

# Design and Verification of a Car Jack Fabricated in Graphite Composite Material

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## ABSTRACT

Using carbon fiber reinforced composites to replace the conventional metals in the manufacturing of high-performance products has been an important step for companies to remain their competitiveness in the market. Accordingly, the car jack used in the automotive industry fits in the trend for improving the performance. In this study, a commercial car jack made of aluminum alloy was redesigned employing graphite/epoxy composite. The finite element software ANSYS was used as the design tool. The iterative process of analysis and design modification was carried out in order to optimize the product performance. The main objective of this study is to initiate cooperation with local industry to develop products with lower weight and higher strength. The other objective is to help the industry to establish its own capability in computer-aided analysis. This computerized development procedure not only can greatly shorten the time span but also reduce the cost. The mechanical testing conducted in this study can help the industry in establishing the database of mechanical properties for composites. The car jack developed in this study was able to reduce its weight by 30% and retain its stiffness. The new design with reduced weight facilitates the easiness in operation and increases the competitiveness of the product. The success of this study indicates the applicability of using composite materials in other industry.

Keywords : Car jack, Graphite fiber composite, Finite element analysis

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