

## Nondestructive Testing & Evaluation SYSTEMS FOR STRUCTURAL INTEGRITY

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sister company, Olson Engineering  
for your next project need.*

A - FOUNDATIONS DEPTH & INTEGRITY SYSTEMS					NDT PLATFORMS		
ID	Test Method	Standards	Applicable On	Test For	Freedom Data PC	NDE 360	CTG
A1	Crosshole Sonic Logging (CSL)	ASTM D6760-08 ACI 228.2R	<ul style="list-style-type: none"> <li>» Auger Cast Concrete Piles</li> <li>» Cemented Radioactive Wastes</li> <li>» Diaphragm Walls / Slurry Walls</li> <li>» Drilled Shafts (Bored Piles)</li> <li>» Mass Concrete Pours</li> <li>» Mat Foundations &amp; Seal Footings</li> <li>» Pressure Injected Footings</li> <li>» Water Saturated Media</li> </ul>	<ul style="list-style-type: none"> <li>» Cracks</li> <li>» Necking</li> <li>» Sand Lenses</li> <li>» Soil / Water Intrusions</li> <li>» Uncured or Weak Concrete</li> <li>» Voids</li> </ul>	✓		
A2	Tomographic Velocity Imaging Software (for CSL, UPV and CS/DS)		<ul style="list-style-type: none"> <li>» Bridge Substructure</li> <li>» Cemented Radioactive Wastes</li> <li>» Concrete Drilled Shafts</li> <li>» Dams</li> <li>» Mat Foundations</li> <li>» Slurry Walls / Diaphragm Walls</li> <li>» Soil / Rock / Masonry / Wood</li> <li>» Structures</li> </ul>	<ul style="list-style-type: none"> <li>» Cracks</li> <li>» Honeycomb</li> <li>» Soil / Rock Moduli</li> <li>» Soil / Rock Velocity Profiles</li> <li>» Soil / Water Intrusions</li> <li>» Uncured or Weak Concrete</li> <li>» Voids</li> </ul>	✓	✓	
A3	Parallel Seismic (PS)	ACI 228.2R	<ul style="list-style-type: none"> <li>» Abutment Piers</li> <li>» Deep Foundations</li> <li>» Sheet Piles and Footings</li> <li>» Timber Piles</li> </ul>	<ul style="list-style-type: none"> <li>» Foundation Type / Integrity</li> <li>» Length Determination</li> <li>» Scour Evaluation</li> </ul>	✓	✓	
A4	Sonic Echo/ Impulse Response (SE/IR)	ASTM D5882-07 ACI 228.2R	<ul style="list-style-type: none"> <li>» Auger Cast Concrete Piles</li> <li>» Bridge Abutments</li> <li>» Drilled Shafts (Bored Piles)</li> <li>» Driven Concrete Piles</li> <li>» Wall Piers</li> <li>» Wood Piles</li> </ul>	<ul style="list-style-type: none"> <li>» Cracks</li> <li>» Deep Foundation Depths</li> <li>» Diameter Changes (Bulb or Necking)</li> <li>» Soil Intrusions</li> <li>» Uncured or Weak Concrete</li> <li>» Voids</li> </ul>	✓	✓	
A5	Ultrasismic (US)  Developed by Olson Engineering, Inc.		<ul style="list-style-type: none"> <li>» Auger Cast Concrete Piles</li> <li>» Bridge Abutments</li> <li>» Drilled Shafts (Bored Piles)</li> <li>» Driven Concrete Piles</li> <li>» Wall Piers</li> </ul>	<ul style="list-style-type: none"> <li>» Cracks</li> <li>» Depth</li> <li>» Soil Intrusions</li> <li>» Voids</li> </ul>	✓	✓	

