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Los Alamos Canyon Bridge Inspections Presentation

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- **Presentation To:**
  - Supercomputing Challenge Students – April 22, 2013
  - FOD/Engineering Managers – April/May 2013

Los Alamos Canyon Bridge Inspections



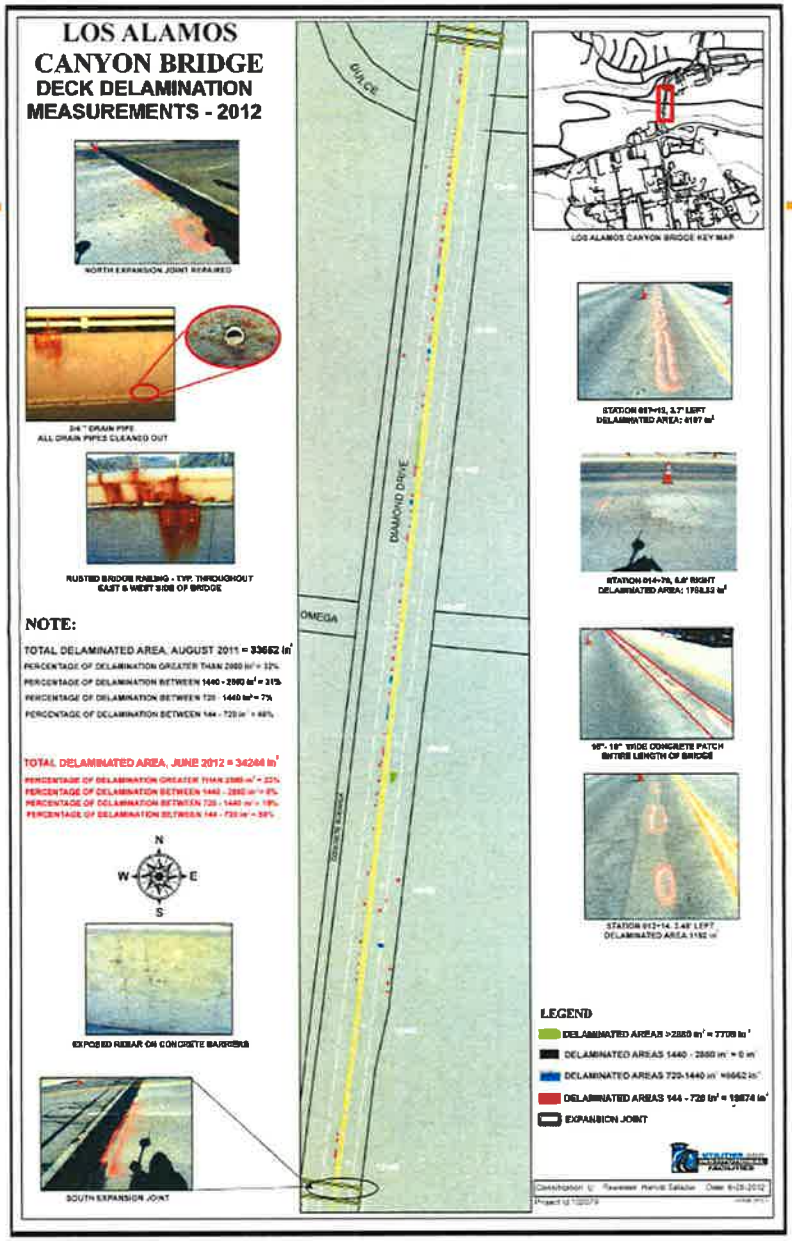
Overview

- Bridge Composition
- Bridge Ratings
- Inspection Recommendations
- Prioritized Projects
- Q&A



Bridge Composition

- **Deck**
  - Deck
  - Wearing Surface
  - Expansion Joint
  - Curbs/Sidewalks
  - Bridge Rails
  - Deck Drains



Bridge Composition

- **Superstructure**
  - Arch ribs
  - Spandrel girders
  - Floorbeams
  - Stringers
  - Bearings
  - Coating System





