

UBIT INSPECTION REPORT

Fox Island Bridge #26211-A

August 3, 2017

A UBIT inspection was conducted on August 3, 2017 from 8:30 am to 3:00 pm.

The Bridge was inspected, with the Under Bridge Inspection Truck (UBIT) UB-62. The UBIT was deployed east side (sidewalk side) of the bridge.

WSDOT Personnel:	Philip Kelly	Bucket Operator
	Josh Morton	Driver
	Troy McWaid	Driver in training

Pierce County Personnel:	Chon Pieruccioni	Inspector (G1210)
	Mike Manley	Co Inspector
	Traffic control was provided by the Road Ops.	

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On August 3, 2017 the Fox Island Bridge #23211-A was inspected using the Washington State Department of Transportation (WSDOT) under bridge inspection truck UB-62.

The following outlines the structural findings beginning at the south end of the bridge (Span 1 and Pier 2) and working North to Pier 20. The bridge has 20 spans. Girders are labeled A to C, left (west) to right (east).

GENERAL NOTES:

The soffit and deck overhangs have leaching cracks throughout. Most of the steel bearing plates have various amounts of rust, dirt and growth on them. Most of the beams have shear cracks at the pier cap girder interface. Many of the concrete I-girders have areas of delamination in the bottom flange mainly on the outside of the exterior beams. Some of the delaminated areas are failing patches from previous repairs. There are exposed rusty rebar at some of these locations. The edges of the grout around the steel bearing pads are spalling off at many of the locations.

SPANS AND PIERS NOTES:

Span 1: There are hairline vertical cracks in all of the T-beams.

Pier 2: There are several transverse leaching cracks in the soffit near the pier. On the south face at the bottom center of the cap there is a 4' long area that is cracked delaminated and spalled exposing 34" of rusty rebar. The delaminating continues about 1' west of the spalling. On the north face at the bottom center of the cap there is a delamination that measure 7'-6" X 0'-6". There is a vertical full height hairline crack on the east outside girder near the pier centerline.

Span 2: There are hairline vertical cracks in all of the T-beams. There are transverse leaching cracks throughout the soffit. One of the cracks at midspan has spalled its entire length between girders B and C.

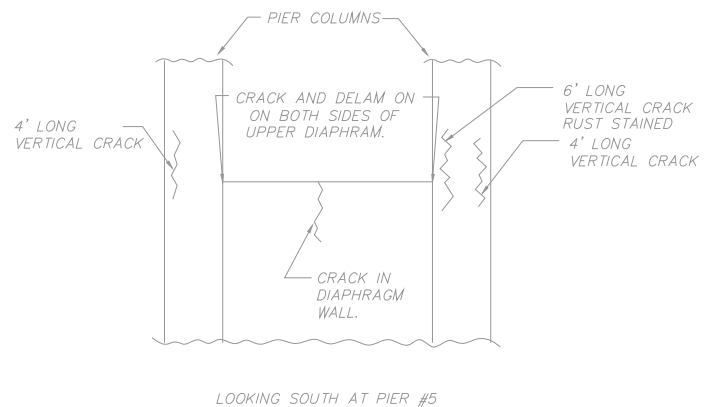
Pier 3: There are a few transverse leaching cracks in the soffit. All of the T-beams have vertical cracks between Piers 2 and 3. There is a full height vertical crack on the east girder exterior face near Pier 3. There is a 1'x15"x3" spall with exposed rusty rebar on the SW corner of the pier cap.

Span 3: There are hairline vertical and diagonal cracks in all of the T-beams.

Pier 4: There are several transverse leaching cracks in the soffit, mostly near Pier 4. The steel beam bearing shim plate at all beams on the north side of Pier 4 stick out 1" to 3" in the front and about 1" in the back. At Girder "B" the front shim worked its way out and was removed by hand (2011). There is a shim sticking out of the back of Girder B bearing about 1". The bearing shim plates appear to have been manufactured oversized. There are hairline vertical cracks on the pier cap under girder B on the south face.

