

Experiment Study on the Influence of Tool Materials on the Drilling of Thick Stacked Plate of 2219 Aluminum Alloy

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Abstract : The drilling and riveting processes are widely used in the assembly of carrier rocket, which makes the efficiency and quality of drilling become the important factor affecting the assembly process. According to the problem existing in the drilling of thick stacked plate (thickness larger than 10mm) of carrier rocket, such as drill break, large noise and burr etc., experimental study of the influence of tool material on the drilling was carried out. The cutting force was measured by a piezoelectric dynamometer, the aperture was measured with an outline projector, and the burr is observed and measured by a digital stereo microscope. Through the measurement, the effects of tool material on the drilling were analyzed from the aspects of drilling force, diameter, and burr. The results show that, compared with carbide drill and coated carbide one, the drilling force of high speed steel is larger. But, the application of high speed steel also has some advantages, e.g. a higher number of hole can be obtained, the height of burr is small, the exit is smooth and the slim burr is less, and the tool experiences wear but not fracture. Therefore, the high speed steel tool is suitable for the drilling of thick stacked plate of 2219 Aluminum alloy.

Keywords : 2219 aluminum alloy, thick stacked plate, drilling, tool material

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