Fast light Alloys Stamping Technology (FAST) for two-phase titanium alloys

Mateusz Kopec[1,2,a], Kehuan Wang[2, 3], Xin Yuan[2], Liliang Wang[2], and Zbigniew L. Kowalewski[1]

[1]Institute of Fundamental Technological Research Polish Academy of Sciences, Warsaw, Poland, [2]Department of Mechanical Engineering, Imperial College London, London, UK [3]State Key Laboratory of Advanced Welding and Joining, Harbin Institute of Technology, Harbin, China

[a]mkopec@ippt.pan.pl, m.kopec16@imperial.ac.uk

Abstract

Hot stamping technology requires a precisely controlled processing window to successfully form components from titanium alloys [1]. Forming near the β phase transus temperatures, leads to the formability reduction due to phase transformation, grain coarsening and oxidation during the long time heating. Therefore, Fast light Alloys Stamping Technology (FAST) was proposed, to form full scale part (wing stiffener) made of Ti6Al4V titanium alloy. The effects of heating parameters on the formability and post-form strength of the material were studied through uniaxial tensile tests using varying heating rates and temperatures. Subsequently, the evolution mechanisms of elongation and post-form strength were studied using scanning electron microscopy and transmission electron microscopy. It was revealed that under FAST conditions, the phase transformation, grain coarsening and oxidation of the material could be greatly reduced due to the extremely short processing time. A complex shaped wing stiffener panel component was successfully formed using TC4 titanium alloy, demonstrating the great potential of FAST in forming complex shaped titanium alloy components [2].

References

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