

Design and Analysis of Formula One Car Halo

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Abstract : Formula One cars are the fastest road course racing cars in the world, owing to very high cornering speeds achieved through the generation of large amounts of aerodynamic downforce. The main intentions and goals of this paper are to reduce the accidents and improving the safety without affecting the visibility of the driver by redesigning Halo that was developed by Mercedes in conjunction with the FIA to deflect flying debris, such as a loose wheel, away from a driver's head while the hinged locking mechanism can quickly be removed for easy access. Halo design has been modified in order to reduce the weight without affecting the aerodynamics of the car. CFD simulation is carried out to observe the flow over the Halo. The velocity profile and pressure contours were analyzed. Halo is designed using SOLIDWORKS Furthermore, using the software ANSYS FLUENT 3D simulation of the airflow contour around the Halo in order to make changes in the geometry to improve the design by reducing air resistance and improving aerodynamics. According to our assumption, new 3D Halo model has better aerodynamic properties in order to analyse possible improvements compared to the initial design. Structural analysis is also done by using ANSYS by making an F1 tire colliding with Halo at 225 kmph in order to know the deflections in the structure.

Keywords : aerodynamics, Halo, safety, visibility

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