NDTitans in action

Case 8.5 Impact-echo testing of a concrete silo wall for delamination

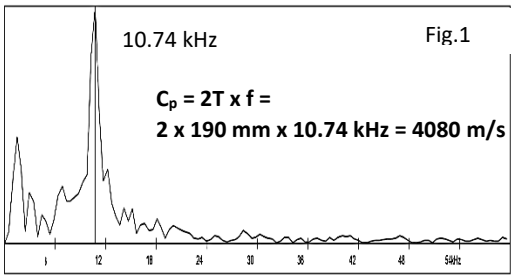
Avantech team carrying out Impact Echo test on wall of silo using the DOCter Impact Echo Test System

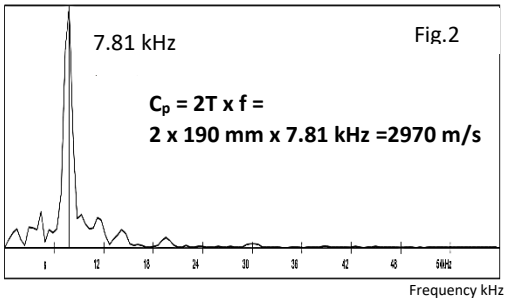
The cylindrical RCC 190 mm thick wall of an in-use cement silo, in the state of Rajasthan - India was recommended for Non-Destructive Testing after the in-house inspection team at the cement plant observed deterioration in the silo wall during routine inspections.

DOCter Impact Echo Test equipment manufactured by Germann Instruments A/S Denmark was used to inspect the silo's RCC wall using the impact echo test method.

The impact-echo signals were classified in four different groups, solid (high and low wave speed), delaminations and honeycombs. In each group one core was drilled out for confirmation:

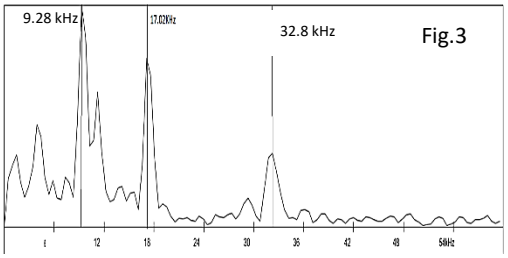
Solid





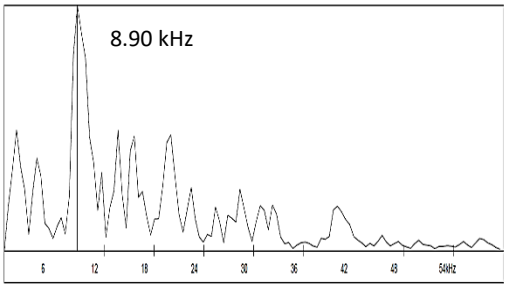
One distinct frequency peak indicating a solid wall, but with different wave speeds (different concrete qualities), for 190 mm thickness

Confirmed by coring



The 9.28 kHz represents a drop from the 10.74 kHz "solid" frequency in fig.1, hence the P-wave is running longer than 190 mm – the thickness of the wall, as It is running around air interfaces. At the same time, the P-wave is being reflected from those air interfaces at 17.02 kHz and 32.8 kHz, indicating smaller delaminations, confirmed by coring.

Honeycomb/Delam.



The solid frequency has dropped to 8.90 kHz. Multiple peaks appear in the frequency spectrum indicating a honeycombs, confirmed by coring.

A total of 600 impact echo tests were conducted at different levels on the silo.

18% of test locations exhibited delainations/honeycombs and 8% reduced wave speed. The results were handed over to the inspectors for further action.

Testing organized and reported by **NDTitan Parampreet Singh**