An Innovative Approach to Pump Station Piping Inspections using Rope Access

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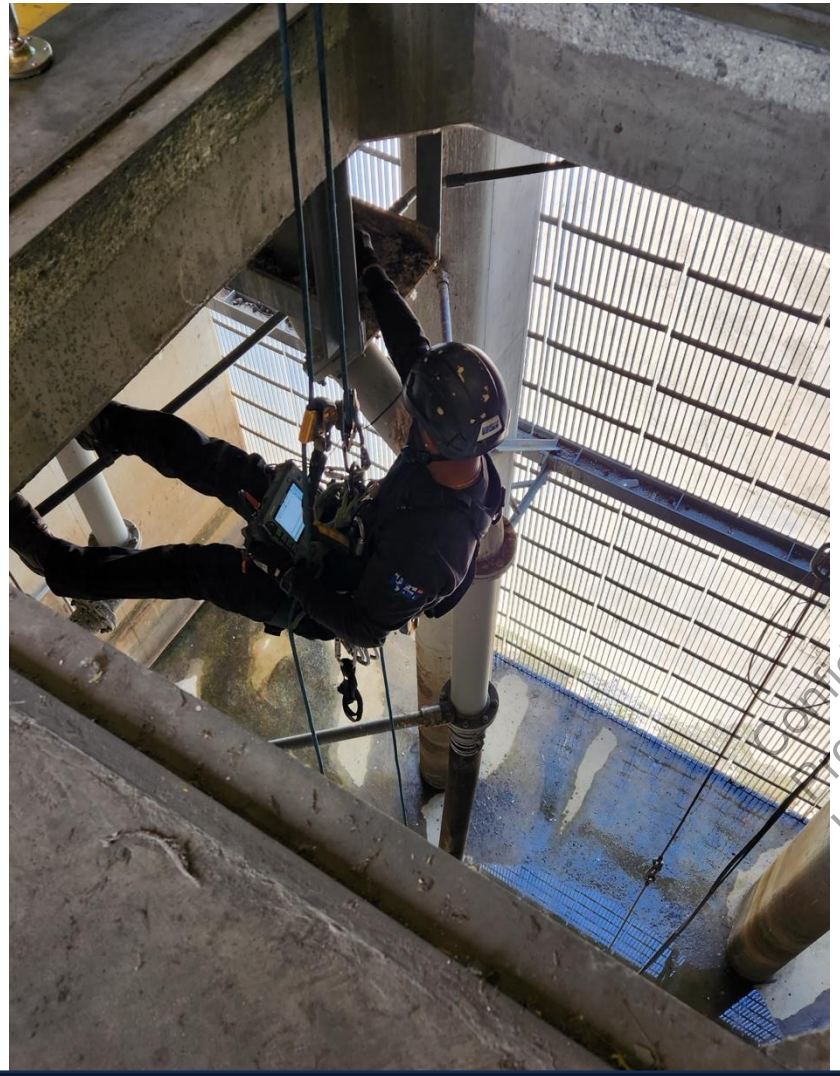
PICA
Pipeline Inspection and Condition Analysis Corporation

Project Overview

Objective:

To provide a comprehensive condition assessment of steel piping at multiple Department of Public Works Pump Stations.

Challenges Faced



1. Underground vaults and confined spaces
2. Elevated pump columns up to 60 feet
3. Flooded vaults, limited accessibility
4. Minimal shutdown time allowed
5. Multiple contractors working in area

Challenges Faced

Traditional access methods such as MEWPs or AWPs were not possible.

Scaffolding posed significant challenges including:

- multi-day setup and removal
- safety hazards in confined spaces
- obstruction of inspection equipment
- additional vendor requirements
- increased costs

Solution

Rope Access with HSI group

Full access to all steel piping

Setup and inspections start within one hour

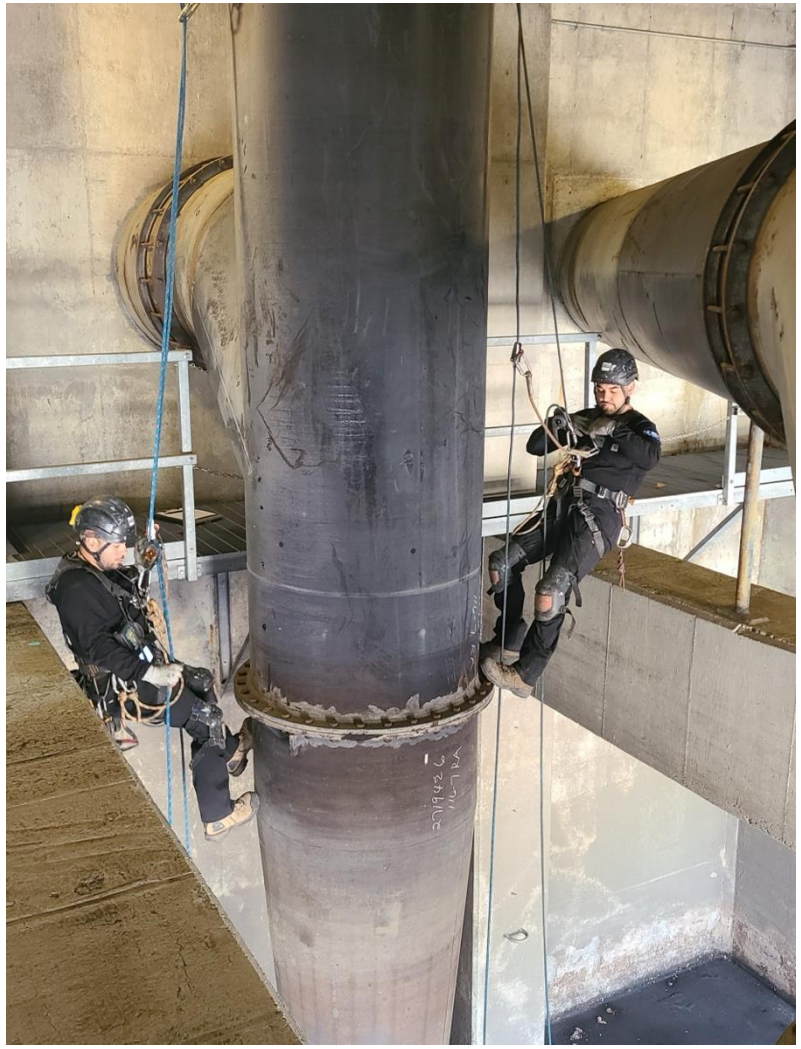
Built in rescue systems and safety plans

