



National Bridge Management, Inspection, and Preservation Conference
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Innovative
Bridge Access Techniques

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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

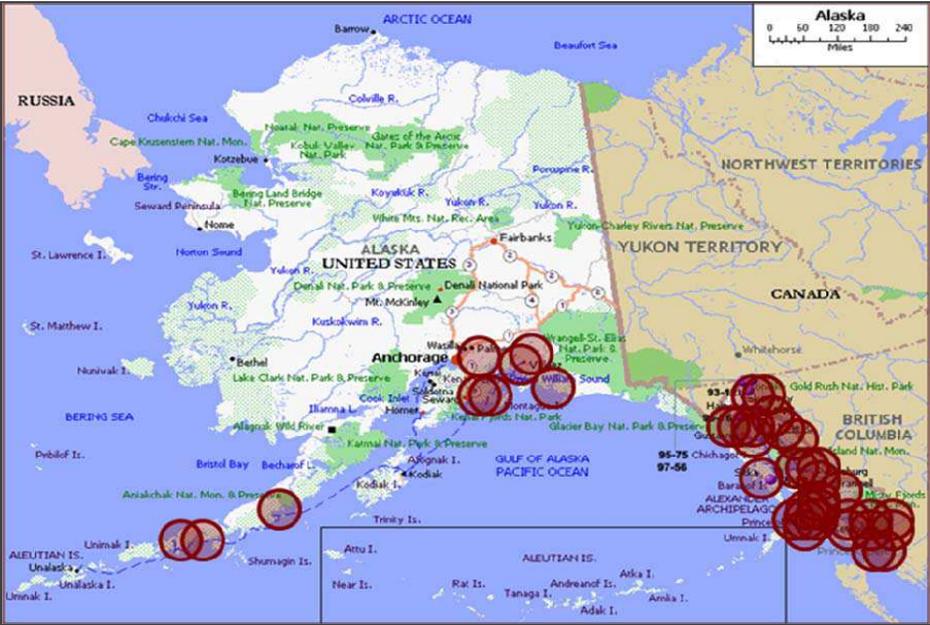
Owner-installed bridge features prevent the use of standard access equipment



