

Impact Echo » ASTM C1383-04

Impact Echo (IE) investigations are performed to assess the condition or thickness of slabs, beams, columns, walls, pavements, runways, tunnels, and dams.



Impact Echo (IE) systems are designed to determine the condition and thickness of concrete, wood, stone, and masonry structural members when voids, honeycomb, and/or cracks are suspected. IE investigations can also be performed to predict the strength of early age concrete if the member thickness is known. Lastly, the IE method will provide information on the depth of a flaw or defect, in addition to mapping its lateral location and extent. An advantage of the IE method over the Ultrasonic Pulse Velocity (UPV) method is that only one side of the structure needs to be accessible for testing.

Other systems based on the Impact Echo principle include Olson Instruments' handheld **Concrete Thickness Gauge (CTG)**, see page 6 and the **Impact Echo Scanner (IES)**, page 26.

Features:

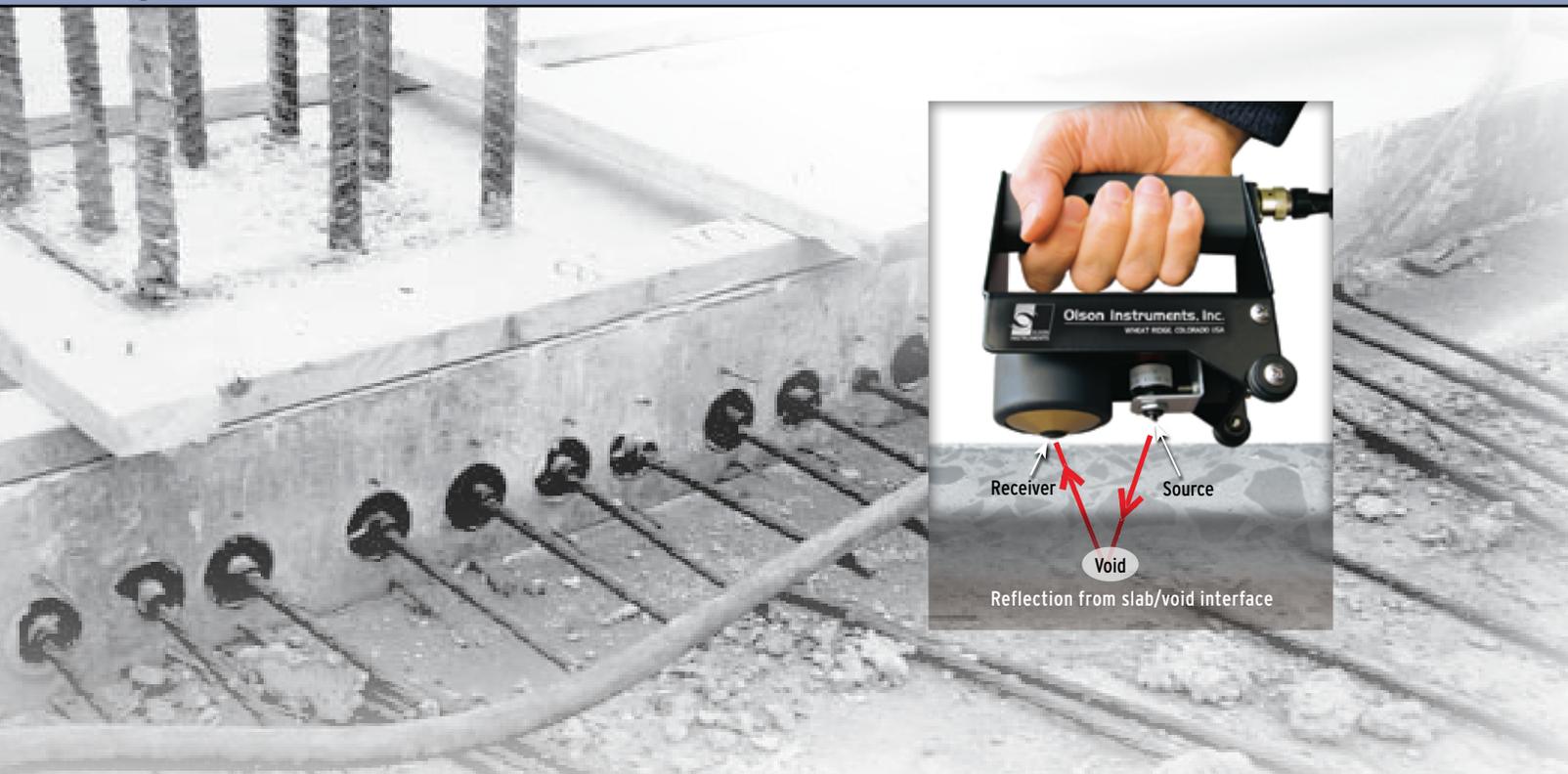
- Economic solution for users who already own either a Freedom Data PC or NDE 360
- Thickness accuracy $\pm 2\%$ at high resolution when calibrated on a known thickness
- Save selected test time/date and spectral thickness results for later review
- English or Metric units can be used
- No coupling agents required for use of test head on concrete
- Easy velocity calibration at known thickness location
- Works on cured, hardened concrete in air or on grade
- Works through paint and most types of bonded tile—checks tile bonding too
- System is compact, durable, and easily transported allowing for multiple tests per day
- Real-time waveform display while testing
- Software allows for more sophisticated processing
- Store more data with these systems than with CTG models
- Can be expanded to use Impact Echo Scanning technology