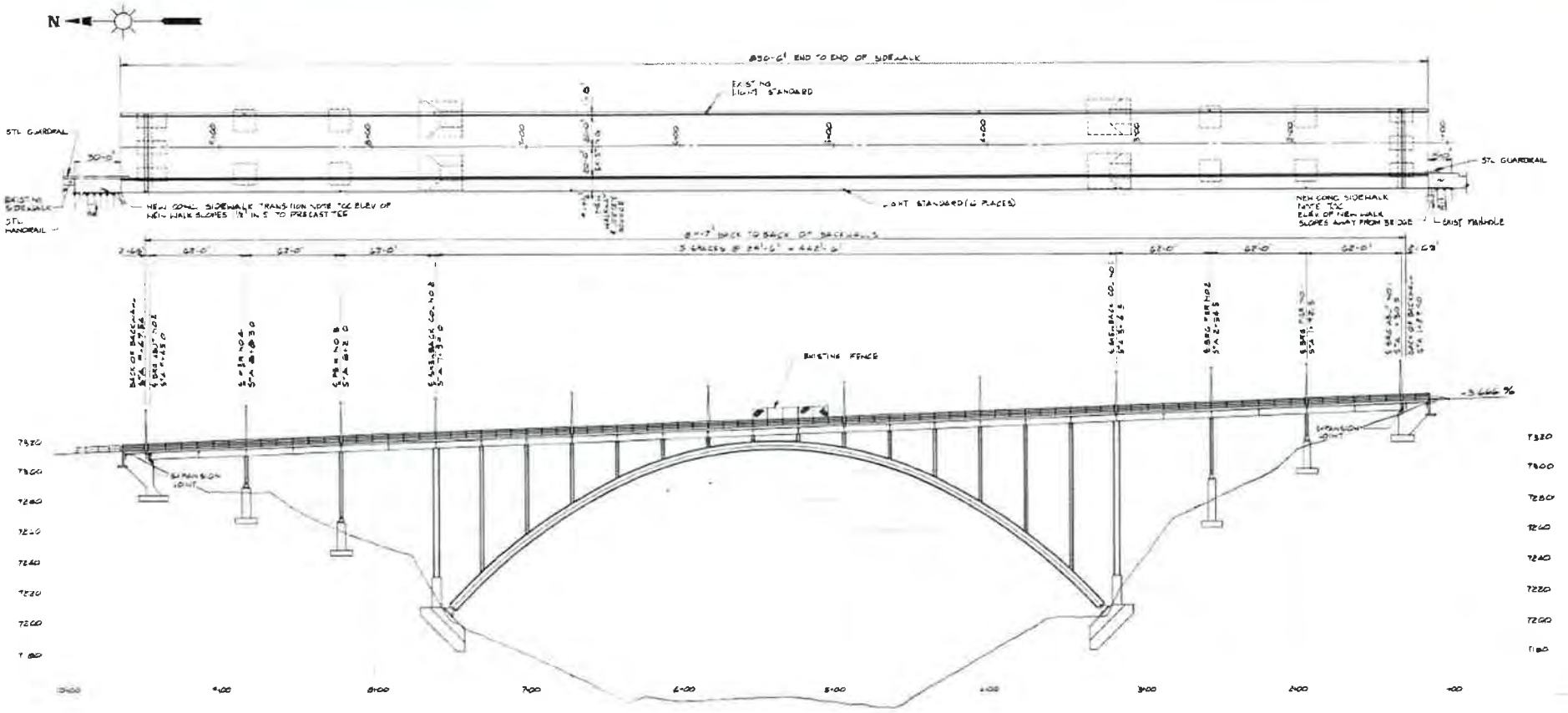
Bridge Composition

- **Substructure**
  - Abutments
  - Piers
  - Foundations
  - Slope Protection
  - Coating System





Bridge Composition



Bridge Ratings

- **Scale is from 0-9**
  - 0 is bridge failure
  - 9 is excellent condition
- **FY-12: Substructure rating decreased**
  - Abutment degradation of sealed repairs
  - Pier cracks of sealed repairs

FY	Deck	Superstructure	Substructure
FY-12	Good (7)	Fair (5)	Fair (5)
FY-11	Good (7)	Fair (5)	Good (7)
FY-10	Good (7)	Fair (5)	Good (7)

