

Ultraseismic »

Developed by Olson Engineering, Inc., Ultraseismic (US) investigations are performed to evaluate the integrity and determine the length of shallow and deep foundations on complex substructures.



The Ultraseismic (US) system is designed to determine the length and integrity of foundations when the upper portion of the structure is accessible but the top is not or when other tests have led to inconclusive results. US investigations can be performed on drilled shafts and driven or auger-cast piles. The investigation can be performed on shallow wall-shaped substructures, such as an abutment or a wall pier of a bridge, provided at least five to six feet of the side of the structural element is exposed for mounting instrumentation. The method is particularly useful in testing abutments and wall piers of bridges because of the relatively large exposed areas available for mounting instrumentation.

The Ultraseismic method represents a more sophisticated approach to the Sonic Echo/Impulse Response (SE/IR) method (for compressional waves) and the Short Kernel (SKM) method (for flexural bending waves). The US method was internally developed by Olson Engineering as a response to difficulties encountered with the SE/IR and SKM (bending wave) methods when many reflecting boundaries are present. The US investigation method can be performed on concrete, masonry, stone, and wood foundations.

Features:

- System design allows for fast and accurate field measurements — depth accuracy can be determined within 5% or better
- Real-time waveform display while testing
- System is compact, durable, and easily transported allowing for multiple tests per day
- IX Foundation, a seismic analysis and display program, allows the full range of data to be viewed at one time, improving the ability to identify the foundation bottom
- Method is particularly useful in testing abutments and wall piers of bridges because of the relatively large exposed areas available for mounting instrumentation
- Method and system allows for testing of piles without full excavation
- The use of many receiver locations results in a high level of confidence in interpretation

| | |
|------------------------------|--|
| » Applicable On: | |
| Drilled Shafts (Bored Piles) | |
| Auger Cast Concrete Piles | |
| Driven Concrete Piles | |
| Bridge Abutments | |
| Wall Piers | |
| » Test For: | |
| Cracks | |
| Depth | |
| Soil Intrusions | |
| Voids | |



| Model | Advantages |
|-------------------------|---|
| US-1 Model | Depth determination of complex substructures and foundations |
| US-1 + SE/IR + PS Model | Versatile suite of length and integrity determination systems |



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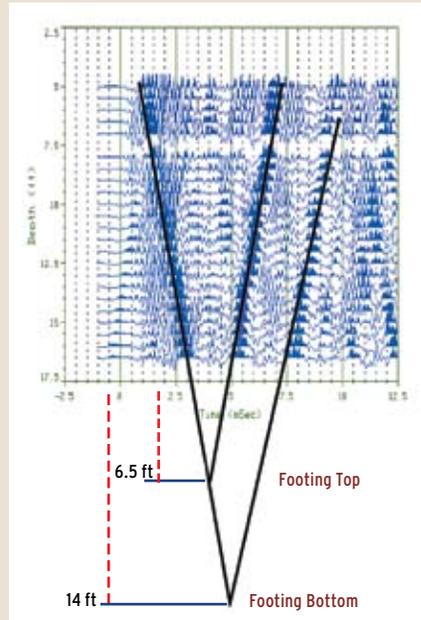
Data Example » 1

Method

The US method is typically performed by mounting a receiver on the upper portion of a foundation or wall and then striking the substructure with an instrumented hammer. The US method requires at least 3 to 6 ft (1 to 1.8 m) of the foundation be exposed for receiver attachments. The general rule is that the larger the exposed area, the better the definition of the reflected events.

Data Collection

The user friendly US 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. It should be noted that US data is usually displayed and analyzed in a program called IXFoundation® created by Interpex Limited.

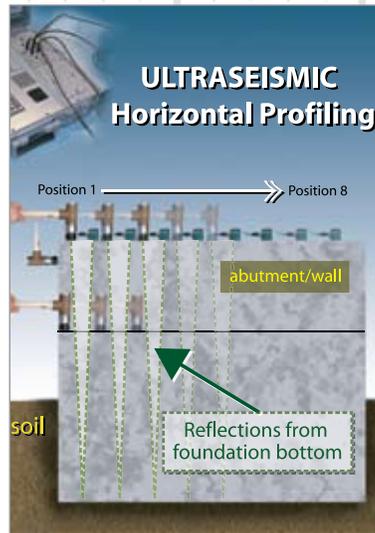
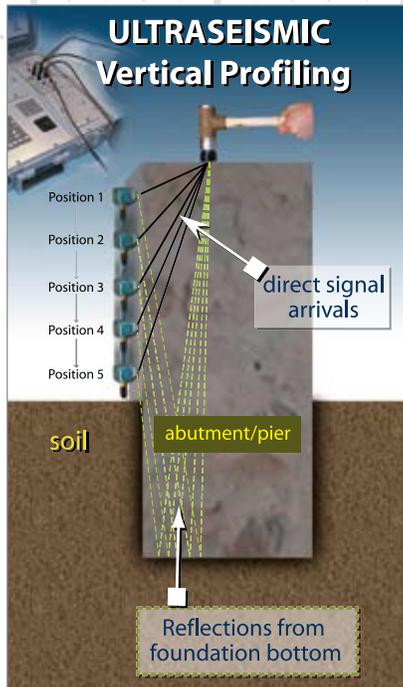


Plot showing several clear breaks, as depicted by the solid black lines.

To illustrate the concept of the Ultraseismic investigation, an example from a Ultraseismic investigation on a concrete bridge column and footing foundation is shown. Using IX Foundation®, all the data from the multiple receiver positions can be presented in one plot.

Vertical hits on the beam generate flexural waves traveling down and up the column/footing substructure to the accelerometers used in the Ultraseismic test.

Note:
Flexural Wave Velocity = 5,800 ft/s



Available Models

The Ultraseismic systems can be run from Olson's Freedom Data PC or NDE 360 Platforms:

1. Ultraseismic - 1 (US-1)
2. Ultraseismic + Sonic Echo/Impulse Response + Parallel Seismic System (US-1 + SE/IR-1 + PS-1)

The **US-1 Model** is the base model. This system includes an accelerometer and an instrumented hammer for 2 channels of data acquisition.

The **US-1 + SE/IR-1 + PS-1 Model** combines **Ultraseismic (US)** with **Sonic Echo/Impulse Response (SE/IR)** and **Parallel Seismic (PS)** for complete foundation testing at a reduced price because the systems share many common components.

For more information on the individual capabilities of each method and system included in the US + SE/IR + PS system, please refer to the individual sections in this catalog.