the wingwalls
- Function is to retain the approach fill
- On standard bridges, backwalls are:
  - horizontal timber planks nailed to the piles
  - vertical driven tongue and groove timber planks nailed to walers attached to piles
  - corrugated, galvanized steel plate
  - concrete
  - Includes extended backwall piles
- Measure and record greatest height – lowest point to top of deck

Backwalls/Breastwalls	3	3	Undersized at east abutment and breastwall planks missing and detached.
Greatest Height (m)	3.10		

17

17

## Backwalls/Breastwalls

- On Standard bridges Breastwalls refer to planks attached to streamside of abutment piles.
- Look for:
  - Defects common to timber and steel
  - Sheathing not installed low enough
    - sheathing to be set 300 mm below ground level or scour protection
  - Loss of fill material below the backwall or breastwall
  - Loose, missing, or bowing planks

18

18

## Backwalls/Breastwalls Ratings

- Rate according to condition and ability to perform as designed (retaining wall)
- Sheathing bowing out from earth pressure rates 5 provided it is functioning (retaining fill).
- Not low enough but no loss of backfill material – rate 5
- Loss of material under sheathing - rate 4 or less
  - Excessive gaps between the planks allowing infiltration rate 4 or less
- Decay, broken or missing planks or defects in extended backwall piles - rate 4 or less

19

19

## Backwalls/Breastwalls Loss of Fill Rated 4



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### Backwall W/ No Fill Loss - Rated 5



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### Repair with Breastwall



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### Vertical Driven Backwall Sheathing

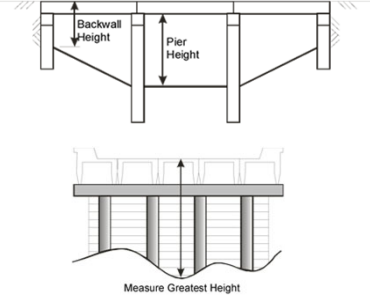


23



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### Backwall & Pier Height



24



24

## Wingwalls

- Applies to abutments only
- Primary function is to retain fill
- Consist of horizontal or vertical driven sheathing attached to piles
- Wing piles are included in inspection and rating
- Stability and Scour/Erosion are rated separately
- Look for:
  - Material defects
  - Sheathing not installed low enough
    - sheathing to be set below the ground level or scour protection installed at the bottom
- Loss of fill material below the wingwall
- Excessive gaps between the planks allowing infiltration
- Sheathing or piles bowing out from earth pressure
- Missing or broken planks or piles
- Missing or damaged tin tops on timber wing piles
  - installed to prevent water from entering cut end and rotting interior of pile
- Proper attachment to backwall - loose or missing wing cleat
- Broken or loose anchor tie to pile

25

25

## Wingwall Ratings

- Requires repairs for aesthetics but is still functional - rate 5 or more
- Requires repairs to be functional - rate 4 or less
  - Loss of fill material – rate 4 or less (also rate under Scour)
  - Sheathing or piles bowing out from earth pressure rate 5 or less depending on functionality
  - Missing or broken planks rate 5 or less depending on functionality
  - Broken or rotted piles rate 4 or less
  - Missing or damaged tin tops on wing piles rate 4

26

26

## Wingwall – Separation from Backwall



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## Wingwall – Broken Pile



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## Wingwall – Leaning but still functional



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## Wingwall – Rebuilt



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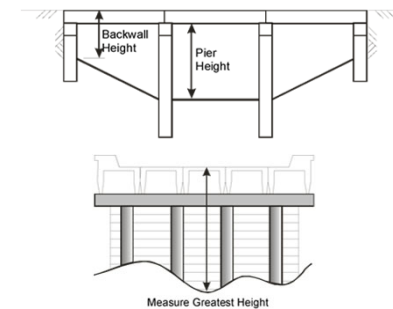
## Piers

- Intermediate support between the abutments on multi-span bridges
- Record pier type
  - On Standard bridges piers are usually “Pile Bents”
  - Pile bent is a single row of piles
  - Pile Bent is recorded as “Pier Column”
- Measure and record greatest height – lowest point to top of pier cap
- Material Type:
  - Timber
  - Steel
  - Concrete

