Materials Processing Institute

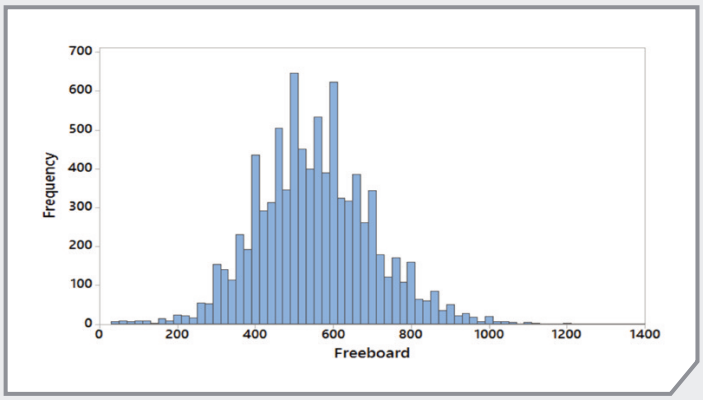
CASE STUDY

Measuring Ladle Freeboard using Radar Technology

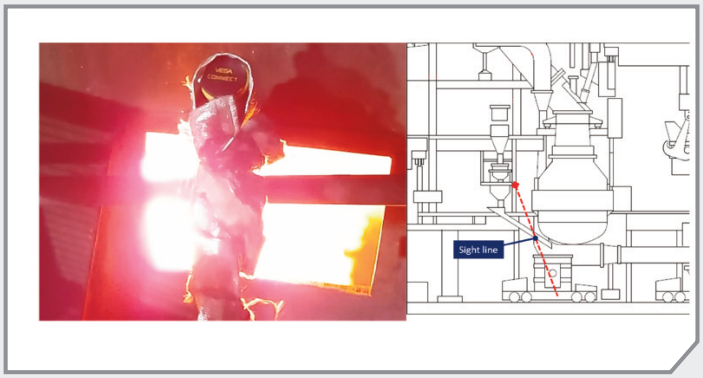
LADLE FREEBOARD

Ladle freeboard is the measurement of the area between the top edge of the ladle and the surface of the molten steel inside it.

Ladle freeboard measurement is important for plant safety and efficiency. Knowing the level of ladle freeboard reduces risks to personnel and equipment and helps determine the amount of molten steel being delivered to the next phase of production, as well as ensuring optimum ladle fills are achieved.



Variability of freeboard in ladles



Location of radar and sight line

THE PROJECT

The client required ladles to be filled to as high a level as possible without the risk of the ladles overflowing during subsequent operations. The target freeboard was 600mm. Radar sensor technology was trialled to test if it could continuously measure the distance between the ladle lip and liquid surface in the ladle during tapping.

OUTCOME

The radar was set up and operated while the vessel was being tapped. The results showed accurate measurements to known data points when the ladle was moved into position, but the signal was disturbed during tapping by the steel stream. The steel level in the ladle after tapping was also clear.

The trial demonstrated that for this application radar measurement technology was not suitable for measuring freeboard while tapping the vessel.

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