Professional Excellence

No operational interference

Reduced risk, time, and cost

Rope Access

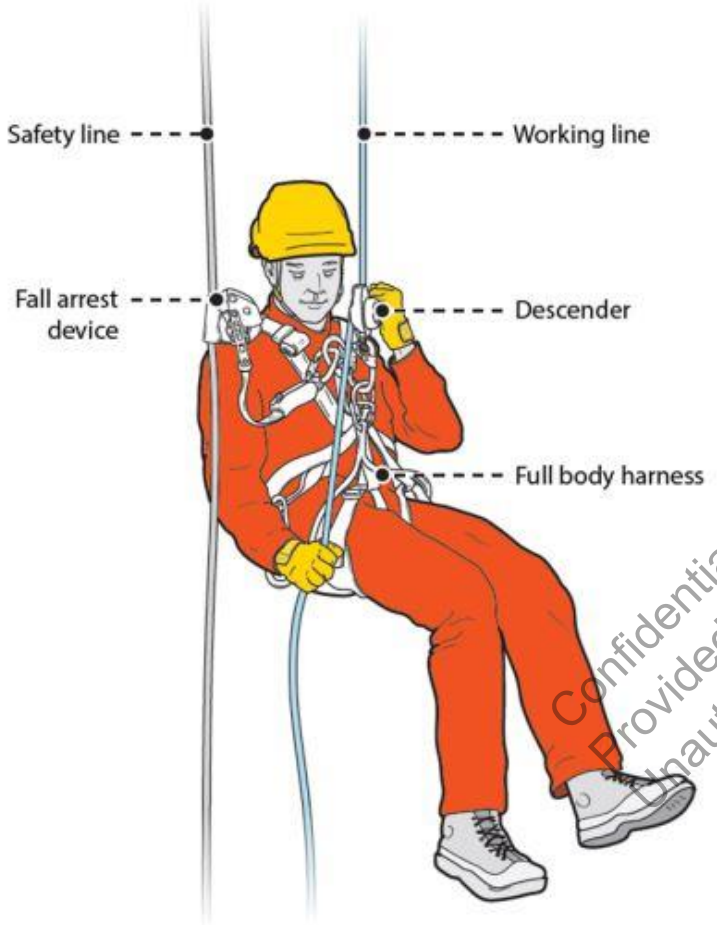


Industrial Rope Access is a proven method of achieving a safe work position at height or in areas of difficult access.

Using similar equipment to rock climbers, Rope Access uses industrial climbing equipment to reach at-height work scopes. Industrial rope access can access almost any location.

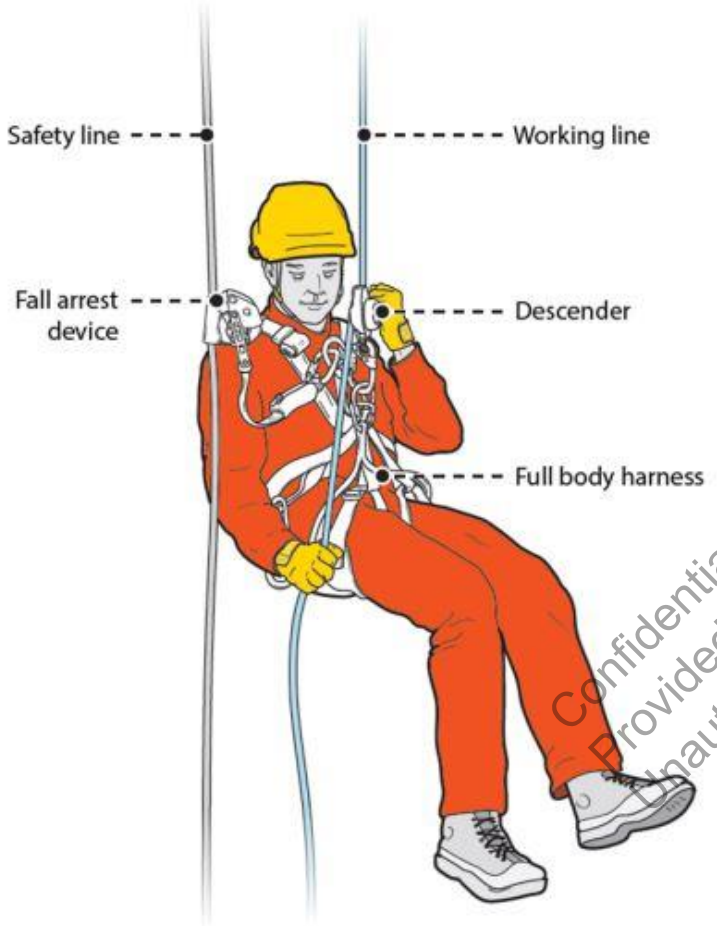
Systems can be quickly assembled and dismantled, leading to less disruptions and increased production.

