

## THEORETICAL AND EXPERIMENTAL STRESSES AND STRAINS ANALYSIS OF THE BUTT WELDED JOINTS

Octavian Mircea, Mariana Doina Banea

Dunarea de Jos University of Galati, Romania  
[octavian.mircea@ugal.ro](mailto:octavian.mircea@ugal.ro)

### ABSTRACT

*This paper presents a comparative study of theoretical and experimental stresses and strains in real butt joints. A theoretical method using finite element analysis has been used for the temperature prediction in the welded joints. Several measurements and visualization of the temperatures distribution have been made using infrared thermography. The welding conditions are similar to the simulation conditions used in finite element analysis. The finite element analysis (FEA) was carried out in two steps. A non-linear transient thermal analysis was conducted first to obtain the global temperature history generated during the welding process. A stress analysis was then developed with the temperatures obtained from the thermal analysis used as loadings in the stress model.*

**KEYWORDS:** Stresses and strains, finite element analysis.

### REFERENCES

- [1] **Mircea O., Banea D.M., Visan D., Birsan D.** - *Temperature field in butt welded joints: Numerical and experimental results.* International Conference "Tehnologii moderne, Calitate, Restructurare" TMCR 2005 Chisinau, Republica Moldova, vol. IV, 19-21 Mai 2005, pg 417-420.
- [2] **Mircea O., Banea D.M.** - *Analysis of Residual Stresses and Strain in a Butt Weld.* BRAMAT 2005: International Conference on Materials Science and Engineering: Brasov-Romania, 24-26 February 2005. ISBN 973-635-454-7, pg. 196;
- [3] **H. J, Argyris,** Computational aspects of welding stress analysis, *Comput. Meth. In Appl. Mech. A. Engn.* 33(1982), p. 635-666.
- [4] \*\*\* Cosmos/M 2,5, User' Manual