31

31

## Backwall & Pier Height



32

32



**Timber Pier Bent (Column) with Sway Bracing**



33

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**Timber Pier Bent (Column) with Full Sheathing**



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**Teepee Pier Bent (Column) with Sheathing, Capitols, Steel Caps**



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**Galvanized Steel Pier Bent (Column) with Bracing**



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## Bearing Seats/Caps/Corbels

- Applies to abutments and piers
- Corbels used on major bridges only
- Purpose
  - Receive the loads from the superstructure
  - Transfer loads to the piles
- High-stress concentrations in bearing areas
  - Under girders or timber stringers
  - Above piles

8.5. ABUTMENT AND PIER BEARING SEATS / CAPS / CORBELS

Bridge Component	Last	Now	Explanation of Condition	
Abutments or Pier/Bents				
(Total Number of Caps or Corbels)				
Bearing Seats/Caps/Corbels Detail Rating				
	N (count)	1 (count)	2 (count)	3 (count)
Last				
Now				
Bearing Seats/Caps/Corbels				
(Type)				
(Depth (mm))				
(Width (mm))				

37

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37

## Abutment or Pier Caps

- Types
  - Timber - found on timber pile bents
  - Concrete - found on concrete or steel
  - Steel - found on steel or timber pile bents
- Confirm and/or record:
  - Record total number of individual caps at each abut and pier (west: east or south:north) (e.g. 3:3). Steel caps welded together count as 1 cap.
  - Caps < 100 mm depth do not count in total (e.g. plywood crown)
  - Record Detailed rating boxes for caps
  - Record the number of caps not visible in the "N" box
  - Record "0's" if caps are rated 4 or more

38

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38

## Abutment or Pier Caps

### Confirm and/or record (cont'd):

- Provide cap rating - refer to Section 8.5
- Record cap material type
  - Timber, steel, concrete
- Record width and depth of caps - if different sizes provide comment
  - Use nominal dimensions-(250, 305, 356 mm)
  - Welded steel caps record total size
- Verify the bridge file number on the file tag
  - verifies that this is the correct bridge
  - if tag is missing, illegible or incorrect, note in maintenance recommendations

39

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39

## Abutment or Pier Caps

### Look for:

- Concrete caps with wide cracks, delamination, spalls, corrosion of rebar, other deterioration
- Material defects
  - Especially decay in timber
  - Check shape of timber caps (bulging/crushing)
- Good contact between girders and caps, and between caps and piles
- Fire damage-reduced section and strength
- Evidence of defective connections
  - Corrosion of dowels or drift pins
  - Broken, cracked or poor welds
- Capitals
  - proper size for pile
- Location and installation of steel cap stiffeners
  - over pile locations
  - on both sides of web
- Rotation or displacement
  - Usually indicates substructure movement

40

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## Timber Caps – Abutments or Piers

- Decay in timber
  - check moist areas - contact between girders, piles, sheeting planks
  - check cut ends, dowel, drift, and bolt holes
  - most often occurs in the cap interior while the treated surface remains sound
  - look for discoloration at bottom of caps where moisture leaches out decay by-products
  - look for crushing or bulging especially in high stress areas at piles or under girders
  - sound caps with hammer to detect hollow areas
  - recommend Level 2 coring if decay present or suspected based on visual clues

41



41

## Rating Abutment/Pier Caps

- Refer to Section 8.5.3 in Manual
- Rate according to condition and functionality
- Record number of caps rated N, 1, 2 & 3 in Detail Rating Field. Record "0" if caps rated >3
- Any deficiencies reducing ability to transmit loads rate 4 or less
- Spalling and rebar exposed - rate 4 or less
- Girder bearing less than 100 mm or timber stringer less than 75 mm, rate 4 or less
- Girder bearing less than 75 mm rate 3 or less
- Timber caps with:
  - Vertical or horizontal splits extending through full dimension rate 4 or less
  - Early signs of rot rate 4 or less
  - Signs of bulging rate 3 or less
  - Signs of crushing rate 2 or less

42



42

## Beginning Rot in Timber Cap – Rated 4



43



43

## Bulging Timber Cap – Rated 3



44



44

**Crushing/Bulging Timber Pier Cap – Rated 2**



45

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**Crushing/Bulging Timber Abutment Cap – Rated 2**



46

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**Crushing/Cracked Timber Pier Cap – Rated 2**