Rope Access



The two-rope system is a fundamental principle of rope access, and it involves using two independent ropes to support the worker. One rope is used as the working line, while the other serves as a backup. This means that if one rope fails, the worker is still securely attached to their secondary rope.

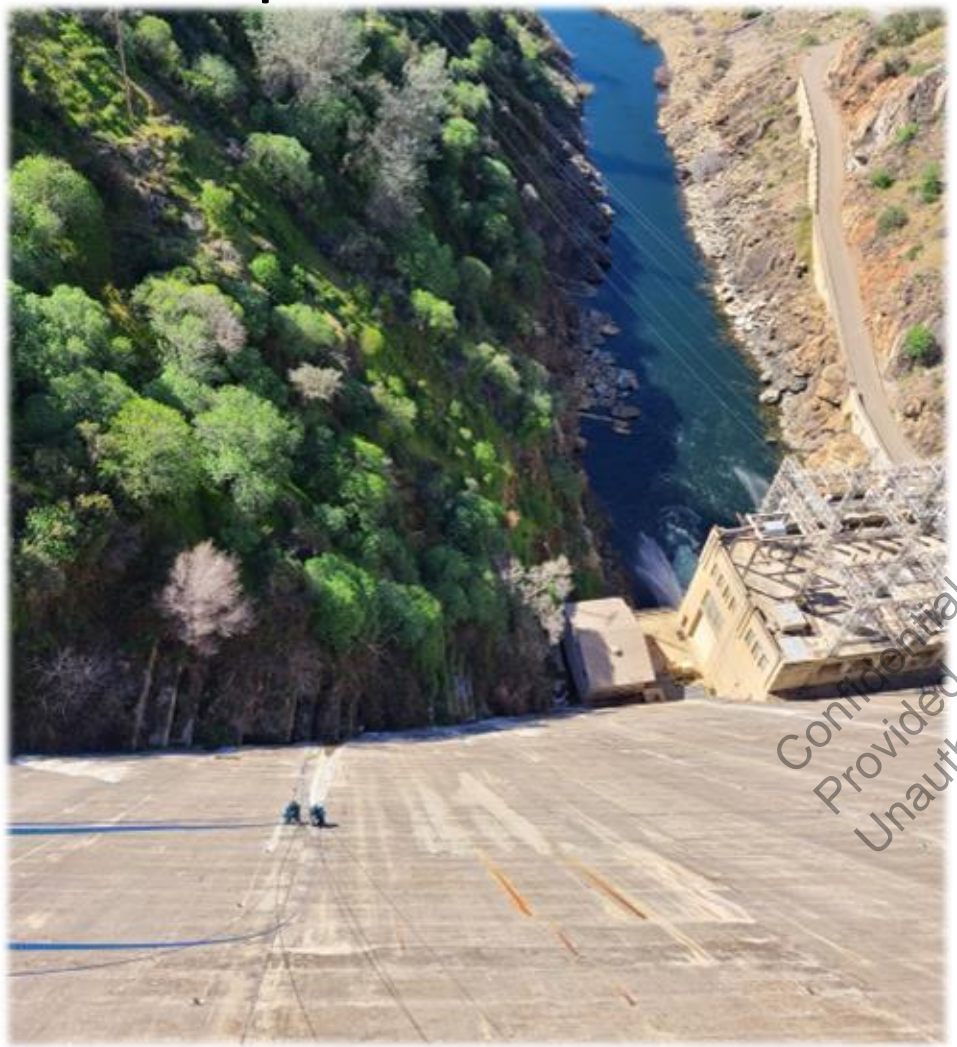
Rope Access



The principle of **double protection** is the heart and foundation of Rope Access and is utilized throughout the system**.**

Redundancy is built into each system. There are multiple components in each system that can support the worker, so if one component fails, there are others in place to provide support and ensure the worker's safety.

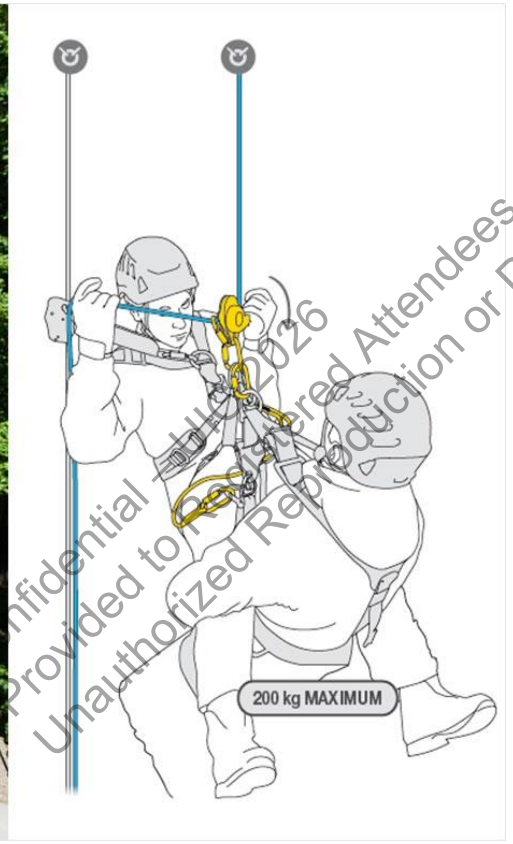
Rope Access



Industrial Rope Access has an unmatched safety record when compared to traditional access methods. There are many factors responsible for this, including:

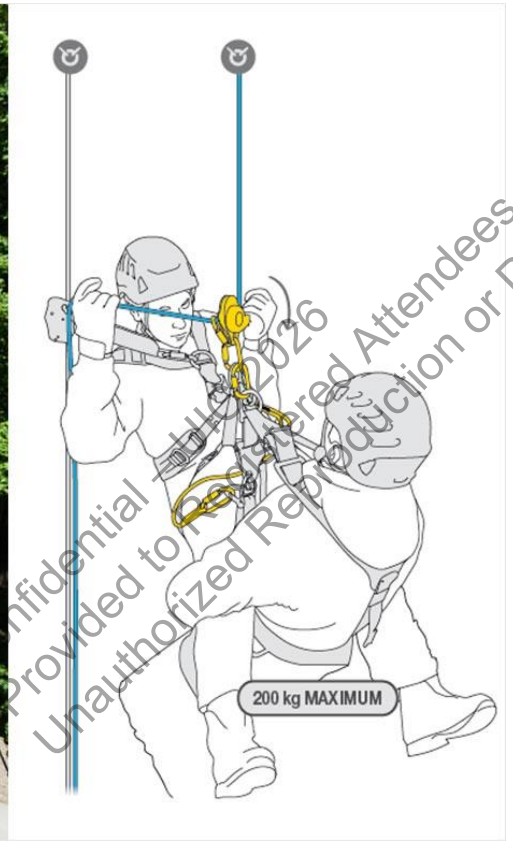
- Written Procedures
- Principle of Double Protection
- Rope Access Training
- Field Supervision
- Equipment

Rope Access



Rescue techniques are taught at all levels and technicians are required to pass practical assessments involving multiple styles of rescues.

Rope Access



Technicians conduct their own rescue in the event of an emergency.

Rope Access Systems are “rigged for rescue” which means rescue can often be completed in minutes if not seconds.

All Rope Access Supervisors (Level III Technicians) are required to hold First Aid, CPR & AED certification.

Rope Access

Professional Associations & Regulatory Bodies

Industrial Rope Access Trade Association (IRATA)

Globally recognized trade association that sets the international standards for industrial rope access techniques, training, and equipment. IRATA provides a framework for safe and effective rope access work in various industries. – www.irata.org

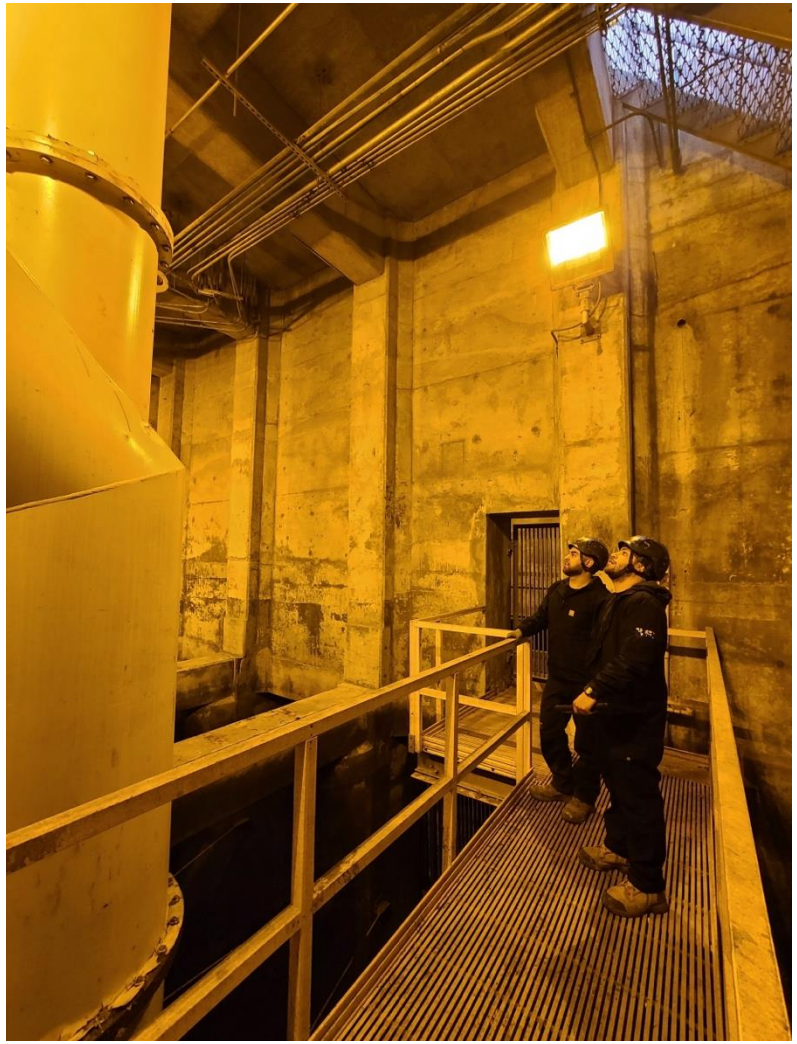
Rope Access

Professional Associations & Regulatory Bodies

Society of Professional Rope Access Technicians (SPRAT)

Professional association that sets the standards for rope access techniques, training, and equipment in North America. - ww.w.sprat.org

Condition Assessment



Identify the structural complexities, environmental risks, and the inspection methods required to complete the condition assessment.

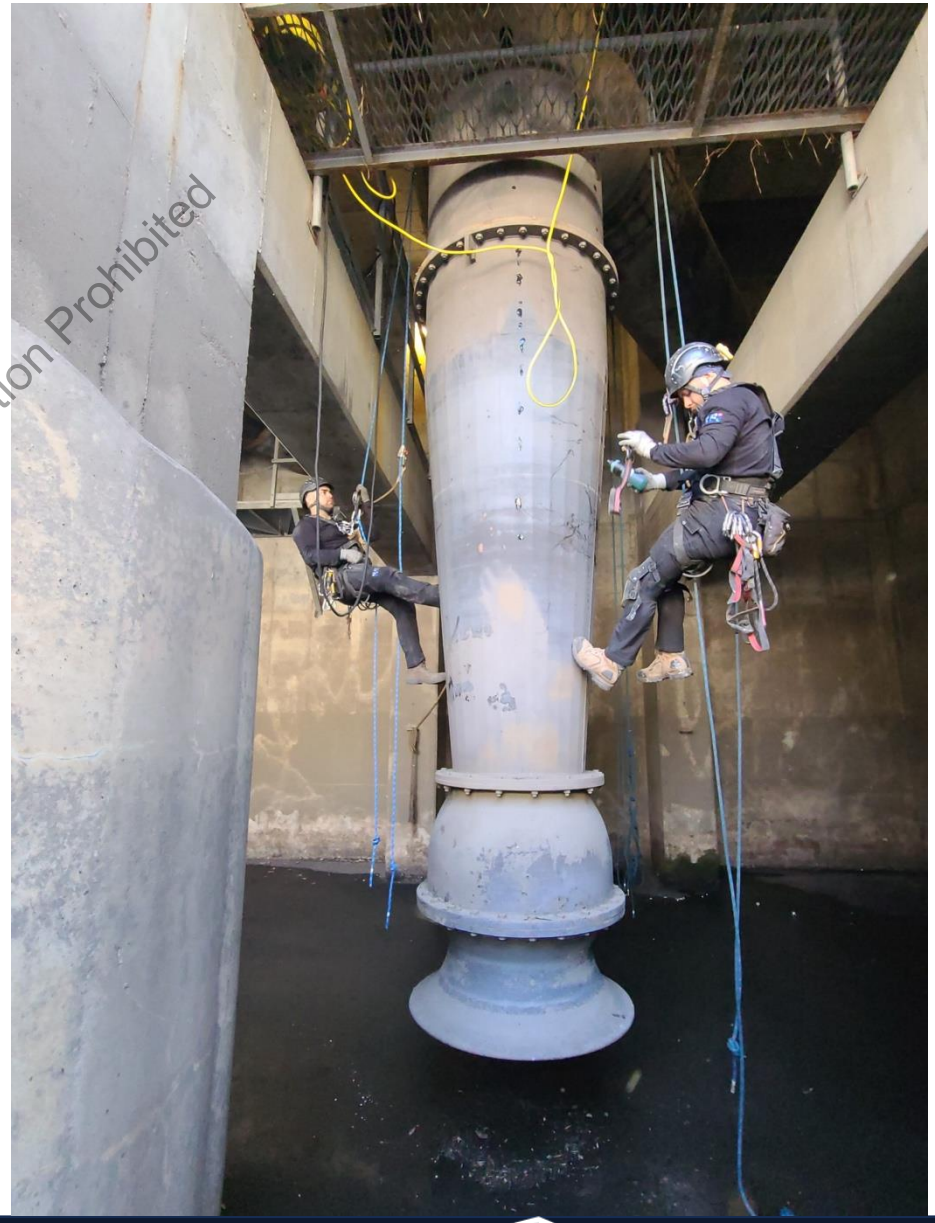
- **Risk Assessment**
  Recognize site-specific hazards related to access, environment, and task, determine appropriate controls.

- **Safety Plan & Method Statement**
  Outline step-by-step procedures, PPE, communication protocols, ensure all technicians are briefed and competent for the task.

- **Rigging & Rescue Plan**
  Anchor selection and rope systems suited to the task and environment. Define clear, practical rescue method

Condition Assessment

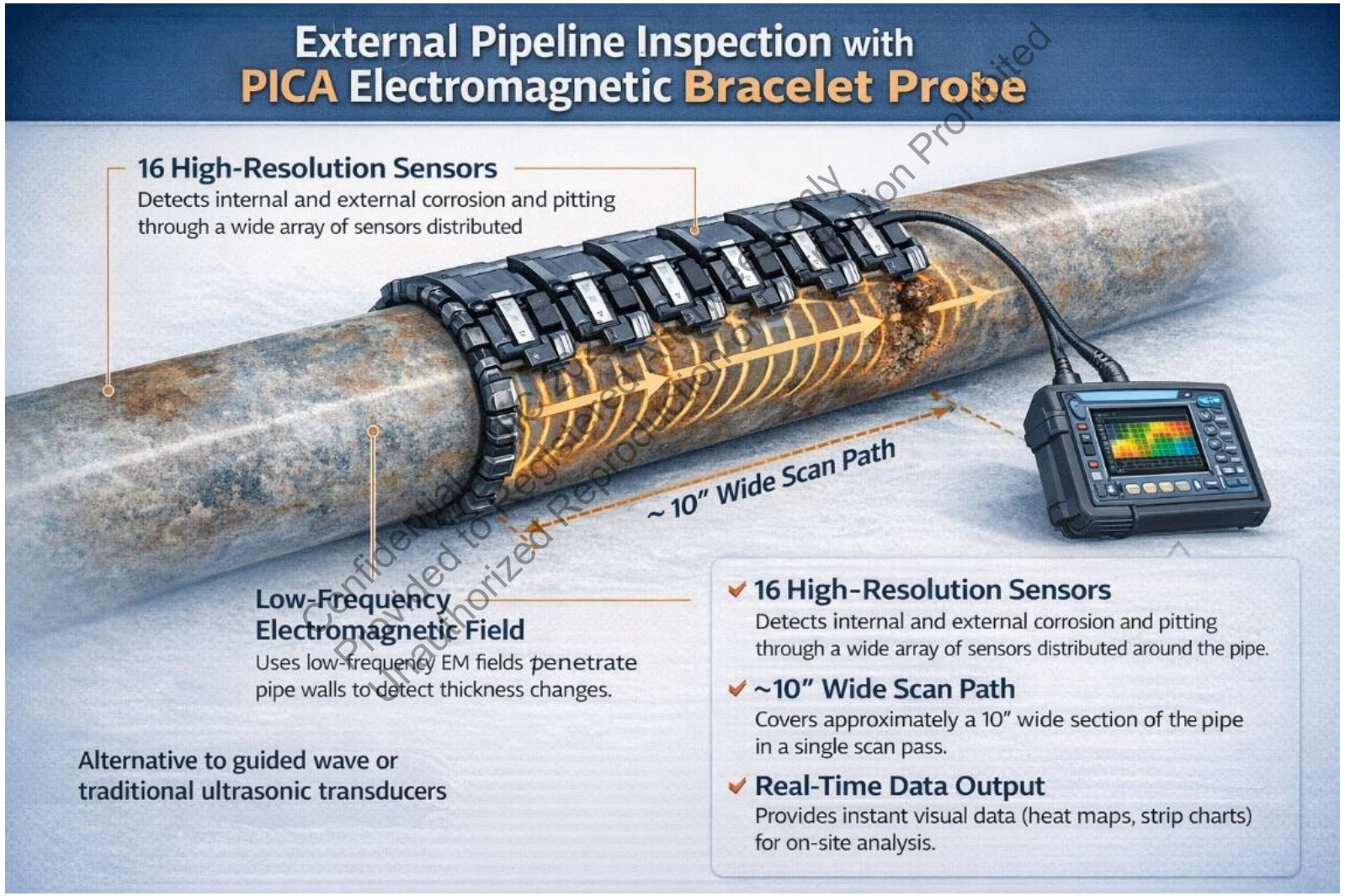
- BARE PIPE BRACELET PROBE
- ULTRASONIC THICKNESS TESTING
- GUIDED WAVE TESTING
- VISUAL INSPECTION



Condition Assessment – Bracelet Probe

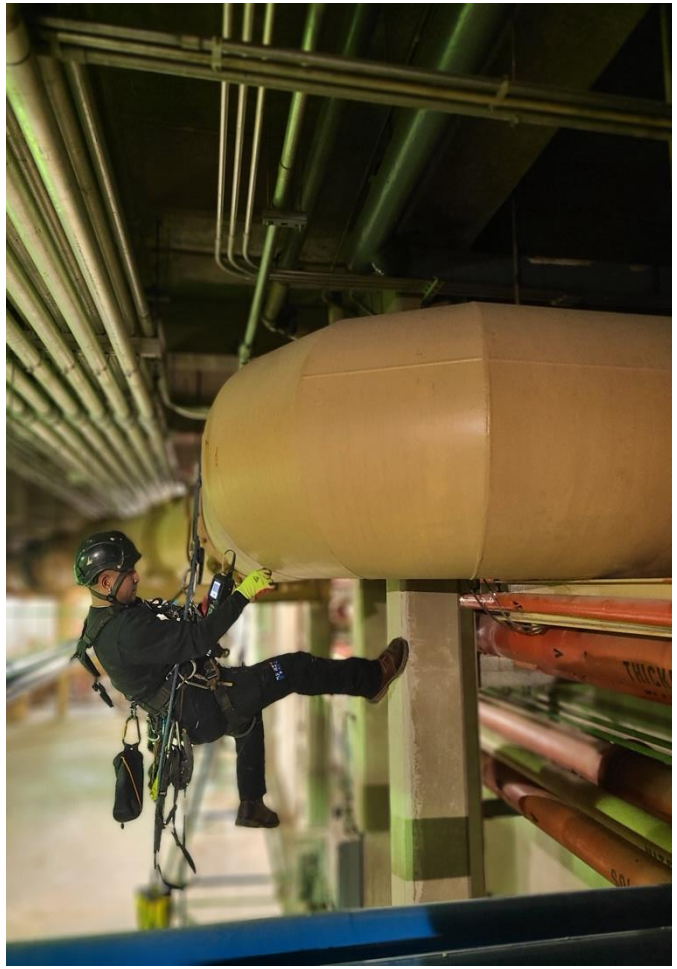
- PICA's external Bare Pipe Bracelet Probe™ uses low-frequency eddy current technology to create color graphs that pinpoint general wall loss, pits, and through-holes.
- Linear scan, conducted rapidly, requires no couplant.
- The system provides real-time wall thickness data on-site, using specialized software and a Ferroscope.

Condition Assessment – Bracelet Probe



Condition Assessment – Ultrasonic Testing

- Ultrasonic thickness testing (UT) is a non-destructive examination method that uses ultrasonic sound waves to measure the thickness of materials from one side.
- UT allows for determining precise remaining wall thickness in local inspection areas
- Used in conjunction with Bracelet Probe to confirm remining wall thickness and defect type.



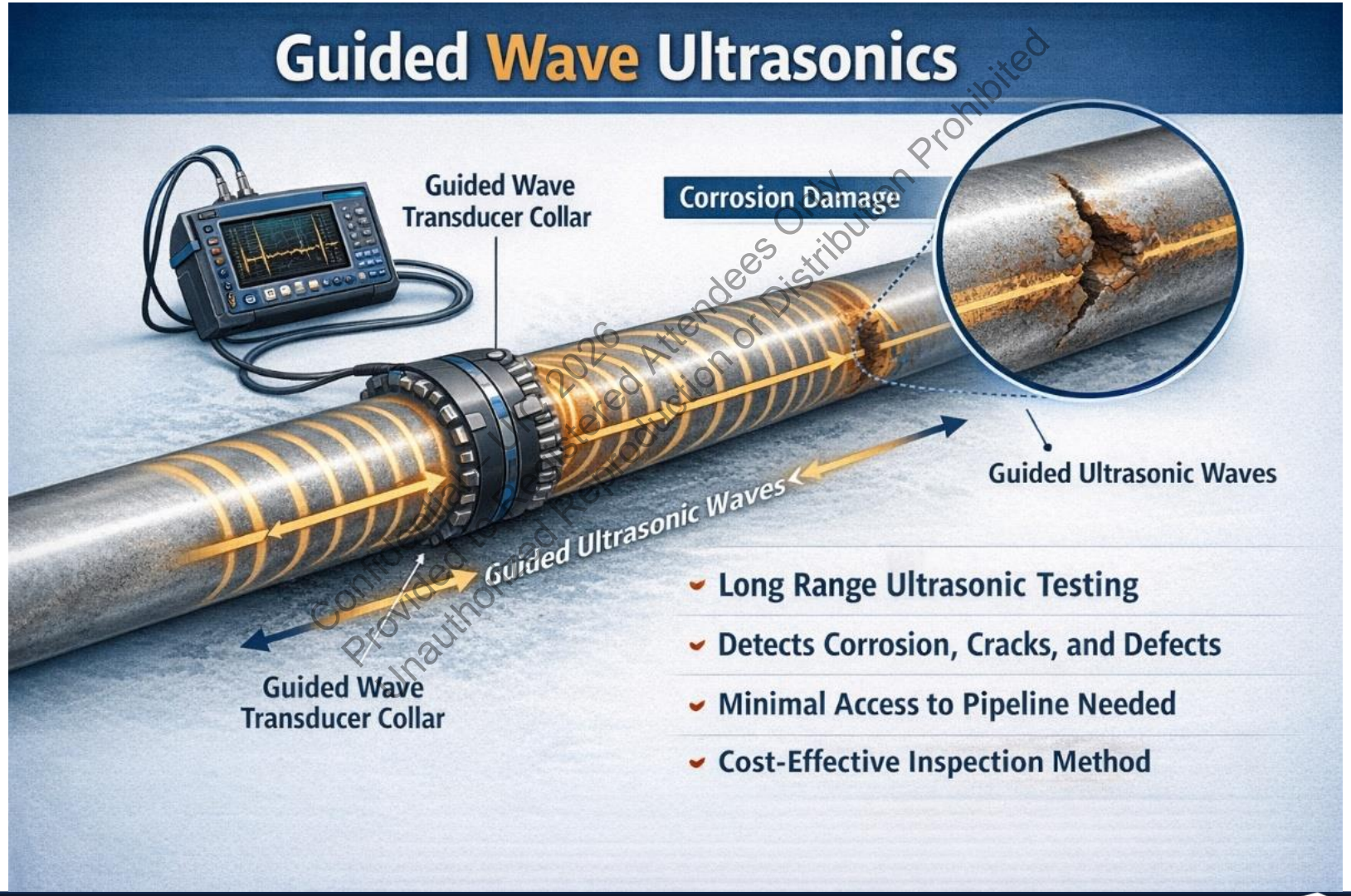
Condition Assessment – Guided Wave

- Guided wave testing (GWT), is a non-destructive examination method that uses low-frequency ultrasonic waves to inspect long sections of pipes and other structures for defects like corrosion or cracks.

- GWT is a screening tool that allows for rapid and cost-effective inspection of pipelines, even those that are buried, insulated, or otherwise difficult to access.

- Used in conjunction with Bracelet Probe to confirm remining wall thickness and defect type.

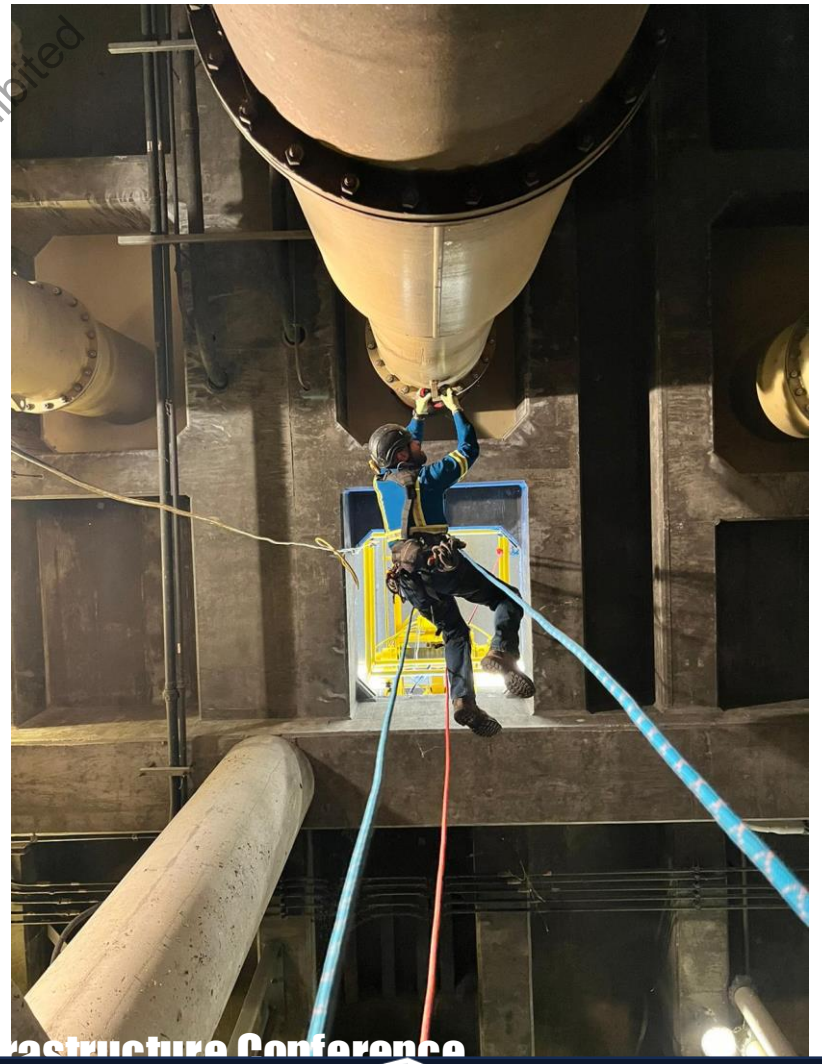
Condition Assessment – Guided Wave



Condition Assessment – Visual Inspection

- Visual inspection examines the external surface of the piping system to identify any visible defects or issues that could compromise its integrity.

- Combining visual with ultrasonic and electromagnetic inspections provides a more complete picture of pipe condition for better decision-making.



Project Observations

- Rope Access allowed access to 100% of the steel piping and columns, ensuring a comprehensive inspection.
- The efficiency of Rope Access meant that systems could be rigged in rapid time.
- Low impact on client operations, no restrictions on simultaneous work taking place.

Project Observations

- No requirement for 3rd party rescue services - Rescue methods are built in.
- Inspections completed quickly, reducing the hours spent within confined space and ‘at-risk hours’.

Results

By utilizing these combined technologies / techniques, large inspection areas were scanned rapidly.

GWT screening allowed localized assessment of defects.

Discovered multiple areas of concern, including significant external corrosion, general internal corrosion and pitting.

Results

Access Methods Compared for one Pump Station

	MEWPs/AWPs	Scaffold	Rope Access
Access to Assets	Not Possible	Limited	100%
Risk Assessment	N/A	High Risk	Low Risk
Vendors Required	N/A	Additional vendors required: scaffolders, rescue.	Access & Rescue provided with inspection.
Shutdown Time	N/A	**9 Days –** Allowing for installation and removal of scaffold.	**0 – Days** – Pump Station operated as normal.
Total Time Required	N/A	**15 days** - 9 days for installation and removal of scaffold , 6 days for inspection	**4 days** – 100% Complete Inspection
Cost Savings	N/A	0%	**73%**

Conclusion

Rope Access is The Ideal Solution for Complex Inspection Environments

- **Flexible**
  Easily adapts to confined spaces, elevated structures, and irregular layouts without the need for large equipment or major site modifications.
- **Safe**
  Built-in rescue plans, certified technicians, and a superior safety record compared to traditional access methods.

Conclusion

Rope Access is The Ideal Solution for Complex Inspection Environments

- **Cost-Effective**
  Eliminates the need for scaffolding, reduces labor hours, and shortens project timelines—delivering significant cost savings.
- **Minimally Disruptive**
  Enables inspections without interrupting facility operations or interfering with other contractors on-site.

Questions?

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