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

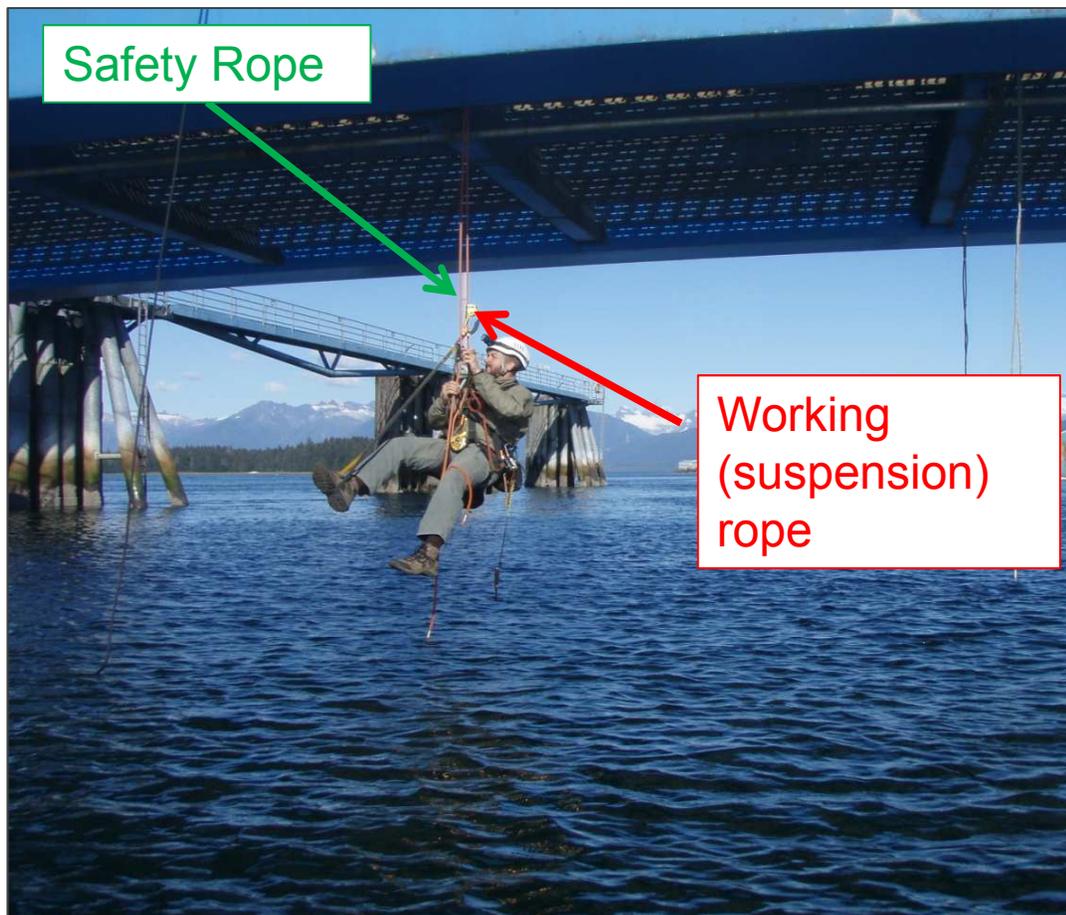


Introduction to Industrial Rope Access

- 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



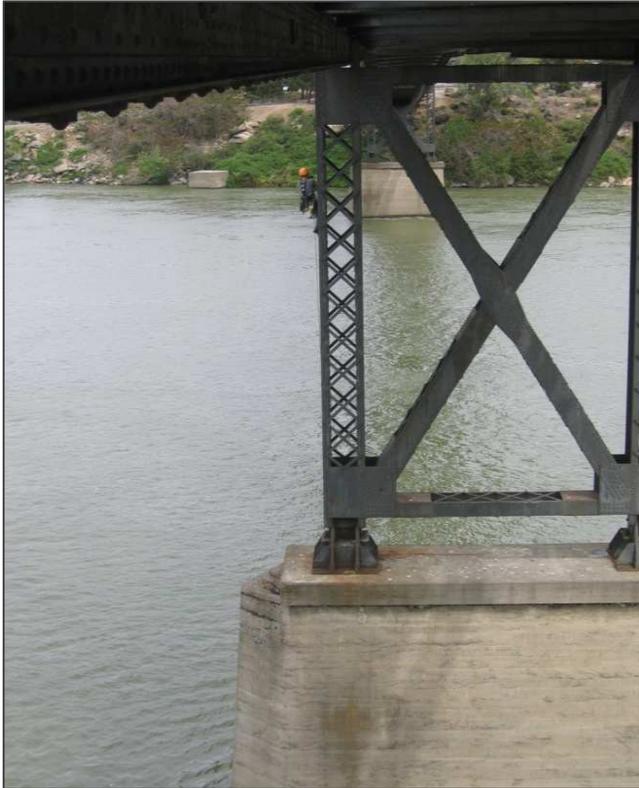
- SPRAT – *Society of Professional Rope Access Technicians*
 - Member-based organization
 - Develops and implements standards used in North America
- Central tenet is use of an independent working and safety ropes

