Complete
Instrumentation Solutions

Newsletter

Mapping of Unknown Foundations

Newsletter on Mapping of Unknown Foundations

- **Sonic Echo/ Impulse Response for Pile Integrity Testing**
- **Parallel Seismic**
- **Construction Scan**
- **Ground Penetrating Radar**
- **Ultraseismic**
- **Impact Echo Scanning**

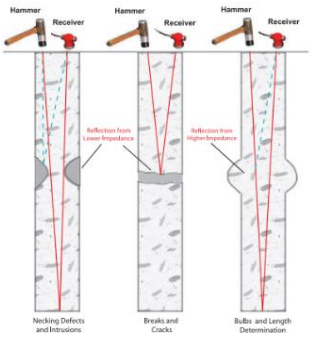
All the above modules can be used with the same Data Acquisition System (NDE 360)

Sonic Echo/ Impulse Response

Features

Sonic Echo/ Impulse Response for Pile Integrity Testing

- The system's design enables swift and precise measurements in the field.
- During testing, users can view waveforms in real-time, enhancing monitoring and analysis.
- The system's portability allows for multiple tests per day, facilitating efficiency in field operations.
- Accurate within 5%, the system reliably determines the depth of foundations.
- The software uses automatic/manual selection of echo events, prediction of echo depth based on user input velocity, and the ability to perform tests with both accelerometer and geophone transducers simultaneously, ensuring robust data quality and analysis.



Sonic Echo/ Impulse Response for Pile Integrity Testing

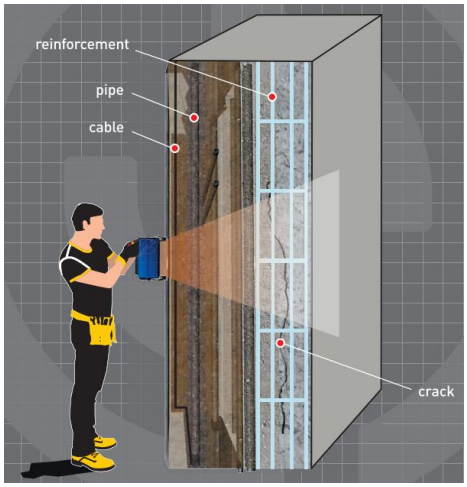
The SE/IR system is crafted to assess the length and structural soundness of foundations where the top or a portion of the upper side is accessible. It can be applied to both new and existing foundations, involving impacting the foundation and capturing echoes using nearby receivers to detect defects or the foundation bottom. Although most effective for columnar foundations like piles and drilled shafts, it has also proven successful on structures like mat foundations and abutment walls, across various materials such as concrete, wood, and round steel pipes.

Typically, the Sonic Echo (SE) method is employed alongside the Impulse Response (IR) method as the SE/IR approach. However, systems are offered for exclusively utilizing the SE methodology without IR analysis. These systems and their accompanying software interpret reflections solely based on time domain data. The IR function facilitates transforming data from time domain to frequency domain, with the software automatically calculating transfer and coherence functions. This feature aids in data quality analysis and provides additional insights into structural reflections.

Parallel Seismic & Construction Scan

Parallel Seismic

Parallel Seismic (PS) systems offer insights into foundation length, compressional velocity, and underlying soil, ideal for inaccessible or impractical sites. They involve water-filled or grouted boreholes, providing fast, accurate measurements with depth accuracy within 5% or better. Compact, durable, and easily transportable, they enable multiple tests per day without excavation. IX Foundation software aids data analysis, enhancing identification of foundation bottoms, making PS systems economical and versatile for various foundation types, including submerged piles and those with complex geometries.



Construction Scan

The Construction Scan 2500 is a portable all-in-one GPR solution designed for automated localizing defects in wood, brick, and reinforced concrete structures, at depths of 0.6 meters. Its applications include detecting defects, determining reinforcement specifications, and locating buried wiring and pipelines. The system comprises a control processing unit, LCD display, antenna unit AB-1700, and power supply unit in one enclosure, with data transfer facilitated via USB interface for further analysis on a PC.

Features

Parallel Seismic

- The system facilitates quick and precise field measurements, achieving depth accuracy of 5% or better.
- It offers cost-effective and versatile solutions compared to alternative methods for determining foundation depths.
- Capable of testing piles without excavation, the system is compact, durable, and portable, enabling multiple tests daily.

