

## **STUDY ON THE RESIDUAL STRESS AND THE DISTORTION OF THE LARGE GEARS OR AXLES DURING THE HEAT TREATMENT**

Y. Wang, SIRRIS, Zwijnaarde, Belgium, yunning.wang@sirris.be

Y. Ling, SIRRIS, Zwijnaarde, Belgium, Yong.Ling@sirris.be

R. Kastelein, SIRRIS, Zwijnaarde, Belgium

Z. A. Xu, SIRRIS, Zwijnaarde, Belgium

The obstacles to the computer simulation of the heat treatment process include not only the complex heat transfer in the quenchant, the variable microstructures and their mechanical properties with the temperature etc., but also some outer factors in the practice of the industry, such as, the non-uniform heating or cooling conditions, the effect of the gravity (especially for the large components), etc.. In this work, we develop some numerical models to simulate the residual stress and the distortion during the heat treatment process. The influences of the gravity, non-uniform quenching conditions on the distortions of the large gear or axes are discussed and the results are compared with the experimental measurements.