UBIT INSPECTION REPORT

Fox Island Bridge #26211-A August 27, 2019

A UBIT inspection was conducted on August 27, 2019 from 8:30 am to 3:00 pm.

The Bridge was inspected, with the Under-Bridge Inspection Truck (UBIT) UB-62.

WSDOT Personnel:	Amir Saleh	Bucket Operator
	Doug Walsh	Driver
Pierce County Personnel:	Gary Amundsen	Inspector (G0803)
	Ben Norton	Co Inspector
	Rick Russom	Co Inspector
	Traffic control was provided by Road Ops.	

On August 27, 2019 the Fox Island Bridge #26211-A was inspected using the Washington State Department of Transportation (WSDOT) under bridge inspection truck UB-62. The UBIT was deployed on the east side (sidewalk side) of the bridge.

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 girders have diagonal shear cracks at the ends and vertical flexure cracks at midspan.

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 many 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 multiple hairline vertical cracks in the girders.

Pier 2: There are several transverse leaching cracks in the soffit near the pier.

There is heavy rust on the bottom of the east roller bearing.

The catcher bearing attached to girder B on span 2 is resting on the steal bearing plate.

On the south face at the bottom center of the cap there is a 4’-0” long area that is cracked delaminated and spalled exposing 34” of rusty rebar. The delaminating continues about 1’-0” west of the spalling.

On the north face at the bottom center of the cap there is a delamination that measures 7’-6” x 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 the girders.

There are transverse leaching cracks throughout the soffit. One of the cracks has a 6” spall at midspan and is delaminated the rest of the length between Girders B and C.

Pier 3: There are a few transverse leaching cracks in the soffit.

The east rocker bearing anchor plate is completely covered with rust.

The girders have vertical cracks between Piers 2 and 3.

There is a full height vertical crack on the east girder exterior face over Pier 3.

There is a 12” x 15" x 3" spall with exposed rusty rebar on the southwest corner of the pier cap.

Span 3: There are hairline vertical and diagonal cracks in the girders.

Pier 4: Pile A has minor cracks on the east face near the top.

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”- 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 bearings under Girders A and B about 3”. The bearing shim plates appear to have been oversized by design.

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 girders near Pier 4.

The drop-in steel suspended span between Piers 4 and 5 rests on concrete corbels.

On the north side of Pier 4, under steel Girder B, the bolt is not tight on the west bearing plate.

The steel girders have rust spots along the bottom flange to web connection. There is also small rust spots on the bottom of the girders.

Some grout is missing from under all bearings at the north end of the steel drop span. Both ends of the steel beam section are sliding plate bearings.

There are spalls in the soffit between Girders 4A, 4B and 4C.

The east concrete corbel was previously repaired. All bearings on the north end are dirty.

Pier 5: The steel rockers of the bearing assembles are tipping slightly to the south.

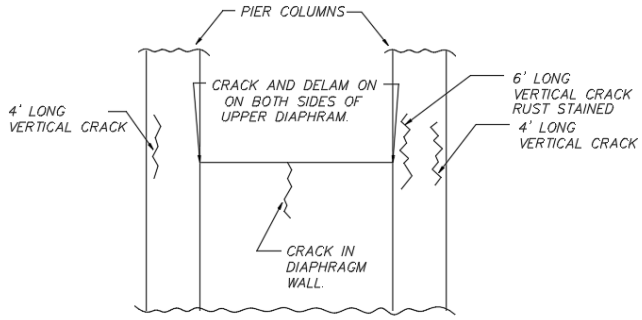
The east bearing is tipping more than the others.

The pier cap has one 12” and one 6” long horizontal rusty rebar exposed in the west end of the north face.

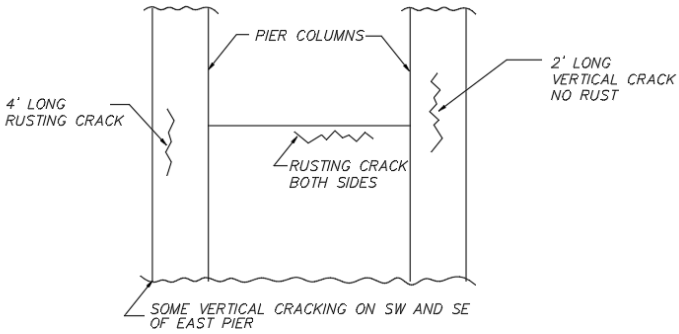
There is a 5’-0” long vertical crack with rust staining at the top of the concrete pier wall diaphragm (see detail).

There are several transverse leaching cracks in the soffit on the south side of Pier 5.

Pier 5 Cap has two areas of spalls with exposed rebar on the northwest face.



