

عنوان مقاله:

An Investigation into the Deep Drawing of Fiber-metal Laminates based on Glass Fiber Reinforced Polypropylene

محل انتشار:

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خلاصه مقاله:

Fiber-metal laminates (FMLs) are new type of composite materials which could improve defects of traditional composites in ductility, formability, impact and damage tolerance. Drawing behavior of athermoplastic based FML consisting of glass-fiber reinforced polypropylene laminate as the core and aluminum AA1200-O as skin layers was investigated. The effects of process variables consisting of blank-holder force, temperature, blank diameter and blank thickness on the forming behavior of the FML were studied. To reduce the number of experiments and investigate process variables on maximum drawing force and wrinkling of specimens, design of experiments was used. The experimental results were indicated that the general effects of blank-holder force on the failure mode in FMLs and the effects of blank diameter and blank thickness of a FML in deep drawing was similar to custom metals. Furthermore, results demonstrated that a high interaction between temperature and blank-holder force was required to remove the wrinkling. Engineering constants of GFRP were obtained using Timoshenko's beam theory. Numerical simulations were performed by the finite element software, ABAQUS, and a good agreement was observed between the numerical and experimental data.

کلمات کلیدی:

Deep Drawing, Fiber-metal Laminate, Design of Experiments, Finite Element Analysis

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