

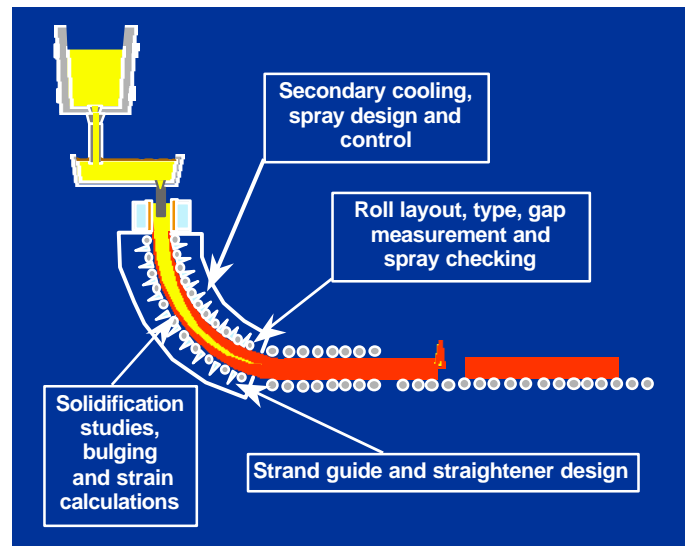
Caster Design Studies

The Teesside Technology Centre is the focus for development of Primary Processes within the Company and has accumulated expertise over many years covering all aspects of continuous casting. This expertise is used to assist in the design of new casters and enhancement of existing casters to increase productivity and improve product quality. Mathematical modelling techniques combined with on-plant measurements, where necessary, are used to assist with these caster designs and operational studies.

Strand solidification models have been developed to calculate strand temperature and shell growth. The models have been extensively calibrated on-line using embedded thermocouples and by utilising laboratory measurements on spray heat transfer coefficients and water distribution. Spray system design studies are carried out using these measurements and models, enabling the nozzle type, position and water flow rate to be established to give a desired temperature profile. Dynamic models are also available to determine the influence of casting speed changes on surface temperature and sump position.

Roller layout design is undertaken using finite element models of strand deformation. These models, again based on extensive experience and on-plant measurements, are used to determine the influence of roll pitch on inter-roll bulging and to calculate the combined effects of bulging and roll misalignment on internal strains. A 2-D model is available for slab casting and a 3-D model for bloom casting where it is necessary to account for the restraining effect of the edges of the bloom. Internal strains can be minimised by the use of tight roll pitches which reduces inter-roll bulging. However, misalignment strains increase with reducing pitch. There is, therefore, an optimum roll spacing for each position down the caster to minimise the total internal strains, whilst avoiding excessive bulging.

A complete roller layout and spray system design service can be supplied and an independent judgement can be made on design proposals for new or enhanced casting machines.



In collaboration with Corus Process Engineering based at Workington, a full design and build service for continuous casters can be offered.