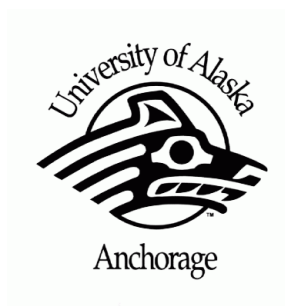


GROUP B – PEDESTRIAN BRIDGE INSPECTION PROJECT Final Presentation



Samantha Caldwell
Shelley Giraldo
Jared Kinney
Brian Weigand

Problem Statement

- ▶ MOA needs a pedestrian bridge inspection program.
- ▶ An inspection program should include:
 - ▶ What to look for when inspecting bridges
 - ▶ How to collect and process inspection data
 - ▶ How to make inspection data useful
 - ▶ How to assess bridge conditions

Scope of Project

▶ Key Tasks

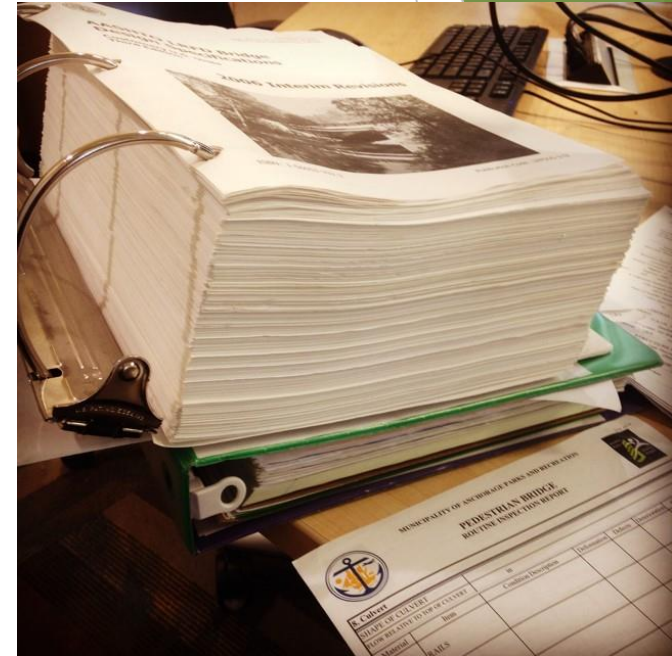
- ▶ Create a bridge inspection template
- ▶ Build geodatabase
- ▶ Survey and inspect 15 bridges
- ▶ Import inspection data into geodatabase
- ▶ Structurally analyze one bridge

Scope of Presentation

- ▶ Inspection program (template and geotadabase)
- ▶ Preferred alternatives
- ▶ Field inspections
- ▶ Inspection results
- ▶ Walkthrough of inspection program
- ▶ Structural analysis of one bridge

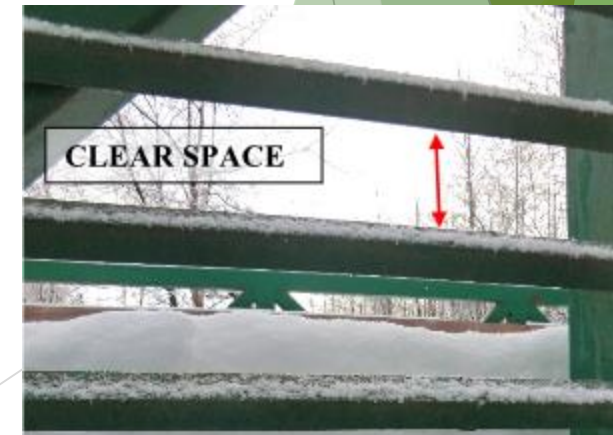
Inspection Template References

- ▶ AASHTO LRFD Bridge Design Specifications
- ▶ FHWA Bridge Inspector's Reference Manual
- ▶ FHWA Coding and Recording Guide
- ▶ FHWA National Bridge Inspection Standard
- ▶ BIA IRR Program Inspection Reports and Codes



