

# Comparison of Material Models in the Study of Mechanical Properties of the Oxide Scales

**HRABOVSKÝ Jozef**

Heat Transfer and Fluid Flow Laboratory,  
Faculty of Mechanical Engineering Brno University of Technology,  
Czech Republic

*Heat treatment of steel is tied to many problems. One of the important problems is the growth of the oxide scale layers and their removal in order to obtain high quality of steel surface. The problem of the oxide scales growth and descaling requires a complex analysis. Complexity of analysis also includes the study of mechanical properties of the oxide scale layers. To study the mechanical properties the small punch method was used. The typical result of the small punch tests is force-displacement curve. Small punch test can be considered analogous to a conventional tensile test. Therefore it is necessary to convert measured force-displacement curve to stress-strain curve. The conversion of the measured curves can be carried out by several methods such as analytical or numerical methods. In this paper the numerical method in ANSYS program was used to convert the measured force-displacement curves. Two material models were applied and results for all examined specimens are compared and presented.*

Co-authors: **Jaroslav Horský, Petr Lošák**