LOOKING SOUTH AT PIER #5



LOOKING SOUTH AT PIER #6

Span 5: There are hairline diagonal/vertical cracks in the girder webs and flanges near Piers 5 and 6.

Pier 6: There are several hairline diagonal and vertical cracks in the webs of the concrete girders 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.

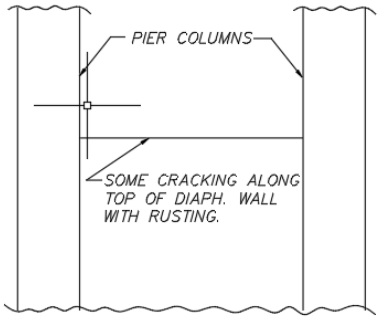
Girder C has some rust stains on the bottom near Pier 6.

Pier 7: The top of the cap on the southwest 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 span flange to web joint.

There is some hairline cracking along the top of the pier diaphragm wall (see detail).

There is a spall with 4" of exposed rusty rebar on the north face of the corbel below steel beam 7C.



LOOKING SOUTH AT PIER #7

Span 7: There are spalls in the soffit with exposed rebar at the north and south ends of the drop span at drain hole locations.

Span 7 steel drop span has a slight sag. This is more pronounced in Girder C (under sidewalk).

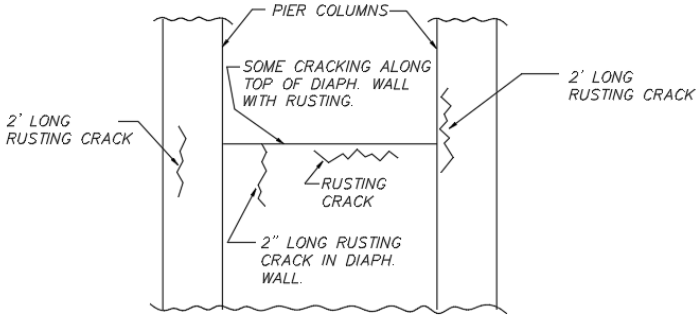
Pier 8: The center diaphragm to deck interface (southeast face) has two exposed rebar.

There are several transverse leaching deck cracks on both sides of Pier 8.

There are several hairline diagonal cracks in the cantilever girder webs. There are several hairline diagonal and vertical cracks in the girders 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).



LOOKING SOUTH AT PIER #8

At Pier 8, the outside face of the web of the west exterior girder has seven exposed rusty rebar due to lack of cover.

Span 8: Girder A has a 4'-0" long patch on the exterior of the bottom flange at the 1/3-point from Pier 8.

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” exposed square rebar has some surface rust but there is no measurable section loss.
There is a spall in the exterior bottom flange that has cracking and some delamination for approximately 24’-0” towards Pier 9.

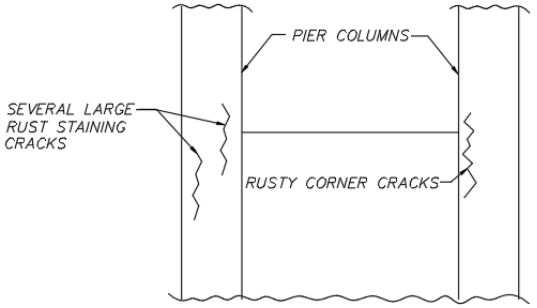
There is some exposed rusty rebar on the bottom flange of this girder at about the ¼-point from Pier 9.

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.

There are several vertical cracks in the pier columns and in the pier diaphragm walls (see detail).



LOOKING SOUTH AT PIER #9

Span 9: The west exterior girder has an 8’-0” 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.

The 12’-0” crack along the west girder 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 girder near the bottom of the flange at Pier 9 with rusty exposed rebar.

There are several diagonal/vertical cracks in the girder web and bottom flanges between Piers 9 and 10.

Pier 10: Pier 10 is the south main channel pier with a timber fender system surrounding the pier.

Span 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’-0” of hairline cracking on the west face.

Girder C has a 24’-0” patch on the east face of the bottom flange. The patch has shrinkage cracking throughout but when sounded, the patch is still bonded to the girder.

There are several diagonal/vertical cracks in girder webs and bottom flanges between Piers 11 and 12.

Girder A has 15” of exposed rebar in the bottom flange at the north 1/3-point diaphragm.

Girder A south end bottom flange has exposed rusty rebar.

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 soffit 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 cracks in the soffit near Pier 12.

Span 12: Girder A, about 1/3-point from Pier 12, has two rusted stirrups due to lack of cover.

There is a 12” and a 24” length of exposed rebar with 8” of spalling.

Girder C, outside edge of the bottom flange, has horizontal/diagonal cracking for ½ the span.

Girder A has a 40’-0” long bottom flange delamination on the west face.