Inspection Recommendations

- **Immediate**
  - Guardrail
  - Keeper plate





Inspection Recommendations

- **Short Term**
  - South abutment



Inspection Recommendations

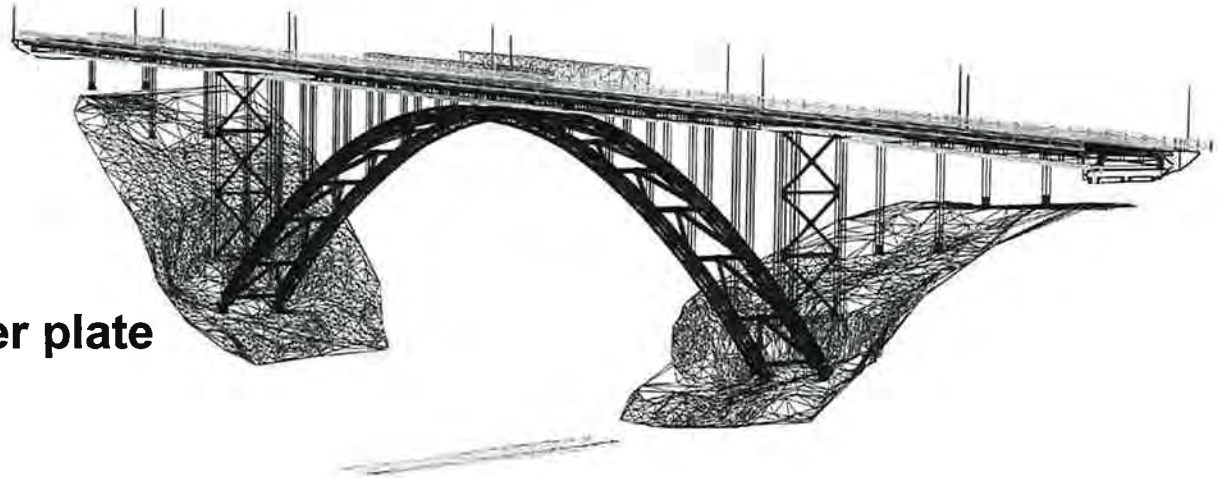
- **Long Term**
  - Metal railing
  - North abutment





Prioritized Projects *Immediate

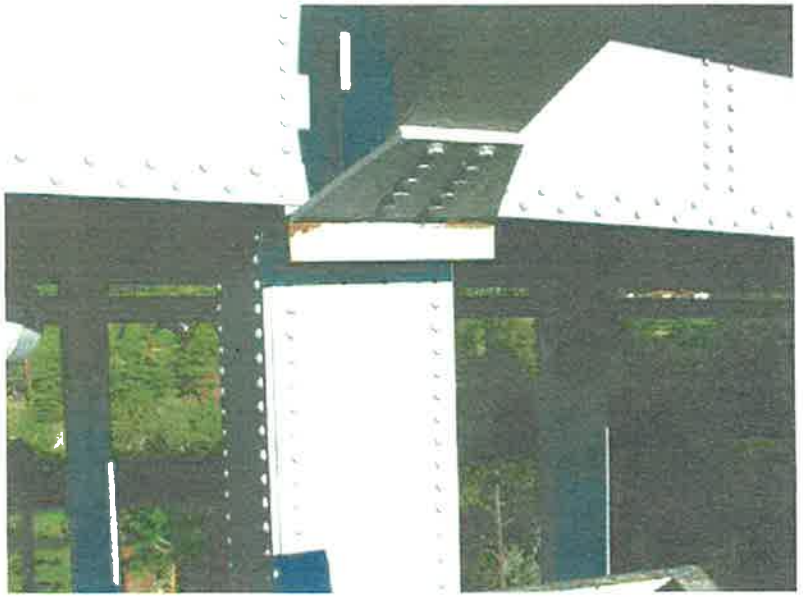
- **Bridge Model**
  - Deck, Superstructure, and Substructure load rating analysis
  - Assess Seismic capabilities
  - ~$100K
- **Southeast guardrail**
  - Footprints for repairs
  - ~$5K
- **South bearing keeper plate**
  - Footprints for repairs
  - ~$5K



**All estimates are ROM and for planning purposes only.*
Estimates can be better assessed upon completion of design.

Prioritized Projects <5 years

- **South concrete abutment**
  - ES-DE for design
  - MSS for repairs
  - ~$250K
- **Missing rivets in spandrals and bolts within floor beams**
  - ES-DE for design
  - MSS for repairs
  - ~$150K
- **Epoxy injection of cracks in concrete**
  - ES-DE for design
  - Outside contract for repairs
  - ~$100K



