

## **SURFACE CRACK CHARACTERIZATION OF TWIN ROLL CASTER SHELLS AND ITS INFLUENCE ON AS-CAST STRIP SURFACE QUALITY**

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### **ABSTRACT**

Caster shells are the most critical components of the twin roll casting process that has significant contribution to the surface quality of the as-cast sheet. Due to their high cost, they also have an impact on the cost structure of as-cast sheet. Twin-roll strip casting is a complex process, which involves high solidification rate and subsequent deformation at the roll bite. Solidified metal exerts enormous mechanical loads on the caster rolls and this results in bending of the caster roll along with the shell. Liquid metal also raises the temperature of the shell considerably at a limited depth and upon leaving the roll bite cooling cycle starts. Heating-cooling cycles at the outer skin of the shell lead to thermal fatigue. Coupled effect of thermal and mechanical fatigue causes surface cracks to appear. These are the features impair the surface properties, even performance of products.

Present study aims to elucidate surface crack formation mechanism of caster shells. Metallographic investigations and SEM studies were conducted on the caster shells. The results are correlated with physical and mechanical properties of the shell materials. Studies were extended to aluminum foil and sheet products in which caster shell related defects were observed.

**Keywords:** Twin roll casting, thermal crack, caster shell.