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

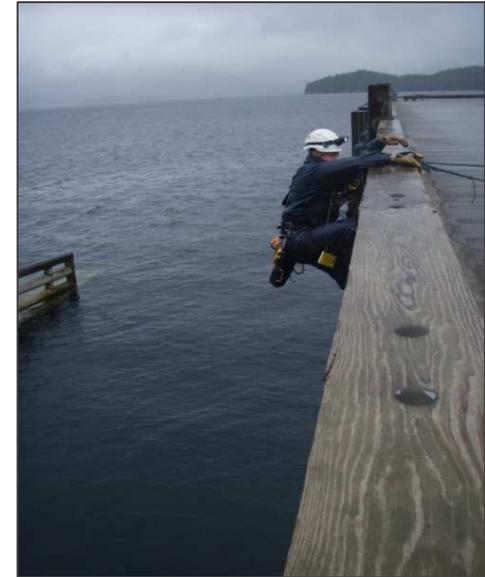
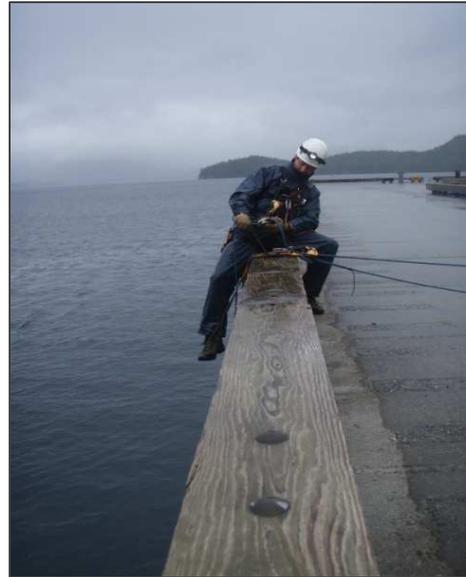
Standard Rope Access Techniques