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Prioritized Projects <5 years

- **Re-paint entire bridge for corrosion**
  - ES-DE for design
  - Outside contract for repairs
  - ~$2M
- **South slope – re-grade**
  - ES-DE for design
  - MSS for repairs
  - ~$80K
- **North slope – re-grade**
  - ES-DE for design
  - MSS for repairs
  - ~$50K



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Prioritized Projects >5 years

- **North concrete abutment**
  - ES-DE for design
  - MSS for repairs
  - ~$125K
- **Metal railing**
  - ES-DE for design
  - Outside contract for repairs
  - ~$300K
- **Deck replacement**
  - Outside contract for design
  - Outside contract for repairs
  - ~$7M



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Q&A

- **What is the official name of the bridge?**
  - Los Alamos Canyon Bridge, Omega Road passes under the Los Alamos Canyon.
- **When was the Los Alamos Canyon Bridge built?**
  - Built in 1951 to American Association of State Highway Officials (AASHO) 1944 code of record. Deck replacement in early 1990s to American Association of State Highway and Transportation Officials (AASHTO) 1983 code of record.
- **What is the average daily traffic (ADT) for the Los Alamos Canyon Bridge?**
  - Based on 2011 traffic count data, the ADT is 13,195 vehicles/day.
- **What is the square footage of the Los Alamos Canyon Bridge?**
  - 362,850 square feet
- **What are the industry codes the bridge is inspected to?**
  - National Bridge Inspection Standards (NBIS), 2004 edition; and Recording and Coding Guide for the Structure Inventory and Appraisal of the Nation's Bridges, 1995 edition.

Q&A

- **Deck inspection?**
  - This item describes the overall condition rating of the deck.
  - Concrete decks should be inspected for cracking, scaling, spalling, leaching, chloride contamination, potholing, delamination, and full or partial depth failures.
  - The condition of the wearing surface/protective system, joints, expansion devices, curbs, sidewalks, parapets, and bridge rail shall not be considered in the overall deck evaluation. However, their condition should be noted on the inspection form.
- **Superstructure inspection?**
  - This item describes the physical condition of all structural members.
  - The structural members should be inspected for signs of distress which may include cracking, deterioration, section loss, and malfunction and misalignment of bearings.
  - The condition of bearings, joints, paint system, etc. shall not be included in this rating, except in extreme situations, but should be noted on the inspection form.
  - Fracture critical components should receive careful attention because failure could lead to collapse of a span or the bridge.

Q&A

- **Substructure inspection?**
  - This item describes the physical condition of piers, abutments, piles, fenders, footings, or other components.
  - All substructure elements should be inspected for visible signs of distress including evidence of cracking, section loss, settlement, misalignment, scour, collision damage, and corrosion.
- **What characteristics make the Los Alamos Canyon Bridge fracture critical?**
  - The spandral girders and floor beams are fracture critical, the rest of the bridge is not.

Q&A

Condition ratings descriptions?

- N – Not Applicable
- 9 – Excellent Condition
- 8 – Very Good Condition (no problems noted)
- 7 – Good Condition (some minor problems)
- 6 – Satisfactory Condition (structural elements show some minor deterioration)
- 5 – Fair Condition (all primary structural elements are sound but may have minor section loss, cracking, spalling or scour)
- 4 – Poor Condition (advanced section loss, deterioration, spalling or scour)
- 3 – Serious Condition (loss of section, deterioration, spalling or scour have seriously affected primary structural components. Local failures are possible. Fatigue cracks in steel or shear cracks in concrete may be present.
- 2 – Critical Condition (advanced deterioration of primary structural elements. Fatigue cracks in steel or shear cracks in concrete may be present or scour may have removed substructure support. Unless closely monitored it may be necessary to close the bridge until corrective action is taken.
- 1 – Imminent Failure Condition (major deterioration or section loss present in critical structural components or obvious vertical or horizontal movement affecting structure stability. Bridge is closed to traffic but corrective action may put back in light service)
- 0 – Failed Condition (out of service and beyond corrective action)