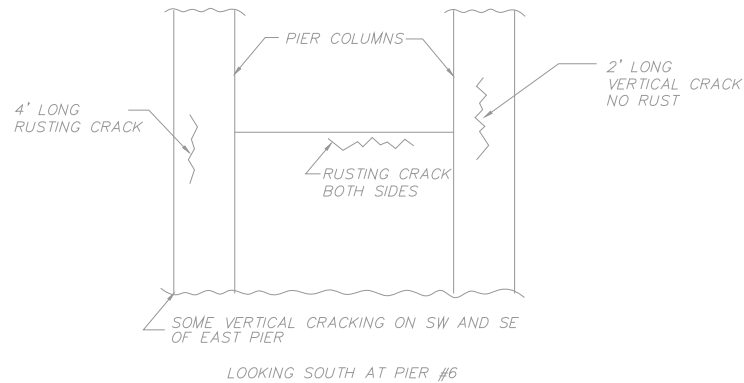
Span 4: There are some hairline vertical cracks in the T-beams near Pier 4. The drop-in steel suspended span between Piers 4 and 5 rests on concrete corbels. Some grout is missing from under all bearings at the north end of the steel beam span. Both ends of the steel beam section are sliding plate bearings. The east concrete corbel was previously repaired. All bearings on the north end are dirty.

Pier 5: The steel rockers of the bearing assemblies are tipping slightly to the south. The east bearing is tipping more than the others. The pier cap has one 12" and one 6" long horizontal rusty rebar exposed in the west end of the north face. There is a 5' long vertical crack with rust staining at the top of the concrete pier wall diaphragm. (See detail) There are several transverse leaching cracks in the soffit on the cantilever (south) side of Pier 5.



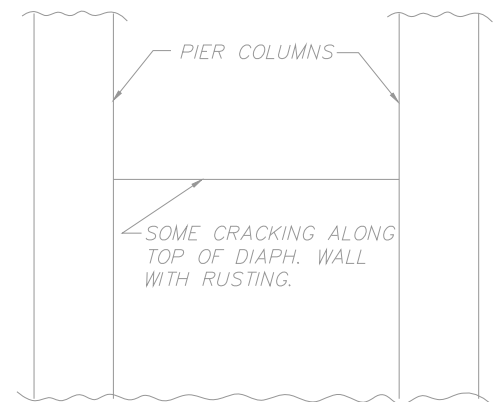
Span 5: There are many hairline diagonal/vertical cracks along the T-beams near Piers 5 and 6.

Pier 6: There are several hairline diagonal/vertical cracks in the webs of the concrete T-beams between Piers 6 and 7. The bottom flange of Girder "A" has hairline cracking. There are several transverse leaching cracks in the soffit near Pier 6. The top east side of the diaphragm has a small pop out with exposed rebar. There are several cracks in the concrete pier wall diaphragm and in the pier columns. Some of the cracks are rust stained.



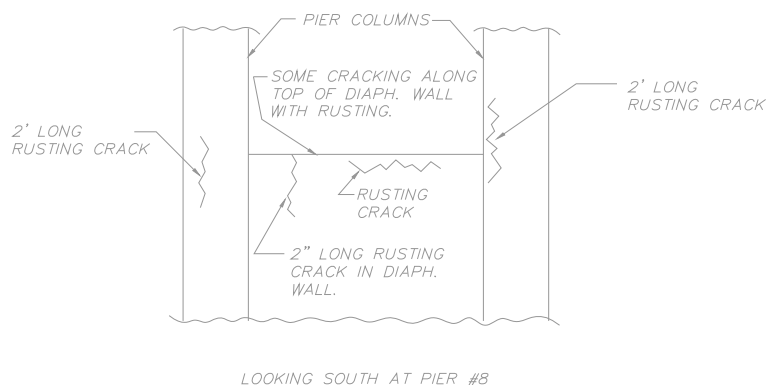
Span 6: Near Pier 6, the west exterior girder has a small spall at the middle of the web.