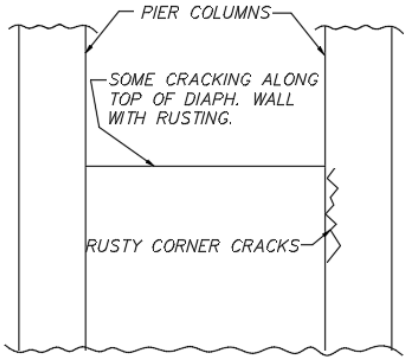
Pier 13: There is slight pitting of paint on all the steel rocker bearing assemblies.

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’-0” 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.



LOOKING NORTH AT PIER #13

There are a few transverse leaching deck cracks near Pier 13.

Column A, north side, has 4 SF of delamination and rust staining.

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.

Girder B has a 3" diameter spall in the east face of the bottom flange.

The upper end of Girder C has a 16” x 6” x 1-1/2” spall with no exposed rebar.

Girder C, east side, has 3 spalls with exposed rebar near Pier 13.

There is pack rust forming between the girder and plate.

There are diagonal/vertical cracks in all girders of Span 13.

From the routine inspection report (note 407) at Pier 13A, 13B and 16A the deck is

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.

A few of the nuts at the drop-in span bearing assemblies are not fully engaged. The bearing assembly under Girder B is missing both nuts.

Span 14: The outside edge of Girder A bottom flange has a 34’-0” long horizontal hairline crack and 10’-0” of delamination at mid-span and a 12” spall in the middle.

There are several hairline diagonal/vertical cracks in the girders 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 an 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.

There are transverse leaching cracks in the soffit near the piers.

There are a few hairline cracks in the webs of the concrete girders.

Span 15: There is diagonal cracking in the flanges of all girders.

There is cracking in soffits throughout.

The outside edge of Girder A bottom flange has a 30” long horizontal leaching hairline crack at mid-span.

There is a 3’-0” 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 under Girder A has been patched and the patch is beginning to break up.

The bearings are tipped slightly to the north.

Span 16: This span 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 the welds. The welds are intact.

Pier 17: The west face of Girder A has spalled off.

Both faces of Girder B have spalled (see photos).

Concrete girders have diagonal hairline cracks in the webs and bottom flange.

The ends of the concrete girders have diagonal cracks that extend from the center of bearing to the west end of the Girder C.

Span 17: There are transverse leaching cracks in the soffit with a few exposed rebar.

There is vertical and diagonal cracking in girder webs throughout.

Pier 18: There are a few transverse leaching deck cracks near Pier 18.

There are a few vertical/diagonal cracks in the girder webs.

The northwest exterior pile has a 2'-0” wide by 3'-0” long spall. The spalls are about 2" deep.

Span 18: There are transverse leaching cracks in the soffit with a few exposed rebar.

There is vertical and diagonal cracking in girder webs throughout.

There are several transverse leaching deck cracks between Piers 18 and 19.

There are hairline cracks in the bottom flanges.

Pier 19: There are some diagonal/vertical cracks in the girder webs between Piers 19 and 20.

There are a few transverse leaching cracks in both sidewalk slabs over the pier.

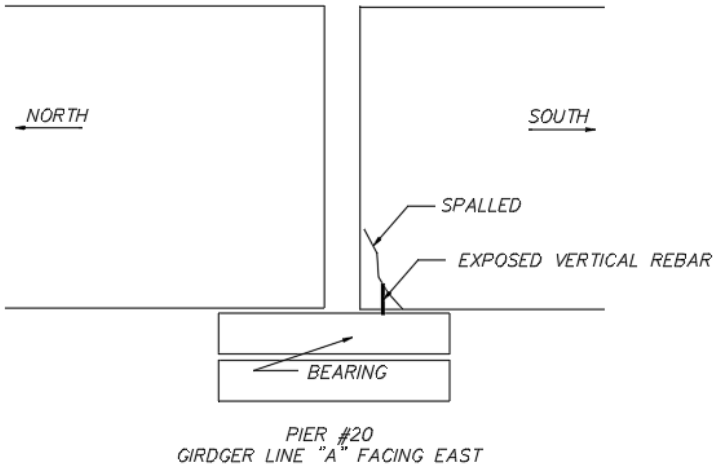
There are some hairline cracks in bottom flanges.

Span 19: There are transverse leaching cracks in soffit with a few exposed rebar.

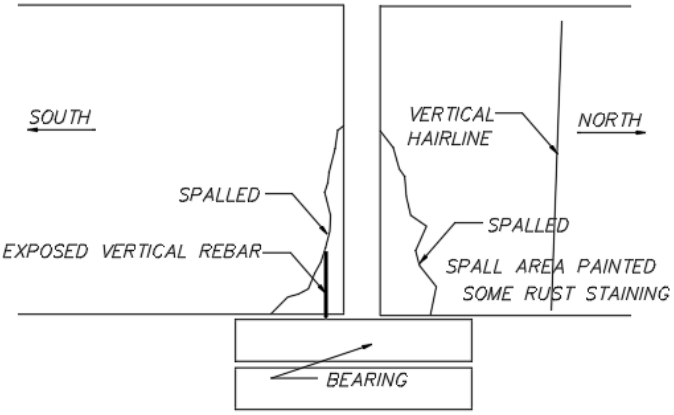
There is vertical and diagonal cracking in girder webs throughout.

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).

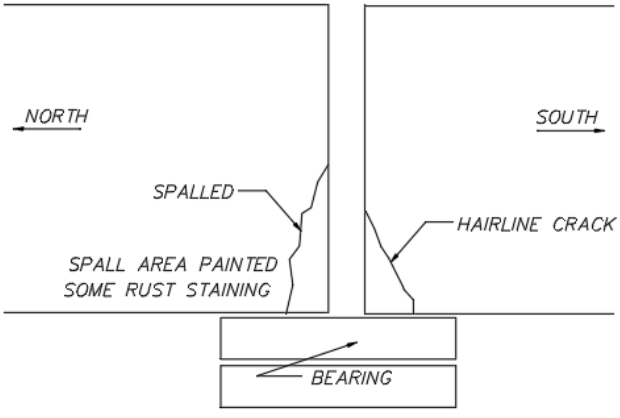
Span 20:



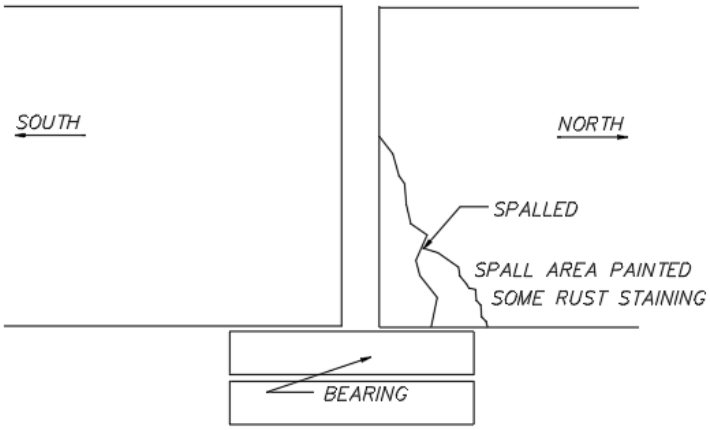
PIER #20
GIRDGER LINE "A" FACING EAST



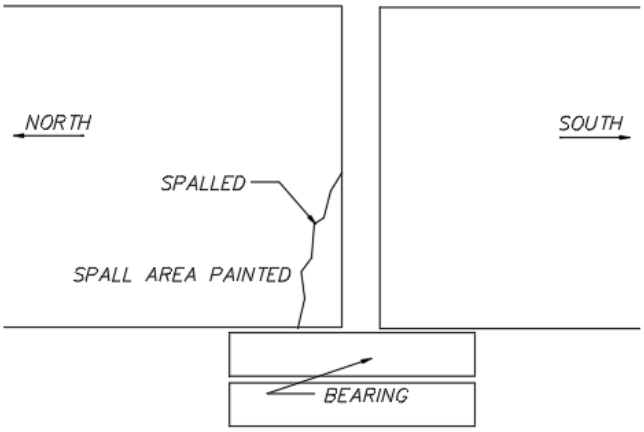
PIER #20
GIRDGER LINE "A" FACING WEST



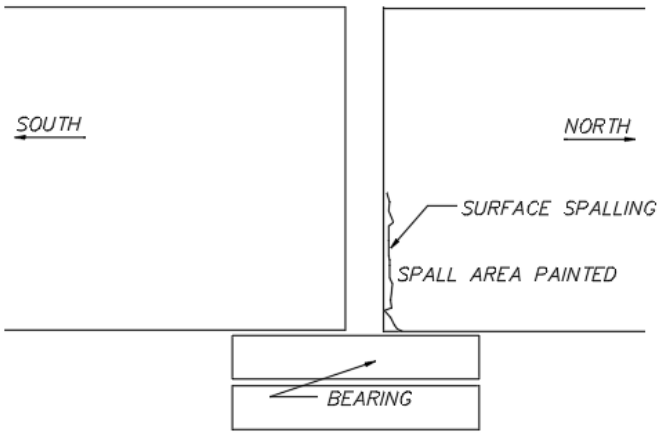
PIER #20
GRIDGER LINE "B" FACING EAST



PIER #20
GRIDGER LINE "B" FACING WEST



PIER #20
GRIDGER LINE "C" FACING EAST



PIER #20
GRIDGER LINE "C" FACING WEST