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Assessment of Quality and Acceptance Criteria of Continuous Cast Steel blooms by Comparing Ultrasonic Signals and Macro Structure

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Abstract

The quality of product will mainly depend upon the quality of raw material. The assessment of quality at the raw material stage will go a long way in assessing the final product quality and also saving on unproductive working of several forming machines.

It has been the normal practice to manufacture tubes and pipes from the rolled billets. The introduction of continuous cast blooms for the manufacture of tubes and pipes is gaining momentum due to the fact that the elimination of hot rolling has a direct bearing on the productivity and the cost of manufacture.

Since the concast material has "as cast" structure, the ultrasonic indications have to be freshly studied with respect to macro structure of the bloom. This will enable for the proper assessment of the quality of the raw material Vis-à-Vis the acceptance criteria of the newly introduced raw material.

The advantage expected out of this project is to fix the scientific means of Non-destructively setting the acceptance standard for these billets. The benefit being avoidance of processing defective billets which is eventually being rejected as that tube or pipe leading to slippage on customer Commitments.

Concast Billets

In the early 1940's research and development resulted in the perfection of methods for the continuous casting of molten steel directly into the form of Billets, by-passing the ingot stage and the necessity for hot rolling operations formerly required to produce such products.

Defects

The quality of continuously cast steel is dependent on the steel making and casting practices employed. It is affected by the interaction of chemical and physical factors, which must be closely controlled to obtain the full potential of the process. Typical defects experienced in con-cast Billets are **Surface:** Longitudinal and transverse Cracks. Laps, Scale and entrapped inclusions and slag oscillation marks. **Sub Surface:** Pinholes, blow holes, inclusions and cracks. **Internal:** Cracks, Porosity, inclusions and segregations.

For Ultrasonic investigations, it is shown that the defect echo and or the reduction of backwall echo exceeding 50% can be used as an 'acceptance Criteria' for selecting good CC blooms for the manufacture of high quality tubes and pipes.