Rope to Rope Transfers



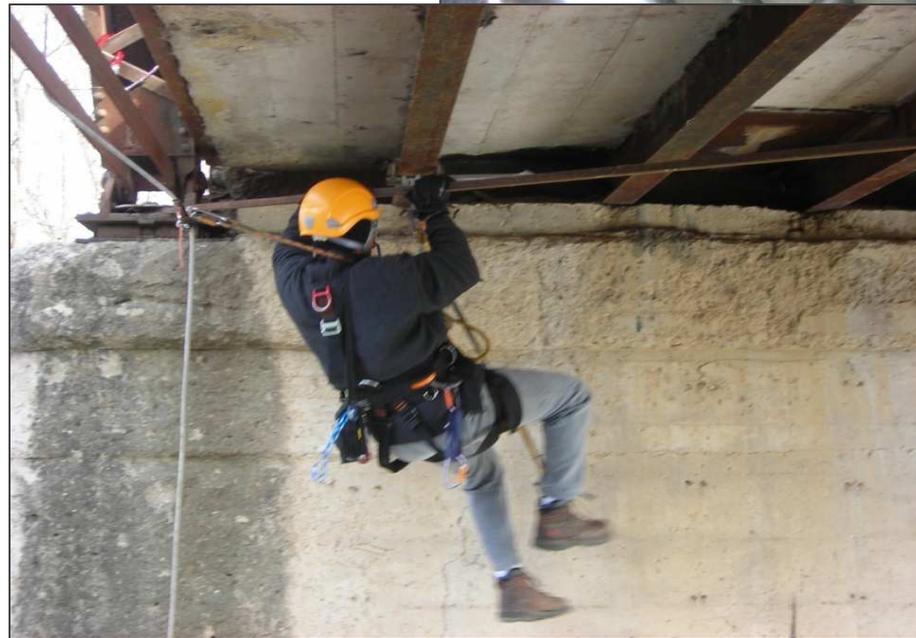
Standard Rope Access Techniques

Edge negotiation



Advanced Rope Access Techniques

Beam clamps



Advanced Rope Access Techniques

Point to point aid climbing



