How to Achieve 2x Faster Onsite Concrete Inspection with New Ultrasonic Capabilities

Ultrasonic Pulse Velocity (UPV) is one of the main indicators used to assess concrete quality in-situ. In 2021, there was a major change made to the European standard for UPV measurement of concrete. It has been 25 years since the last significant change in the standard and one which has enabled an entirely new level of productivity for onsite testing...

What changed in the standard?

The latest release European standard for ultrasonic pulse velocity of concrete EN12504-4 now allows the pulse velocity to be determined with shear waves (S-waves) in pulse echo mode.

Why was it changed?

Traditional UPV uses P-wave values as an indicator of concrete quality which requires the direct transmission method for best results. When only single side access is available, the only possibility with UPV is to use the indirect transmission method, which is both inaccurate and time-consuming to carry out.

Let's take a look at a typical onsite workflow with traditional UPV so we can compare…

UPV measurement set up and workflow

There are three configurations for traditional UPV testing**:**

1. **Direct Transmission**: Optimum configuration with maximum signal level and most accurate method of pulse velocity determination.

2. **Indirect Transmission:** Signal level is only about 2 – 3 % of signal level when using direct transmission.

3. **Semi-direct Transmission**: Sensitivity is somewhere between the other two methods, with lower accuracy than the direct method.

As you can see, direct transmission with access from two sides of the concrete is necessary for meaningful results with UPV.

Challenges with onsite UPV measurement

- Although UPV has been a popular choice for onsite measurements, there are some known drawbacks:
- Two people are required
- A grid must be drawn on both sides of the structure and correctly aligned (time consuming)
- The operators must co-ordinate the measurement (not easy in high noise levels)
- One operator must view and record the measurements
- Very long cables can be required (potential safety hazard)
- Coupling gel is required to obtain sufficient signal strength (messy!)

Compare UPV to UPE (Ultrasonic Pulse Echo)

What is pulse echo mode?

Ultrasonic pulse echo mode (UPE) with the Pundit PD8050 extends the capabilities of traditional UPV, especially when access to the structure is restricted to a single side.

If we compare the direct transmission method with the new pulse echo method, we can see that the direct method (traditional UPV):

- requires access from two sides

- requires a couplant with the transducers

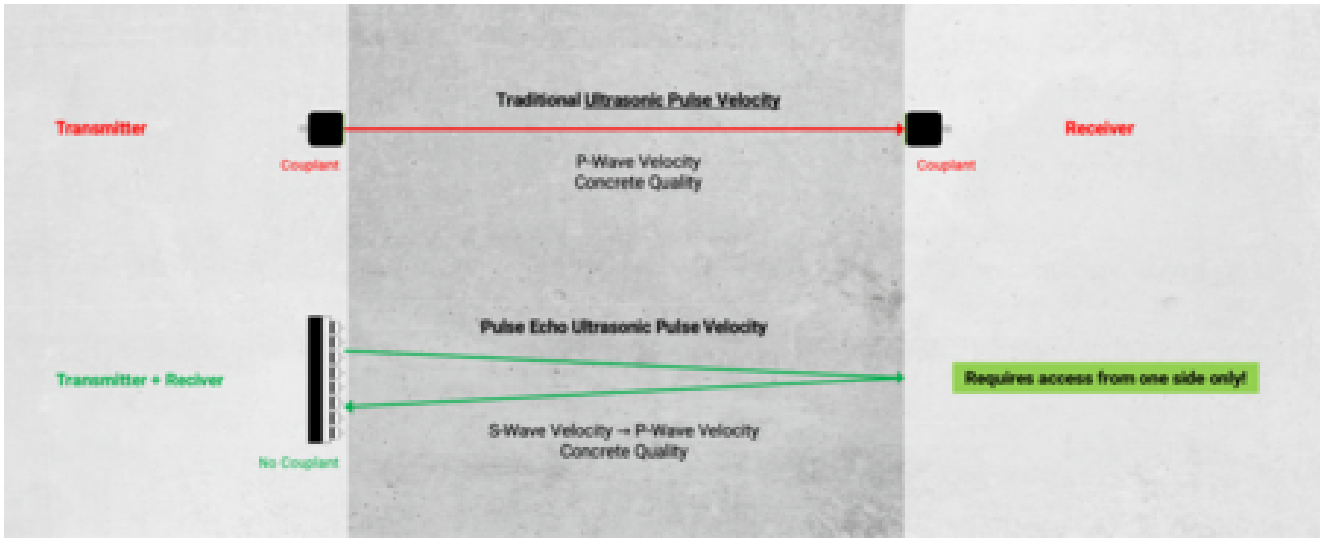
- measures a p-wave velocity

Compared to the pulse echo mode (UPE):

- Measures from a single side

- Doesn't require any couplant

- Measures an s-wave velocity which can also be converted into a p-wave velocity



On site UPE measurement

When it comes to onsite measurement there are big advantages with pulse echo. Aside from being significantly easier, these are some of the following benefits:

- Only one person is needed
- A grid measurement on one side only
- No coordination with a second operator.
- No cables
- No coupling gel is required
- At least two times faster than traditional method

The ultimate solution for concrete testing with Ultrasonic Pulse Echo

The Pundit PD8050 ultrasonic imaging system is the preferred solution for assessing concrete quality and uniformity testing. Because UPV testing is completely nondestructive and now that it is faster than it has ever been before, the PD8050 makes it the ideal non-destructive test for concrete uniformity testing.

Thanks to the new grid scan mode on the PD8050, applications such as identifying weak spots or identifying the best location to take cores, the whole procedure has been made very simple.

But don't just take our word for it, see how the PD8050 solution can enhance your onsite concrete inspections! Request a demo with our experts.

SCREENING EAGLE | proceq

Terms Of Use
Website Data Privacy Policy

Copyright © 2024 Screening Eagle Technologies. All rights reserved. The trademarks and logos displayed herein are registered and unregistered trademarks of Screening Eagle Technologies S.A. and/or its affiliates, in Switzerland and certain other countries.