Alaska Department of Transportation & Public Facilities
Anchorage Earthquake, November 30th 2018
Bridge Inspection Response

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Keep Alaska Moving through service and infrastructure
OVERVIEW

• Earthquake!
• Response Logistics
• Damage Findings
• Lessons Learned
November 30, 2018 Earthquake

M7.0 Earthquake Strikes Southern Alaska, November 30, 2018

MAGNITUDE 7.0
30 November, 2018
61.332°N 149.935°W
17:29:28 UTC
November 30, 2018 Earthquake
Alaska DOT&PF Bridge Section

- Staffing and Responsibilities
  - 23 Engineers – 11 Inspection Team Leaders
  - Bridge design and plan development
    - Structural Design & Bridge Hydraulics
  - Bridge Inspection & Load Rating
    - Inspections and load ratings are performed by design engineers every summer
  - Bridge engineers are familiar with bridge inventory
  - Familiar with inspection practices, equipment and techniques.
Response

• Bridge Office is Centralized in Juneau
  - Juneau can only be reached by air or sea
    - 500 air miles from Anchorage

• Inspection Teams
  - 3 team leaders & 2 assistants
  - NR Bridge Crew
  - 4th team leader sent 2 days later

• Bridge Inspection Trucks – Stored in Anchorage
  - 4WD F450 and F550 trucks with equipment boxes
Priority of Inspection Work

• What order to inspect in? Simply in terms of distance? Route importance?
  ▪ Damage reports
  ▪ Mainline critical routes (Glenn Highway, Seward Hwy, Minnesota Ave)
  ▪ Age of structure
  ▪ Retrofitted?
  ▪ Structure details
    • Multi span structures > single span structures
  ▪ Knowledge of previous issues or performance
**Inspection**

- 3 teams initially, 4\textsuperscript{th} called in two days later
  - Approximately $20\pm$ structures inspected each day by each team
  - 15-30 minutes spent at each bridge
    - Looking for significant damage that would endanger public or that could be effected by aftershocks
    - Basic notes & photos
Inspection Markings

Bridge Number & Organization

Date & Time

Initials of inspector

Status of Structure
1 Close structure. Bridge is collapsed or impassible
2 Close structure. Shoring would support bridge reopening
3 Structure can remain open to traffic

• Every bridge inspected was marked like this to ensure that work wasn’t being doubled up and that bridges weren’t missed
Inspection Findings

Pedestrian Culvert #7020 in June 2018
Inspection Findings

PUC #7020 on 11/30
Inspection Findings

Approach roadway settlement or failure

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Inspection Findings

Slope failures in front of wingwalls & abutments

16” Drop
Inspection Findings

Shear key spalling/movement/delaminations
Inspection Findings

Shear key spalling/movement/delaminations
Inspection Findings

Bent anchor bolts and global movement
Inspection Findings

Bent anchor bolts and global movement
Inspection Findings

Misc. findings
November 30, 2018 Earthquake
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Inspection Findings

Misc. findings

6’-6”
Reopening the Highway

Grinding then Pavement Step
Inspection Summary

• Inspected about 300 bridges in 4 to 5 days
• 18 bridges require some form of repair
  ▪ More in depth inspection required for scope of repair
  ▪ Repair work planned to start this summer (2019)
• On going monitoring of ground disturbance
Lessons Learned

- Anchorage Airport was briefly closed
  - Investigate other travel options
  - National Guard, Coast Guard, Ferry & Drive
- Inspection teams didn’t take the first available flight
  - Extra time was spent in the office preparing and organizing for the field work
  - Deploying a quick response reconnaissance team as soon as possible might be better overall
Lessons Learned

- Portable Digital Files
  - Recommend a continually updated evault be kept on a portable hard drive
- Inspection teams heavily relied on cell phone communication – What if no cell service?
  - Only had one radio – Need more.
- Food & Lodging
  - Initially limited but quickly available
  - Brought some provisions
Lessons Learned

• Inaccurate initial damage reports
  ▪ Local maintenance personnel didn’t always recognize pre-existing damage
  ▪ Need to provide more training to first responders

• Initial inspectors failed to mark bridges
  ▪ Failure to follow response protocol could result in inefficiencies or possibly missed bridges.

• Bridge inspectors’ time was occasionally diverted by requests for public relations efforts