

Influence of heat treatment on the structure and abrasion wear of A105N steel

A. GHARBI, K. BOUHAMLIA, O. GHELLOUDJ, C.E. RAMOUL

Abstract : Wear is the removal of material from a surface by very different mechanisms such as abrasion, erosion, fatigue and corrosion. In the industrial sector, the cost of repairing used parts is very high; the solution in this case is to choose an anti-wear material. To choose an anti-wear material, the first factor is the identification of wear type; however, the conditions of use in the industry are complex so the choice of materials is difficult. Usually the choice of material depends on several factors such as high hardness, high resistance to abrasive wear and low friction coefficient. Thermal treatments are proposed in order to improve these properties. The objective of our work is to study the influence of heat treatment on the structure and abrasion resistance behavior of A105N steel. Samples solution treatment is carried out at a temperature of 900 °C for 2 h then quenched in water. Experimental techniques such as optical microscopy, SEM, EDX and abrasion wear test are used to highlight the effect of heat treatment on the wear resistance of the steel. The microstructural characterization shows that in the initial state, the structure is composed of ferrite and perlite, after tempering, the structure is composed of perlite and bainite. The wear tests by abrasion show a clear difference on the weight losses of up to 50% following the quenching treatment.

Keywords : wear, abrasion, steel, heat treatment, A105N.