HATCH

STRUCTURAL HEALTH ASSESSMENT IN HEAVY INDUSTRIES

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Hatch

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Inform - Engage - Advance

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Content

- Purpose of SHM
- Methods of SHM
- Case Study on Industrial Application
- Conclusion

Purpose of SHM

- Detect deterioration of structures due to corrosion, weathering, fatigue, chemical attack
- Locate damage zones
- Provide structural assessment for maintenance and rebuild plans

Methods of SHM

- Periodic techniques
  - Visual Inspection
  - Ground Penetrating Radar
  - Impact Echo
- Continuous techniques
  - Strain gauges
  - AE monitoring
  - Fiber Optic Sensing

Case Study of Industrial Application

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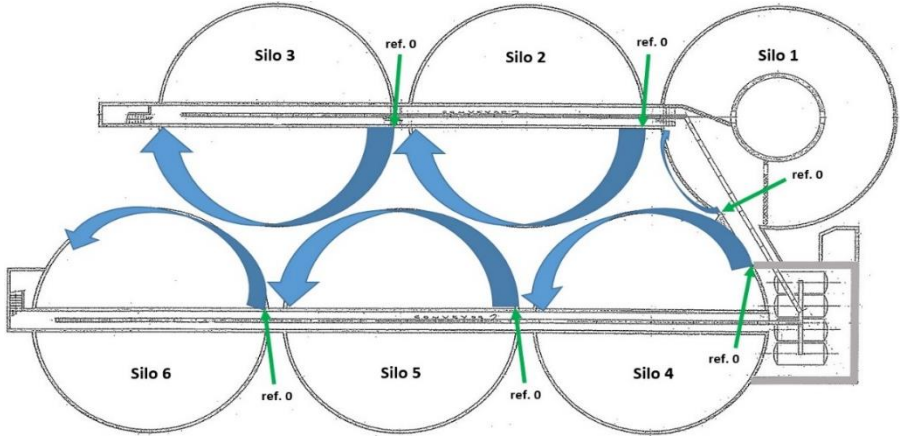
- Six Cylindrical Concrete Silo (1957)
- One Steel Silo (1959)
- Subject to Typical Canadian Freeze and Thaw Condition for >60 years



Case Study of Industrial Application

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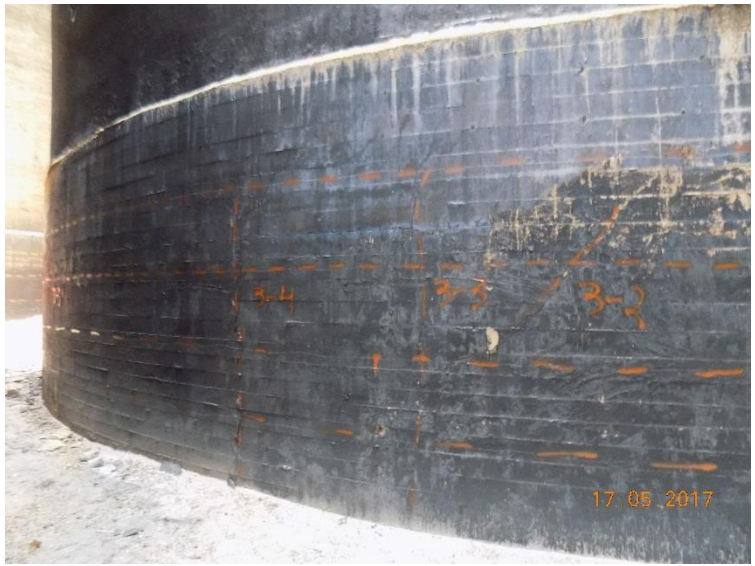
- Assess Structural Health suitable for Service Life Extension?

Comprehensive NDT program:

- Visual Inspection
- Ground Penetrating Radar
- Impact Echo
- Schmidt Hammer Rebound Test
- Ultrasound Test

