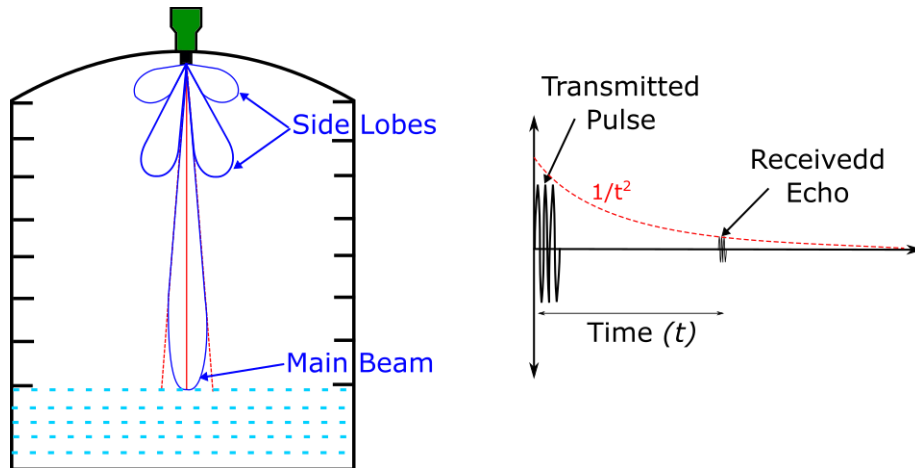


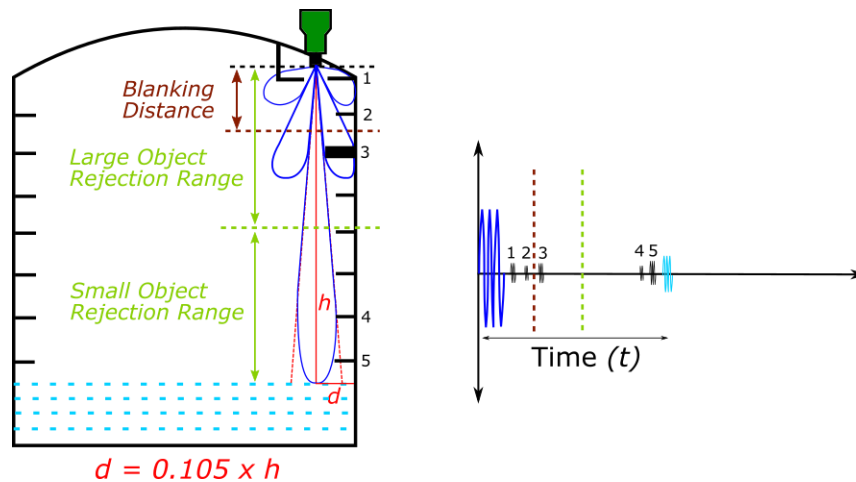
Intelligent adaptive echo detection technology

The Mud-pit level sensor work by utilizing principles of sound to offer continuous level measurement of both liquid and solid media.



The top-mounted sensor emits a high-frequency (50kHz) ultrasonic sound pulse of very short duration, then records the time it takes for the echo to return. Based on the speed of sound for the ambient temperature evaluated by the sensor, the distance from the sensor to the top of the liquid media can be calculated by dividing the time between the initial pulse and its echo by two. [The principle is similar to the echolocation used by bats and dolphins.] The amplitude of the received echo diminishes with a profile that is inversely proportional to the square of time (distance) as per the property of sound waves. A typical radiation power pattern for the transmitted pulse and received echo from the sensor for the main ultrasonic beam and residual side lobes are depicted above.

If the sensor is mounted closer to the side wall of the mud-pit, multiple stray reflections can occur from maintenance rungs and the objects alike as shown below.



Hence, for best performance it is highly recommended to install the sensor at a distance(d) away from any unwanted objects with respect to their depth(h) satisfying the formula $d = 0.105 \times h$, though the sensor has an 'intelligent adaptive echo detection technology' to avoid any such stray reflection echoes as much as possible with respect to the selected 'mud-pit size' or range.

Mud-pit size	Range	Sampling Time	Large object rejection range	Small object rejection range	Maximum Fill Rate
0	5m – 6m	0.450s	0.4m – 2.9m	2.9m – 6.0m	6.0m/min
1	7m – 8m	0.750s	0.4m – 4.7m	4.7m – 8.5m	5.0m/min
2	9m – 10m	1.000s	0.4m – 5.4m	5.4m – 9.5m	5.3m/min
3	11m – 12m	1.125s	0.4m – 6.4m	6.4m – 10.5m	5.4m/min

Echoes from objects 1 & 2 can be rejected by the 'blanking-distance' selection and the echoes from large object 3 and small objects 4 & 5 can possibly be rejected by the selection of 'mud-pit size'.