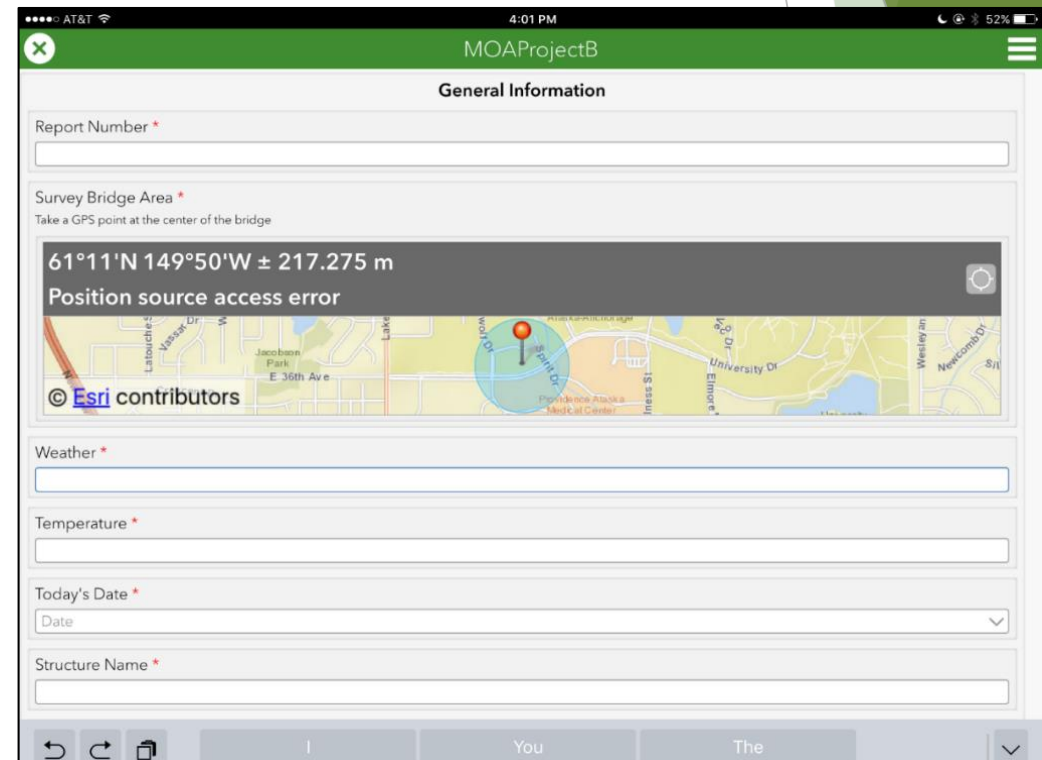
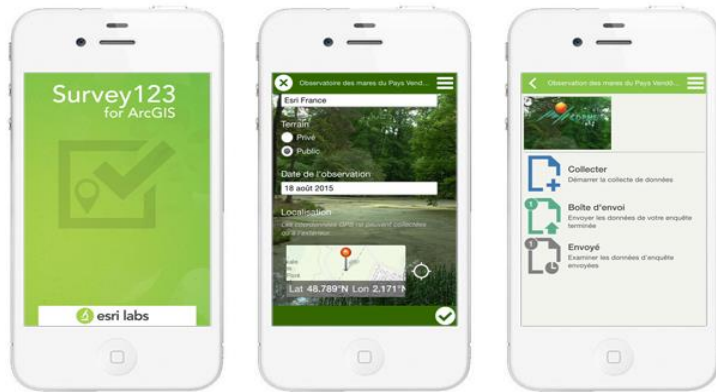
Inspection Template Information

- ▶ General (location, weather, feature crossed)
- ▶ Bridge structure (type of bridge, materials used)
- ▶ Safety hazards (sight distance, guardrail spacing, signage)
- ▶ Structural integrity (missing or damaged elements, excessive deflection, scouring)
- ▶ Condition ratings



Preferred Alternative - MOA Project B App

- ▶ Customized Survey 123 app
- ▶ Can be used on any iOS or Android device
- ▶ Recommended by client
- ▶ Coded in Visual Basic
- ▶ Exports data to ESRI server