» Applicable On:
Beams
Bridge Decks
Columns
Dams
Pavements
Pipes
Post-Tensioned Ducts
Runways
Slabs
Tunnels
Walls
» Test For:
Cracks
Delaminations
Honeycomb
Thickness
Voids



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Method

In conventional IE investigations, the hammer or impactor is used to generate compressional waves that reflect back from the bottom of the tested member or from a discontinuity. The response of the system is then measured by the receiver placed next to the impact point. Only one relatively smooth and clean surface needs to be accessible for receiver placement and hammer or solenoid impact.

Data Collection

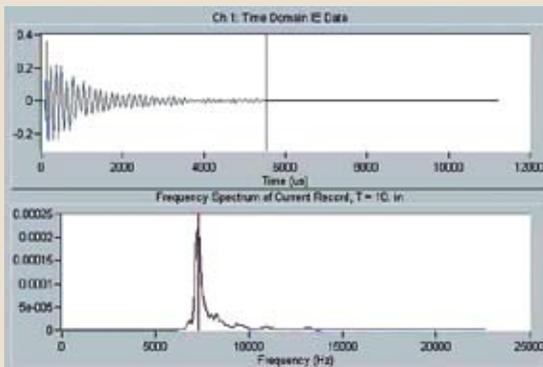
The user friendly IE software is written and tested at Olson Instruments' corporate office in Colorado. We do not outsource any tech support questions and, should you require software support, we welcome your questions and comments.

Available Models

The Impact Echo system is available in eight different models which can be run from Olson's Freedom Data PC or NDE 360 Platforms:

1. Impact Echo-1 (IE-1)
2. Impact Echo-1 + Super Thin (IE-1-ST)
3. Impact Echo-1 + Surface Wave (IE-1-SW)
4. Impact Echo-1 + Super Thin + Surface Wave (IE-1-ST-SW)
5. Impact Echo-2 (IE-2)
6. Impact Echo-2 + Super Thin (IE-2-ST)
7. Impact Echo-2 + Surface Wave (IE-2-SW)
8. Impact Echo-2 + Super Thin + Surface Wave (IE-2-ST-SW)

Data Example » 1



Performing the IE method at a sound concrete location gives results similar to the figure shown. A single, sharp, clear peak representing a known thickness is indicative of sound concrete. The slab investigated was 10 inches thick and the bottom echo results in a peak at 10 inches.

IE - Concrete Location

Model	Advantages
IE-1 Model	Will store more data than CTG systems. Tests concrete between 3.2" to 6 ft (81 mm to 1.8 m). Includes impactor solenoid and displacement transducer
IE-1-ST Model	Allows user to test concrete down to 1.5" (38 mm)
IE-1-SW Model	Allows user to perform Surface Wave (SW) tests with 8" arm (203 mm) <i>(see CTG-SW section, page 7 for more details)</i>
IE-1-ST-SW Model	Allows user to test concrete down to 1.5" (38 mm) and perform Surface Wave (SW) tests
IE-2 Model	In addition to impactor solenoid and displacement transducer, includes accelerometer and small impulse hammer
IE-2-ST Model	Allows user to test concrete down to 1.5" (38 mm)
IE-2-SW Model	Allows user to perform Surface Wave (SW) tests
IE-2-ST-SW Model	Allows user to test concrete down to 1.5" (38 mm) and perform Surface Wave (SW) tests