Abstract

Purpose – During steel plate and long-product production, numerous imperfections and defects appear that deteriorate product quality and consequently reduce revenue. The purpose of this paper is to provide a practical overview of typical defects (surface and internal) that occur and their root causes.

Design/methodology/approach – The data presented here derive from the quality department and from more than 50 technical reports of ELKEME S.A. on the last decade’s production of steel making companies STOMANA S.A. and SIDENOR S.A., with emphasis on the defects occurred in some of the products of the Bulgarian plant. Stereoscopic observations of surface defects, light optical metallography, and scanning electron microscopy with EDS represent the most used techniques to characterize defected macro-/micro-areas and microstructures.

Findings – In general, the most commonly encountered defects from semi-finished (billets, blooms, and slabs) and final (round bar and plate) steel products are as follows: network cracks, porosity, gas holes, shrinkage, shell, slivers, casting powder entrapment, ladle slag entrapment, other non-metallic inclusions, low hot ductility, centerline segregation cracking, macro- and micro-segregation, and mechanical defects (scratches, transverse cracks, and seams).

Originality/value – Root cause analysis and categorization of the most commonly encountered defects can pave the way to production process improvements that directly affect final product quality and the overall per ton production cost. The benefits of this work obviously affect all steel producers/processers, and also society through the safety increase achieved by the quality improvement in the steel products used in constructions and automobile parts.