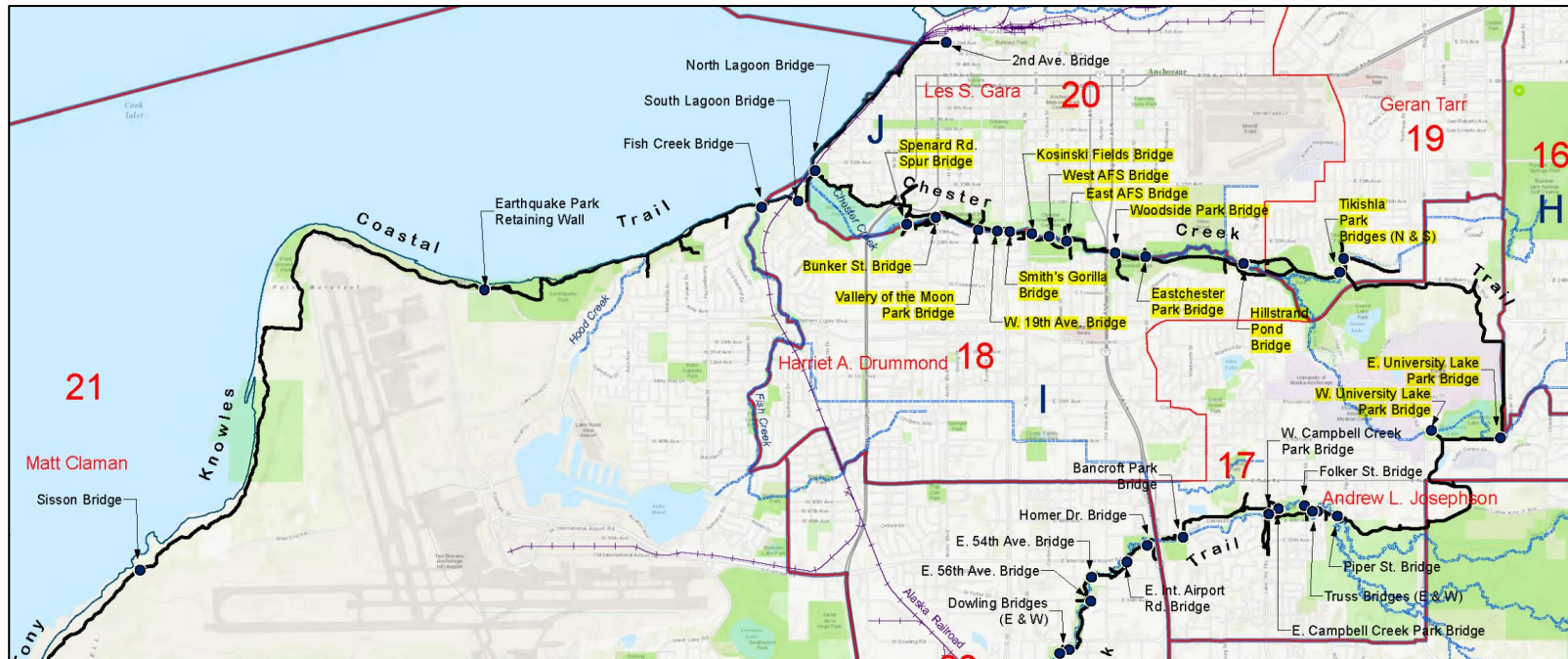


Preferred Alternative - Cloud Based Geodatabase

- ▶ Hosted on ESRI server
 - ▶ Can be accessed by anyone with password
- ▶ Can easily add data from Survey 123 app
- ▶ Allows visualization and querying of bridge data
- ▶ Can be imported into ESRI Bridge Inventory

Field Inspections

- ▶ MOA Project B App was developed and tested
- ▶ Inspections (15) were conducted February 4th to March 14th



Field Inspections

- ▶ Inspection program will be used by Parks and Rec employees
- ▶ Inspection guide was created to accompany program