Visual Inspection

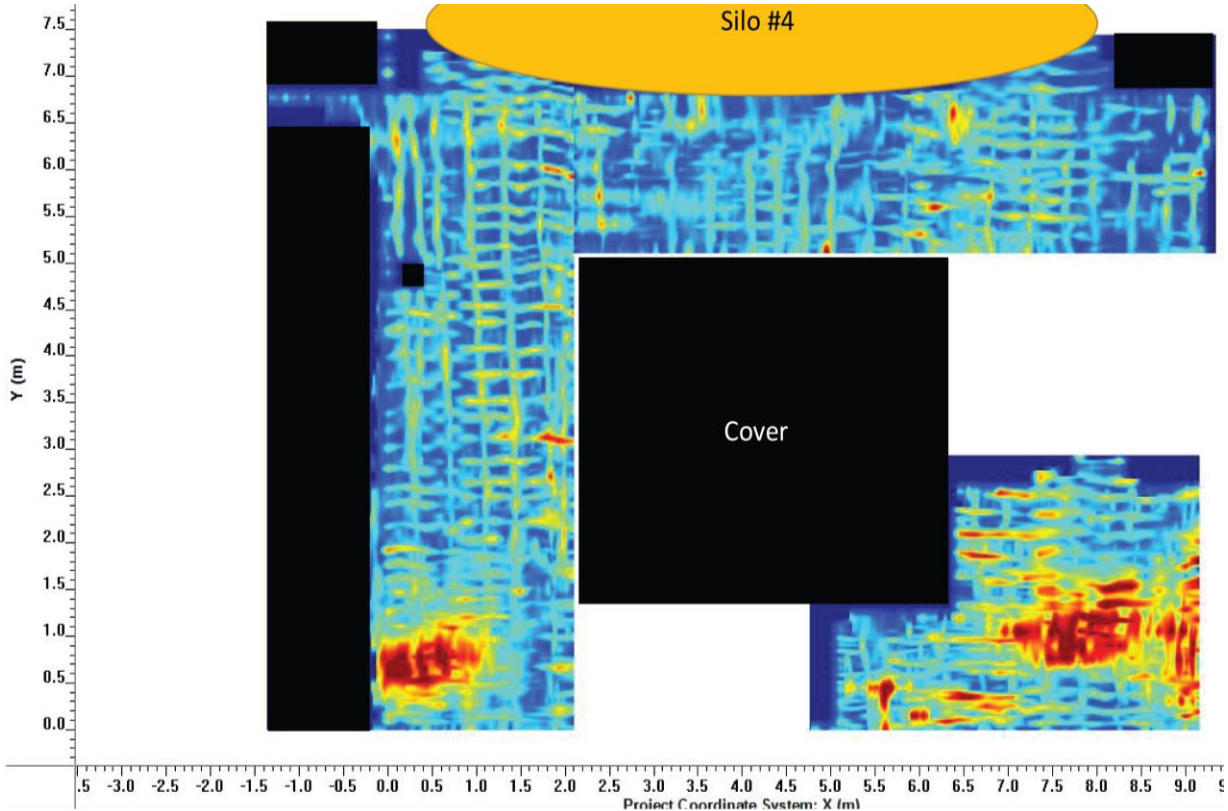
- Locate Visible Damages and Main Structural Elements for further NDT Inspection
- Reduce Cost of NDT Inspection



