

BRIDGE DATA:

Bridge No./Name:	N2-068: Kootenay River FSR / Kootenay River (32.80 km)
Inspection Date:	August 1, 2015
Inspected By:	S. Stanley, J. Pheh
Year Built:	1961
Number of Spans:	5
Location:	50° 22' 32.2" N 115° 37' 7.4" W



Span Lengths:	Span 1: 6.1 m Span 2: 24.4 m Span 3: 24.4 m Span 4: 24.4 m Span 5: 6.1 m
Superstructure:	<p>Spans 1 & 5: Fifteen creosote treated sawn timber stringers (530 mm deep x 185 mm wide) spaced @ 300 mm c/c over piers with a flared spacing over the abutments as below:</p> <ul style="list-style-type: none"> • 1-4 @ 550 mm c/c • 4-8 @ 300 mm c/c • 8-9 @ 600 mm c/c • 9-13 @ 300 mm c/c • 13-15 @ 550 mm c/c <p>Spans 2 – 4: Three Creosote treated timber glulam slab girders (1500 mm deep x 280 mm wide) spaced @ 1600 mm c/c, with creosote treated timber diaphragms (135 mm wide x 1330 mm deep) at 1/3 span points.</p> <p>Bolstering rod system: Pairs of ø36 mm high tension rods with plastic sheathing running parallel to each girder, braced / deflected at 1/3 span points with steel brackets and glulam needle beams (540 mm deep x 220 mm wide), anchored to the girder ends with a steel bracket located 770 mm down from top of girder and recessed 300 mm in from end of girder.</p>
Deck:	<p>4200 mm wide.</p> <p>Untreated longitudinal timber running planks (300 mm x 100 mm thick)</p> <p>Spans 1 & 5: Creosote treated transverse 2"x4" timber subdeck (38 mm x 89 mm) laminated together on edge.</p> <p>Spans 2-4: Creosote treated transverse 2"x8" timber subdeck (38 mm x 184 mm) laminated together on edge.</p>
Curb:	Untreated timber curbs, risers and handrails.
Substructure:	<p>Abutments: 6 creosote treated timber bearing piles (300 mm x 300 mm) spaced at approx 1200 mm c/c.</p> <p>Piers 1 & 4: 2 rows of 6 creosote treated timber pier shafts (290 mm x 290 mm) spaced at approx 920 mm c/c with diagonal timber plank diaphragms, bearing on a buried pad footing.</p> <p>Pier caps: 2 parallel creosote treated timber caps (390 mm x 390 mm).</p> <p>Piers 2 & 3: 2 rows of 6 creosote treated timber pier shafts (290 mm x 290 mm) spaced at approx 920 mm c/c with diagonal timber plank diaphragms.</p> <p>Pier caps: 2 parallel creosote treated timber caps (390 mm x 390 mm).</p> <p>Pile caps: Cast in place concrete pile caps bearing on steel piles.</p>

GENERAL BRIDGE CONDITION:

Superstructure Condition:	Good to Fair
Substructure Condition:	Fair to Poor
Deck Condition:	Fair
Load Posting:	No Sign noted
Date for the Next Close Proximity Inspection:	2017
Projected Replacement Date:	2020

INSPECTION NOTES

Approaches:

- Both approaches have only one precast concrete barrier per side.
- Abutment 2 (camp) approach has some minor rutting within wheel paths.

Deck:

- Approx 25% of curb / handrail has recently been replaced, however isolated sections of original curb rail was found to contain rot.
- Subdeck was found to be saturated, but no indications of rot were noted.
- Minor accumulation of granular debris on deck.

Girders/Superstructure:

The superstructure of spans 2 – 4 is comprised of three girder lines and a thorough inspection of both sides of each girder was performed, with only minor impedance presented by the bolstering rods. Overall, the girders were found to be in good condition with the exception of limited creosote coverage remaining on the exterior face of Girder line 3. Brown masses of dead insects were found to be accumulating on some faces of the girders and diaphragms, but upon clearing, no signs of structural degradation were detected. Girders were regularly sounded throughout with no deficiencies detected, and no notable checks / splits. The superstructure of spans 1 & 5 is comprised of fifteen (15) timber stringers that flare out at the abutment ends to accommodate a widened approach to the bridge. These timber stringers appeared to be in good condition.

