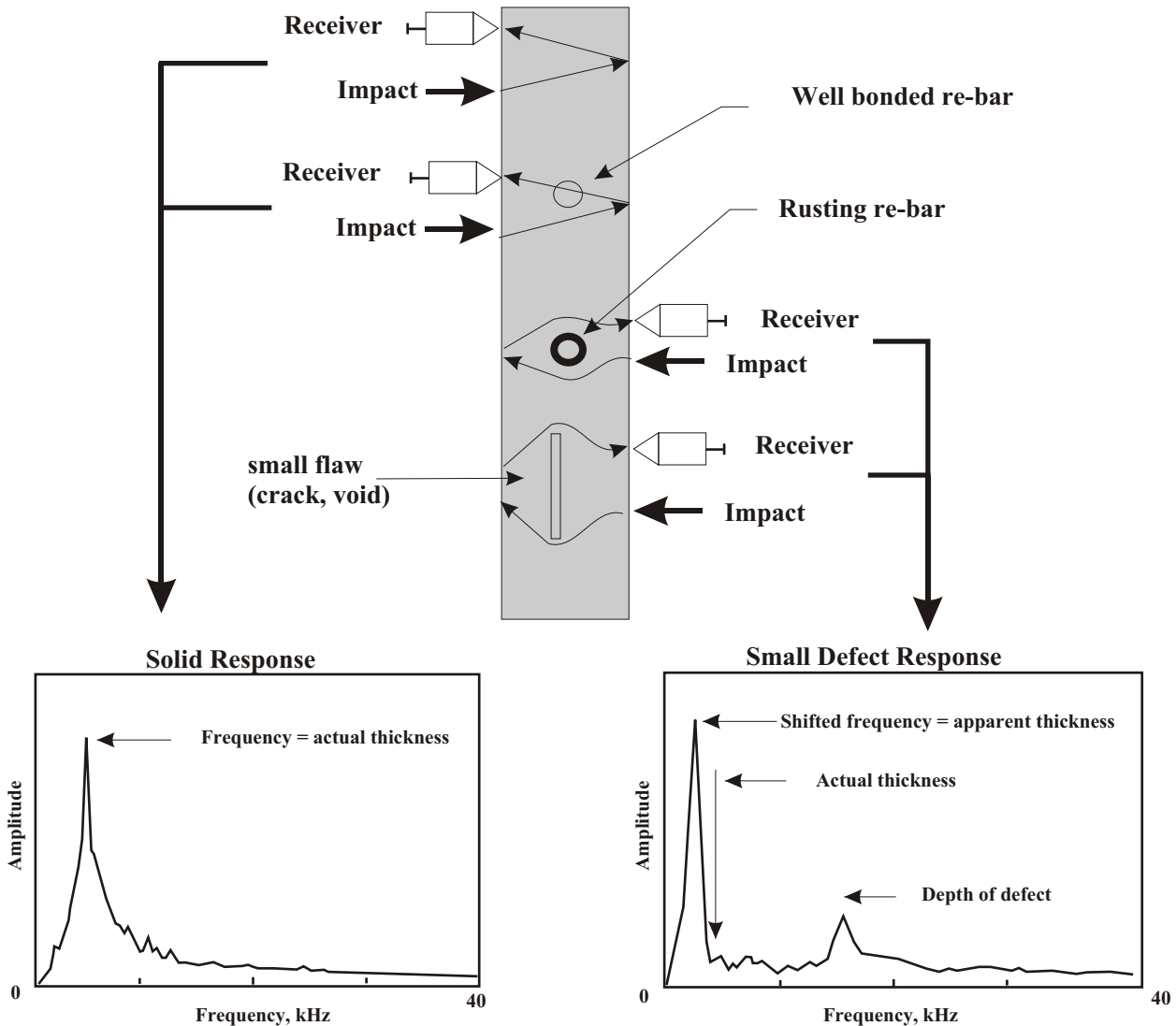


EXAMPLES OF IMPACT-ECHO SIGNAL THROUGH SOLID CONCRETE AND CONCRETE CONTAINING MINOR FLAWS



The impact-echo signal through solid concrete produces a single large amplitude peak frequency corresponding to the frequency thickness of the concrete tested. This is also true where the signal travels through well bonded reinforcing steel. In contrast, concrete containing small defects such as small voids, small cracks or rusting reinforcing steel, exhibits a more complicated pattern. Where a small flaw is present a low amplitude, high amplitude peak is produced by reflection of the sound wave from the back of the concrete. Since the wave has to travel around the flaw, its path length is longer and therefore the peak frequency is less than a normal solid concrete response. This translates to an *apparent increase* in thickness. Depending on the acoustic properties, the signal is often accompanied by a secondary frequency peak equivalent to the depth of the flaw. The larger the flaw the greater the shift in frequency - "Impact-Echo, Non-Destructive Testing of Concrete and Masonry, M.J. Sansalone and W.B. Street, Bullbrier Press, 1997

Specialists in NDT and Computer Monitoring of Structures

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Company Profile

Tekron Services is a Canadian company providing specialized inspection and testing of construction materials. Incorporated in 1987, the company offers a wide range of inspection and non-destructive testing services to evaluate structures and construction materials. Since the formation of the company our goal has been to incorporate emerging technology into tools and techniques for the construction industry.

Data Sheets

To illustrate these technologies Tekron has produced a series of data information sheets and case studies. These data sheets are available on request and are posted on our web page from time to time.

Evaluation Techniques

Since 1987, our company has been involved in several notable investigations including earthquake damage, historical masonry and extensive water leakage, often requiring unusual field techniques to be used to evaluate the problems. Our methods often make use of advanced computerized systems including impact-echo technology which uses sound waves to evaluate defects deep within concrete structures, ground penetrating radar which uses electrical conductivity to detect dissimilarities and computer monitoring techniques using miniature data loggers or cellular connections to evaluate the dynamics acting upon a structure. A list of some of the techniques used and types of investigations completed are given below.

NDT Techniques

Impact-echo

- Thickness
- Delamination
- Honeycombing
- Voids

Ground Penetrating Radar

- Re-bar & post-tension cable detection
- Voids & honeycomb in concrete
- Voids below concrete
- Voids in masonry

Corrosion mapping

Boroscope

Moisture and humidity detection

Dynamic measurement of physical properties

- Linear displacement transducers
- Telltale
- Demeg gauge
- Vibrating wire strain gauge
- Vibrating wire water pressure transducers
- Vibrating wire tilt meters
- Miniature single and multiple channel data loggers including the following sensors:-
 - Temperature
 - Humidity
 - Light intensity
 - Voltage
 - Motor on/off vibration sensor
 - Motor on/offA/C sensor

Investigations

Concrete Structures

- Bridge decks
- Parking garages
- Reservoirs
- Dams
- Concrete pipes
- Tunnels and shafts
- Water retaining structures
- Pavements
- Foundations
- Historical structures
- Concrete protection
- Analysis of structural materials
- Monitoring of physical properties

Building Envelopes

- Roof inspection
- Anchor Safety Testing
- Masonry cladding
- Residential inspection
- Precast concrete
- Stone cladding
- Historical masonry

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