47

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47

**Crushing Timber Abutment Cap – Rated 2**



48

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48

### Crushing Timber Cap – Rated 2



49



49

### Crushing Timber Cap – Rated 2



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50

### Timber Corbels Major Bridges



51



51

### Level 2 Timber Coring



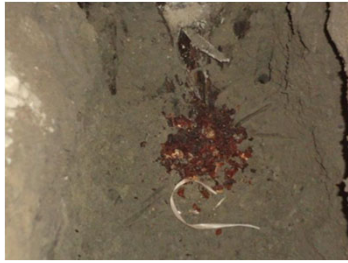
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52

### Level 2 Core Samples

Core shavings with rot



53

Good texture and colour – no rot



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### Fire Damaged Timber Cap with Section Loss



54

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### Concrete Pier Cap with Spalling



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### Abutment and Pier Piles

- Applies to piles at abutments and piers
- Piles receive the loads from the caps and transmit them to the ground
- Piles also accommodate lateral loads
  - ice and drift
  - earth pressure
- Record Detail Ratings as "0" if piles rated 4 or more

#### 8.8. ABUTMENT BEARING PILES AND PIER SHAFT / PILES

Bridge Component	Last	Now	Explanation of Condition
(Total Number of Bearing Piles : )			
Piles Detail Rating			
	1 (count)	2 (count)	3 (count)
Last			
Now			
Abutment Piles or Pier Shaft/Piles			
Greatest Height (m)			

56

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56

## Abutment and Pier Piles

- Pile types
  - Timber
  - Steel H-pile
  - Steel pipe pile filled with concrete
  - Concrete
- Record the maximum pier height
  - Measure from the lowest point to top of pier cap

57



57

## Abutment and Pier Piles

- Look for:
  - Material defects
    - Cracks, wide splits, rot of timber piles (especially in wet/dry zone)
    - Cracks, corrosion/loss of section of steel piles
  - Collision damage from ice, drift or vehicles (lead pile especially)
  - Abrasion from ice or drift
  - Bowing due to excessive earth pressure or vertical loads
  - Misalignment (out of plumb – not sharing loads) due to lateral forces
    - Determine if as built (piles driven out of plumb is common) or related to stability
    - Look for sloped cut on pile top or shims between pile and backwall
  - Uneven spacing due to poor construction
  - Signs of heaving or settlement. Note in vertical misalignment

58



58

## Abutment and Pier Piles

### Confirm and/or record:

- Confirm pile type
- Total number of bearing piles at each abutment and pier (any pile supporting cap or corbel)
- Example 8:7 (numbers may be different)

59

59

- Provide rating for abutment and pier piles - refer to Section 8.8.3
- Record Detailed Rating boxes for piles
  - Record total number of abut/pier piles not visible ("N")
  - Record "0" if piles rated 4 or more



59

## Abutment & Pier Piles

- Rate condition and functionality
- Do not consider
  - Stability - rate under abutment or pier stability
  - Bracing - rate under bracing
  - Struts - rate under struts
- Piles not sharing loads from the superstructure - rate 4 or less
- Splits, cracks, checks
  - >10 and <20mm - rate 4 or less
  - >20 and <30mm – rate 3 or less
  - Repaired (banding, clamps - rate 5
- Timber abutment piles leaning (>5°) rate 3 or less\*
  - Confirm entire length in contact & being pushed over by backwall pressure and not due to pile driven out of plumb
- Horizontal bending cracks rate 3 or less
- Crushing from horizontal load of struts rate 3 or less
- Bowing under vertical or lateral loads - rate 2 or less
- Bulging outer fibers - rate 2
- Record number of piles rated N, 1, 2 or 3 in pier/abutment Detail Ratings (0 if rated 4 or more)

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### Timber Abutment Pile Bulging – Rated 2



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### Timber Abutment Pile Bulging – Rated 2



62

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62

### Timber Piles Bulging/ Bowing – Rated 2



63

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63

### Timber Pile Wide Split <30 mm – Rated 3



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64



Timber Pile Horizontal Bending Crack – Rated 3



65

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65

Timber Pile with Rot – Rated 3



66

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66

Timber Piles Repaired with Steel Splice



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67

Timber Pile Not Sharing Load – Rated 3



68

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68

## Paint / Coating

- Applies to abutments and pier elements
- Steel
  - Paint
  - Galvanizing
- Concrete
  - Cosmetic coatings
  - Pigmented Sealers
  - Waterproofing coatings
- Does not refer to the creosote on timber components
- Refers to nose plate coating only on timber piers

Nose Plate	4	4	Stream has degraded below bottom of nose plates.
Paint/Coating (Colour Description : ) (Colour Code : )	X	X	No paint on nose plate.