Pier 7: The top of the cap on the SW corner of Pier 7 is cracked and delaminated with 24" of exposed rusty rebar. There is minor rusting along the lower fillet of the steel drop section flange to web joint. There is some hairline cracking along the top of the pier diaphragm wall. (See detail.) The east girder has some rust stains on the bottom near pier 6. There is a spall with 4" of exposed rusty rebar on the north face of the corbel below steel beam 7C



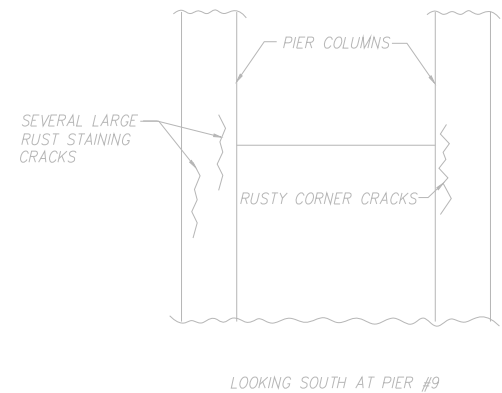
Span 7: There is 6" of exposed rebar in the soffit at the NW corner of the drop span.

Pier 8: The center diaphragm to deck interface (SE face) has two exposed rebar. There are several transverse leaching deck cracks on both sides of Pier 8. Also, several hairline diagonal cracks in the T-beam cantilever webs. There are several hairline diagonal and vertical cracks in the T-beams between Piers 8 and 9. There are several transverse leaching cracks in the soffit near Piers 8 and 9. There are vertical rust stained cracks on the corners of the columns near the column diaphragm. (See detail.) At Pier 8, the outside face of the web of the west exterior girder has 7 exposed rusty rebar due to lack of cover.



Span 8: At the 1/3 point from pier 8 the west exterior girder has a 4' long patch on the exterior of the bottom flange. The patch is cracking and delaminating with a 24" X 4" spall. There are several diagonal cracks in the girder web above the patch that have been grouted. Near mid span on the bottom flange of the west exterior girder there is a spall exposing 12" of rebar. The 2" square bar has some surface rust but there is no measurable section loss. From the spall, the exterior bottom flange has cracking and some delamination for approximately 24' towards pier 9. There is some exposed rusty rebar on the bottom flange of this girder at about the 1/4 point from pier 9. The utility cover of one of the 4" lines under the sidewalk is separated.

Pier 9: All four corners of the east pilaster are spalled off near the water line. There are several transverse leaching cracks in the soffit near Pier 9 on the north side. The 12' crack along the west T-beam bottom flange, reported in a previous inspection report, has been patched. The patch has cracks and is delaminating. There are three 3" diameter spalls in the web of the west T-beam near the bottom of the flange at Pier 9 with rusty rebar exposed. There are several vertical cracks in the pier columns and in the pier diaphragm walls. (See detail.)



Span 9: The west exterior girder had an 8' long patch on the exterior of the bottom flange that has failed and is exposing 7'-7" of rebar. The 2" square bar has some surface rust but there is no measurable section loss.

Pier 10: Pier 10 is the south main channel pier with a timber fender system surrounding the pier. There are several diagonal/vertical cracks in the T-beams, web and bottom flanges, between Piers 9 and 10. There are some transverse leaching cracks in the soffit on both sides of Pier 10

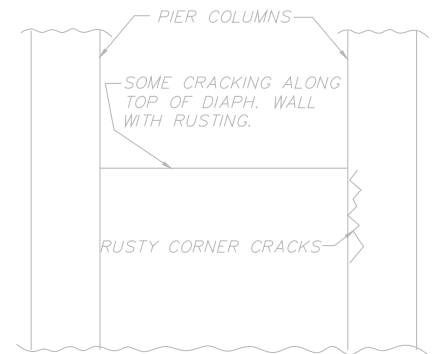
Pier 11: Pier 11 is the north main pier with a timber fender system surrounding the pier.

Span 11: At mid span the bottom flange of girder A has 20' of hairline cracking on the west face. 24' of the east face of the girder C bottom flange has been patched. The patch has shrinkage cracking throughout but when sounded, the patch is still bonded to the girder. There are several diagonal/vertical cracks in T-beam webs and bottom flanges between Piers 11 and 12. Girder A has a 15" exposed bar in the bottom flange at the north 1/3 diaphragm. Rusty rebar showing on the South Cantilever girder A bottom flange. There is minor surface rust on all the drop span bearings. There is minor surface rust on the bottom flange of the Channel diaphragms.

Pier 12: There is slight pitting of the paint on all three steel pin bearings. There are several transverse leaching cracks in the deck near Pier 12. There are a few vertical cracks along the north side of Pier 12 at the diaphragm wall and at the pier column corners. There are several transverse leaching deck cracks near Pier 12.