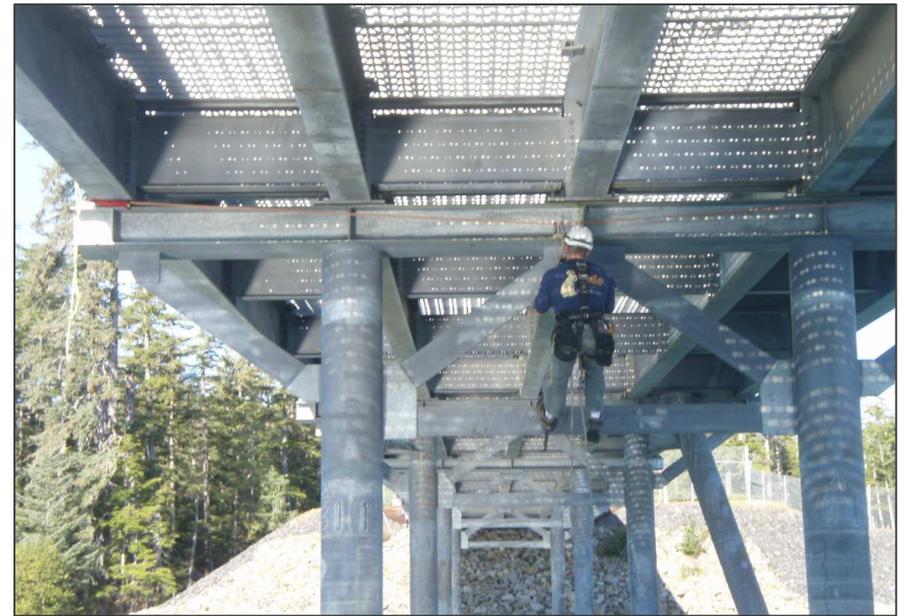
Advanced Rope Access Techniques

Low Angle Traverse



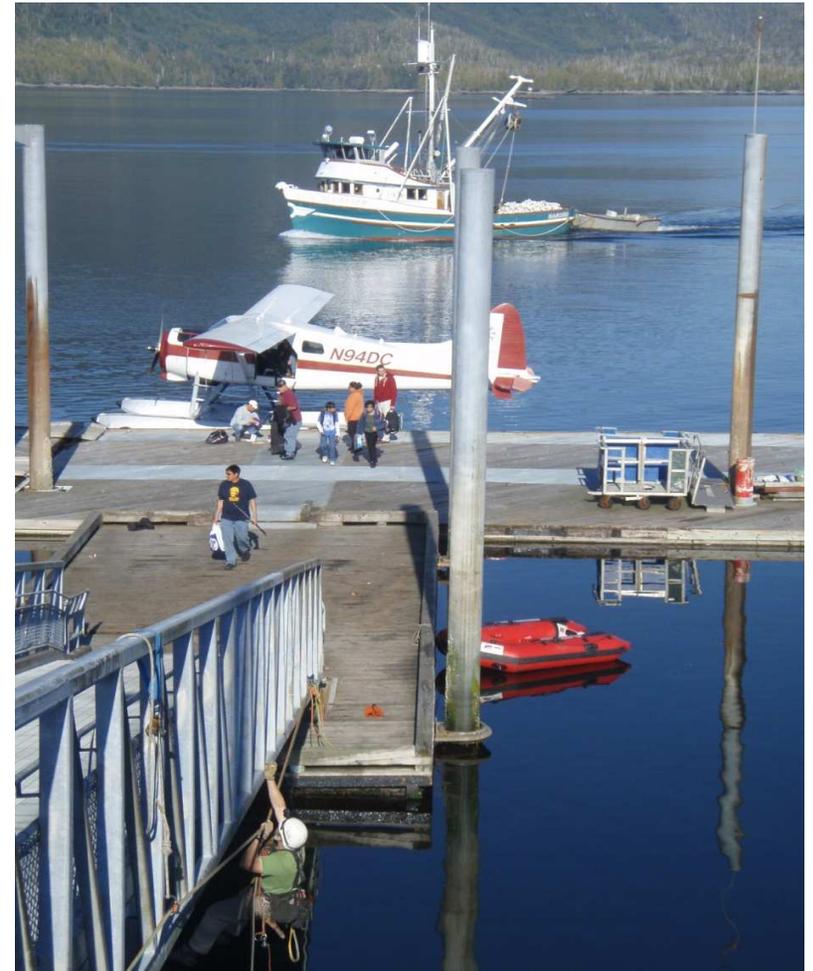
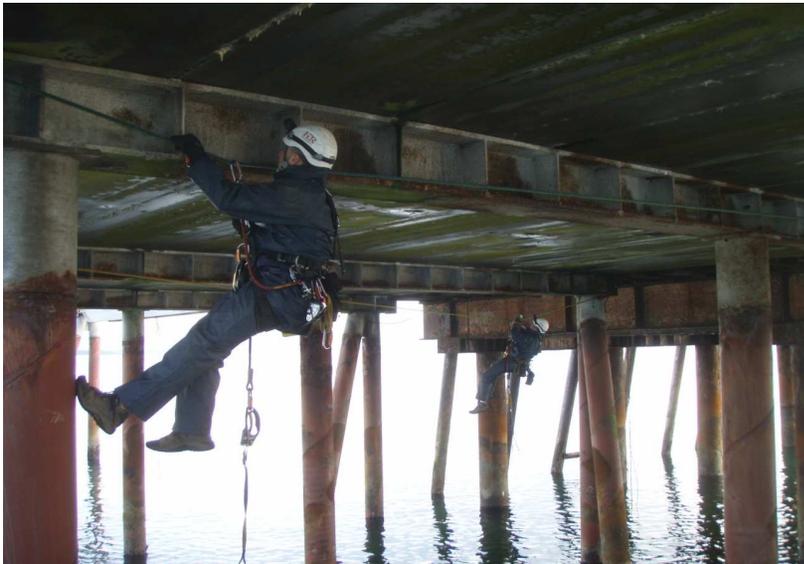
Advanced Rope Access Techniques

