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E-BABE-Modal finite element analysis of the first global body in white Saudi car Gazal 1

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Modal analysis test the for first Saudi car Gazal1 was carried out. The chassis-alone modal analysis was made and its result for first torsional mode is 34.9 Hz (the target is >26 Hz) and for first bending mode is 38.2 Hz (the target is >26 Hz). Those results are in target. In general the chassis has a global good behaviour with high values of Eigen modes. The strain energy distribution is well distributed in the structure that will support the BIW (Body in white) upper structure. This is a good base for the complete global BIW (BIW+chassis) possible behaviour. Global BIW modal analysis was also made. The result for the first bending mode is 30.7 Hz which is in target (the target is >29 Hz). But the analysis does not reach the target for the first torsional mode 17.6 Hz (the target is >26 Hz), due to the weakness of the rear end area which consists of upper joint and lower joint. This analysis showed that the connection between the D pillar and the rear longitudinal member is weak and that the main problem is located in lower joint area. Hence, the connection with the rear panel has to be improved. An upper joint and lower joint sensitivity analysis was also made to understand which joint that has the highest influence on the body normal modes and, hence, to identify the areas where the design change activities should be focused. The sensitivity analysis shows that upper joint has the highest sensitivity for first torsional mode, while lower joint has the highest sensitivity for first bending mode. Knowing that, it is the first torsional mode that is out of target, then, the design change activities must be focused on the strengthening of upper joint.

Biography

Ahmad Gemeal pursued his PhD from Al Faraby University Kazakhstan National University, Kazakhstan. He worked on the project Gazal1 (Saudi Car) at the Advanced Manufacturing Institute of King Saud University, KSA. He is currently working in the Department, Plastic Deformation Lab at the Central Metallurgical Research and Development Institute Metals Technology, Egypt. He has published more than 16 papers in reputed journals.

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