Agenda

- Common Bridge Inspection Access Challenges
- Inspector’s Conventional Access Toolbox
- Introduction to industrial rope access
  - Standard rope access techniques
  - Current evolutions in rope access
- Non-standard bridge access solutions
- Commonly used “tools of the trade”
Common Bridge Access Challenges

Load posted bridges preclude use of conventional access equipment

Traffic volumes and safety considerations prohibit lane closures
Common Bridge Access Challenges

- Structure geometry not conducive to efficient access
- Owner-installed bridge features prevent the use of standard access equipment
Common Bridge Access Challenges

Geography dictates economics of transporting conventional access tools

Unique structural features warrant unique access approaches
Bridge Inspector’s Access Toolbox

- Ground Access
  - Ladders
  - Waders
- Structure Climbing
Bridge Inspector’s Access Toolbox

- Hydraulic Equipment
  - Underbridge Inspection Vehicles (Snoopers)
  - Manlifts
  - Bucket Trucks
Bridge Inspector’s Access Toolbox

• Conventional Rigging
  – Boatswain’s Chairs
  – Swing Stage
  – Sky Climbers

• Non-standard rigging
  – Industrial Rope Access
Introduction to Industrial Rope Access

- Provides means to position workers in virtually any location throughout the 3-D environment
- Differs from fall protection in that rope serves as primary means of suspension
Introduction to Industrial Rope Access

- SPRAT – Society of Professional Rope Access Technicians
  - Member-based organization
  - Develops and implements standards used in North America

- Central tenet is use of an independent working and safety ropes
Introduction to Industrial Rope Access

• Levels of SPRAT Certification
  – Level I (worker) – 32 hours instruction + demonstrated proficiency in prescribed tasks
  – Level II (technician) – 500 hours as a Level I + demonstrated proficiency in prescribed tasks
  – Level III (Supervisor) – 500 hours as a Level II + demonstrated proficiency in prescribed tasks
Standard Rope Access Techniques

Use of ascending and descending devices
Standard Rope Access Techniques

Rope to Rope Transfers
Standard Rope Access Techniques

Edge negotiation
Advanced Rope Access Techniques

Beam clamps
Advanced Rope Access Techniques

Point to point aid climbing
Advanced Rope Access Techniques

Low Angle Traverse
Advanced Rope Access Techniques

Tensioned High Lines
Advanced Rope Access Techniques

Tensioned High Lines
Advanced Rope Access Techniques

Cable Rollers
Advanced Rope Access Techniques

Cross hauling
Non-Standard Bridge Access

Challenge - Debris fence on lower deck of the Fremont Bridge prevents UBIV access to lower deck floor system
Non-Standard Bridge Access

*Solution* – Installation of gates at selected panels
Non-Standard Bridge Access

Challenge – Efficient access to upper deck floor system of the Steel Bridge’s movable lift span under significant daily train traffic.
Non-Standard Bridge Access

Solution – Use the moveable lower deck to inspect the upper deck floor system members at eye-level.
Non-standard Bridge Access

Challenge – Significant inspection effort required for large structure in remote location
(Tatitlek, AK)
Non-standard Bridge Access

**Solution** - Use of tidal fluctuations (~40 feet) to aid expedient access
Tools of the Trade

• Waterproof notebooks and pens
• Waterproof and shockproof cameras
• Cordless magnetic particle testing equipment
• Headlamps to illuminate connection regions
• Magnetic rulers
• Compact ultrasonic measuring units
• Bridge-specific booklets for note-taking
Conclusion

• Common Bridge Inspection Access Challenges
  – Load posting
  – Traffic considerations
  – Restrictive geometry
  – Unique bridge features
  – Geography
  – Mechanical features
Conclusion

• Bridge Inspector’s Access Toolbox
  – Ground-level
  – Structure climbing with fall protection
  – Hydraulic Equipment
  – Conventional rigging and climbing
  – Non-standard rigging
Conclusion

Introduction to Industrial Rope Access
Conclusion

Standard and non-standard rope access techniques
Conclusion

Unique Access Challenges and Solutions
Thank you for your attention!
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Color Palette

- R2
  - G25
  - B56
- R79
  - G70
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- R62
  - G63
  - B64
- R84
  - G87
  - B89
- R242
  - G242
  - B242
- R200
  - G190
  - B169
Overcoming Inspection Access Challenges

Innovative Solutions to Bridge Inspection Access
Bridge Inspector’s Access Toolbox