69

69



69

## Paint / Coating

- No coating on treated timber substructures therefore rate X.
  - unless there is a nose plate then rate plate coating
- Check areas exposed to moisture and or salt
  - under leaking joints
  - water line
  - ground line
- Check areas that are difficult to coat
  - edges and corners
  - bolts and connections
  - areas with poor access

70

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## Paint / Coating

- Rate according to condition and ability to protect the underlying element
- Top-coat deteriorating but prime coat intact - rate 5
- Pitting or loss of section of underlying element - rate 4 or less
- Coatings for aesthetics only (pigmented coatings on concrete) - rate 3 or more
- If no coating on steel elements and there is corrosion, rate 4 or less.

71

71



71

## Abutment / Pier Stability

Bridge Component	Substructure		Explanation of Condition
	Least	Now	
Abutments			
Abutment Stability			
Pier Stability			

- Applies to abutments and piers but rated separately
- Can cause failure of the structure or problems with superstructure
- Small movement can be tolerated
- Excessive movements are those which affect load carrying capacity, level of service or cause distress to bridge elements

72



72

## Abutment / Pier Stability

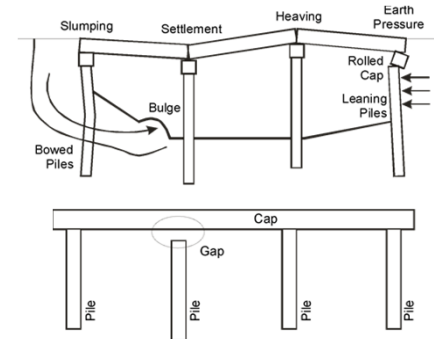
- Types
  - Rotational or dipping
    - excessive earth pressure
    - Scour/erosion
    - Superstructure movement
  - Vertical
    - heaving due to frost
    - settlement due to inadequate bearing capacity
  - Horizontal
    - movement of soil mass or slope failure

73

73

73

## Abutment / Pier Stability



74

74

## Abutment / Pier Stability

- Span alignment problems detected in superstructure inspection may indicate substructure instability
- Rotational Movement - look for:
  - mis-alignment of caps with backwalls or piles (rotating or rolling)
  - damage to connections at bearing areas
  - damage to anchoring system
  - signs of embankment movement

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## Abutment / Pier Stability

- Lateral Movement - look for:
  - uneven bearing areas
  - horizontal misalignment between spans
  - separation between backwall and wingwalls
  - signs of embankment movement
  - out of plumb piles
  - bowed struts
  - broken backwall scab/anchor pile connections

76

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76

## Abutment/Pier Stability

- Vertical Movement - look for:
  - unevenness in superstructure
  - gaps between piles and caps
  - misalignment of structural elements
- Significant scour may not affect stability
- Movement that requires monitoring - rate 4 or less
- Movement causing damage to any bridge element - rate 4 or less
- Note elements supporting stability with defects (e.g. struts, bracing). Ratings of these elements should be consistent with stability rating

77

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## Abutment / Pier Stability Bowed Struts



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## Stability – Heaved Pier



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## Stability – Settled Pier



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## Scour / Erosion

Substructure			
Bridge Component	Last	Now	Explanation of Condition
Abutments			
Scour/Erosion			
Piers/Bents			
Scour			

- Abutments and piers rated separately
- Refers to removal of material by flowing water stream or approach drainage
- Most bridge failures associated with scour / erosion during floods
- Only scour which affects or has the potential to affect the abutments or piers

81

81

## Scour / Erosion

Definition – refer to 16.2

- Scour – Removal of streambed material due to increased velocities caused by obstruction or constrictions
  - Erosion – general removal of material on stream banks, drainage ditches etc. by flowing water
- Factors
    - stream geometry
    - type of material in stream banks and bed
    - obstructions
      - ice, drift, piers, abutments, river training works
    - alignment of piers and abutments
    - degree or constriction at bridge
    - severity of flood

