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Increasing CO₂ Efficiency Using Advanced Glazing for Cabin

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ABSTRACT

Global environmental regulations are getting stricter every year and automobile companies are striving hard to get a better hold in market by meeting these stringent norms. Overall reduction in the automotive emissions is not only limited to complex powertrain modules; but can even be achieved with small changes in the aerodynamics of the vehicle. These changes can have a significant impact in the performance and has the potential to reduce the carbon footprint of the vehicle. From a Cab-Body perspective, efficiency of a vehicle can be attained by practicing effective thermal management of cabin, employing lightweight materials, improving aerodynamics, and adopting optimized design criterions.

In this project, a range of work have been carried out to find possible efficient solutions with respect to glazing, structural materials, and design improvements in Cab-Body. An extensive market research has been carried out to find the commercially available latest technologies and the feasible ways of adopting them. Every practical technology was scrutinized and weighted for their merits. Designs were made in CATIA to fit in these technologies with simultaneously following the standards and legal regulations. Also, current designs were analyzed to create new set of guidelines for the future design works.

The outcomes reveal that the application of variable LCG's can control the radiations entering the cabin based on the user preferences. Comparison between various light control glazings have been depicted along with the supplier selection and part design. Also, rules were created for floor modules based on the study conducted on the existing floor design in the Volvo family segments. These can act as a benchmark for the upcoming new designs. A study on light weighing solutions were also carried out that has the potential of reducing the weight of the BIW structure. Also, work was carried in clash and section analysis in relation to the new ongoing project.

The developed proposals have the potential to reduce the load on engine and increase the fuel economy. A wholistic approach have been developed in terms of efficient thermal management, weight savings and design improvement. Improvement of glazing can create privacy, safety and create a premium quality feeling for the customer. The cost incurred in this transition is also reasonable when compared to the changes in powertrain modules. Thus, the adaptation of these mentioned proposals can create a lot of positive impact in the reduction of CO2 footprint of the vehicle.

The design works was carried out in CATIA V5 along with the support of Windchill PDM as the product database management tool.

Keywords: Global Environment, Cab-body, Glazing, thermal management, CATIA