

Vibration Measurements of Single-Lap Cantilevered SPR Beams

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Abstract : Self-pierce riveting (SPR) is a new high-speed mechanical fastening technique which is suitable for point joining dissimilar sheet materials, as well as coated and pre-painted sheet materials. Mechanical structures assembled by SPR are expected to possess a high damping capacity. In this study, experimental measurement techniques were proposed for the prediction of vibration behavior of single-lap cantilevered SPR beams. The dynamic test software and the data acquisition hardware were used in the experimental measurement of the dynamic response of the single-lap cantilevered SPR beams. Free and forced vibration behavior of the single-lap cantilevered SPR beams was measured using the LMS CADA-X experimental modal analysis software and the LMS-DIFA Scadas II data acquisition hardware. The frequency response functions of the SPR beams of different rivet number were compared. The main goal of the paper is to provide a basic measuring method for further research on vibration based non-destructive damage detection in single-lap cantilevered SPR beams.

Keywords : self-piercing riveting, dynamic response, experimental measurement, frequency response functions

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