車禍肇事中人體受正面撞擊之損傷分析

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摘 要

在車禍事故中乘客頭部受傷機率高達58.1%，其損傷往往是導致嚴重受傷甚至死亡的主要原因，因此探討車禍事故中乘員之損傷，是各大車廠以及消費者關心的議題。在歐、美先進國家，為取得車禍事故之結果，均成立實車碰撞實驗室，以獲取接近實際車禍之結果；但其耗用之成本所費不貲且實車承受撞擊後已無法重複使用，另在人體樣本方面，不論是以自願者或是以屍體實驗，其來源十分不易、重複性不高，亦不符人道立場。因此，在經過多年的發展後，大部分的實驗改用台車衝擊實驗代替實車碰撞，以HybridIII實驗人偶代替真人，其優點為節省成本且能獲得完整數據。而隨著電腦的發展，利用有限元素等數值分析方法模擬衝擊實驗能更進一步節省成本。因此本論文藉由有限元素分析程式LS-DYNA進行可變形有限元素人偶各部位模擬驗證，進一步與實驗值進行可信度之比較，另亦探討35mph台車衝擊試驗模擬進行撞擊損傷分析，進一步與剛性有限元素人偶進行適用性之比較。另有鑑於交通事故所衍生的肇事糾紛，直至現今仍未從損傷分析的角度作考量；因此本研究將探討不同速度正面撞擊中，計算人偶頭部加速度值，並依據美國FMVSS 208法規計算頭部傷害指標（HIC）之量化值，來判斷乘客損傷程度與受傷量化值之關係，由已知之受傷結果反推撞擊前之速度，以增進現行肇事鑑定作業程序之客觀因素，提供相關單位作為肇事鑑定之參考。

關鍵詞 : 台車衝擊實驗，頭部傷害指標，實車碰撞，肇事鑑定

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