

# **Influence of niobium on the hardening phenomenon and wear in the manganese steel \ (12% Mn\ ) destined for the railway**

**manganese steel, effect of niobium, hardening, wear**

**Abstract:** This study relates to the manufacture of austenitic manganese steel for the heartswitching crossings of railways in all industrial countries where heavy loads are moved by rail. This steel is characterized by a high surface hardness service yard caused by the phenomenon of hardening. According to the microstructure formed after quenching, the transformation of austenite into martensite during working, determine the operating life. The rate of transformation of austenite into martensite can force a compromise between ductility and wear resistance of the steel in order to withstand large forces without breaking. The objective of this study is to improve the resistance to abrasion and friction to cast state and after heat treatment by the addition of niobium. This study permitted to develop a new shade of manganese steel can be integrated into the production of heart of railway switches with better lifecycle.

**Keywords :** manganese steel, effect of niobium, hardening, wear.