**Technical Report Documentation Page**

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| **1. Report No.**DOT HS XXX XXX | **2. Government Accession No.** | **3. Recipient’s Catalog No.** |
| **4. Title and Subtitle**Cost and Weight Analysis of Roof Crush Resistance Upgrade | **5. Report Date**March 23, 2018 |
| **6. Performing Organization Code** |
| **7. Author**Ricardo Inc. | **8. Performing Organization Report No.** |
| **9. Performing Organization Name and Address**Detroit Technical CenterVan Buren Twp., MI48111 USA | **10. Work Unit No. (TRAIS)** |
| **11. Contract or Grant No.**DTNH2216D00037/0001 |
| **12. Sponsoring Agency Name and Address**National Highway Traffic Safety AdministrationEvaluation Division; National Center for Statistics and Analysis1200 New Jersey Avenue SE.Washington, DC 20590 | **13. Type of Report and Period Covered**NHTSA Technical Report |
| **14. Sponsoring Agency Code**NSA-310 |
| **15. Supplementary Notes** |
| **16. Abstract**The National Highway Traffic Safety Administration (NHTSA) published an upgraded Federal Motor Vehicle Safety Standards (FMVSS) No. 216a to improve the roof crush resistance for light duty vehicles. FMVSS 216a started to phase in with model year (MY) 2013 vehicles and was required for all applicable vehicle models by MY 2016. The purpose of this study was to determine the incremental consumer cost and weight impacts of the upgraded roof crush standard by comparing vehicle models which had their structures redesigned to meet the new requirements. The FMVSS standard 216a specified four major changes intended to result in significantly stronger roof structures: 1) The maximum applied force must equal three times the unloaded vehicle weight for vehicles under 6,000 pounds gross vehicle weight rating (GVWR); 2) The standard includes vehicles with GVWR between 6,000 and 10,000 pounds; 3) Head room maintenance is monitored through the use of 50% percentile male head form seated in the front seats; 4) The platen force, displacement, and head form contact requirements must be met on both sides of the vehicle’s roof structure.Ricardo Strategic Consulting (RSC) and NHTSA have selected and studied the cost and weight impact of seven light passenger vehicle pairs with body structures that have been redesigned to meet the upgraded FMVSS 216a roof crush standard. For the seven vehicle pairs studied, it was found that the average increase in weight to meet the upgraded standard was 16.4 kg or 17% of the weight of the body parts that are involved with roof crush strength on the baseline vehicle and the average cost increase was $68.89 or 21% of the baseline cost. |
| **17. Key Words**Roof, Crush, FVMSS 216, LSS, HSS, VHS, Steel, Pilar  | **18. Distribution Statement**This report is free of charge from the NHTSA Web site at [www.nhtsa.dot.gov](http://www.nhtsa.dot.gov)  |
| **19. Security Classif. (Of this report)**Unclassified | **20. Security Classif. (Of this page)**Unclassified | **21. No. of Pages**59 | **22. Price** |

**Form DOT F 1700.7** (8-72)