Timber glulam check / split reference terminology is as follows:

Width

- Narrow - ≤ 2 mm wide
- Medium - 2 - 5 mm wide
- Wide - ≥ 5 mm wide

Depth

- Shallow - ≤ 80 mm deep
- Medium - 80 - 120 mm deep
- Deep - ≥ 120 mm deep

Length

- Short - ≤ 2 m long
- Medium - 2 - 4 m long
- Long - ≥ 4 m long

Girder 1:

- Creosote coverage of approx 75 - 100% remaining on U.S exterior and D.S interior faces.

Girder 2:

- Creosote coverage of approx 75 – 100% remaining on both (interior) faces.

Girder 3:

- Creosote coverage of approx 75 - 100% remaining on U.S interior face.
- Creosote coverage of approx 20% remaining on D.S exterior face, with significant weathering, but no significant checks or splits noted.

Bolstering system:

- 36mm dia high tension rods spaced at 450 mm c/c appear to be in good to fair condition. Exposed portions of the rods have light surficial corrosion.
- Bolstering struts are located at approx 1/3 span points, with creosote coverage of approx 50 – 75% remaining.
- Span 1, strut 1 has isolated narrow, shallow, short splits.

Abutments/Piers:

No neoprene pads were found between bearing surface of caps and underside of girders / stringers. Visible portions of concrete pile caps appear to be in good condition. Timber sheathing planks on the pier shafts are missing in isolated areas. Timber elements of the pier shafts and abutments were sounded throughout and generally appeared to be in fair condition with the exception of what is noted below.

Abutment 1:

- Pile 4 was found to contain rot.
- Pile cap is rotated outwards, more extensively at the U.S side.
- Some sluffing of approach fill noted around wingwalls.

Abutment 2

- A2 cap is rotated outwards approx. 5°.
- Wingwall planks are not bearing on wingwall piles in regular locations.
- Timber elements sounded throughout and appear to be in fair condition.

Pier 1

- No other notable deficiencies.

Pier 2

- Bottom timber pier shaft sills are rotten with bulging of the thin steel plate sheathing noted.
- Significant accumulation of silt and debris noted between pier shafts and sheathing.
- Minor accumulation of drift debris was noted at U.S end of pier.

Pier 3

- The lower portion of the timber pier shafts were not visible for inspection due to the thin steel plate sheathing, however the presence of rot is highly suspected, given proximity to water level, the significant accumulation of trapped, saturated silt and debris noted between pier shafts and sheathing, and what appears to be slight bulging of the steel sheathing.

Pier 4

- Pier 4, D.S pier cap (Abutment 1 side) was cored with no indications of rot, where orange paint indicator was previously applied (see photo log).

BRIDGE INSPECTION SUMMARY & RECOMMENDATIONS:

This bridge was inspected during ideal weather conditions using a "snooper truck" to gain access to stringers, girders, underside of deck, piers and all elements of the bolstering system. The approaches are generally in good

condition with the exception of an inadequate amount of concrete approach barriers. The timber superstructure appears to be in good to fair condition with no significant checks or splits of note, despite the poor creosote coverage on the exterior face of Girder 3. The steel elements of the bolstering system appear to be in good to fair condition. The protective covering on the tension rods is missing and exposing bare steel in regular locations, at the ends of the rods. A significant amount of rot was found in the lower pier shaft bearing sills of Pier 2 & 3, which is of concern. This bridge is approx. 54 years of age and has already surpassed its originally intended design life of 50 years. Regular close proximity inspections should continue, paying particular attention to the lower portion of the timber pier shafts.

The following maintenance works are recommended:

ITEM	DESCRIPTION	PRIORITY
1	Install more approach barriers	High
2	Further assess and plan for pier replacement / preservation. Consider a Level 2 timber coring assessment.	High

Prepared by:

A handwritten signature in black ink, appearing to be 'S. Stanley'.

Steven Stanley, C.E.T.
LEX3 Engineering Inc.

Reviewed by

A handwritten signature in black ink, appearing to be 'K. Jackson'.

Kris Jackson, M.Sc., P.Eng.
LEX3 Engineering Inc.





Photo #1
Upstream elevation



Photo #2
Downstream elevation



Photo #3
Abutment 1 (woods) approach



Photo #4
Abutment 2 (camp) approach

-Note isolated minor rutting of approach through wheel paths.



Photo #5
Abutment 1



Photo #6
Abutment 1

-Orange point denotes area of
rot found in Pile 4.



Photo #7
Abutment 1 U.S Wingwall



Photo #8
Abutment 1 D.S wingwall



Photo #9
Pier 1 – looking to Abutment 1



Photo #10
Pier 1 U.S cap / end of Girder 1



Photo #11
Pier 2 - looking to Abutment 2

-Note minor accumulation of drift debris on U.S end of pier.