Tensioned High Lines



Advanced Rope Access Techniques

Tensioned High Lines



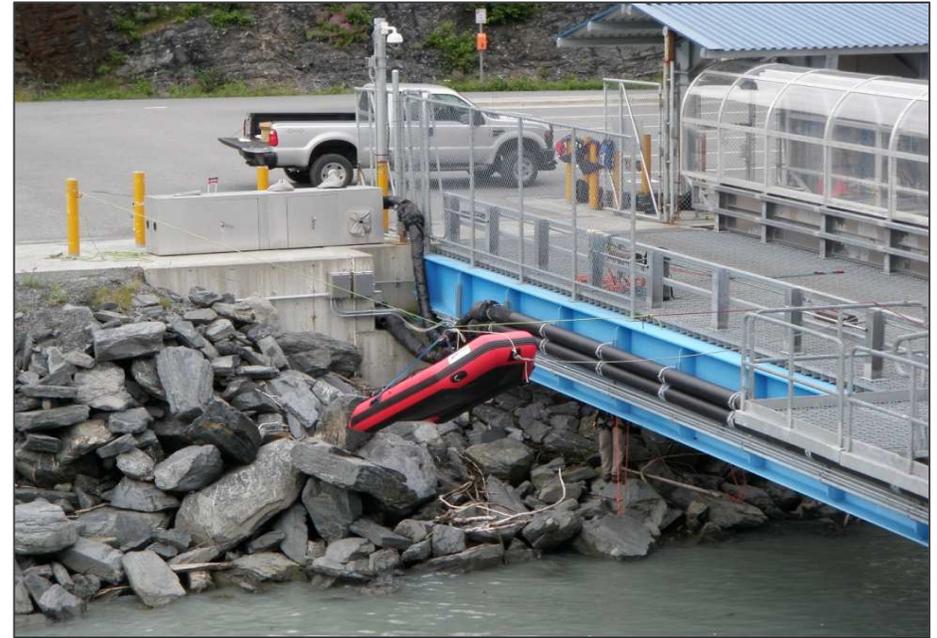
Advanced Rope Access Techniques

Cable Rollers



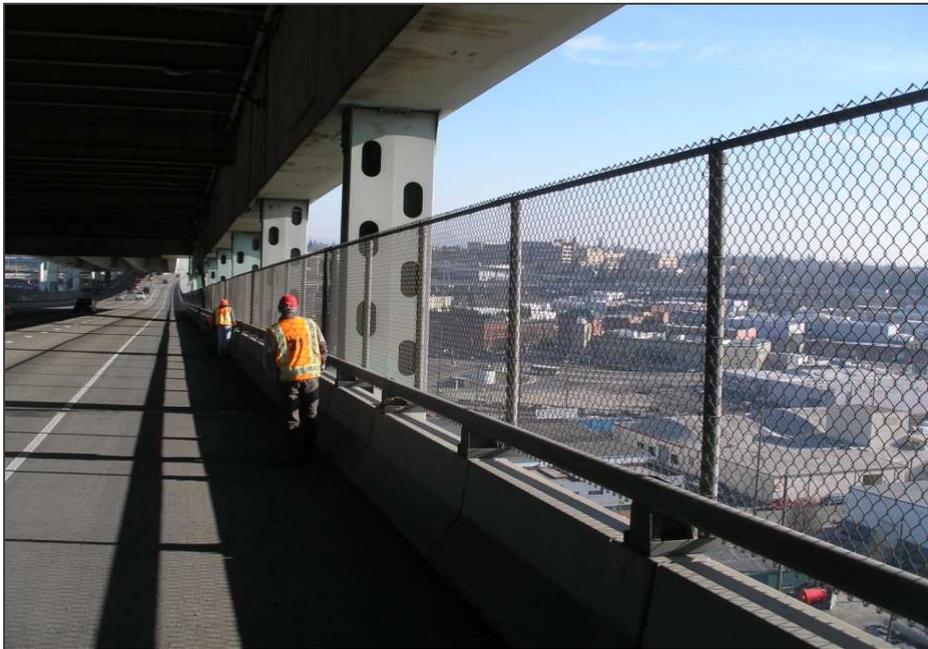
Advanced Rope Access Techniques

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



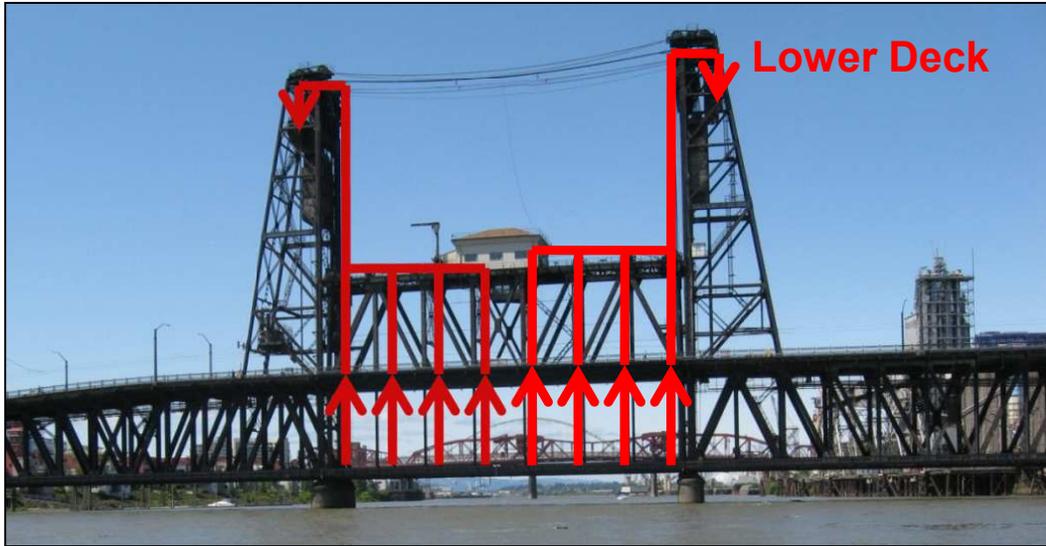
Non-Standard Bridge Access

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)



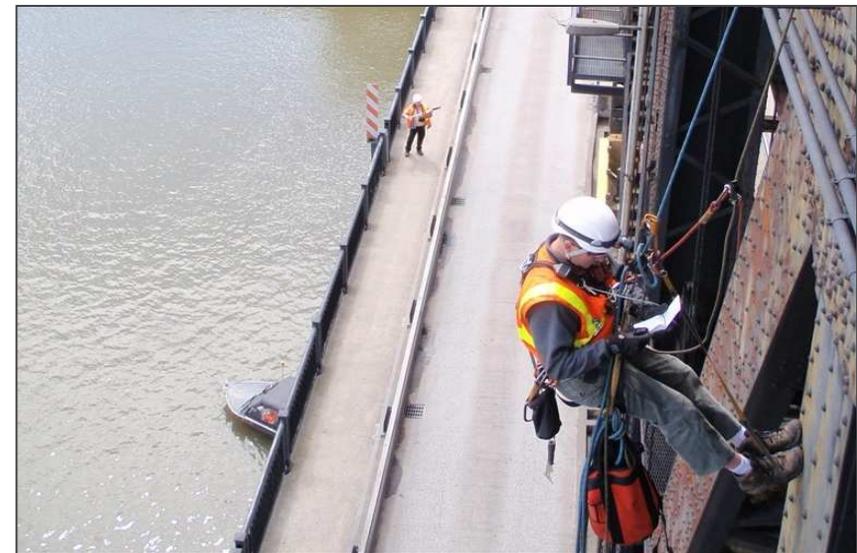
Non-standard Bridge Access

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



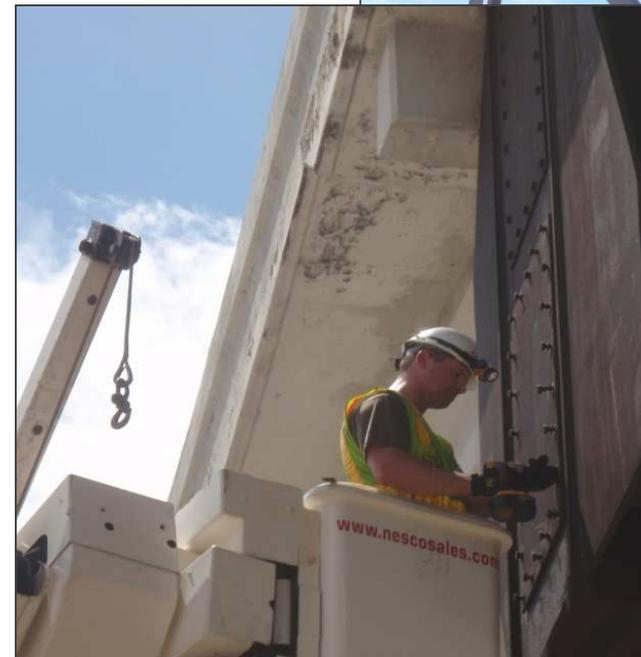
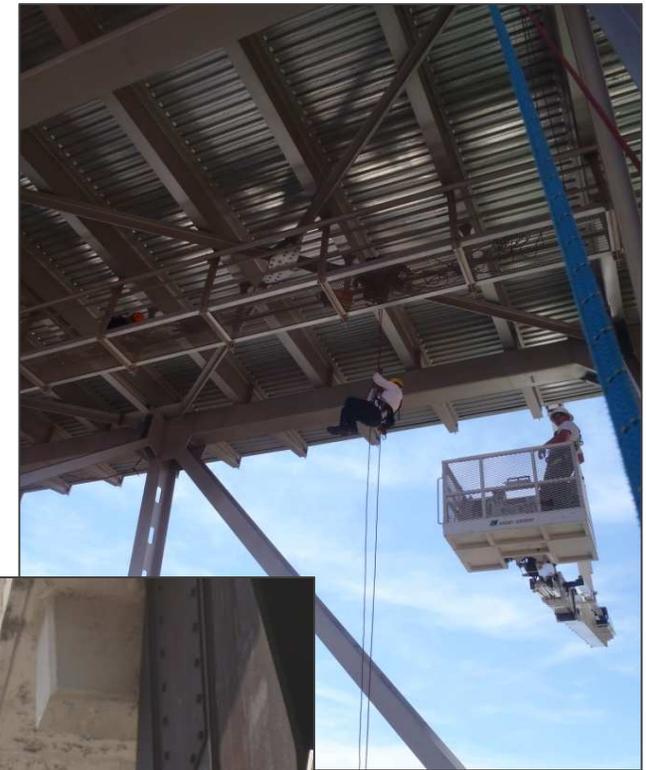
Conclusion

