

**An Investigation into deformation mechanisms in the rolling of  
complex sheets with internal defects**

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Abstract

This study conducts a finite element analysis of the plastic deformation and bonding behaviour of complex aluminium-copper sheets containing internal defective voids in the asymmetrical cold rolling process. The influences of the roll diameter, the thickness ratio of the upper/lower sheet layers, the total sheet thickness at the entrance, and the sheet thickness reduction ratio on the dimensions of the internal void at the exit and the effective stress/strain distributions in the complex sheet are examined. Additionally, the evolution of closing of the correlation between the upper/lower voids under different rolling process parameters is explored. The present numerical results provide a valuable insight into the deformation mechanisms involved in the cold rolling of complex sheets with internal defects.