Features

Construction Scan

- 5" color display
- Built-in USB interface
- Internal 2 GB Flash memory card
- Detachable SD-card
- Guiding laser
- Multilingual support (Russian, English, Chinese)
- Quickly-detachable 15V Li-io battery

Ground Penetrating Radar

Features

Ground Penetrating Radar

- **Flexible Configuration:** Easily switches between single/dual-channel or multi-channel setups.
- **Wide Compatibility:** Works with all MALÅ Geoscience antennas (30 MHz to 2.3 GHz).
- **Fast Data Transfer:** Ethernet connection ensures speedy, reliable data transfer.
- **Versatile Measurements:** Conducts various surveys, including reflection, tomography, and velocity.
- **Scalable System:** Expandable with up to three Expansion Units for increased channels and antenna support.

Ground Penetrating Radar

The MALÅ ProEx Control Unit sets a new standard in GPR versatility, designed for advanced users. Its flexible design seamlessly transitions between single or dual-channel systems and expands to multi-channel setups with optional units. Compatible with all MALÅ GPR Antennas, it supports up to 16 recording channels simultaneously, ensuring exceptional adaptability and performance. Additionally, the MALÅ MIRA option extends its capabilities to unlimited data channels, maintaining high-speed and reliable data transfer via Ethernet communications. The MALÅ ProEx stands as the pinnacle of GPR control units, succeeding its esteemed predecessor, the MALÅ RAMAC/GPR CUII, with aplomb.

Born from countless hours of development, the ProEx system embodies versatility, scalability, and computational power, earning its status as the industry leader in GPR technology. As a modular, full-range Ground Penetrating Radar controller, it caters to the needs of advanced professionals with multi-channel parallel processing capability and support for all MALÅ antennas. Whether navigating multi-channel road measurements, concrete analysis, landscape profiling, or utility detection, the MALÅ ProEx remains the go-to solution for geophysics contractors, consultants, and research organizations, offering unmatched versatility for diverse non-destructive assessment needs.

Ultraseismic

Ultraseismic

Ultraseismic (US) investigations are conducted to assess the integrity and length of both shallow and deep foundations. This method is applicable to various foundation types, including drilled shafts, driven or auger-cast piles, and shallow wall-shaped substructures like bridge abutments or wall piers, provided there is sufficient exposed area for instrumentation installation. Particularly advantageous for testing bridge abutments and wall piers due to the ample available mounting space. The US method offers a more advanced alternative to the Sonic Echo/Impulse Response (SE/IR) and Short Kernel methods, especially when dealing with multiple reflecting boundaries.

Ultraseismic investigations offer depth determinations for foundations with an accuracy of up to 5%. Developed to address challenges encountered with SE/IR and SKM methods in the presence of numerous reflecting boundaries, the US investigation method can be applied to concrete, masonry, stone, and wood foundations. While steel pile foundations can also be investigated, acoustic energy damping is higher in steel pipes compared to concrete and wood, attributed to their larger surface areas and smaller cross-sectional areas.

Features

Ultraseismic

- Ultraseismic investigations efficiently assess integrity and length of both shallow and deep foundations.
- Suitable for various foundation types, including drilled shafts, piles, and bridges.
- Provides a sophisticated approach compared to traditional methods like SE/IR and Short Kernel, especially in complex scenarios.
- Applicable to concrete, masonry, stone, and wood foundations, with some limitations for steel pile investigations due to acoustic energy damping.

Impact Echo Scanning

Features

Impact Echo Scanning

- Achieves ± 2% accuracy when calibrated on a known thickness, ensuring reliable results.
- Capable of conducting thousands of tests per hour for detailed imaging of internal concrete conditions.
- Compact, durable design allows for easy transportation and multiple tests daily, with real-time waveform display during testing.

Impact Echo Scanning

The Impact Echo Scanning (IES) system is tailored for comprehensive investigations across wide areas, targeting shallow voids, debonding, cracking, or honeycomb typically found within overlays on bridge decks or dense rebar mats. Common applications include locating post-tensioning (PT) cables and assessing duct grout condition in reinforced structures. The scanning technology enables precise tracing of PT cables through slabs and beams. Notably, the IES method requires access to only one side of the structure for testing. It is based on Olson Engineering's patented technology, incorporating a rolling transducer and automated impactor for nearly continuous Impact Echo-based thickness and flaw scanning of structural concrete and pavements.

Testing is conducted at slow walking speeds, yielding results every inch (25 mm) along a line. Multiple lines can be amalgamated to generate 2-D to 3-D visualizations depicting concrete thickness and the locations of internal voids, honeycomb, cracking, delamination, etc. The scanning method is capable of determining bottom echo thicknesses up to approximately 40 inches (1 m).

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