

## **DYNAMIC RESPONSE ANALYSIS FOR DEVELOPMENT OF FLEXIBLE LIGHTWEIGHT VEHICLE CHASSIS USING CAE TOOLS**

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### **ABSTRACT**

*This paper is elaborated the works done in studying dynamic response analysis of flexible lightweight vehicle chassis using CAE tools. The dynamic response analysis is implemented to analyze the lightweight material as pursue the automaker's goal in making of the lighter vehicle. Light weighting is the concept that being used by an automaker in order to overcome the fuel consumption and performance. This analysis is developed by comparing the conventional structure which is steel and aluminum as an alternative material which is lighter than steel, as one of the ways in reducing the weight of a vehicle. This simulation model is designed with the geometric and conditions similarity for both types of material to develop the accurate analysis of dynamic response analysis of lightweight vehicle chassis. The study on the chassis is developed on the go-kart model. The simulation model of go-kart is developed as a multi-body model which is consisted of four tires linked to the chassis. The tires receive the disturbance force from the road and transmit to the chassis. Chassis is the important structure that carried the entire load attached to the vehicle such as, engine system, braking systems and steering systems. Chassis structure also carried the driver who is affected by vibration. As the go-kart model is designed without suspension systems, thus, the chassis structure can produce high level of vibration from the little source of disturbance. This vibration phenomena would effect on human health if exceeds the limit of endurance. The effect of the vibration of the structure is measured in acceleration, velocity and displacement. To validate the simulation model, the result of the physical model is used. Through this dynamic response analysis, indicating the steel chassis produces high levels of vibration rather than aluminum chassis. This simulation analysis method has described the ability of CAE in order analyzed the anticipated disturbance during the design stage of lightweights vehicle.*

**KEYWORDS:** CAE, Simulation, Lightweight Vehicle Chassis, Vibration Analysis

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