

Temperature Field on Dissimilar Metals Welding: Numerical and Experimental Results

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ABSTRACT

Goldak et al., first introduced the three-dimensional double ellipsoidal heat source to predict the temperature field of semi-infinite body. For thin plates the source influence in the thickness direction could be negligible and the source becomes a Gaussian surface-distributed heat source or elliptical disk heat source.

Assuming such heat source, several theoretical and experimental investigations on heat transfer in copper-carbon steel welded joints are presented in this paper. An actual theoretical method using finite element analysis is availed for the temperatures prediction in the welded joints. Using thin sheets, temperature variation in the thickness direction is negligible and heat flow is considered two-dimensional. Convection and radiation influence and thermo-physical properties depending on the temperature are considered in the mathematical model proposed by the authors. Several measurements and visualization of the temperatures distribution have been made during welding process, using infrared thermography, a non-contact temperature measurement method.

References

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