

# 具保護行人之引擎蓋結構設計研究

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## 摘要

每年有數以千計的行人在車禍事故中傷亡，在這些死亡人數中有60%係因頭部及臉部的損傷所致，又頭部及臉部的損傷有17.3%是碰撞到汽車引擎罩引起，上述數據顯示考慮汽車引擎罩對行人頭部安全的必要性。本論文首先分析行人頭部與引擎罩撞擊時頭部合成加速度的組成與變化，正確的計算頭部合成加速度各分量的比例，並且探討引擎罩結構設計參數對各加速度分量的影響；進一步依據最佳的加速度曲線分析頭部合成加速度特性變化因素。此部份研究分析結果可提供汽車引擎罩結構設計與研發行人防護裝置之參考。由於各種車型的引擎罩結構設計皆不同，故選擇引擎罩外板結構及內板加強結構一較佳的厚度是非常重要的。接著本研究依據EEVC/WG17測試標準使用頭部衝擊器進行模擬分析，探討引擎罩外板結構及內板加強結構厚度對行人頭部損傷的影響。再提出引擎罩外板結構及內板加強結構之厚度最佳化設計，並且依標準對引擎罩外板表面結構多點進行測試，以確保行人頭部安全。基於本研究之引擎罩外板結構及內板加強結構之厚度設計結果，已完成一可確保行人頭部安全的引擎罩結構，此引擎罩結構可使撞擊時頭部合成加速度接近最佳的加速度曲線。本研究設計之引擎罩結構厚度不僅可減少行人頭部損傷，並具足夠的結構剛性可有效保護汽車乘員安全。

關鍵詞：行人，頭部衝擊器，頭部損傷，引擎罩，引擎罩內板加強結構，最佳化設計

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