

車用頂車機之碳纖複材化的設計分析與製作測試

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摘要

工業之發展迅速，廠家為了尋求利潤，選擇利用碳纖維複合材料，取代傳統金屬元件，已經是高性能產品所必須發展的趨勢。而在車輛工業中，汽車頂車機能夠往高品質更高安全係數來提升，也正好順應此一趨勢之發展。本研究針對鋁合金製產品，以碳纖複合材料來取代。重新設計並以ANSYS等電腦軟體分析作模擬，而根據分析結果作修正設計，往最佳化的設計來努力，最後再進行性能及安全測試。在本報告裡第一主要研究的目的，即在於和廠商合作研發出輕量化與高單位強度之產品，還有培訓電腦分析的人力，以期能夠在開發上可以節省時間降低研究成本，也相信藉此計畫，希望經由複材試片所用的材料基本機械性質測試，可以協助廠商建立設計開發所需的部分材料特性資料庫，亦能夠建立自主的研發系統，實現產、學攜手。另外，第二個目的，在設計、製造頂車機上引用碳纖零件，考量同等剛性下，預期可以達到30%之減重。對頂車機整體重量而言，減重可以增加操作方便性，同時也是市場中、提高競爭力的重要指標。雖然這項研究，僅僅是複材研究開發裡的小小一步，然而複合材料在許多的應用上，確實是相當的成熟可觀。

關鍵詞：汽車頂車機、碳纖複材、有限元素分析

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