側撞滑撬測試數值模型之建立與應用

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摘 要

為了提升車輛結構與防護裝備的安全性能，一般車廠以及研 究單位皆採用全車碰撞測試，雖然全車碰撞測試為最完善且最直 接之測試分析方法，但是在考量人力、物力以及財力等因素，可 考量使用側撞滑橇衝擊測試系統。由於電腦軟、硬體的快速發展， 其運算速度不斷的提升，在車輛結構與被動安全防護裝備設計初 期則可利用數值模擬軟體進行初步分析以及改良，更可進一步進 行被動安全防護裝備之最適化設計。故本論文將以數值方法建構 側撞滑橇衝擊模型，並進行數值模型之驗證與應用。本論文所建 構之側撞滑橇衝擊系統數值模型乃參考TNO 公司所研發之 BASIS 測試系統，以LS-DYNA 3D 有限元素數值分析軟體進行數 值環境模型的建構。側撞滑橇衝擊系統數值模型測試分析結果與 美規FMVSS-214 全車側撞數值模擬結果進行比對與驗證；並且 應用側撞滑橇衝擊系統數值模型進行側撞氣囊初步設計與安全性 之評估。本論文所建立之側撞滑橇衝擊測試系統數值模型不僅可 以大大縮短數值模擬的計算時間，更可以針對設計與分析需求進 行不同碰撞條件的模擬，可有效降低研發成本與時程。亦可藉由 本論文建立之模型進行車輛側撞與被動安全防護裝置之安全性評 估，提供車廠與相關車輛研究單位進行研發設計之參考。

關鍵詞 : 側撞滑橇測試，全車碰撞測試，有限元素法，側撞氣囊 乘員損傷，LS-DYNA 3D

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