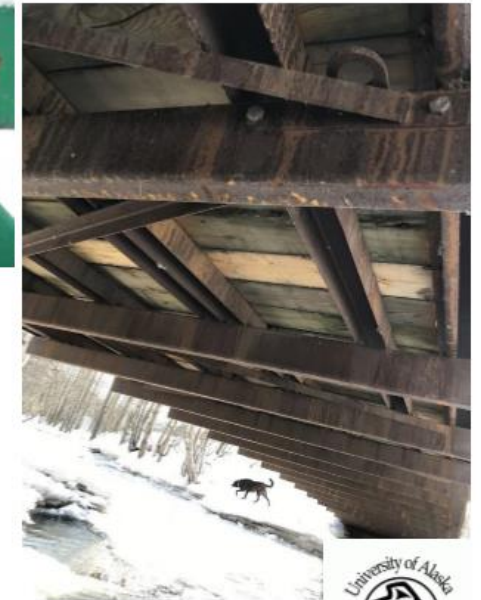


MUNICIPALITY OF ANCHORAGE
PARKS AND RECREATION



MOA PROJECT B

PEDESTRIAN BRIDGE INSPECTION GUIDE



APRIL 2017

Inspection Results

Table 2. Superstructure Condition Ratings

Bridge	Railing	Truss	Deck/Deck Overlay	Expansion Joints	Floor Beams	Stringers/ Girders
<u>Spenard Rd. Spur Bridge</u>	8	8	7	8	8	-
Bunker St. Bridge	6	6	5	6	7	6
Valley of the Moon Park Bridge	7	-	7	N	-	8
W. 19 th Ave. Bridge	4	-	5	N	7	6
Smith's Gorilla Bridge	6	5	6	6	6	6
<u>Kosinski Fields Bridge</u>	6	-	6	N	7	5
West AFS Bridge	7	6	6	N	6	6
East AFS Bridge	6	5	6	N	6	6
Woodside Park Bridge	7	5	6	N	6	5
Eastchester Park Bridge	6	6	7	5	6	6
<u>Hillstrand Pond Bridge</u>	8	-	-	-	-	-
Tikishla Park Bridge North	5	-	6	6	-	6
Tikishla Park Bridge South	5	-	7	N	-	6
West University Lake Park Bridge	7	7	7	N	7	7
East University Lake Park Bridge	6	6	7	N	5	5

► 0-9

Inspection Results

- ▶ Some elements not visible due to snow cover
- ▶ Railing height and spacing
- ▶ Splitting and decay of wood members
- ▶ Corrosion
- ▶ Damaged steel members
- ▶ Scouring

