

# **Analysis of Sponge Cracks of 50BV30 Microalloyed Steel and the Countermeasures**

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Sponge crack is a severe defect detected on 50BV30 hot-rolled billets. The aim of this paper is to study the formation mechanism and the influence of process parameters on this defect formation. The microstructure investigation revealed that the sponge cracks could be attributed to transverse cracks occurring at bloom corners. Transverse corner cracks initiated and developed along  $\gamma$  grain boundaries when the bloom was subjected to an improper composition and casting process. Precipitation of AlN, BN at  $\gamma$  grain boundaries resulted in ductility loss, which enhanced crack formation. Higher Ti content promotes TiN precipitation, and restrains AlN, BN to form below the straightening temperature. Soft secondary cooling was also applied to increase corner temperature and reduce temperature fluctuation. The defect rate was dramatically reduced from > 30% to < 2% after the control of AlN, BN precipitation and soft spray cooling.