

Continuous Casting Dynamic Spray Control

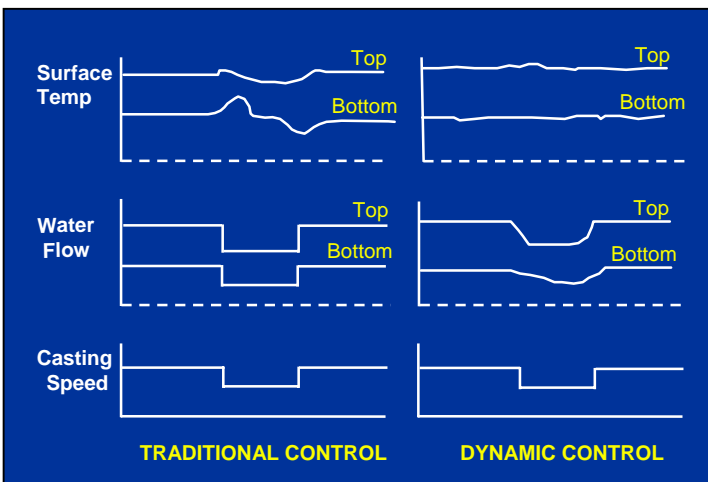
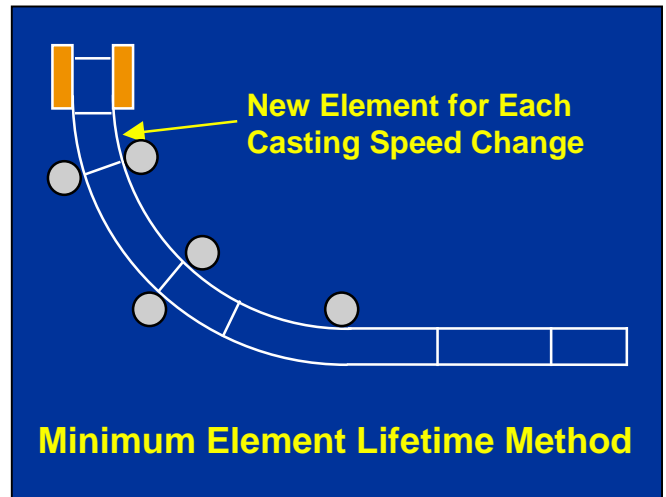
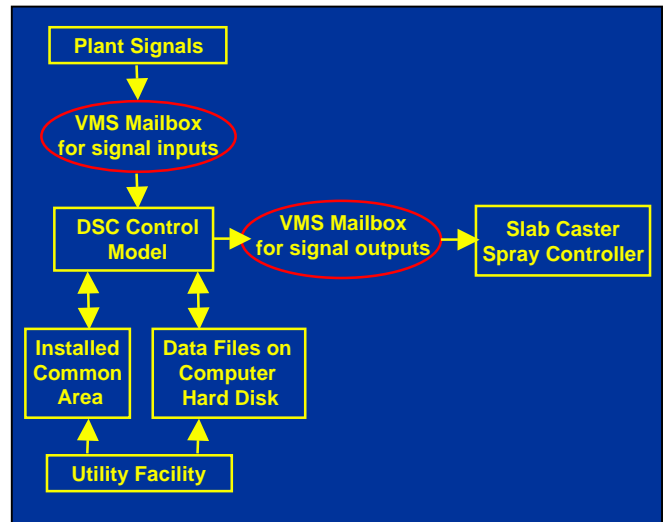


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Dynamic spray control (DSC) is a means of controlling the secondary cooling water flow rates on a continuous casting machine to ensure that a consistent strand surface temperature profile is maintained within the spray chamber, regardless of changes in casting speed. It is in use on many of the casters at Corus, including Scunthorpe slab caster and Lackenby slab and bloom casters.

Traditional methods of controlling the secondary cooling water flow use a ratio control, which automatically varies the cooling according to casting speed. However, an abrupt change in casting speed will produce a corresponding change in the cooling water flow which will produce significant fluctuations in the strand surface temperature, especially near the bottom of the spray chamber (see diagram below).

With dynamic spray control, mathematical models are used to determine the relationship between heat transfer and time according to the codes of practice for the casting machine. The relationship between heat transfer and cooling water flow rate is also calculated. Cooling water flow rates are then determined by how long a section of strand has been in the spray chamber. This is known as the "element lifetime" method of dynamic spray control. The effect of this method is to smooth out changes in water flow due to sudden changes in casting speed, which produces a more consistent strand surface temperature (see diagram below).



Benefits of using DSC:-

- Reduced operator workload in monitoring casting speed and water flow rates.
- Consistent strand temperature, resulting in improved quality, i.e. reduced transverse face and corner cracking, reduced internal cracking, reduction in inadequately straightened product.
- Decreased surface conditioning.
- Increased hot charging ratio.