Scouring



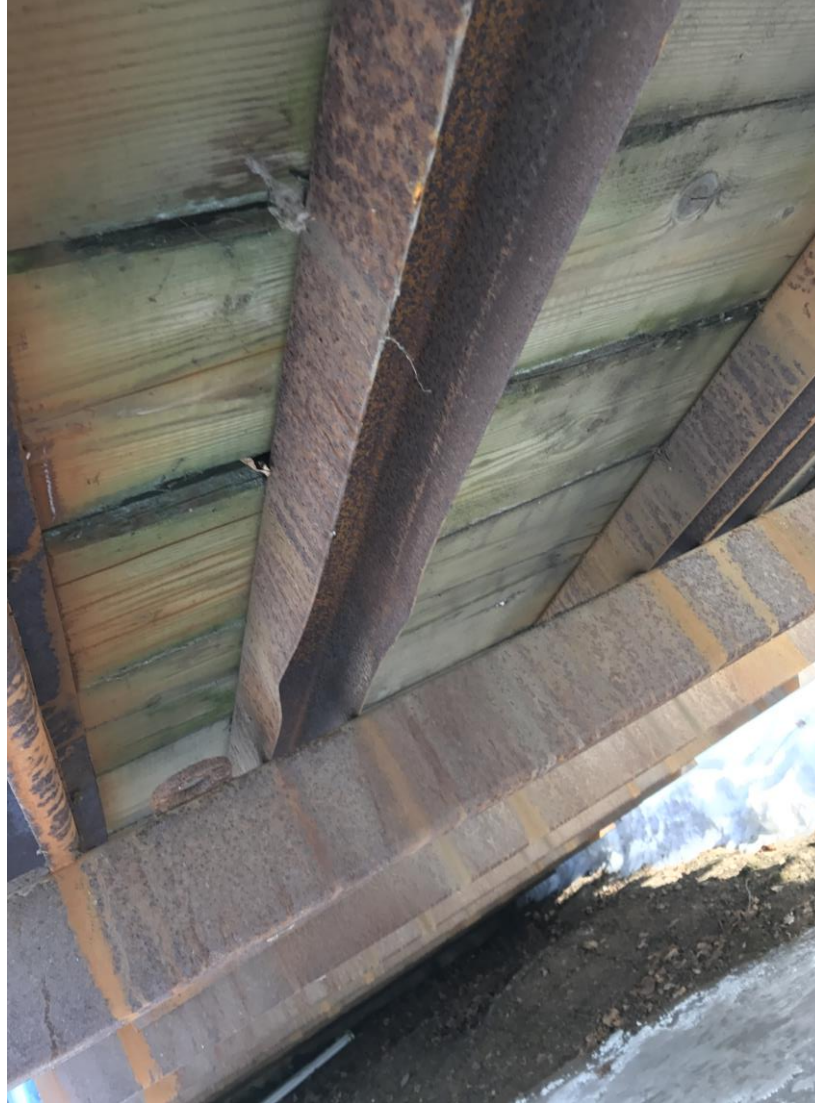
Corrosion



Timber Decay and Splitting



Damaged Steel Members



Inspection Simulation

▶ Brought to you by Brian

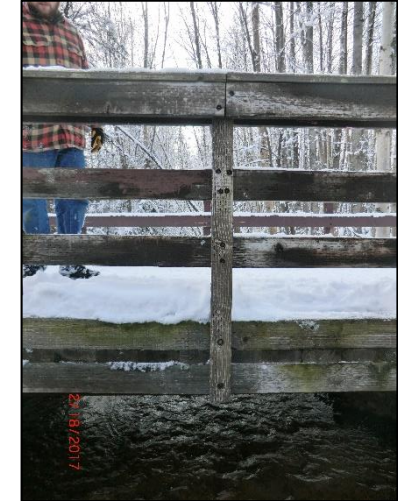
Structural Analysis



- ▶ Tikishla Park Bridge North
- ▶ Spans 28.5' X 9' Wide
- ▶ Limited Sight Distance
- ▶ Wooden Railing and Deck
- ▶ Supported by (2) W10x33 beams

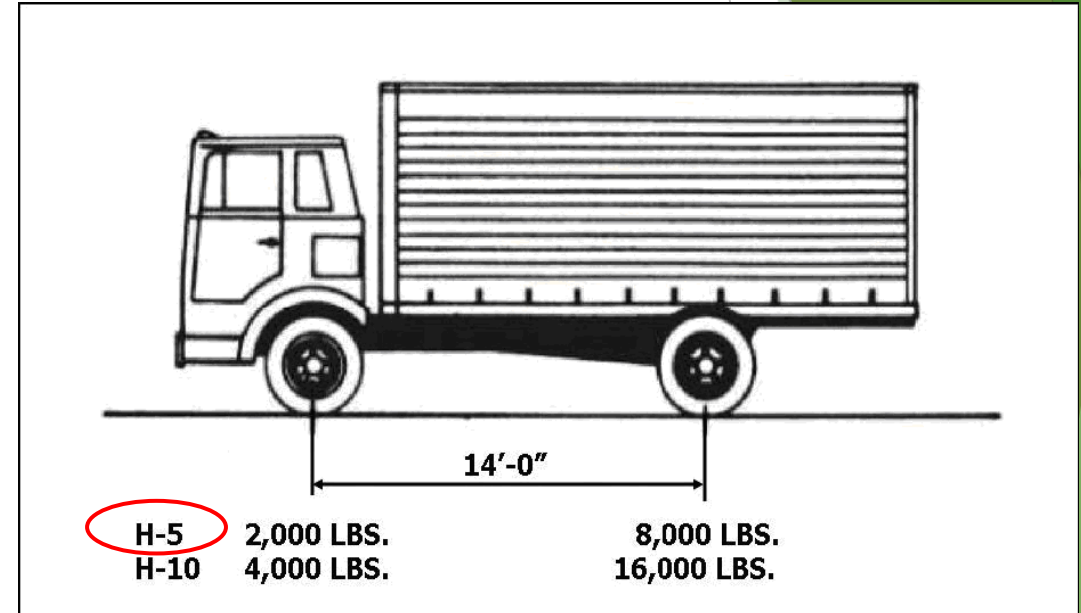
Structural Analysis Assumptions

- ▶ Timber is Hem-Fir
 - ▶ 1/8 inch of decay on all surfaces
 - ▶ Decking is commercial grade
- ▶ A992 steel
 - ▶ Negligible section loss
 - ▶ Decking does not provide bracing for girders
- ▶ Tire contact area is 10"X20"
 - ▶ 3 planks engaged



Structural Analysis - Specified Design Load Combinations

- ▶ Live (Pedestrian)+Dead+Snow Loads
 - ▶ Pedestrian - 90 psf
 - ▶ Dead (Self-Weight) - 4500 lb
 - ▶ Snow - 42 psf
- ▶ Dead+Live (Vehicle) Loads
 - ▶ Dead (Self-Weight) - 4500 lb
 - ▶ Live (Moving Vehicle Load)
 - ▶ Front Tire - 1 kip
 - ▶ Back Tire - 4 kip



Design Vehicle: H-5

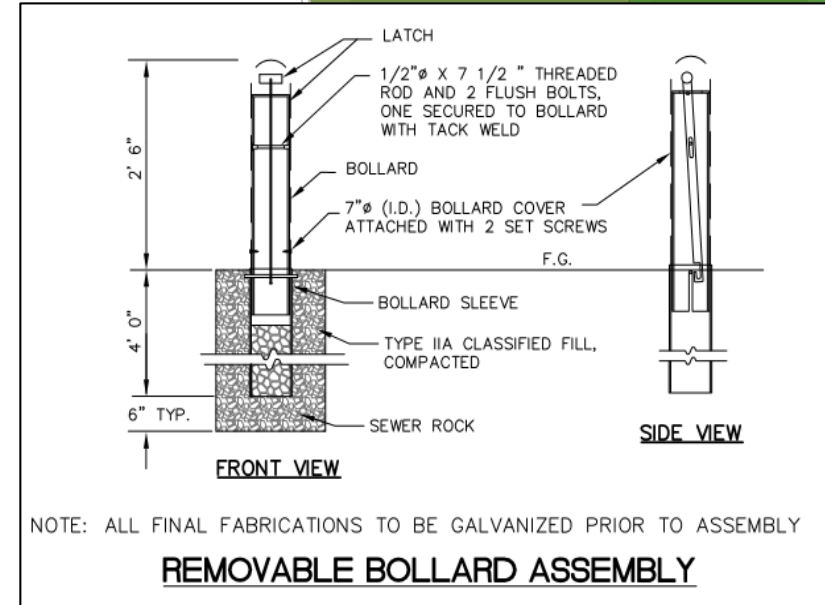
Structural Analysis - Results

- ▶ Timber Decking
 - ▶ L+D+S: did not fail
 - ▶ D+L: failed due to shear
- ▶ Steel Girders
 - ▶ L+D+S: failed in bending (and deflection)
 - ▶ Pedestrian Load: 152 people (not likely)
 - ▶ D+L: did not fail (excessive deflection)



Recommendations

- ▶ Install removable bollards
- ▶ Provide signage preventing unauthorized vehicles from crossing
- ▶ Rehabilitation/replacement of railing
- ▶ If decking is going to be replaced, entire timber frame should be replaced
- ▶ Replace bridge



Project Outcomes

- ▶ Pedestrian bridge inspection program ready for use by Anchorage Parks and Recreation
- ▶ Trails will be safer
- ▶ Municipality of Anchorage can make thoughtful decisions to determine spending priorities



Questions?