B - GEOPHYSICAL SYSTEMS					NDT PLATFORMS		
ID	Test Method	Standards	Applicable On	Test For	Freedom Data PC	NDE 360	CTG
B1	Crosshole / Downhole Seismic Systems (CS/DS)	ASTM D4428/ D4428M-00/ D5882	<ul style="list-style-type: none"> <li>» Soil &amp; Rock for Seismic Vibrating and Machine Foundation Design</li> <li>» Soil Modulus Measurement</li> </ul>	<ul style="list-style-type: none"> <li>» Image voids, Solution Caverns, Washouts with Tomography</li> <li>» Locate Faults, Fractures</li> <li>» Seismic Shear &amp; Compressional Wave Velocities</li> </ul>	✓		
B2	Seismic Refraction / Seismic Reflection (SRR)	ASTM D5777-00 ASTM D7128-05	<ul style="list-style-type: none"> <li>» Mass Concrete</li> <li>» Mass Cyclopean Masonry</li> <li>» Rock / Soil</li> </ul>	<ul style="list-style-type: none"> <li>» Bedrock Topography</li> <li>» Compressional Wave Velocity Profiles</li> <li>» Fractures</li> <li>» Layer Thickness</li> <li>» Rippability / Excavatability</li> <li>» Water Table Depth / Mapping</li> </ul>	✓		
B3	Spectral Analysis of Surface Waves - G (SASW-G)	ASTM D6758-02 ACI 228.2R	<ul style="list-style-type: none"> <li>» Asphalt</li> <li>» Concrete</li> <li>» Masonry</li> <li>» Soil / Rock</li> <li>» Wood</li> </ul>	<ul style="list-style-type: none"> <li>» Layer Thickness</li> <li>» Shear Wave Velocity Profiles</li> <li>» Soil &amp; Rock Moduli</li> </ul>	✓	✓	

## C - STRUCTURAL, PAVEMENT & TUNNEL SYSTEMS

## NDT PLATFORMS

ID	Test Method	Standards	Applicable On	Test For	Freedom Data PC	NDE 360	CTG
C1	Impact Echo (IE)	ASTM C1383-04	<ul style="list-style-type: none"> <li>» Beams</li> <li>» Bridge Decks</li> <li>» Columns</li> <li>» Dams</li> <li>» Pavements</li> <li>» Pipes</li> <li>» Post-Tensioned Duct Grouting</li> <li>» Runways</li> <li>» Slabs</li> <li>» Tunnels</li> <li>» Walls</li> </ul>	<ul style="list-style-type: none"> <li>» Cracks</li> <li>» Delaminations</li> <li>» Honeycomb</li> <li>» Thickness</li> <li>» Voids</li> </ul>	✓	✓	✓
C2	Impact Echo Scanner (IES) <small>Patented technology by Olson</small>	ASTM C1383-04	» same as Impact Echo (IE) above	» same as Impact Echo (IE) above	✓	✓	
C3	Multiple Impact Surface Waves (MISW)		<ul style="list-style-type: none"> <li>» Asphalt</li> <li>» Base</li> <li>» Concrete</li> <li>» Rock</li> <li>» Subbase</li> <li>» Subgrade Soil</li> </ul>	<ul style="list-style-type: none"> <li>» Layer Shear Moduli</li> <li>» Layer Poisson's Ratio</li> <li>» Layer Thickness</li> <li>» Layer Young's (Elastic) Moduli</li> </ul>	✓	✓	
C4	Slab Impulse Response (SIR)	ACI 228.2R	<ul style="list-style-type: none"> <li>» Concrete Slabs / Retaining Walls</li> <li>» Pavements</li> <li>» Pond or Pool Bottoms</li> <li>» Runways</li> <li>» Spillways</li> <li>» Tunnel Liners</li> </ul>	<ul style="list-style-type: none"> <li>» Delaminations in Decks</li> <li>» Soft or Weak Subgrade Support</li> <li>» Voids Below Slabs</li> <li>» Voids Below Tunnel Linings</li> </ul>	✓	✓	
C5	Spectral Analysis of Surface Waves - S (SASW-S)	ACI 228.2R	<ul style="list-style-type: none"> <li>» Asphalt</li> <li>» Concrete</li> <li>» Masonry</li> <li>» Stone</li> <li>» Wood</li> </ul>	<ul style="list-style-type: none"> <li>» Layer Thickness</li> <li>» Material Moduli</li> <li>» Shear Wave Velocity Profiles</li> </ul>	✓	✓	
				» Velocity Calibration Only			✓
C6	Ultrasonic Pulse Velocity (UPV)	ASTM C597-02, E494-95 ACI 228.R BSI 98/105795	<ul style="list-style-type: none"> <li>» Beams</li> <li>» Bridge Decks</li> <li>» Elevated Slabs</li> <li>» Shaft Tops</li> <li>» Walls</li> </ul>	<ul style="list-style-type: none"> <li>» Cracks</li> <li>» Delaminations</li> <li>» Honeycomb</li> <li>» Velocity vs. Strength Correlation with Cores</li> <li>» Voids</li> </ul>	✓	✓	



Olson Instruments, Inc.

*Find, Characterize, & Assess the Condition of Structures - Nondestructively!*

### Imaging the Infrastructure for ASSESSMENT, MONITORING & REPAIR



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- NONDESTRUCTIVE EVALUATION (NDE)
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