

Lightweight Solar Vehicle Impact Analysis Using ABAQUS/EXPLICIT

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Abstract: This paper described the Abaqus/Explicit 6.7 simulation work performed to study the frontal crash impact condition for an in-house designed and produced lightweight solar vehicle main structural body. The structural body was fabricated from aluminum hollow pipes welded together. The analysis is needed to safeguard the safety of the vehicle driver. The dynamic response of the vehicle structure when subjected to frontal impact condition was simulated, according to NASA best practice for crash test methodology. The simulated speed used was based on the NHTSA standard. Comparison of the analysis with the standard Head Injury Criteria (HIC) and Chest Injury Criteria (CIC) revealed that the driver of the designed vehicle would not be risk because the acceleration resultant was found to be lower than 20 G. The analysis also proved that structural component was able to protect the driver during any frontal collision incident. However, to ensure the safety of the driver, safety precautions such as the use of seatbelt and helmet as well as driving below the speed limit are recommended.

Keywords: Simulation, Abaqus, Lightweight vehicle, Frontal impact analysis