正撞氣囊數值模型之建立與分析

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摘 要

汽車正撞氣囊為乘員被動安全系統之一，主要為緩衝乘員在前撞事故中頭部的運動，以防止 與車內裝結構接觸碰撞，同時分散對乘員胸部的衝擊力。為使正撞氣囊能於撞擊事故中發揮保護 乘員之作用，一般於氣囊設計中，首先針對許多法規環境下進行安全性測試，並於最後在台車或 全車撞擊測試下分析人體損傷，以作為設計改良正撞氣囊相關參數之參考。為能應用CAE技術建 立正撞氣囊數值模擬分析工具，節省氣囊開發之成本，本研究將以LS-DYNA 3D軟體建構有限元素 氣囊模型，且為驗證建構氣囊模型方法的正確性與評估氣囊模型的安全性，並進行氣囊靜態展開 、頭部撞擊與軀幹撞擊等三種數值測試。最後依據CAE氣囊設計流程設計一正撞氣囊模組，並使用 正撞台車撞擊測試，評估所設計之正撞氣囊模組對乘員保護的安全性與有效性。本論文除可建立 國內車輛碰撞數值模擬分析能量，並可藉由氣囊建構與模擬驗證程序提供車廠及相關研究單位對 正撞氣囊設計與改良研發之參考，以使人體頭部及胸部於車輛正面碰撞時之傷害程度降至最低。

關鍵詞 : 正撞氣囊 ; 氣囊靜態展開測試 ; 頭部撞擊測試 ; 軀幹撞擊測試 ; 台車撞擊測試 ; LS-DYNA ; 氣囊 ; 模型 ; 數值 ; 正撞 ; 安全性 ; 有效性 ; 正確性 ; 衝擊力 ; 台車

目錄

封面內頁 簽名頁 授權書.....iii 中文摘要.....iv 英文摘要.....v 誌謝.....vi 目錄.....vii 圖目錄.....x 表目錄.....xii 第一章前言 1.1 研究動機.....1 1.2 文獻回顧.....4 1.3 研究目的.....7 1.4 論文架構.....8 第二章正撞氣囊 2.1 正撞氣囊系統結構.....12 2.2 正撞氣囊工作原理.....14 2.3 正撞氣囊測試法規.....15 第三章正撞氣囊有限元素模型 3.1 正撞氣囊有限元素模型建構流程.....21 3.2 正撞氣囊有限元素模型.....22 3.3 正撞氣囊有限元素模型之驗證.....24 第四章正撞氣囊設計與安全性分析 4.1正撞衝擊台車測試有限元素模型.....48 4.2台車衝擊測試模擬驗證.....49 4.3 正撞氣囊設計.....50 第五章結論.....81 參考文獻.....83

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