防後撞頸部損傷之座椅設計

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摘 要

車輛後撞事故對於乘員的頸部傷害相當大，主要是汽車座椅無法完整提供乘員後移的支撐性而使乘員頸部產生鞭甩現象，迫使頸椎移位而有挫傷情形發生；由於汽車座椅是後撞中與乘員接觸的主要部件而左右著頸部的損傷程度，因此汽車座椅的改善設計將可有效減少後撞乘員頸部損傷。為提升車輛撞擊事故乘員的安全性，本論文將進行防止乘員後撞損傷之座椅設計，並且利用台車衝擊測試方式評估座椅設計的有效性與安全性。考量分析的成本與時效因素下，在台車衝擊測試方面將採電腦數值模擬方式進行，首先以MADYMO分析軟體建構一台車衝擊測試數值模型，為了確認數值模型的正確性，將以後撞分析結果之人偶各部位歷時圖與損傷值與文獻中實驗數據進行比對。接著為能設計一有效防護乘員之汽車座椅，本文將採已驗證的台車撞擊測試模型探討座椅參數與乘員頸部的關聯性，其中座椅參數包括座椅轉角器的勁度、座椅的摩擦係數及頭枕的角度。最後由座椅對乘員頸部損傷的影響因素中進行座椅的改善設計，由於目前汽車座椅的頭枕與椅背在撞擊過程一起移動，造成頭部與胸部的速度與加速度差距較大，因此本論文以頭枕與椅背分離的概念設計一汽車座椅，再利用台車衝擊測試模擬方式量測人偶頸部損傷值，以進行安全防護性的評估。本論文所建構與驗證過之衝擊台車模型未來可用於進行其他車內被動安全裝置分析使用，並且座椅影響因素的討論與分離式座椅的設計將可提供車輛研究單位與業界在提升車輛後撞事故中乘員安全性的參考。

關鍵詞 : 後撞、頸部損傷、分離式座椅

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