



Modelling of the carburizing and nitriding processes

– P. Cavaliere, G. Zavarise, A. De Santis, M. Perillo

Cavaliere P. - University of Salento, Dept. of Innovation Engineering (Italy)
Zavarise Giorgio - University of Salento, Dept. of Innovation Engineering (Italy)
De Santis Alberto - University of Salento, Dept. of Innovation Engineering (Italy)
Perillo Marco - EnginSoft

Abstract

The thermo-chemical diffusion process of carburizing and nitriding was modeled in the present study. The analyses led to the prediction of surface hardened layers dimensions and hardness in commercial steels. A diffusion model based on Fick's laws was applied to such steels in order to describe the growth kinetics of layers, then the analytical model was employed to perform finite element calculations. In such a way it was possible to calculate the carbon and nitrogen concentration in the cross sections of cylindrical samples and the consequent hardness profiles coupled with those of the residual stresses. The results from analytical model and FE calculations were compared with experimental data.