Slab Impulse Response » ASTM C1740-10 | ACI 228.2R

The Slab Impulse Response method is excellent for evaluating the condition of slab subgrade and tunnel lining support.

The Slab Impulse Response (SIR) system is designed to identify subgrade voids below slabs-on-grade less than two feet thick. In addition, the Slab IR test method can be used on other concrete structures to quickly locate areas with delaminations or voids in the concrete, if the damage is relatively shallow. Slab IR can be performed on reinforced and non-reinforced concrete slabs as well as asphalt or asphalt-overlay slabs.

The Slab IR method is often used in conjunction with GPR for subgrade void detection and mapping. Collecting Slab IR data at multiple, densely spaced locations can improve the conclusions by mapping relative areas of higher and lower mobility. Relatively low mobility (velocity/force) and flexibility (displacement/force) qualitatively indicates that such an area appears to be more solidly supported than an area with relatively high mobility and flexibility.

Features:

- System is compact, durable, and easily transported allowing for up to 600 tests per day
- Real-time waveform display while testing
- Short learning curve for data acquisition and basic processing
- 2-D maps are easily generated from data by exporting the tables from WinSIR into Excel
- English or Metric units can be used

» Applicable On:
Concrete Slabs and Retaining Walls
Pavements
Pond or Pool Bottoms
Runways
Spillways
Tunnel Liners
» Test For:
Delaminations in Decks
Voids below slabs/tunnel linings
Soft, weak subgrade support

Model	Advantages
SIR-1 Model	Complete system for testing of slabs-on-ground
SIR-2 Model	Allows the user to test slabs and to expand testing to tunnels, inclined spillways, etc.

Freedom Data PC or NDE 360 Required, Sold Separately

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Method

Conventional SIR testing requires access to the top of the slab. The vertical geophone receiver is mounted to the surface of the slab adjacent to the impact location and generally 3-4 inches away. Once the slab top is impacted with an impulse hammer, the response of the slab is monitored by the geophone. The hammer input and the receiver output are recorded by an Olson Instruments Freedom Data PC or NDE 360 equipped with the Slab Impulse Response System (SIR-1). In easy access areas, 400-600 Slab IR tests can be performed in an 8 hour workday. Once all of the data is collected, it can be processed with the WinSIR software provided, imported into a spreadsheet program, and then contour mapped.

Data Collection

The user-friendly SIR 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 Slab Impulse Response system is available in two different models which can be run from Olson's Freedom Data PC or NDE 360 Platforms:

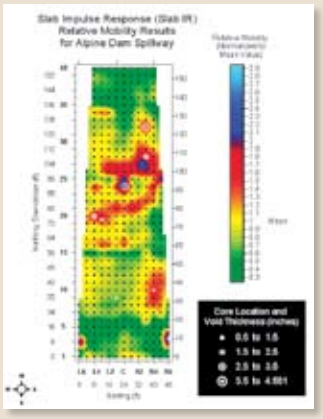
1. Slab Impulse Response - 1 (SIR-1)
2. Slab Impulse Response - 2 (SIR-2)

The **SIR-1 Model** includes a vertical geophone transducer for flat slabs, an instrumented hammer, cables, and the acquisition/processing software. This system can be easily used to test slabs-on-grade and then create 2-D contour maps by importing the results table into programs like Excel. These renderings are often a valuable resource for isolating and repairing voids below slabs-on-grade.

The **SIR-2 Model** includes the addition of an omni-directional velocity transducer to perform tests on walls and ceilings of concrete beams and tunnels.

Determine areas of void/poor subgrade support and flawed concrete conditions with Slab Impulse Response

Data Example » 1



Subgrade support condition evaluation parameters:

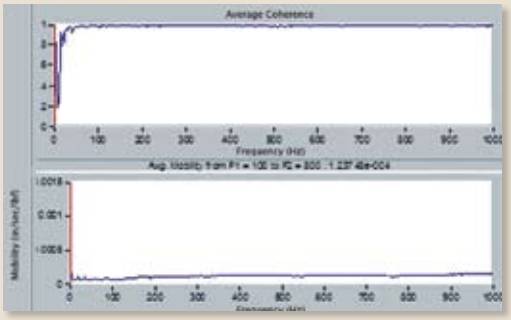
- Mean mobility (in/sec/lbf)
- Shape of the mobility plot at frequencies above the initial straight-line portion of the curve (between 100 to 800 Hz in this investigation)
- Initial slope of the mobility plot gives the low-strain flexibility (in/lbf) of the spillway-subgrade system

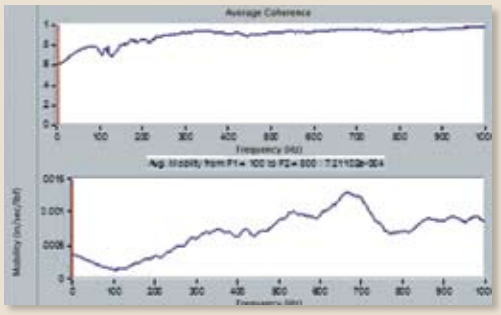
Interpretation Pitfalls

- Slab thickness
- Local reinforcement
- Local joints/seams

Data Example » 2

Good subgrade support – low, smooth mobility.





Poor subgrade support – high, irregular mobility