During hot rolling a layer of oxide (scale) is formed under the surface of steel strips. The characteristics of scale have a direct influence on productivity, since the removal process (mechanical and/or chemical) as well as the generation of iron oxide instead of steel. This project aims to characterize, identify and quantify the phases present in scale samples collected from industrial hot rolling (Hot Strip Mill CSN), particularly hematite, magnetite and wustite. The techniques of XRD, Rietveld method, SEM and micro-hardness tests carried out to determine the micro-hardness of these phases, and thickness of the scale layer in different stages to establish the mechanisms of formation and the influence of operational parameters on the physicochemical characteristics of mill scale. The main goal of this study is subsidize the improvement of productivity of hot rolling and subsequent processes of pickling and cold forming.

**Keywords:** oxide scale; hot-rolled strip; magnetite; hematite; wustite; wustite decomposition.

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