82

82

## Scour / Erosion

- Look for:
  - A variation from the natural stream banks or bed
  - General stream degradation and associated slumping of banks
  - Loss of material
    - toe of headslope
    - in front of abutment backwalls
    - around piers
  - Scour if any debris is present (drift caught on pier)

83

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## Scour / Erosion

- Determine the extent of the scour / erosion and probable cause
- Approach road drainage that is also causing abutment or pier erosion also rated in Abutment/Pier Scour/Erosion
- Scour or erosion causing loss of fill material from below or behind backwall rate 4 or less
- If stability of structure threatened rate 3 or less
- If vertical bank at the abutment rate 3 or less
- If loss of fill is safety concern resulting in a hazard, rate 2 or less (e.g. void under approach road)

84

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84

## Bracing / Struts / Sheathing

Substructure		
Bridge Component	Last	New
Bracing/Struts/Sheathing		

- Applies to:
  - Bracing or sheathing on piers
  - Horizontal struts which extend between abutment or pier piles
  - Rated in pier section (including single span bridges)
- Bracing and sheathing
  - For load distribution between piles
  - Strengthen pier stability
  - Bracing are single planks or steel members connecting the piles
  - Sheathing is a solid wall of planks on both sides of the pier
    - usually combined with a nose plate

85

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## Bracing / Struts / Sheathing

- Struts
  - Normally timber
  - Prevent lateral backwall/earth pressure from pushing the abutment piles out
  - If no struts, check that other pile anchor systems in place for backwall type abutment – could be anchor wires or cables, backwall clamps and scabs

86

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## Bracing / Struts / Sheathing

- Look for:
  - Material defects
  - Adequate connections
    - struts include retainer planks (horizontal planks on piles supporting struts)
  - Whether struts interfere with passage of drift or ice
  - Struts bear on piles and not caps
  - Missing or bowing struts

87

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## Bracing / Struts / Sheathing

- Rate according to condition and functionality
- If different elements present rate worst with single rating - use "Explanation of Condition" to identify other elements and defects (struts and sway brace)
- Missing or broken struts are bowed – rate 3
- Loose or missing sheathing rate 4 or less
- Cracked, broken, or missing bracing rate 4 or less

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## Bracing / Struts / Sheathing

Piers/Bents				
(Type : <b>PIER-COLUMN</b> )				
(Total Number of Caps/Corbels : 8:5)				
Caps cored Aug. 25/15				
Pier 2 has 1 100x305 T.T. on top of caps				
Pier 1 has 2 - 100x305 T.T. on top of caps				
Beginning rot in all 100x305 T.T. top planks at both piers.				
Bearing Seats/Caps/Corbels Detail Ratings				
	N (count)	1 (count)	2 (count)	3 (count)
Last	0	0	0	0
Now	0	0	0	0
Bearing Seats/Caps/Corbels				
(Type : <b>TREATED TIMBER</b> )				
(Depth(mm) : 305)				
(Width(mm) : 356)				
(Total Number of Bearing Piles : 10:9)				
Piles cored Aug. 25/15				
P1-P4, P6 and P2-P5, P6, P8 and P9 all with beginning rot at base of pile.				
Wide checking to Pier 2, Pile 9 - Ok.				
Piles Detail Ratings				
	N (count)	1 (count)	2 (count)	3 (count)
Last	0	0	0	0
Now	0	0	0	0
Pier Shaft/Piles				
(Greatest Height (m) : 5.30)				
Pier 2 - 1 cracked bracing plank. Struts in Sp. 1 and 2 (150 x 200 TT Rated 7				
Bracing/Struts/Sheathing				
4 4				

89

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89

## Nose Plate

Nose Plate	4	4	Stream has degraded below bottom of nose plates.
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- Applies to piers only
- Located on the upstream side
- Protects pier from impact or abrasion from ice or drift
- Made from steel and bolted or welded to pier
- Found on H-pile and timber piers (for standard bridges)

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## Nose Plate

- Look for:
  - Material defects
  - Adequate connections to pier shaft/piles
  - Impact damage
  - Coating
- Rate according to condition and functionality
- Missing nose plate on timber pier prone to damage from ice or drift rate 3 or less
- Pier without a nose plate rate X - but if required to protect from damage provide comments and make maintenance recommendation

91

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## Nose Plate



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## Debris

Debris (Y/N)	Yes	Old piles.
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- Applies to substructure as a whole – abuts and piers
- Material deposited in the bridge opening
  - trees and vegetation
  - logs
  - boulders
  - beaver dams
  - refuse (tires, washing machines, etc.)
  - old piling, retaining walls etc. under bridge

93



93

## Debris

- Problems caused by debris
  - reduction in flow carrying capacity of bridge
  - localized scour
  - impedes fish passage
  - upstream siltation

94



94

## Debris

- Look at the entire bridge opening for any debris accumulation
- If debris is located away from the bridge, record under the “Channel” section
  - If has an effect on the bridge or has the potential
- Indicate whether any significant debris is present by Yes or No
  - If Yes, provide supporting comment
- A rating is not required but the presence of debris may affect the Substructure General Rating
- Old piling is common debris, respond Yes and provide comment and recommendation if causing damage, impeding flow, or catching other debris

95

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95

## Abutments

Bridge Component		Substructure		Last	Now	Explanation of Condition
Abutments						
[Extended Backwall Piles (Y/N) - Y]						
[Extended Backwall Piles Spacing(m)] - 1500						
[Total Number of Caps/Corbels - 1 (1)]						
Bearing Seats/Caps/Corbels Detail Ratings						
	N (count)	1 (count)	2 (count)	3 (count)		Caps cured July 16, 2014.
Last	0	0	0	0		
Now	0	0	1	1		A1 cap is crushing. A2 cap is beginning to bulge.
Bearing Seats/Caps/Corbels						
[Type - TREATED TIMBER]						
[Depth(mm) - 305]						
[Width(mm) - 305]						
Backwall/Breastwall						
			3	3		Undermined at east abutment and breastwall planks missing and detached.
Greatest Height (m)						
		3	10			
Wingwalls						
				5	5	
[Total Number of Bearing Piles - 6 (6)]						
Piles Detail Ratings						
	N (count)	1 (count)	2 (count)	3 (count)		Piles cured July 16, 2014. A1-P1 to bearing and has not full height. P2 is cracked and bulging at groundline and has not full height. P3 has rot. P4, P5 beginning rot. A2-P1, P2 have rot. P4, P5 have beginning rot.
Last	0	0	2	3		
Now	0	0	2	3		
Piles						
			2	2		
Piers/Coatings						
			X	X		
Abutment Stability						
			3	3		Rotted and bulging piles.
Scour/Erosion						
			3	3		Undermined and eroded at A2.

96



96



## Piers

Piers/Bents (Type : PIER-COLUMN)				Caps changed in 1988.	
(Total Number of Caps/Corbels : 3-3)					
Bearing Seats/Caps/Corbels Detail Ratings					
Last	N (count)	1 (count)	2 (count)	3 (count)	
Now	0	0	0	0	
Bearing Seats/Caps/Corbels					
(Type : TREATED TIMBER)					
(Depth(mm) : 300)					
(Distances) : 200					
(Total Number of Bearing Piles : 6-6)					
Piles Detail Ratings					
Last	N (count)	1 (count)	2 (count)	3 (count)	
Now	0	0	2	6	
Pile Shear/Piles					
Greatest Height (m)	4.50				
Bracing/Struts/Sheathing	5	4	Missing 1 bottom plank at P2 but allows for pile inspection.		
Nose Plate	4	4	Stream has degraded below bottom of nose plates.		
Paint/Coating	X	X	No paint on nose plate.		
(Colour Description : )					
(Colour Code : )					
Pier Stability	4	4	Rot in pier piles.		
Scour	5	5	Minor scour behind both piers.		
Debris (Y/N)	Yes		Old piles.		
Substructure General Rating	2	2			

97



97

## General Rating

- Governed by; refer to 1.10.3 and 8.15
  - Structural load carrying members
  - Caps/Seats ratings
  - Pile ratings
  - Backwall rating of 2 or less
  - Abutment and/or pier stability ratings
- The structural element ratings for both the abutments and piers must be taken into account when determining Substructure General Rating

98

98



98

Questions?



99