A Study on Increasing Structural Strength of Bus

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ABSTRACT

Bus is a high occupancy vehicle, and its safety issues are concerned by many people and institutions. Most advanced countries set up suitable regulations of bus safety according to European regulation ECE R66 and American regulation FMVSS 220 Being based on the backgrounds, test procedures, and standard of requirements of the two regulations, the presented meaning and principle, which is the important reference of improving the design of superstructure of bus, are discussed. Therefore, the non-linear software LS-DYNA 3D was used to simulate the bus rollover test according to the European regulation ECE R66 of structural strength of superstructure of bus and the American regulation FMVSS 220 of rollover protection of school bus in this paper. The seriously deformed parts, energy absorption, energy transmission, deformation behavior and dynamic response were investigated. The differences between the regulations and the numerical simulations were discussed. On the other hand, the reinforcements used to strengthen the structural strength of bus were investigated in this study. By searching the reinforcements of aircraft, ship, and bus, three database of reinforcements were created, including patch, fillet, and added cross section. TNO test method of reinforcement of bus was applied to study the better structure of reinforcement. The results showed that added cross section was the best way to resist the deformation caused by rollover. Therefore, this strengthening method was applied to improve the structure of body section of a certain bus and the rollover was analyzed to discuss the real strengthening effect.In this study, the constructed numerical environment of simulation and database of reinforcement should be provided to domestic bus manufacturers to improve the superstructure of bus.

Keywords : Bus, Reinforcement, ECE R66, FMVSS 220, TNO

Table of Contents

封面內頁 簽名頁 授權書.....iii 中文摘要.....iv 英文摘要.....v 誌謝.....vi 目錄.....vii 圖目錄.....xii 表目錄.....xv 第一章 緒論.....1 1.1 緣起.....1 1.2 文獻回顧.....2 1.3 本文目標.....8 第二章 大客車翻覆數值分析理論基礎.....16 2.1 大客車翻覆之數值分析理論.....16 2.2 LS-DYNA 程式之數值技巧.....17 第三章 大客車翻覆安全法規.....29 3.1 美國校車翻覆防護法規-FMVSS 220.....29 3.2 歐洲大客車上層結構強度法規-ECE R66.....32 第四章 大客車翻覆法規FMVSS 220與ECE R66之比較探討.....38 4.1 法規之設立精神.....38 4.2 大客車翻覆防護法規之模擬流程.....41 4.3 法規之交叉比對.....73 4.4 結果比較分析.....53 4.5 結果與討論.....55 第五章 大客車補強結構資料庫之建立.....73 5.1 現有大客車結構補強類型.....74 5.2 現有船舶與航空器結構補強類型.....74 5.3 補強結構資料庫之建立.....75 第六章 大客車補強方式之研究.....83 6.1 TNO 補強結構測試.....83 6.2 車身段結構補強模擬.....88 6.3 大客車補強結構之能量吸收.....88 6.4 大客車補強結構總結.....89 第七章 結論.....102 參考文獻.....106 附錄A 美國FMVSS 220法規-校車翻覆防護.....111 附錄B 歐洲ECE R66法規-大客車車身結構強度分析.....113 附錄C 大客車補強結構資料庫.....129 圖目錄 圖1.1 大客車之結構依車體不同區域進行分類 10 圖1.2 針對不同骨架搭接形式進行多種補強方法 10 圖1.3 Zhang之傘型網格焊點模型 11 圖1.4 Deng之焊接簡化模型 11 圖1.5 Mahadevan結構體上分佈之四個焊點在應力分析模型 12 圖1.6 航空器之艙門複合材料補強蒙皮 12 圖1.7 極地船舶底部結構之撞擊模擬 13 圖1.8 國外某型小型飛機機體結構不同角度之撞擊分析 13 圖1.9 國外某型小型飛機機體結構填角型補強 14 圖2.1 LS-DYNA數值模擬分析流程 25 圖2.2 樑元素、薄殼元素、固體元素示意圖 26 圖2.3 主從面示意圖 27 圖2.4 碰撞後自身面接觸示意圖 27 圖2.5 Lagrangian、Eulerian、ALE描述法之構型變化 28 圖3.1 大客車傾斜穩定度測試 34 圖3.2 依據FMVSS 220法規之校車車頂擠壓試驗 34 圖3.3 美規FMVSS 220之施力板尺寸示意圖 35 圖3.4 依據ECE R66法規之整車翻覆碰撞試驗 35 圖3.5 依據ECE R66法規之車身段翻覆碰撞試驗 36 圖3.6 依據ECE R66法規之大客車擬靜態車身段負載測試 36 圖3.7 依據ECE R66法規之安全空間示

意圖 37 圖4.1 大客車全車骨架幾何圖 56 圖4.2 大客車車身之有限元素模型 56 圖4.3 大客車底盤之有限元素模型 57 圖4.4 大客車骨架加上蒙皮與玻璃之有限元素模型 57 圖4.5 大客車骨架材料特性曲線 58 圖4.6 大客車底盤材料特性曲線 58 圖4.7 國外某型大客車全車車頂擠壓動態反應圖(前視圖) 59 圖4.8 國外某型大客車全車翻覆動態反應圖 61 圖4.9 車體結構最嚴重之28區域 63 圖4.10 大客車車頂擠壓內能與時間之關係圖 63 圖4.11 施力板與車頂間作用力與時間關係之曲線圖 64 圖4.12 大客車翻覆能量與時間之關係圖 64 圖4.13 FMVSS 220與ECE R66之內能比較 65 圖4.14 結構變形量侵入生存空間之情形 66 圖4.15 車頂擠壓試驗過程中易產生應力集中部位 67 圖5.1 補強結構資料庫之建立架構 79 圖5.2 補丁式補強結構 80 圖5.3 填角式補強結構 80 圖5.4 增加截面積式補強結構 81 圖6.1 大客車邊柱結構 91 圖6.2 TNO補強結構測試情境 92 圖6.3 焊點(Spot-weld)於軟體中之建構方式 93 圖6.4 未施加補強結構之細部尺寸 93 圖6.5 補丁式補強結構之細部尺寸 94 圖6.6 填角式補強結構之細部尺寸 94 圖6.7 增加截面積式補強結構之細部尺寸 95 圖6.8 補強結構之作用力與行程曲線圖 95 圖6.9 補強結構所提升之等效應力曲線 96 圖6.10 未加補強結構之車身段翻覆動態反應圖 97 圖6.11 加上補強結構之車身段翻覆動態反應圖 99 圖6.12 車身段翻覆之位移量與時間關係圖 101 表目錄 表1.1 2004年依車種別之致命事故統計 14 表1.2 九十四年台閩地區A1類道路交通事故統計 15 表4.1 大客車各部位之有限元素資料 68 表4.2 大客車各部位之材料性質 68 表4.3 大客車各部位之位移量 69 表4.4 大客車各部位之等效應力與等效塑性應變 70 表4.5 大客車於ECE R66測試之各區段內能分佈 71 表4.6 大客車於FMVSS 220測試之各區段內能分佈 71 表4.7 大客車G區段之內能比較 72 表4.8 大客車G區段之位移量比較 72 表4.9 大客車G區段之應力與應變比較 72 表5.1 大客車補強結構資料庫彙整表 82 表6.1 補強結構模擬結果之比較 101 表6.2 補強結構之能量吸收 101

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