Photo #12
Pier 2 – looking to Abutment 1

-Note isolated sheathing planks are missing.



Photo #13
Pier 2 – D.S end

-Extensive rot noted in lower portion of timber pier shaft, behind sheathing.



Photo #14
Anchorages of bolstering over
Pier 2

-Typical condition.



Photo #15
Pier 3 – looking to Abutment 2

-Note isolated damaged timber sheathing.



Photo #16
Pier 3 – looking to Abutment 1

-Note areas of sheathing planks missing.



Photo #17
Pier 3 - looking downwards
between shafts and behind
sheathing

-Sheathing is trapping silt and
moisture.

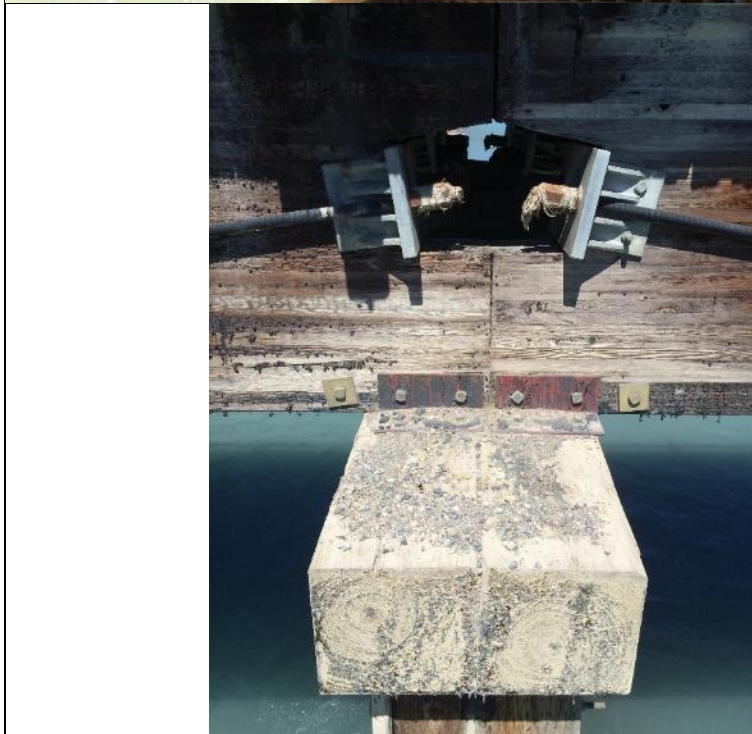


Photo #18
Pier 3 – D.S cap



Photo #19
Pier 4 – looking to Abutment 2



Photo #20
Pier 4 – looking to Abutment 1 /
D.S

	<p>Photo #21 Pier 4 – Looking D.S</p> <p>-Note significant check in end of left cap. -Timber sounded with a hammer throughout with no indication of rot noted.</p>
	<p>Photo #22 Pier 4 – shaving from core taken</p> <p>-Shavings did not indicate presence of rot.</p>



Photo #23
Abutment 2 – U.S



Photo #24
Abutment 2 - piles and pile cap

-Pile cap appears to be rotating outwards.



Photo #25
Abutment 2 - U.S wingwall



Photo #26
Abutment 2 - D.S wingwall

-Top wingwall planks are not restrained by first pile.



Photo #27
Span 5 stringers



Photo #28
Underside of Span 2 looking to
Abutment 2

-Good creosote coverage on interior faces, however poor creosote coverage of Girder 3, exterior face.



Photo #29
Span 2 bolstering bracket

-Steel bracket and timber strut appears to be in good condition (typical).



Photo #30
Span 2 bolstering bracket



Photo #31
Bolstering rods

-Bolstering rods appear to be in good condition with little damage to coatings except around anchorage ends.



Photo #32
Span 1 bolstering bracket 2



Photo #33
Span 2, Girder 1, bolstering
bracket 2, looking to Abutment 2

-Poor creosote coverage on
exterior of Girder 3.



Photo #34
Span 2, Girder 3, bolstering
bracket 1, looking to Abutment 1

-Note log resting on bolstering
rods between bracket 1 and 2,
likely indicative of previous high
water.



Photo #35
Interior faces of Girder 2 & 3

Typical condition, with extensive creosote coverage remaining.



Photo #36
Top of deck, looking to
Abutment 1

-Note that portions of the handrail has recently been replaced.