Span 12: About 1/3 span from Pier 12 on Girder "A" there are two rusted stirrups due to lack of cover. 12" and 24" long with 8" of spalling. Girder "C" outside edge of the bottom flange has horizontal/diagonal cracking for 1/2 the span. Girder A has a 40' long bottom flange delamination on the west (outside) face.

Pier 13: There is slight pitting of paint on all three steel rocker bearing assemblies. The concrete corbel repair on the northwest corner of the steel beam span is leaching along the patch joint on both sides. There are several short leaching and/or rusting cracks along Pier 13 near and on the diaphragm. There is one 18" square hole in the pier diaphragm at about 12' below the top of the diaphragm. There are vertical cracks on some of the column corners with some spalling and delamination, however, no reinforcing steel is exposed at this time. There are a few transverse leaching deck cracks near Pier 13.



LOOKING NORTH AT PIER #13

Span 13: The paint on the steel drop span has started to fail and there is noticeably more rust on this span especially between the spot welds and at the web to bottom flange connection. There is no measurable section loss. There is a large amount of guano. T-beam "B" has a 3" diameter spall in the east face of the bottom flange. The upper end of Girder "C" has a 16"x6"x1-2" spall with no exposed rebar. The east exterior girder has 3 spalls with exposed rebar near Pier 13. There is pack rust forming between the girder and plate. There are many diagonal/vertical cracks on T-Beams' between Piers 12 and 13.

Pier 14: There are numerous transverse leaching deck cracks on both sides of Pier 14. The steel bearing plate under Steel Beam "A" is pushed out of the bearing assembly about 3". There is pack rust on the bearing shims. There is an exposed rebar in the top of the lower diaphragm.

Span 14: The outside edge of Girder "A" bottom flange has a 34' long horizontal hairline crack and 10' of delam at mid-span and a 12" spall in the middle. There are several hairline diagonal/vertical cracks in the T-beams between Piers 14 and 15.

Pier 15: There are some hairline cracks in the lower northwest corner of the upper diaphragm pier wall. There is a 18" long spall on the bottom of the upper diaphragm near the east column. There is a vertical crack along centerline of the lower pier wall. The outside edge of Girder "A" bottom flange has a 30" long horizontal leaching hairline crack at mid-span. There are transverse leaching cracks in the soffit near the pier. There are a few hairline cracks in the web of the concrete T-beams.

Span 15: There are diagonal cracking in the flanges of all girders. Cracking in soffits throughout. There is a 3' long crack in the west face of the bottom flange of Girder A.

- Pier 16: There is one vertical crack in the pier wall. The soffit has several transverse leaching cracks near the pier. There is some minor pitting of paint. The corbel at 16a has been patch and the repair has a visible cold joint.
- Span 16: This span also has noticeably more rust on the steel beams, possibly because of the large amount of guano present. The steel beam drop-in span is rusting along the edges of the bottom flange and along the cover plate spot welds. There is no measurable section loss. On the west side of girder B near mid span there is a 1/8" gap between the cover plate and the flange between 2 welds. The welds are intact.
- Pier 17: The ends of all of the concrete T-Beams have diagonal cracks that extend from the center of bearing to the end of the girder with the west face of C, both faces of B and the west face A has spalled off(See photos). Concrete T-beams have diagonal hairline cracks in the webs and bottom flange.
- Span 17-19: Transvers leaching cracks in soffit with a few exposed rebar. Diagonal cracking in webs throughout.
- Pier 18: There are a few transverse leaching deck cracks near Pier 18. There are several transverse leaching deck cracks between Piers 18 and 19. There are a few vertical/diagonal cracks in the T-beam webs. There are hairline cracks in the bottom flanges. The NW exterior pile has a 2' wide by 3' long spall with no exposed rebar. The spall is about 2" deep.
- Pier 19: There are some diagonal/vertical cracks in the T-beam webs between Piers 19 and 20. There are a few transverse leaching cracks in both sidewalk slabs over the pier. There are some hairline cracks in bottom flanges.
- Pier 20: The ends of the girders have diagonal spalls at the bearing. The ends of the span 20 girders have been chipped, cleaned and painted. See the following sketches:

