鋁/聚碳酸酯複合材料之車引擎蓋設計

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摘 要

根據世界衛生組織統計，全世界每年有120萬人死於道路交通事故中，汽車製造商在車輛上附加許多安全裝置與功能以減少乘員的損傷，在每年數千人死於行人與車輛碰撞事故的情況下，行人防護也成為交通安全的重要議題。在行人與車輛碰撞事故中，行人頭部為最主要的損傷區域，佔了行人死亡人數的60%，且根據統計有17.3%頭部與臉部的損傷是因碰撞車輛引擎蓋所致，這也是汽車製造商關注與考量引擎蓋設計的主因。本研究針對一鋁/聚碳酸酯的三明治結構作為汽車引擎蓋材料，並進行可行性分析，另亦探討三明治結構厚度對行人頭部損傷的影響分析。為了設計一具行人安全的引擎蓋，本研究以LS-DYNA軟體建構頭型衝擊器撞擊引擎蓋的數值模型，並且依據歐洲汽車安全促進協會17工作小組(EEVC/WG17及歐洲新車安全評鑑協會(Euro NCAP)的程序進行評估。研究結果顯示所設計之三明治引擎蓋結構能在碰撞過程中同時保護行人及引擎室零件；本研究所建立之數值模型及分析結果能有效提供車輛引擎蓋設計及行人安全技術發展之參考。

關鍵詞 : 行人、頭型衝擊器、引擎蓋、三明治結構、鋁、聚碳酸酯

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