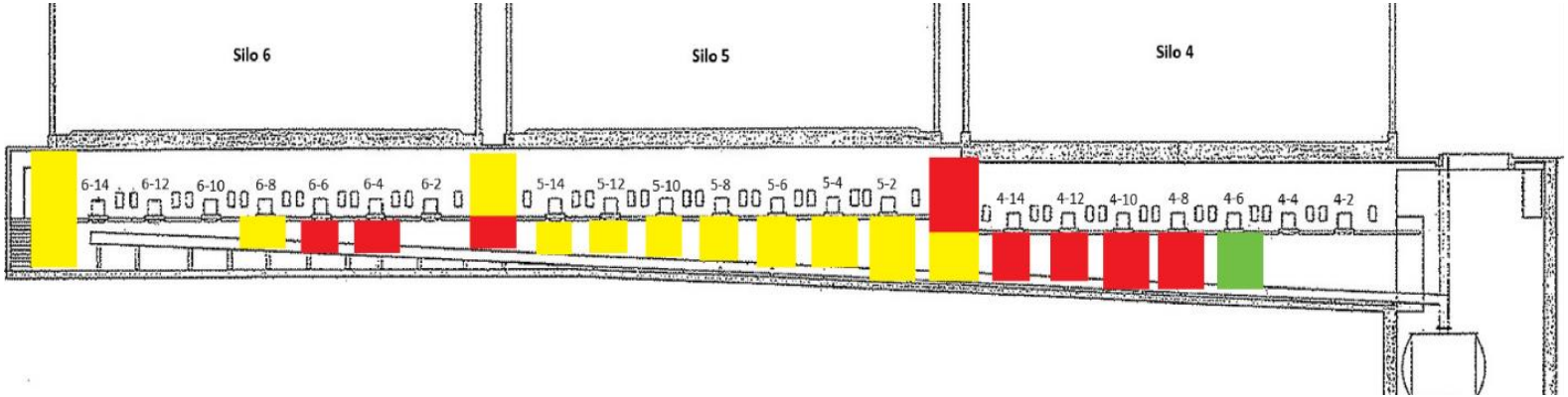
Exterior Damages on Wall

Interior Damaged Wall

Machine Room Roof 2D GPR Results



GPR Results of Delamination Map



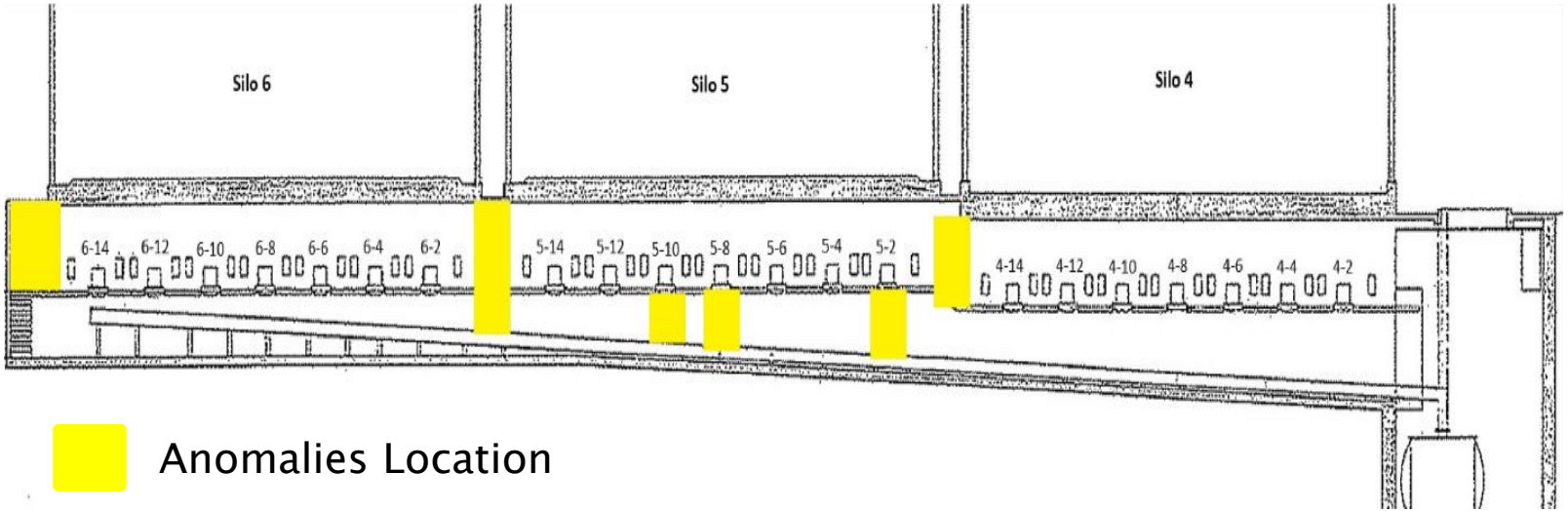
Severely Delaminated

Moderately Delaminated

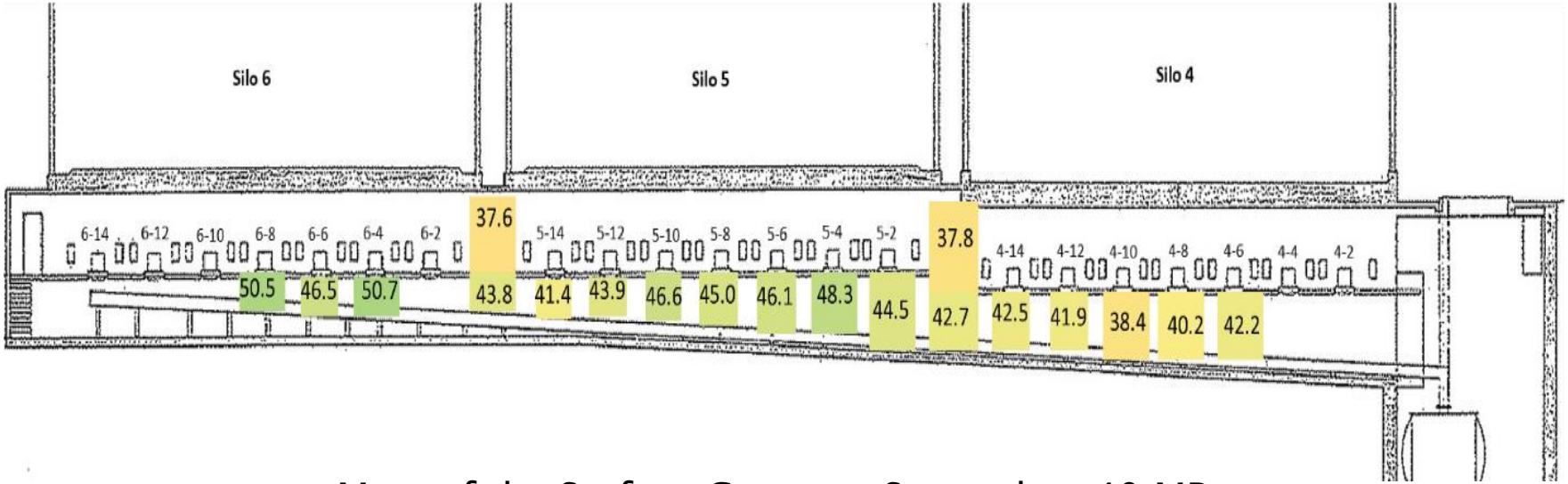
Consolidated Concrete

Impact-Echo (IE)

- Determine Cracks or Voids

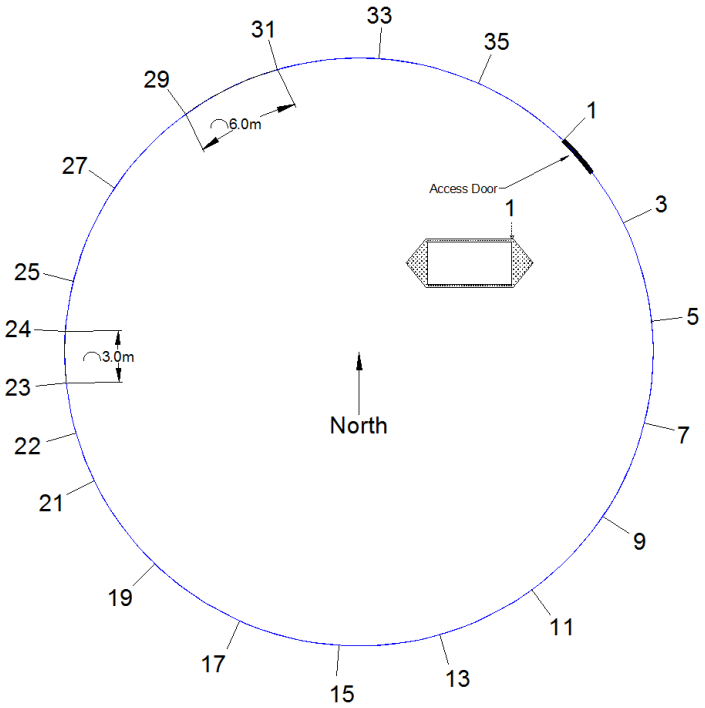


Schmidt Hammer

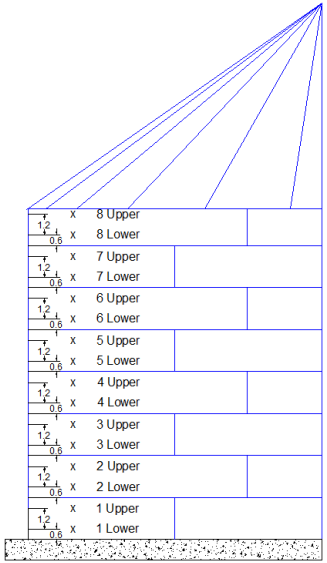


Most of the Surface Concrete Strength > 40 MPa

Ultrasound Test



543 UT Measurements
Average Thickness Loss is 0.4 mm



Corrosion and
Deteriorated Membrane

Conclusion

Comprehensive SHM Program:

- Prolong Campaign Life
- Plan for Maintenance → Timely Mitigation Measures
- Localize the Extent of Repair → Reduce cost

For more information,
please visit www.hatch.com

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