6th European Conference on Computational Mechanics (ECCM 6)
7th European Conference on Computational Fluid Dynamics (ECFD 7)
11 – 15 June 2018, Glasgow, UK

Bending Fracture of Polymer Coated Metal Sheets

Suhwan Yun[1], Sungwook Jun[1], Jaebong Jung[1], Jiyong Jung[2], Ji Hoon Kim[1]

[1] Pusan National University, 2 Busandaehak-ro 63beon-gil, Geumjeong-gu, Busan 46241, South Korea, kimjh@pusan.ac.kr

[2] LG Electronics, 222 LG-ro, Jinwi-myeon, Pyeongtaek-si, Gyeonggi-do 17709, South Korea

Key Words: *PET film, Sheet metal forming, finite element analysis, fracture.*

Cracks may develop in polymer coated sheet metals during forming, in particular bending with small bending radii, if the stretchability of the polymer film is limited. In this work, fracture of the polyethylene terephthalate (PET) film in PET coated steel sheets was analyzed. To predict the fracture of PET coated steel sheets during forming, fracture limits of the PET film were measured for various stress states using uniaxial tensile tests and Marciniak tests and a fracture criterion is obtained. In addition, the effect of bending curvature on fracture was analyzed using pre-stretch bending tests. Using the fracture limit criterion of the PET film, cracks of the PET coated steel sheets were predicted for deep drawing and bending. The predicted locations of fracture agreed well with measurements.