Redesign of Existing Sedan into a Convertible Car for Indian Scenario

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Abstract:

Automotive industry is one of the largest markets, offering varieties of vehicles to the entire world. There are different segments of passenger cars available in the market viz. Hatch back, Sedan, SUV, Convertible, Limousine, and Coupe they are unique in their body design. In Indian market, sedan and hatch back passenger car segments are the popular, accommodating at least five passengers with reasonable boot space. However convertible cars are considered as high end cars due to its stylistic appeal, better performance and aesthetics and people enjoy driving these cars with moving wind interaction. In recent times, the convertible car is getting popular and its evident that most of them are used by youth, sport's persons and celebrities. At present, there is no convertible car available in Indian market. Hence, there is a need for redesign of a sedan car into a convertible car with the necessary structural and interior modifications so that it can be affordable to Indian customers.

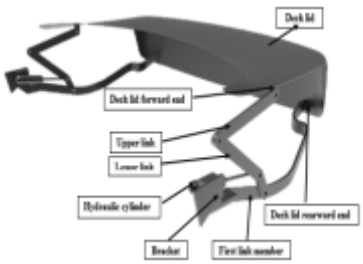
In this project work an attempt was made to redesign an existing Indian sedan into a convertible car conceptually. Initially literature survey and a Gemba study was carried on existing sedan cars available in the market. Quality Function Deployment (QFD) and Product Design Specification (PDS) were generated based on the Gemba study. Concept sketch of both interior and exterior were generated for convertible car incorporating seating layout and roof retracting mechanism. Detail design and geometric modelling for the selected concept was created using Autodesk Alias and CATIA V5 tool incorporating improved interiors and seating arrangements. Roof retracting mechanism was modelled, assembled and kinematically simulated for its functionality using ADAMS VIEW tool.

Ergonomic study on the car seating system has been carried to verify the seating comfort and easy ingress and egress using Uni-graphics NX 8 software tool. Scaled mock up model of modified sedan into convertible car was developed with roof retracting mechanism and demonstrated for its functionality.

Concept sketch for convertible car

Virtual model

Rooftop mechanism in operation



Retracting roof mechanism

Boot-lid mechanism in closed and open condition

Ingress and egress