

On the Nature and the Control of Thermal Oxide Formation on Hot-Rolled Low Carbon Steels

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After the hot-rolling process, the hot-rolled steel with desired geometry and properties is obtained, naturally with the thermal oxide scale formed on its surface. The presence of this oxide must be well controlled. For example, if the hot-rolled steel will be further sent to the cold rolling, the steel with poor scale adhesion is preferred. However, if the hot-rolled steel is directly delivered for the use in this form such as for making a body of an excavator or a chassis of a pick-up truck, the intimate adherence of scale to the steel substrate is needed. The present talk reviews the formation of thermal oxide on iron and carbon steels including the ones produced from the blast-furnace and electric-arc-furnace routes. Factors that affect the oxide formation and scale adherence, i.e. the steel chemistry and the hot-rolling parameters, will be addressed. The scale adhesion assessment using the tensile test accompanied by the Galerie-Dupeux model to quantify the adhesion energy will also be included in the talk.