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



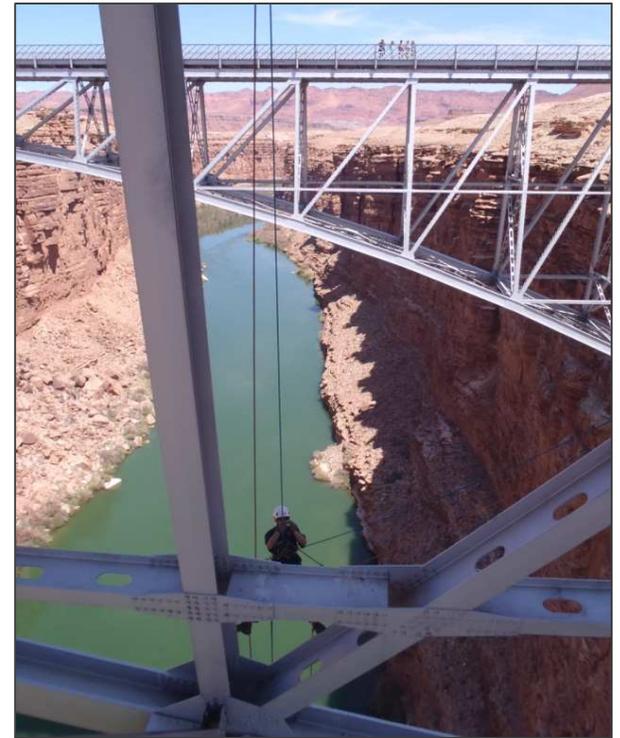
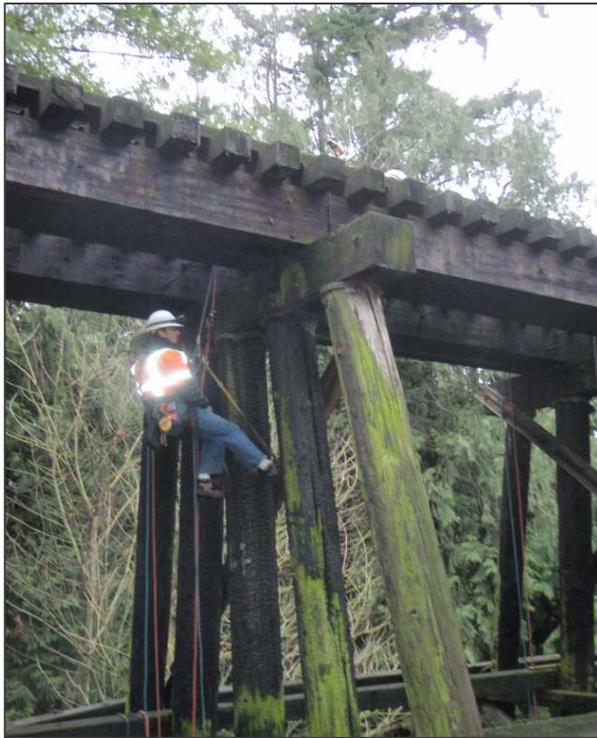
Conclusion

- 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 Challenge and Solutions



Conclusion

Tools of the Trade





Thank you for your attention!

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Color Palette

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Overcoming Inspection Access Challenges

Innovative Solutions to Bridge Inspection
Access

Bridge Inspector's Access Toolbox