

Continuous Casting of Slabs

Temperature Control for Continuous Caster Production of Slabs and Billets



Q

Question

How do you maintain the quality of steel slabs being produced by a continuous caster?

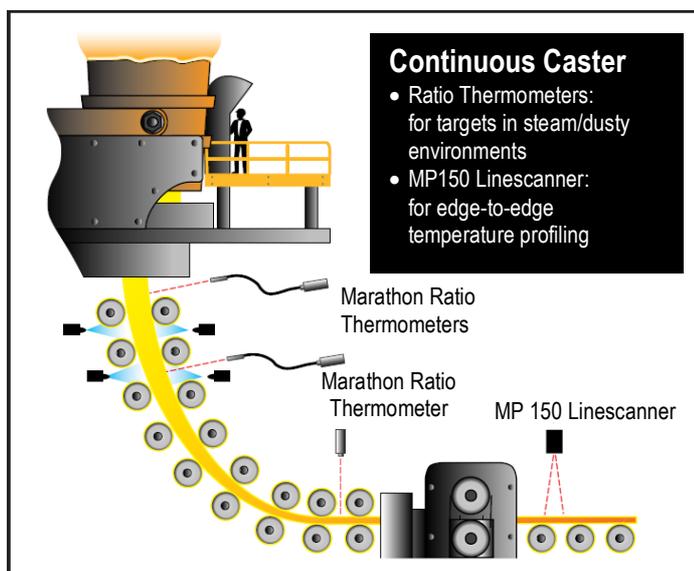


A

Answer

Situation Analysis

Molten steel is poured from a high-capacity ladle into a tundish (refractory-lined funnel) through a water-cooled die and into a continuous caster machine, where the large glowing steel strand continues to be cooled by an array of spray jets, as it travels through the curved spray section. Once the steel has passed through the water-cooled die and is making its way downstream, knowing the strand temperature in the spray zone is important for a number of reasons. One of the main reasons for monitoring and recording the temperature is to maintain steel of a consistent quality. Efficient water cooling is also critical and temperature monitoring can alert operators to a plugged or misdirected water jet. Catastrophic breakouts are to be avoided at all costs due to the damage caused and subsequent clean up that is required when such an event occurs. Temperature measurement in the spray zone is particularly difficult due to a field-of-view that is obscured by large amounts of steam.



- Steel temperature: 750 to 1500 °C
- Ambient temperature: 40 to 150 °C
- Distance to measurement object: 0,3 to 7 m

Solution and Improvements

The Raytek Marathon Series of infrared pyrometers is the suitable match for the spray zone and the straightening section of the continuous caster. The ratio units have two silicon detectors in the same instrument that allow for up to 95% signal attenuation, preventing steam and dust from interfering with the accuracy of the measurement results. A fiber-optic unit (FR models), with its small optical head and flexible cable, is the best choice for hard-to-reach locations and can be used without cooling in an ambient environment up to 315 °C. For the MR models, a rugged ThermoJacket with a built-in air purge collar can be used to house the unit and protect it from physical damage. The unique “dirty window” alarm on both ratio instruments will alert the user to excessive attenuation levels in the event that debris has built up on the window of the instrument.

For the simultaneous monitoring of multiple slabs, an MP150 linescanner can be used. The MP150 is mounted above the straightening section to generate edge-to-edge temperature profiles using DataTemp ES150 software. These profiles can be used to monitor product quality downstream. The MP150 can be air-cooled inside an enclosure to provide thermal, as well as mechanical protection. The benefits of the temperature profile image range from product quality to process optimization.



Rugged fibre-optic sensor FR



Environmental protection with ThermoJacket



Edge-to-edge temperature profiling with MP150 Linescanner

Raytek Product

- Marathon series, FR or MR model
- MP150 Linescanner, 1M or 2M model

Benefits

- Improved safety – less chance of breakouts
- Higher quality product
- Fuel savings
- Reduced maintenance costs

Accessories

- ThermoJacket for MR
- Air purge collar for FR
- Sighting tube and flexible glass fibre protection for FR
- DataTemp® MultiDrop software for Marathon series
- DataTemp ES150 software for MP150 linescanner

For customized solutions to your process, please contact: