ASSESSMENTS OF AIR BAG PERFORMANCE BASED ON THE 5TH PERCENTILE FEMALE HYBRID III CRASH TEST DUMMY

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ABSTRACT

Historically, assessments of frontal crash safety have been based primarily on the measured responses of 50^{th} percentile male dummies in relatively high speed vehicle crashes against a rigid flat barrier. Under such test conditions, the ability of supplementary airbag systems to greatly reduce head injury potential is clearly evident in crash tests performed by Transport Canada and others. However, significant segments of the driving population travel routinely with their seats positioned ahead of the nominal mid-position used in 50^{th} percentile male dummy tests. Moreover, most frontal impacts can be expected to produce softer vehicle deceleration signatures than those produced in flat rigid wall tests. The necessity of broadening the range of regulated crash conditions to which vehicles fitted with airbag systems are subjected is highlighted in crash tests performed by Transport Canada using 5^{th} percentile female Hybrid III tests, with seats placed in their most forward positions. The neck loads observed in these tests far exceeded commonly referenced injury assessment values. The magnitudes of the neck loads were influenced not only by the aggressiveness of the airbag system, but also by the timing of the deployment of the airbag. The neck loads observed in low speed offset frontal crash tests often exceeded those observed in high-speed, rigid-wall tests, as a result of the timing of airbag deployment.

INTRODUCTION

The fitment of supplementary airbag systems is not mandatory in Canada. In the formulation of occupant protection standards governing occupant protection in frontal crashes, emphasis in Canada continues to be placed on regulating total system performance, rather than the specification of hardware. The technical requirements of Canada Motor Safety Vehicle Standard (CMVSS) 208 have been revised recently to reflect performance levels achievable with current technology. The revised performance requirements have only been satisfied consistently by vehicles fitted with supplementary airbag systems [1,2]. Given the highly integrated nature of the automobile industry in North America, it is anticipated that most, if not all, new passenger-carrying vehicles sold in Canada will be fitted with supplementary airbag systems. Though no test with an unbelted dummy is specified in Canada, it is reasonable to expect that the design of most airbags fitted in Canada will continue to be strongly influenced by US regulatory requirements, which continue to emphasize the protection of unbelted occupants.

One major shortcoming of both Canadian and US regulatory requirements is that each front outboard seating position is tested with a dummy of 50th percentile male dimensions in one well-defined seating posture. Consequently, the performance levels achieved in the test may not be indicative of the levels of protection likely to be afforded to occupants of different stature. Of particular concern are possible adverse airbag-occupant interactions if the seat is located forward of the mid seat position. There is evidence from laboratory testing that the proximity of an occupant to the airbag module has a strong influence on the response of the neck and the chest [3,4].

FIELD PERFORMANCE

In order to gain an understanding of the field performance of supplementary airbag systems in Canada, Transport Canada, in the fall of 1993, initiated a directed study devoted to documenting the injury experience of occupants involved in crashes resulting in the deployment of an airbag system. The data collection methodology adopted for this study is similar to that used in the Fully Restrained Occupant Study (FROS) where the emphasis was on evaluating the collision performance of three-point seat belt systems [5]. The Air Cushion Restraint Study (ACRS) utilizes the resources of university-based collision investigation teams located across Canada. Each participating team is assigned a defined area of operation and case selection criteria. The study and findings are described in detail in previous publications [6,7,8].

Available Canadian evidence suggests that, as expected, airbags are highly effective in preventing serious or fatal head injury and facial fracture in high severity crashes, but that these gains are offset by bag-induced injuries in low severity crashes, when deployment is unwarranted if the belt system is being used. Female drivers are the most adversely affected in low-severity crashes.

The Canadian experience with airbags is consistent with the findings of a number of US studies. The introduction of the airbag has produced a variety of new injury mechanisms, such as facial injuries from "bag slap", upper extremity fractures, either directly from the deploying airbag module or from arm flailing, and thermal burns to the face and arms [9, 10, 11]. Among adults, most of the bag-induced injuries are minor in severity (AIS 1) as measured by the Abbreviated Injury Scale (AIS) [12]. However, upper extremity fractures rated AIS 2 or AIS 3 are not uncommon [13]. In the 1996 Report to Congress, NHTSA noted that the risk of serious (AIS 3) upper extremity injury to a belted driver may increase by some 40 percent with airbags [14]. Others have estimated that the risk of upper extremity injury among belted drivers may be increased by as much as a factor of 4 given airbag deployment [15]. Several studies have noted that the incidence of bag-induced upper extremity injury, particularly of upper extremity fracture, is far higher among female drivers than male drivers [8, 16,17]. The majority of the bag-induced arm fractures among belted female drivers occur in relatively low speed impacts [8].

In terms of overall fatality risk, the initial findings, at least for adults, are encouraging. Without exception, the effectiveness studies completed to date have shown that airbags reduce the risk of fatal injury among both drivers and adult passengers by some 11-14 percent, with the prevailing rates of seat belt usage in the US [18, 19, 20, 21].

Available evidence also suggests that airbags increase the overall risk of fatal injury among children under the age of 10 by some 21 percent [21]. In the US, NHTSA is investigating collisions involving airbag-related fatal or seriously injured occupants under its Special Crash Investigations (SCI) programme. Over 55 child deaths, directly attributable to airbag deployments, have been recorded to date under this programme. The vast majority of these deaths occurred in crashes of relatively minor severity. This death toll prompted NHTSA to relax the unbelted test requirements associated with FMVSS 208 in order to facilitate the rapid introduction of "depowered" airbag systems into the US.

At the time of writing, the SCI database also contained a total of 43 airbag-related adult fatalities. Of the 13 belted drivers represented in the database, 10 (77%) were females. All ten female victims were under 165 cm in height. The majority sustained fatal neck and/or head trauma. All three belted male drivers sustained fatal chest trauma. Of the 21 unbelted drivers represented in the database, 16 (76%) were females. The majority of unbelted drivers, both males and females, sustained fatal chest trauma.

A monitoring programme, similar to the SCI, has also been implemented in Canada. To date, only one child death directly attributable to an airbag deployment is known to have occurred in Canada. At least four adult deaths directly attributable to an airbag deployment in a relatively low speed impact are known to have occurred in Canada. Three of the cases involved belted female drivers. The remaining case involved an unbelted male driver.

While most case studies of airbag-related deaths involve low to moderate speed collisions, it is important to recognize that the energy released by an airbag is independent of collision severity. As such, fatal bag-related injury can occur at all collision severities. With increasing collision severity, however, the injury outcome, in the absence of airbag deployment, becomes increasingly uncertain. Consequently, counts of airbag fatalities are limited to lower speed crashes where, in the absence of deployment, the occupant would have been expected to survive the crash.

JOINT TC/NHTSA CRASH TEST PROGRAMME

Based on an examination of the available data on the field performance of airbag systems in Canada, in 1996 Transport Canada implemented a major research programme to evaluate testing protocols which could be incorporated in Canada Motor Vehicle Safety Standard (CMVSS 208) to minimize the risk of bag-induced injury to belted occupants of short stature in frontal collisions. The crash test dummy selected for the programme was the 5^{th} percentile Hybrid III female. In addition to representing a small adult, it has the advantage of representing, in size, a 12- to 13-year old child. Given the current recommendation in Canada, that all children aged 12 years or less, travel in a rear seat whenever possible, the 5^{th} percentile female Hybrid III is an ideal dummy for the purposes of regulating front seat passenger-side protection.

Two series of full-scale vehicle crash tests were conducted as part of the programme. The first series involved 48 km/h rigid barrier crash tests with the seats in the full forward position. The second series of tests involved low-speed, offset-frontal crashes, utilizing the deformable barrier face and vehicle alignment protocols defined in Europe under Directive 96/79/EC. As in the rigid barrier tests, the 5^{th} percentile Hybrid III was tested with the seat in the fully forward position.

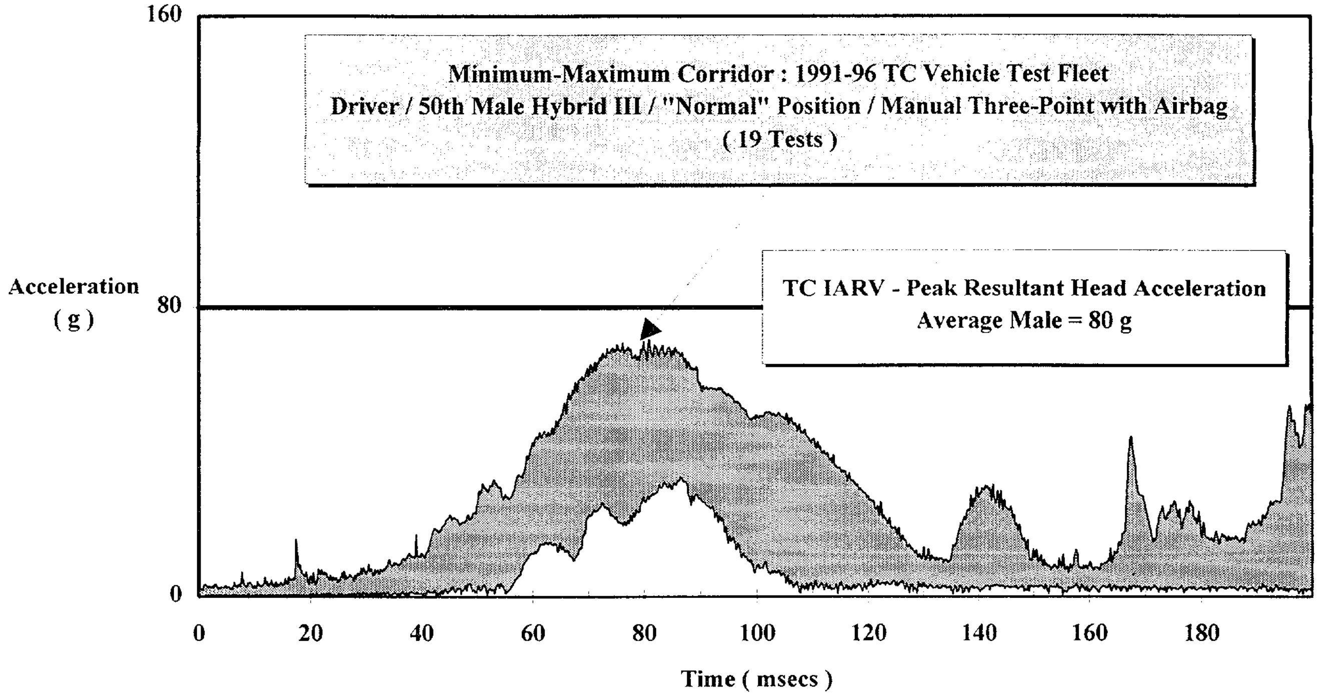

Figure 1. Range of Resultant Head Acceleration Responses Measured in 48 km/h Rigid Barrier Tests of First Generation Airbag with 50[th] Percentile Male Hybrid III (Driver Side).

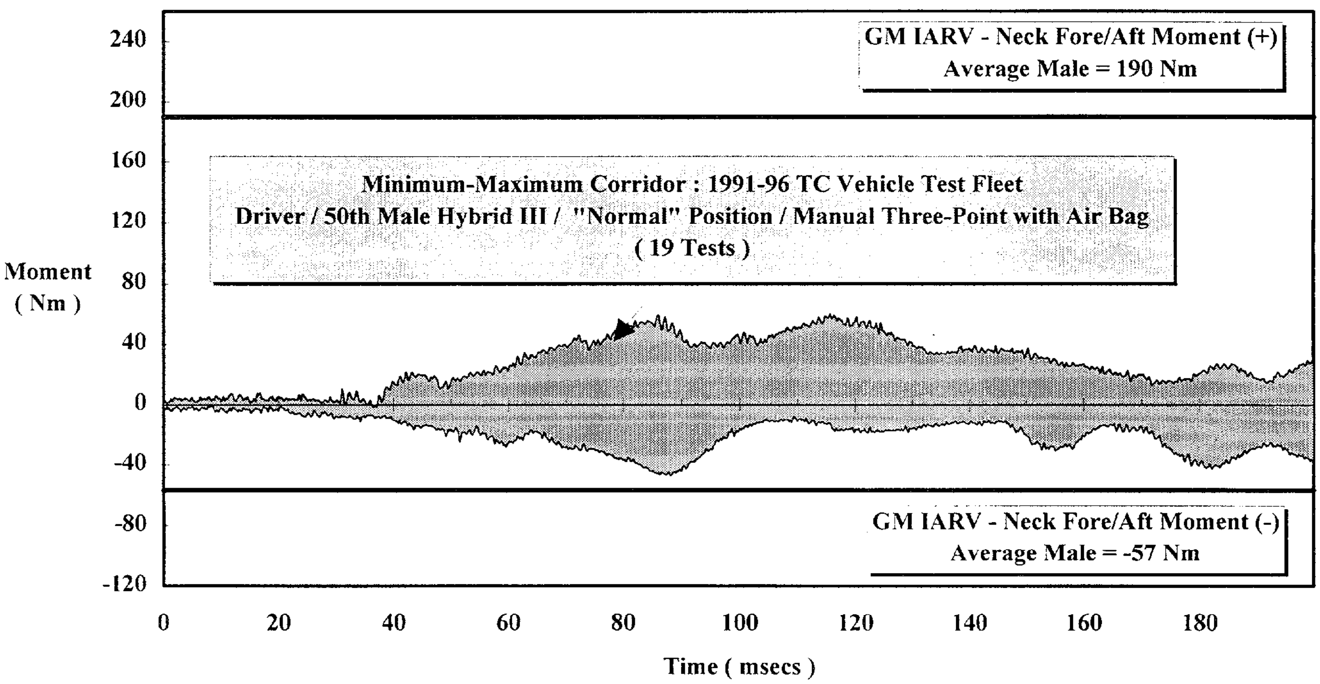

Figure 2. Range of Neck Extension Moment Responses Measured in 48 km/h Rigid Barrier Tests of First Generation Airbag Systems with 50[th] Percentile Male Hybrid III (Driver Side).

As part of a joint research agreement between Transport Canada and the NHTSA, the programme was expanded to include a representative sample of both first- and second-generation airbag systems and vehicles of different size classes. A total of 72 full-scale vehicle crash tests, utilizing one or two 5th percentile Hybrid III dummies, have been performed to date, generating a database of 124 individual 5th percentile Hybrid III dummy tests.

Baseline Responses - Mid-Size Male Hybrid III

In interpreting the results obtained in the tests with the 5th percentile female Hybrid III, it is informative to first consider the dummy responses typically measured in 48 km/h rigid barrier tests using the 50th percentile male Hybrid III dummy. The resultant acceleration-time histories of the head measured on the driver side in airbag tests with the dummy belted in 19 tests conducted by Transport Canada are presented in Figure 1. The fore/aft neck moment-time histories associated with the same tests are presented in Figure 2.

In a rigid barrier crash, the vehicle deceleration pulse generally produces deployment of the airbag early in the crash, typically within 15 to 25 milliseconds of the first contact with the barrier. This, in combination with the clearance between the steering wheel module and dummy, normally provided when the seat is in the mid-position, allows the airbag to inflate fully, prior to dummy contact. Under such circumstances, head and neck kinematics are well controlled and excessive forward flexion or rearward extension of the neck is avoided. In all 19 tests, the peak resultant head acceleration values were less than Transport Canada's Injury Assessment Reference Value (IARV) of 80 g [2]. Similarly, the peak fore/aft neck moments were all well below the IARV values of 190 Nm in flexion and 57 Nm in extension, derived by General Motors [22]. Although not presented, all peak neck shear forces and peak axial forces measured in this series of tests were also well below GM IARV values. Consequently, the tests would predict negligible risk of injury of the head or neck under the conditions represented. The near absence of bag-related fatalities among belted male drivers from head or neck trauma would support this conclusion.

5th Percentile Female Hybrid III Results

Rigid Frontal Barrier Tests - Driver-side response data generated with the 5th percentile female dummy are available for a total of 34 48 km/h rigid frontal barrier crash tests, in which the vehicle was equipped with a driver-side airbag and the bag deployed. The peak dummy response values and calculated injury indices

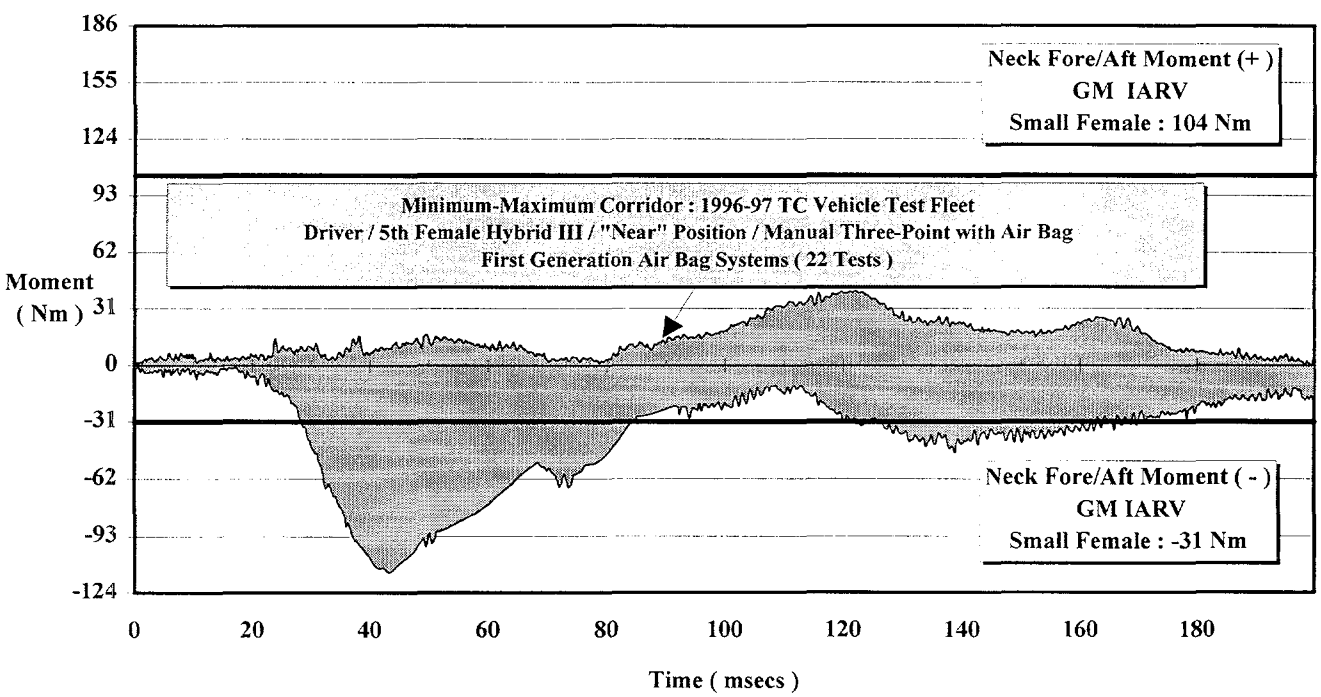

Figure 3. Range of Neck Extension Moment Responses Measured in 48 km/h Rigid Barrier Tests of First Generation Airbag Systems with 5th Percentile Female Hybrid III (Driver Side).

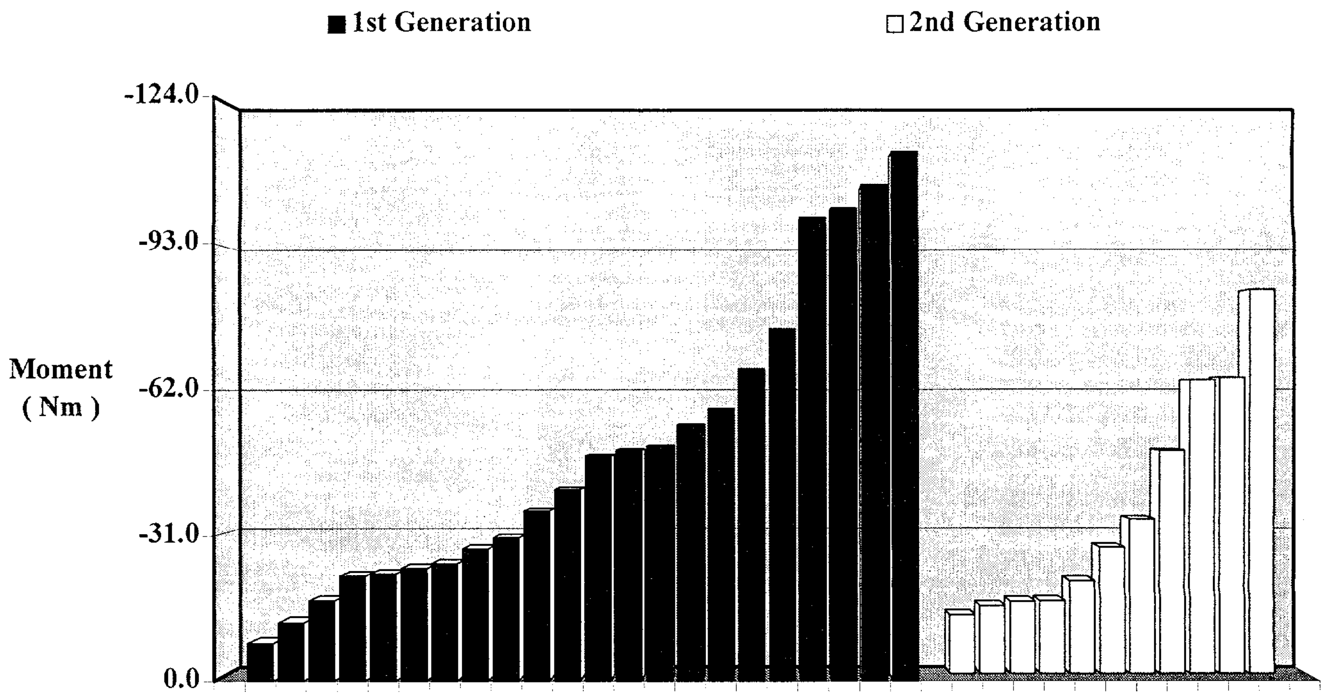

Figure 4. Peak Driver Neck Extension Moments Measured in 48 km/h Rigid Barrier Tests with 5th Percentile Female Hybrid III as a Function Air Bag Grouping.

obtained in this series of airbag tests are summarized in Appendix A1 for drivers, and Appendix A2 for front right passengers.

Given the imprecise nature of the term "depowered", the term "second-generation" is used in the present paper to denote vehicle models redesigned for model year 1998 to take advantage of the amendments to FMVSS 208 introduced to facilitate "depowering" of airbag systems in the US. The term "first-generation" is used to describe all pre-1998 airbag systems and 1998 airbag systems not yet redesigned at the time of vehicle purchase. It should be noted that the changes made to many 1998 vehicle models were not necessarily limited to reductions in the power output of the airbag module. Other components of the airbag system were frequently changed as well and, in some cases, the seat belt systems were redesigned. It should be also noted that six pre-1998 vehicles were modified by Transport Canada to reflect 1998 design changes to the airbag system and seat belt assemblies (if applicable). These vehicles are included in the second-generation airbag totals.

As most bag-related deaths in the case of belted female drivers are associated with neck trauma, the discussions below focus primarily on the fore/aft neck extension moments measured on the dummy. The range of neck responses observed in the first generation test series in rigid barrier tests with the 5th percentile female dummy in the driver's position is depicted in Figure 3.

The close proximity of the small dummy to the steering wheel results in the dummy interacting with the airbag while it is still expanding. This typically results in the head being forced upwards and rearwards as the bag continues to expand under the chin producing an extension-tension neck response. Maximum extension of the neck is generally observed some 40 to 50 milliseconds into the crash.

Complete driver neck response data are available for 22 of the 23 tests with first generation systems and 11 tests with second generation systems. A comparison of the peak neck extension moments observed in these tests is presented in Figure 4. As can be seen, both series of tests generated a wide range of peak values. In contrast to the results obtained using a mid-size male dummy, exceedances of the GM neck extension IARV for a small female (31 Nm) were common in this series of tests. The IARV was exceeded in 13 of 22 (59%) of the first-generation tests and in 5 of 11 (45%) of the second-generation tests. Peak values exceeding three times the IARV were observed in 4 (18%) of the first generation tests, the highest neck extension moment value being

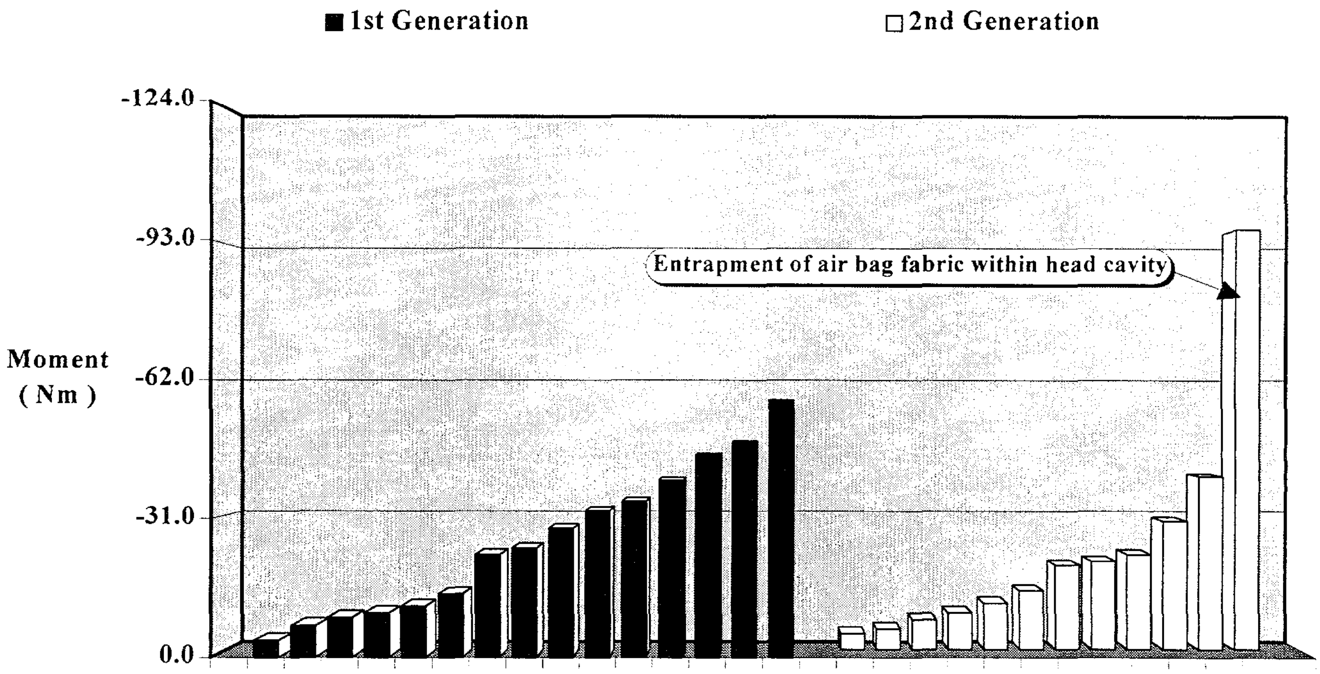

Figure 5. Peak Front Right Passenger Neck Extension Moments Measured in 48 km/h Rigid Barrier Tests with 5th Percentile Female Hybrid III as a Function Airbag Grouping.

113 Nm. The highest neck extension moment observed in the second generation tests was 84 Nm. The average peak neck extension moment observed in the second-generation test series was some 26% lower than the mean value observed in the first generation series of tests (36.6 Nm vs. 49.4 Nm).

The corresponding data for the passenger tests are presented in Figure 5. Passenger head and neck kinematics were far more complex than for the driver. Depending on the vehicle and design of the airbag system, the neck experienced either axial tension or compression accompanied by either forward flexion or rearward extension, with all possible combinations represented. In tests involving first-generation systems, exceedance of any neck IARV was observed only when the loading conditions produced a tension-extension response. The extension IARV was exceed in 6 out of 15 (40%) of the tests. However the maximum extension moment was only 58 Nm, less than half the maximum value recorded on a 5th-percentile driver. The extension IARV was exceed in 2 of 12 of the second-generation tests. In one of these, however, the airbag fabric very clearly penetrated the head cavity, despite the use of a protective neck shield. The neck response data for this test are therefore highly suspect. Excluding this test, the mean neck extension moment for the second generation test series was 16.3 Nm, or 38% less than the mean value of 26.1 Nm observed in the first-generation test series.

Offset Frontal Deformable Barrier Tests - The vast majority of tests conducted with the European offset deformable barrier face were conducted with a nominal impact speed of 40 km/h. This speed was selected since early testing indicated that the associated impact severity was sufficient to trigger the deployment of most, if not all, current airbag systems, while still representing a collision environment which is relatively innocuous to a belted individual, including belted occupants who travel with the seat fully forward. All tests were performed with a 40% vehicle offset to the barrier face as defined in Directive 96/79/EC. The driver- and passenger-side data generated by this series of 40 km/h tests are summarized in Appendices A.3 and A.4, respectively.

Complete neck response data for the driver's position in this series of 40 km/h impacts are available for 12 first-generation and 12 second-generation tests. The peak neck extension moments are presented in Figure 6. It is interesting to note that, despite the fact that the 40 km/h offset deformable barrier test condition is far less severe than the 48 km/h rigid barrier test condition, the offset tests produced higher peak neck response values.

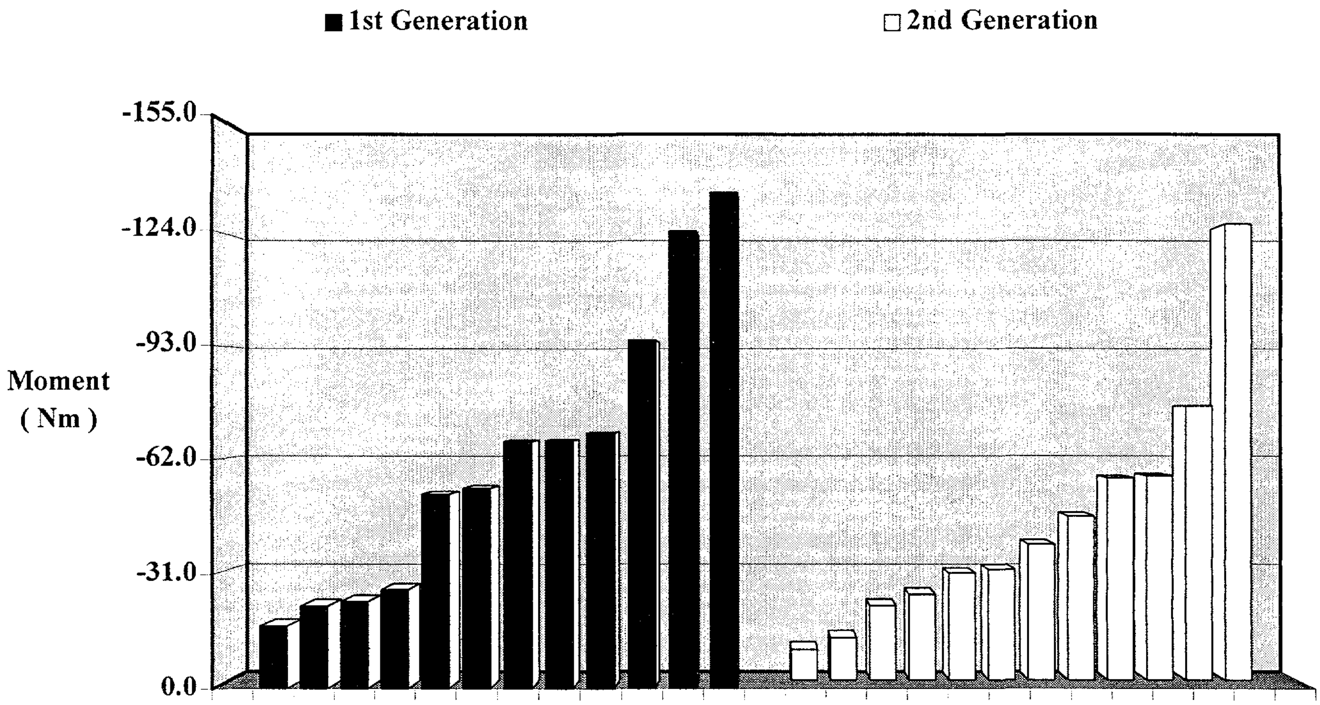

Figure 6. Peak Driver Neck Extension Moments Measured in 40 km/h Offset Frontal Deformable Barrier Tests with 5th Percentile Female Hybrid III as a Function Airbag Grouping.

The highest peak neck extension value observed in the first-generation test series was 134 Nm, while the corresponding highest peak value observed in the second generation test series was 127 Nm. Notwithstanding the similarity in maximum values, the mean peak neck extension moment observed in the second-generation test series was 36.3 Nm, a value approximately 42% lower that of the mean value of 62.7 Nm observed in the first generation test series.

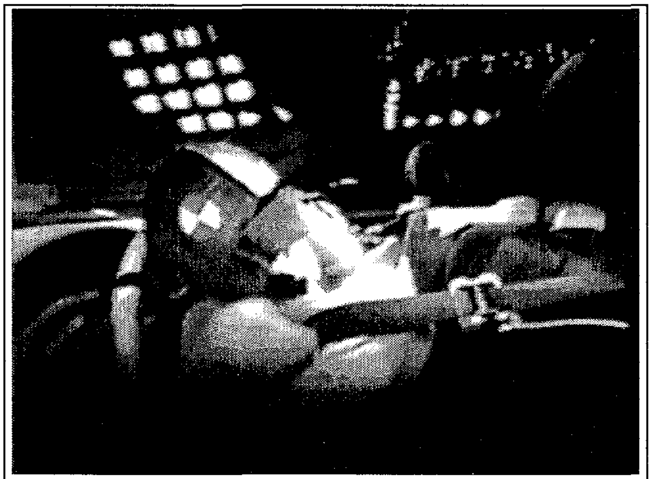

Figure 7. Delayed Deployment (1st Generation Airbag)

The elevated neck moment values observed in the offset tests can be attributed to the timing of the airbag deployments. These occurred as late as 110 milliseconds into the crash. In a number of instances the initial clearance between the dummy and the delay in firing of the bag resulted in the dummies head being in contact with the airbag module at time of deployment (Figure 7).

The neck extension IARV was exceeded by the driver in 8 of 12 (67%) of the first-generation tests and in 6 of 12 (50%) of the second-generation tests. However, while peak neck extension values exceeding twice the IARV value were observed in 6 of 12 first-generation tests (50%), this was the case for only 2 of 12 (17%) of the second generation tests. That difference accounts for the much lower mean neck extension value noted above for the latter series of tests.

In the second generation test series, the influence of late bag deployment on neck response was far less pronounced than in the first generation test series. Indeed, the second lowest peak neck extension moment was recorded in the test which produced the latest airbag

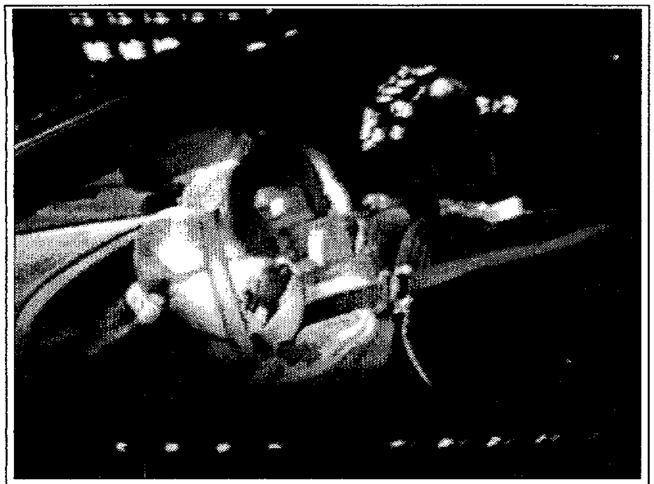

Figure 8. Delayed Deployment (2nd Generation Airbag)

deployment in the second-generation test series. At the time of deployment, the head was already in contact with the module. The tear pattern of the module cover and steering wheel design, in combination with the reduced power level of the airbag module, resulted in the airbag deploying laterally and sufficiently behind the steering wheel rim so that very little impact energy was transferred to the head (Figure 8). The peak driver neck extension moment observed in this test was 12 Nm.

Neck response data for the passengers in this series of 40 km/h impacts are available for 7 first-generation tests and 13 second-generation tests. The neck extension IARV was exceeded by the passenger in 4 of 7 (57%) first-generation tests and in 2 of 13 (15%) second-generation tests. The mean neck extension moment for the second-generation test series was 13.9 Nm, approximately 57% less than the mean value of 32.6 Nm observed in the first-generation test series.

The magnitude of the passenger neck moments was strongly influenced by the timing of the airbag deployment. This was true for both first and second generation vehicles. The highest neck moment observed in the second-generation test series was 58 Nm and was produced by the test associated with latest deployment (107 ms). The same vehicle model was also represented in the first-generation test fleet. The 1997 version of the same vehicle model produced a peak neck extension value of only 22 Nm. The much lower value likely reflects the earlier time of airbag deployment (34 ms).

<u>Specialty Tests</u> - As part of the above offset test series, a number of selected vehicle models were also tested at different impact severities. These tests were

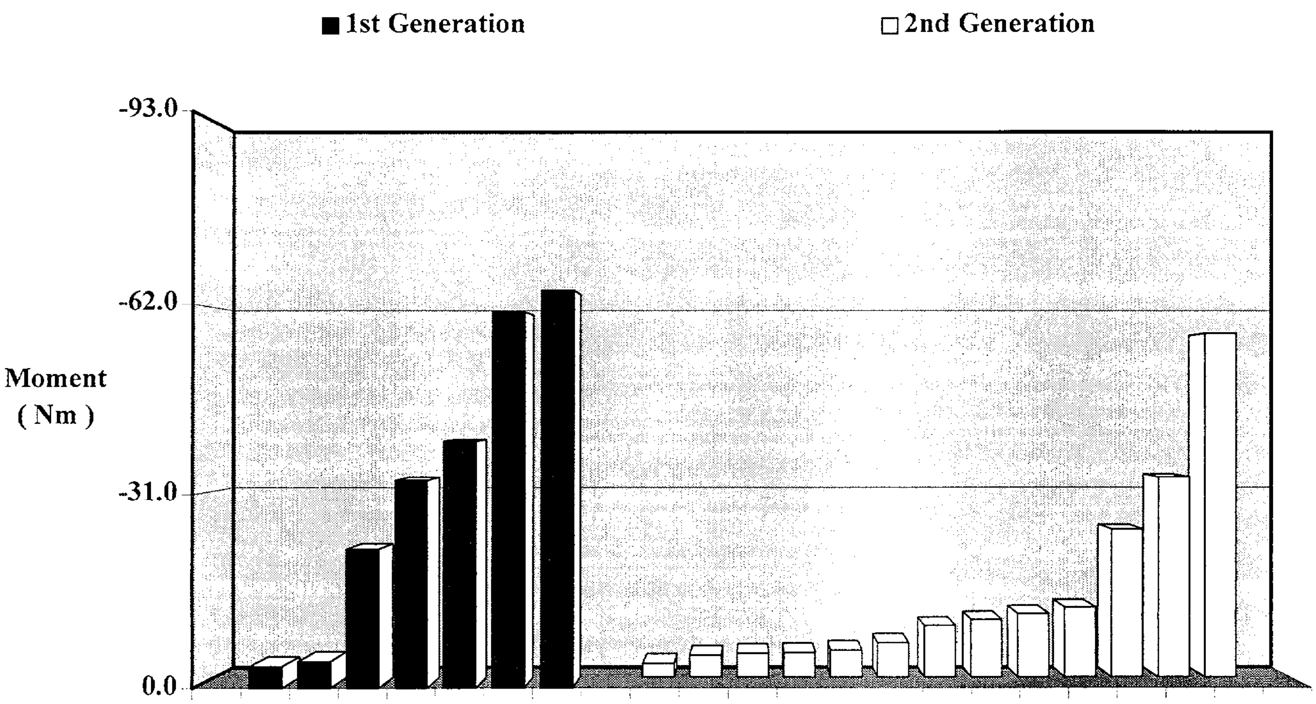

Figure 9. Peak Front Right Passenger Neck Extension Moments Measured in 40 km/h Offset Frontal Deformable Barrier Tests with 5th Percentile Female Hybrid III as a Function Airbag Grouping.

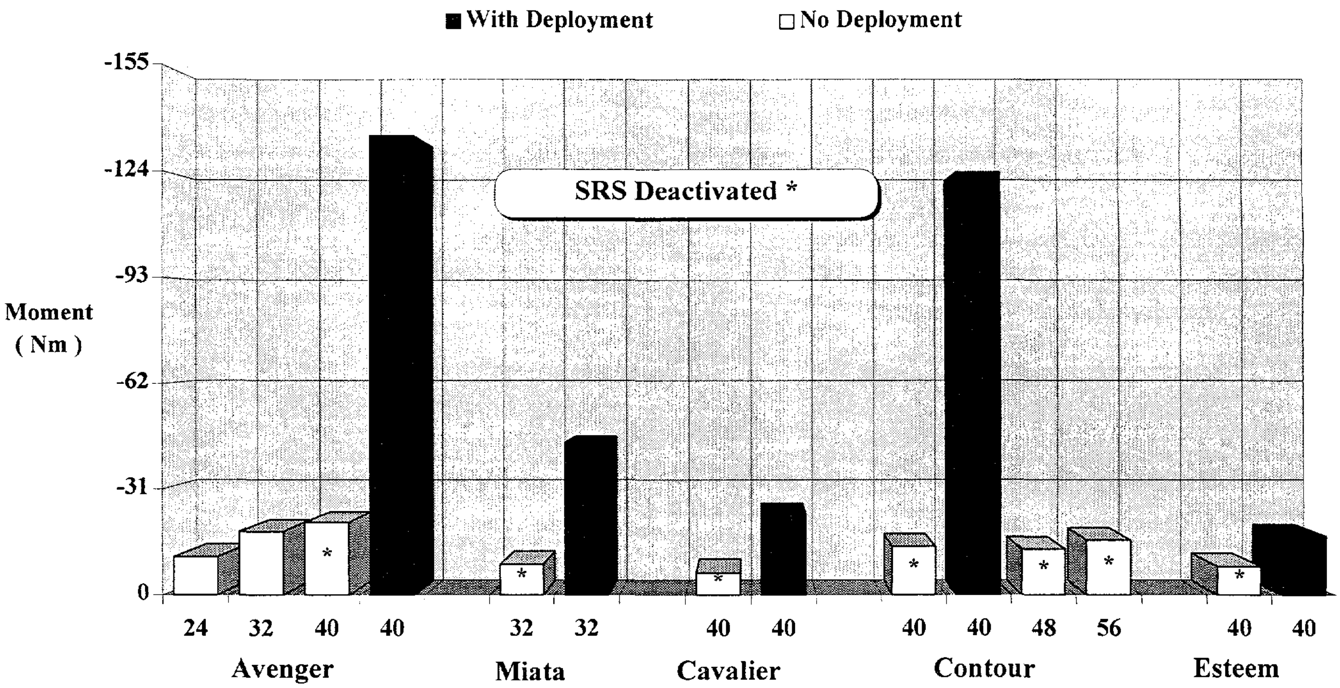

Figure 10. Peak Driver Neck Extension Moments Measured in Offset Frontal Deformable Barrier Tests with 5th Percentile Female Hybrid III as a Function Impact Speed and Airbag Deployment.

performed initially to establish the collision severity at which the airbag system would deploy in an offset deformable barrier test. In addition, it was intended to quantify the effects of deactivation, on the responses measured on a belted 5th percentile female Hybrid III, with the seat in the fully forward position, at collision severities at or just above the deployment threshold. Seven tests were performed with deactivated airbags. For one vehicle model, two additional tests, one at 48 km/h and one at 56 km/h, were performed with the airbag system deactivated. A detailed breakdown of the dummy responses measured in this series of tests is provided in Appendix A.5. The peak driver neck extension moments observed in this series of tests, are presented in Figure 10.

From the data presented, it can be observed that the peak neck moments obtained with airbag deployment always exceeded those which were obtained when the airbag system was deactivated. Indeed, in none of the tests performed with the airbag system deactivated was any commonly referenced IARV or regulated injury index exceeded. These results suggest that current airbag deployment thresholds are set too low, at least for belted drivers.

The above results also highlight the requirement for a low-speed test procedure to ensure that airbag systems are not only optimized for belted occupants but also that their performance is assessed over a range of different collision severities. In Figure 11, curves of vehicle deceleration versus time, typically observed in high-speed tests against rigid barriers, are compared with those observed in 40 km/h offset frontal deformable barrier tests with a 40% vehicle offset. Whereas the rigid wall test can be seen to produce very high vehicle decelerations very early in the crash sequence, the offset condition produces a "soft" deceleration pulse with peak decelerations relatively late in the collision. As can also be seen, the profile of the crash pulse in the offset test shows good agreement with generic sled pulses used to represent a typical collision.

The late deceleration peaks produced in the offset test often trigger airbag deployment. Under such situations, very high neck loads can be produced by the bag, whereas, in the absence of airbag deployment, the same occupant would be riding down the collision safely. With the advent of airbag systems, it can be seen that the relevance of the high speed rigid wall test has been greatly reduced.

Paired-Vehicle Comparisons - Many vehicle models represented in the first-generation test series differed from those in the second-generation series. The subset of vehicle models that was represented in both series of tests was examined separately, to see if these tests of paired vehicles showed any trends which differed from those observed in the main programme. The results for the paired vehicles are presented in Figures 12 and 13 for rigid- and offset-barrier tests, respectively.

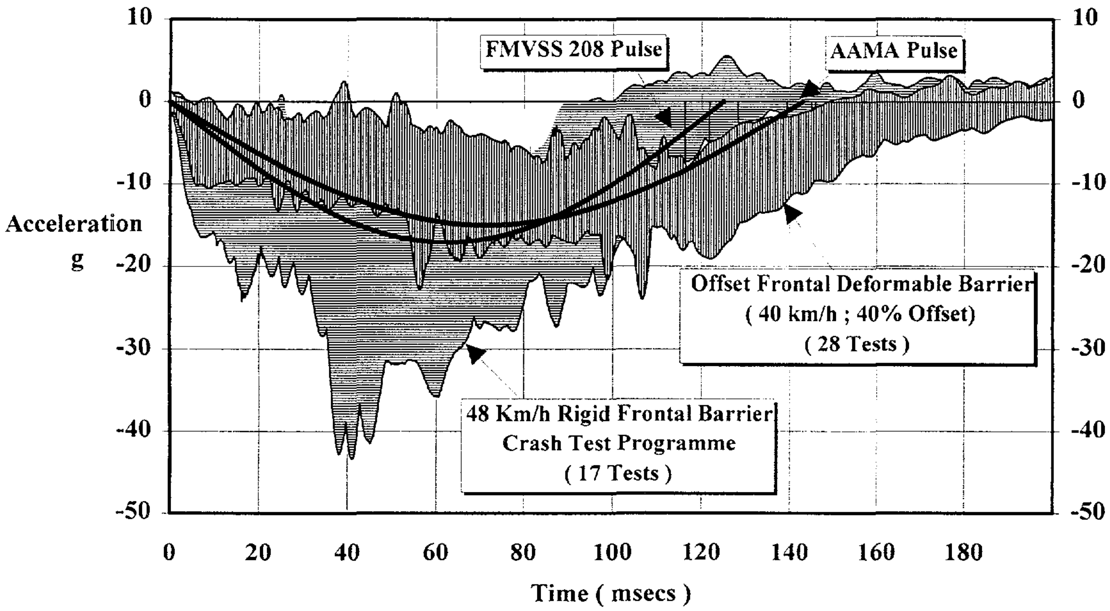

Figure 11. Comparison of Crash Pulses

From the results presented, it can be seen that the tests of paired vehicles produced trends similar to those noted in earlier discussions. The second-generation tests produced lower peak driver neck extensions, with the largest differences being observed in the offset tests. Given that the offset test is more representative of real-world crashes, this suggests that the magnitude of the benefits likely to be achieved with "depowering" could be greater than predicted on the basis of rigid barrier test data. Further support for this observation can be found in a comparison of the peak neck extension values, observed in static tests of one of the vehicle models represented in the paired-vehicle subset. Those results are presented in Figure 14.

In that series of static airbag tests, a 5[th] percentile female Hybrid III driver was subjected to a series of four separate airbag deployments. The baseline test was done with the seat in the fully forward position and the seat back in the most upright position. The dummy was then pivoted forward until the head was in contact with the module and retested. Additional tests were performed at two intermediate positions. The fifth static test took the form of an ISO-type "chin on hub" out-of-position test. As would be expected, the maximum neck extension moments increased with increasing proximity of the dummy to the airbag module. In tests where the dummy is in close proximity to the module, the reductions in peak neck loads achieved with second-generation airbag modules show much closer agreement with those predicted by the offset tests than with those predicted by the rigid barrier tests. It is also interesting to note that, while static out-of-position tests are frequently regarded to represent a "worst-case" scenario, even the "chin on hub" test produced a peak neck extension value that was lower than that observed in the full-scale vehicle offset test.

DISCUSSION

Low speed offset frontal crash testing, using belted 5[th]-percentile dummies in the fully forward seat position, overcomes two serious deficiencies which exist in current regulatory practices. The first deficiency is the absence of any requirements explicitly addressing the frontal protection requirements of drivers of short stature who, by necessity, often sit close to the steering assembly. In addition, current regulatory practices fail to ensure that optimum benefits are achieved over the range of collision severities represented in the field. Rigid wall tests, in themselves, provide little assurance that timely deployment of the airbag will be achieved in the "softer" collisions which account for the majority of real frontal crashes. The low-speed offset test should not be viewed as a substitute for the high speed barrier test. Rather, it

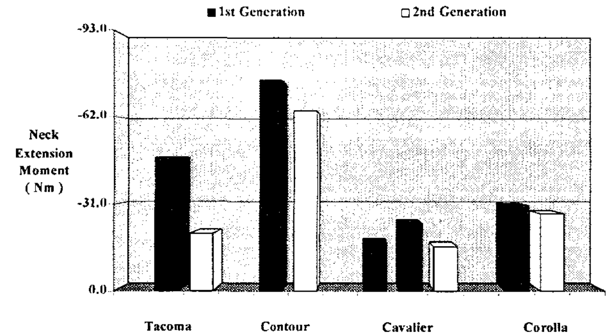

Figure 12. Peak Driver Neck Extension Moment : 1st Generation vs. 2nd Generation Systems (48 km/h Rigid Barrier).

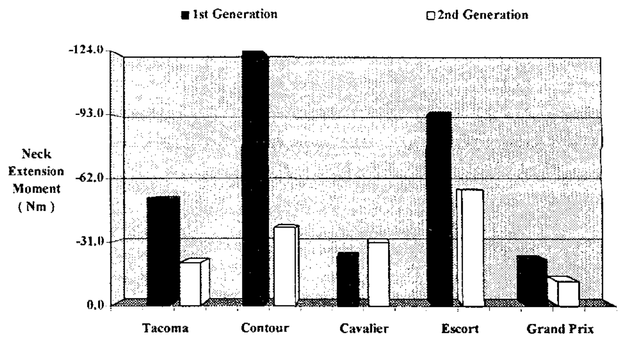

Figure 13. Peak Driver Neck Extension Moment : 1st Generation vs. 2nd Generation Systems (40 km/h Offset Frontal).

should be viewed as a means of broadening the relevance of frontal protection standards to encompass a wider range of occupants sizes and collision severities. An added advantage of the low speed offset frontal test, as described in the present paper, is that it makes use of testing hardware already in widespread use around the world.

The findings of the present study suggest that changes in airbag design introduced in most 1998 models should help to reduce the incidence of serious or fatal bag-related injury among both drivers and right-front passengers. Further improvements in sensor technology are required, however, with respect both to the discrimination of collision severity and the assurance of timely airbag deployment. The frequency of late or delayed deployments observed in the present test programme suggests the need for additional, satellite crash sensors in the forward portions of the vehicle.

Not all aspects of the testing hardware or procedures developed or employed in the offset testing protocol have been finalized. Issues yet to be resolved completely include the design of the neck shield, and finalization of the dummy positioning procedure. Once these two issues are resolved, repeatability trials will be performed.

DISCLAIMER

The conclusions reached and opinions expressed in this paper are solely the responsibility of the author. Unless otherwise stated, they do not necessarily represent the official policy of Transport Canada.

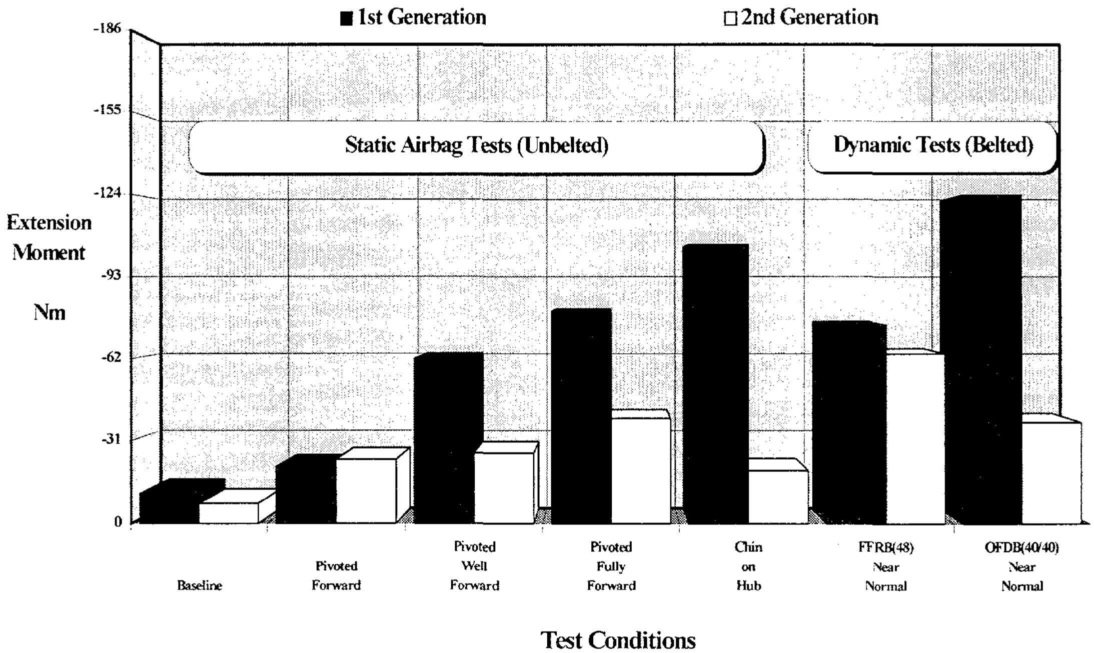

Figure 14. Peak Driver Neck Extension Moment as a Function of Test Condition.

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Appendix A.1 - 48 km/h Full Frontal Rigid Barrier Crash Test Series / 5th Percentile Female Hybrid III ATD / Driver Side Results

Full Frontal Rigid Barrier Crash Test Series	Head Response	Neck Response		Chest Response		
	SAE 1000	SAE 1000	SAE 600	SAE 600 / SAE 180	SAE 600 / SAE 180 / SAE 60	SAE 600 / SAE 180
TC Test Number / Test Vehicle	Resultant Head No Clip Acc. (g) / HIC (15 ms)	Axial Force Positive/Negative (N)	Calculated Occipital Moment Positive/Negative (Nm)	Mid-Sternum Deflection (mm)	Mid-Sternum VC (m/s)	Resultant Chest No Clip Acc. (g)
First-Generation Test / Air Bag Deployment						
TC96-101D 1996 Toyota Tacoma	**97.6 / 700**	2802 / -1768	8 / -48	#N/A / -41.4	#N/A / #N/A / 0.000	81.0 / #N/A
TC96-102D 1996 Dodge Avenger	58.4 / 283	2710 / -454	7 / -101	#N/A / -29.7	#N/A / #N/A / 0.265	38.3 / #N/A
TC96-103D 1996 Mazda MPV	**104.0** / 268	2612 / -327	11 / -99	#N/A / -22.7	#N/A / #N/A / 0.164	40.2 / #N/A
TC96-112D 1996 Merc Mystique	67.1 / 307	2593 / -387	11 / -75	#N/A / -24.4	#N/A / #N/A / 0.210	48.0 / #N/A
TC96-114D 1996 Chev Cavalier	52.7 / 181	1857 / -603	13 / -17	#N/A / -21.2	#N/A / #N/A / 0.090	46.4 / #N/A
TC96-115D 1996 Suzuki Esteem	61.9 / 309	1980 / -1006	14 / -36	#N/A / -30.6	#N/A / #N/A / 0.269	49.5 / #N/A
TC96-122D 1996 Mazda Miata	39.8 / 54	1793 / -549	32 / -49	#N/A / -42.3	#N/A / #N/A / 0.337	49.3 / #N/A
TC96-151D 1996 Toyota Corolla	50.1 / 154	1638 / -432	10 / -31	#N/A / -21.7	#N/A / #N/A / 0.075	39.8 / #N/A
TC97-101D 1997 GM Venture	65.6 / 334	2120 / -276	#N/A / #N/A **ND**	#N/A / -34.7	#N/A / #N/A / 0.363	50.4 / #N/A
TC97-102D 1997 Jeep TJ	48.6 / 209	1669 / -333	16 / -25	#N/A / -48.2	#N/A / #N/A / 0.518	41.2 / #N/A
TC97-103D 1997 Hyundai Tiburon	41.3 / 75	1844 / -521	40 / -105	#N/A / -33.8	#N/A / #N/A / 0.256	48.6 / #N/A
TC97-104D 1997 Ford F150 PU	**129.7** / 313	1812 / -803	26 / -28	#N/A / -35.1	#N/A / #N/A / 0.267	80.5 / #N/A
TC97-105D 1997 Saturn SL	42.7 / 149	1593 / -403	17 / -12	#N/A / -34.7	#N/A / #N/A / 0.367	36.8 / #N/A
TC97-106D 1997 Suzuki X90	58.6 / 290	2514 / -1051	11 / -66	#N/A / -35.2	#N/A / #N/A / 0.226	59.6 / #N/A
TC97-107D 1997 Dodge Dakota	47.5 / 106	1736 / -720	8 / -41	#N/A / -40.4	#N/A / #N/A / 0.323	48.2 / #N/A
TC97-110D 1997 Chev Cavalier	50.7 / 138	1469 / -521	19 / -24	#N/A / -29.4	#N/A / #N/A / 0.311	38.7 / #N/A
TC97-134D 1997 Toyota Rav4	65.8 / 403	2491 / -800	31 / -58	#N/A / -39.4	#N/A / #N/A / 0.367	61.5 / #N/A
TC97-153D 1997 Cherolet Malibu	48.8 / 194	2047 / -736	6 / -50	#N/A / -23.2	#N/A / #N/A / 0.123	115.7 / #N/A
TC97-161D 1997 Pontiac Grand Prix	47.7 / 165	1262 / -86	11 / -23	-17.0 / #N/A	0.074 / 0.054 / 0.051	#N/A / 32.7
TC97-162D 1997 Toyota Camry CE	53.9 / 208	1895 / -233	10 / -113	-30.7 / #N/A	0.393 / 0.333 / 0.318	#N/A / 43.3
TC97-164D 1997 Volkswagen Jetta GL	37.2 / 93	1250 / -35	28 / -23	-21.0 / #N/A	0.200 / 0.182 / 0.146	#N/A / 52.9
TC97-165D 1997 Ford Escort LX	52.0 / 178	1902 / -255	2 / -55	-23.7 / #N/A	0.171 / 0.132 / 0.121	#N/A / 59.2
TC98-105D 1998 Plymouth Voyager	52.9 / 255	1567 / -368	12 / -8	-43.0 / #N/A	0.659 / 0.509 / 0.509	#N/A / 46.7
Second-Generation Test / Air Bag Deployment						
TC97-201D 1996 Merc Mystique [M]	69.9 / 366	2385 / -178	16 / -64	-31.5 / #N/A	0.507 / 0.421 / 0.411	#N/A / 46.8
TC97-203D 1997 Chev Cavalier [M]	44.1 / 113	1446 / -181	14 / -16	-18.6 / #N/A	0.218 / 0.190 / 0.162	#N/A / 42.1
TC98-102D 1998 Nissan Altima	45.4 / 141	1481 / -169	13 / -16	-21.5 / #N/A	0.155 / 0.140 / 0.127	#N/A / 42.9
TC98-103D 1998 Honda Accord	50.4 / 225	1647 / -329	2 / -49	-32.3 / #N/A	0.351 / 0.305 / 0.299	#N/A / 48.4
TC98-106D 1998 Ford Explorer 2WD	48.2 / 154	2179 / -276	13 / -65	-39.8 / #N/A	0.850 / 0.727 / 0.701	#N/A / 61.4
TC98-107D 1998 Nissan Sentra	47.5 / 199	1363 / -7	4 / -15	-20.3 / #N/A	0.133 / 0.117 / 0.099	#N/A / 38.1
TC98-108D 1998 Dodge Neon	67.8 / 354	1996 / -339	8 / -13	-29.0 / #N/A	0.358 / 0.295 / 0.288	#N/A / 50.4
TC98-111D 1998 Mazda 626	52.4 / 220	2150 / -663	4 / -84	-23.9 / #N/A	0.185 / 0.132 / #N/A	#N/A / 49.3
TC98-112D 1998 Nissan Frontier	65.9 / 436	1626 / -435	12 / -34	-40.7 / #N/A	0.509 / 0.413 / #N/A	#N/A / 48.2
TC98-201D 1998 Toyota Corolla VE	60.5 / 324	1957 / -355	5 / -28	-18.3 / #N/A	0.189 / 0.110 / 0.097	#N/A / 37.9
TC98-205D 1998 Toyota Tacoma PU	87.7 / 545	2730 / -436	10 / -20	-42.5 / #N/A	0.700 / 0.488 / 0.448	#N/A / 62.1

Notes :

M - Vehicle modified to reflect 1998 design changes.

ND - No data. Transducer or data acquisition failure/malfunction.

Appendix A.2 - 48 km/h Full Frontal Rigid Barrier Crash Test Series / 5th Percentile Female Hybrid III ATD / Front Right Passenger Side Results

Full Frontal Rigid Barrier Crash Test Series		Head Response		Neck Response				Chest Response						
		SAE 1000		SAE 1000		SAE 600		SAE 600 / SAE 180		SAE 600 / SAE 180 / SAE 60			SAE 600 / SAE 180	
TC Test Number / Test Vehicle		Resultant Head No Clip Acc. (g)	HIC (15 ms)	Axial Force Positive/Negative (N)		Calculated Occipital Moment Positive/Negative (Nm)		Mid-Sternum Deflection (mm)		Mid-Sternum VC (m/s)			Resultant Chest No Clip Acc. (g)	
First-Generation Test / Air Bag Deployment														
TC97-165P	1997 Ford Escort LX	48.5	197	2015	-83	31	-58	-32.5	#N/A	0.274	0.209	0.203	#N/A	45.7
TC97-164P	1997 Volkswagen Jetta GL	49.1	160	1849	-293	17	-40	-37.4	#N/A	0.450	0.381	0.376	#N/A	49.7
TC97-162P	1997 Toyota Camry CE	89.6	108	273	-1694	78	-7	-19.3	#N/A	0.105	0.072	0.067	#N/A	33.5
TC97-161P	1997 Pontiac Grand Prix	58.1	204	1638	-88	8	-45	-21.0	#N/A	0.169	0.125	0.119	#N/A	44.5
TC97-153P	1997 Cherolet Malibu	54.9	236	587	-1190	57	-23	#N/A	-15.1	#N/A	#N/A	0.083	47.2	#N/A
TC97-134P	1997 Toyota Rav4	152.8	564	2961	-1536	4	-33	#N/A	-33.1	#N/A	#N/A	0.312	80.1	#N/A
TC97-110P	1997 Chev Cavalier	62.2	343	1263	-708	26	-14	#N/A	-21.8	#N/A	#N/A	0.128	50.9	#N/A
TC97-107P	1997 Dodge Dakota	34.2	86	1596	-432	33	-48	#N/A	-33.0	#N/A	#N/A	0.313	42.1	#N/A
TC97-106P	1997 Suzuki X90	65.3	133	2019	-362	43	-35	#N/A	-36.4	#N/A	#N/A	0.256	56.9	#N/A
TC97-105P	1997 Saturn SL	49.9	205	1815	-397	24	-11	#N/A	-30.1	#N/A	#N/A	0.140	47.6	#N/A
TC97-104P	1997 Ford F150 PU	46.7	180	1124	-406	30	-4	#N/A	-34.4	#N/A	#N/A	0.304	59.7	#N/A
TC97-103P	1997 Hyundai Tiburon	53.4	267	990	-495	25	-10	#N/A	-26.6	#N/A	#N/A	0.204	63.5	#N/A
TC97-102P	1997 Jeep TJ	43.0	166	1552	-273	13	-29	#N/A	-38.1	#N/A	#N/A	0.345	41.0	#N/A
TC97-101P	1997 GM Venture	53.6	193	2003	-394	35	-24	#N/A	-26.5	#N/A	#N/A	0.179	95.5	#N/A
TC96-124P	1996 Dodge Caravan	72.6	87	812	-793	98	-9	#N/A	-26.0	#N/A	#N/A	0.152	46.5	#N/A
Second-Generation Test / Air Bag Deployment														
TC97-201P	1996 Merc Mystique [M]	62.0	384	757	-725	47	-4	-16.2	#N/A	0.076	0.066	0.063	#N/A	52.9
TC97-203P	1997 Chev Cavalier [M]	59.6	285	1764	-416	27	-8	-14.4	#N/A	0.080	0.061	0.059	#N/A	58.8
TC98-102P	1998 Nissan Altima	65.0	296	197	-1342	74	-11	-11.9	#N/A	0.063	0.047	0.046	#N/A	39.8
TC98-103P	1998 Honda Accord	56.3	269	1057	-241	14	-22	-23.1	#N/A	0.190	0.174	0.156	#N/A	44.6
TC98-105P	1998 Plymouth Voyager	63.6	318	1477	-459	37	-19	-30.6	#N/A	0.340	0.270	0.254	#N/A	51.9
TC98-106P	1998 Ford Explorer 2WD	43.8	155	1249	-585	22	-14	-21.2	#N/A	0.156	0.113	0.103	#N/A	46.7
TC98-107P	1998 Nissan Sentra	51.7	244	1066	-292	29	-20	-27.1	#N/A	0.242	0.208	0.193	#N/A	45.3
TC98-108P	1998 Dodge Neon	59.0	303	519	-729	47	-7	-19.9	#N/A	0.132	0.087	0.078	#N/A	48.7
TC98-111P	1998 Mazda 626	61.7	262	2783	-222 S2	18	-96 S2	-27.9	#N/A	0.294	0.208	#N/A	#N/A	48.8
TC98-112P	1998 Nissan Frontier	70.7	356	1050	-2126	45	-30	-43.9	#N/A	0.665	0.602	#N/A	#N/A	56.2
TC98-201P	1998 Toyota Corolla VE	88.0	559	578	-1904	29	-5	-19.0	#N/A	0.062	0.050	0.048	#N/A	47.4
TC98-205P	1998 Toyota Tacoma PU	59.0	300	1447	-374	37	-40	-35.8	#N/A	0.417	0.344	0.342	#N/A	66.9

Notes :

M - Vehicle modified to reflect 1998 design changes.

ND - No data. Transducer or data acquisition failure/malfunction.

S2 - Peak value suspect. Penetration of airbag fabric into head cavity.

Appendix A.3 - Offset Frontal Deformable Barrier Crash Test Series / 5th Percentile Female Hybrid III ATD / Driver Side Results

Offset Frontal Deformable Barrier Crash Test Series		Head Response	Neck Response		Chest Response		
		SAE 1000	SAE 1000	SAE 600	SAE 600 / SAE 180	SAE 600 / SAE 180 / SAE 60	SAE 600 / SAE 180
TC Test Number / Test Vehicle		Resultant Head No Clip Acc. (g) / HIC (15 ms)	Axial Force Positive/Negative (N)	Calculated Occipital Moment Positive/Negative (Nm)	Mid-Sternum Deflection (mm)	Mid-Sternum VC (m/s)	Resultant Chest No Clip Acc. (g)
40 km/h ; 40% Offset Frontal Test - First-Generation Test / Air Bag Deployment							
TC94-022D	1994 Dodge Caravan	53.9 / 226	1009 / -32	19 / -67	-25.0 / #N/A	0.200 / #N/A / 0.158	#N/A / 21.3
TC95-206D	1995 Ford Contour	74.5 / 367	2752 / -505	17 / -124	#N/A / -22.4	#N/A / #N/A / 0.170	42.4 / #N/A
TC96-002D	1996 Suzuki Esteem	42.5 / 85	1225 / -229	19 / -17	#N/A / -23.1	#N/A / #N/A / 0.174	28.2 / #N/A
TC96-021D	1996 Toyota Tacoma	93.2 / 648	3044 / -705	20 / -53	#N/A / -23.1	#N/A / #N/A / 0.072	29.7 / #N/A
TC96-024D	1996Chev Lumina LS	71.7 / 240	2676 / -308	5 / -67	#N/A / -33.9	#N/A / #N/A / 0.569	58.6 / #N/A
TC96-025D	1996 Chev Cavalier	47.6 / 112	1330 / -270	23 / -24	#N/A / -21.9	#N/A / #N/A / 0.169	20.6 / #N/A
TC96-211D	1996 Dodge Avenger	82.9 / 338	4583 / -644 S	11 / -134 S1	#N/A / -37.6	#N/A / 0.057 / 0.252	77.8 / #N/A
TC97-205D	1997 Pontiac Grand Prix	27.5 / 52	693 / -115	11 / -23	-9.7 / #N/A	0.035 / 0.062 / 0.021	#N/A / 17.9
TC97-206D	1997 Toyota Camry	90.5 / 293	1763 / -4	2 / -54	-30.3 / #N/A	0.266 / 0.076 / 0.217	#N/A / 32.2
TC97-208D	1997 VW Jetta	38.0 / 19	832 / -230	22 / -27	-14.7 / #N/A	0.081 / 0.188 / 0.045	#N/A / 22.4
TC97-209D	1997 Ford Escort	45.7 / 138	755 / -25	19 / -94	-16.6 / #N/A	0.113 / 0.118 / 0.091	#N/A / 22.0
TC98-207D	1998 Dodge Caravan	31.6 / 66	1184 / -37	1 / -69	-21.8 / #N/A	0.136 / #N/A / 0.104	#N/A / 24.0
40 km/h ; 40% Offset Frontal Test - Second-Generation Test / Air Bag Deployment							
TC97-200D	1997 Merc Mystique [M]	50.9 / 187	896 / -81	18 / -38	-24.3 / #N/A	0.265 / 0.127 / 0.210	#N/A / 25.7
TC97-204D	1997 Chev Cavalier [M]	48.4 / 193	825 / -41	8 / -31	-12.5 / #N/A	0.056 / 0.106 / 0.048	#N/A / 21.4
TC98-101D	1998 Toyota Corolla	44.2 / 145	1370 / -70	21 / -24	-13.6 / #N/A	0.103 / 0.220 / 0.046	#N/A / 26.6
TC98-109D	1998 Toyota Tacoma	62.5 / 311	1535 / -412	15 / -21	-20.4 / #N/A	0.173 / 0.491 / 0.103	#N/A / 28.6
TC98-202D	1998 Nissan Altima	45.0 / 96	1499 / -68	16 / -57	-18.6 / #N/A	0.120 / 0.181 / 0.098	#N/A / 16.6
TC98-203D	1998 Ford Escort	41.0 / 87	1478 / -6	35 / -56	-14.1 / #N/A	0.079 / 0.383 / 0.060	#N/A / 18.1
TC98-204D	1998 Ford F150	29.4 / 27	646 / -39	15 / -9	-17.1 / #N/A	0.094 / #N/A / 0.067	#N/A / 21.0
TC98-206D	1998 Ford Explorer 2WD	62.3 / 183	2573 / -57	1 / -30	-24.3 / #N/A	0.249 / #N/A / 0.167	#N/A / 27.7
TC98-208D	1998 Dodge Neon	77.1 / 486	2829 / -117	0 / -127	-26.1 / #N/A	0.334 / #N/A / 0.169	#N/A / 38.7
TC98-209D	1998 Honda Accord	81.7 / 402	3495 / -603	2 / -77	-27.6 / #N/A	0.764 / #N/A / 0.374	#N/A / 41.1
TC98-210D	1998 Nissan Sentra	64.0 / 325	2246 / -589	39 / -46	-17.5 / #N/A	0.235 / #N/A / 0.151	#N/A / 29.8
TC98-211D	1998 Pontiac Grand Prix SE	57.1 / 131	2090 / -22	22 / -12	-27.3 / #N/A	0.466 / #N/A / 0.306	#N/A / 33.9

Notes :

M - Vehicle modified to reflect 1998 design changes.
ND - No data. Transducer or data acquisition failure/malfunction.
S - Full-scale setting of transducer exceeded.
S1 - Peak value suspect. Full-scale setting for x-axis neck shear force exceeded.

Appendix A.4 - Offset Frontal Deformable Barrier Crash Test Series / 5th Percentile Female Hybrid III ATD / Front Right Passenger Side Results

Offset Frontal Deformable Barrier		Head Response	Neck Response		Chest Response		
Crash Test Series		SAE 1000	SAE 1000	SAE 600	SAE 600 / SAE 180	SAE 600 / SAE 180 / SAE 60	SAE 600 / SAE 180
TC Test Number / Test Vehicle		Resultant Head No Clip Acc. (g) / HIC (15 ms)	Axial Force Positive/Negative (N)	Calculated Occipital Moment Positive/Negative (Nm)	Mid-Sternum Deflection (mm)	Mid-Sternum VC (m/s)	Resultant Chest No Clip Acc. (g)
First-Generation Test / Air Bag Deployment / "Near' Position							
TC94-022P	1994 Dodge Caravan	82.2 / 202	482 / -527	84 / -4	-9.6 / #N/A	0.048 / 0.033 / 0.031	#N/A / 30.8
TC96-024P	1996Chev Lumina LS	128.9 / 378	3507 / -289	23 / -61	#N/A / -14.7	#N/A / #N/A / 0.060	33.8 / #N/A
TC96-025P	1996 Chev Cavalier	74.8 / 22	435 / -235	43 / -4	#N/A / -13.3	#N/A / #N/A / 0.045	21.4 / #N/A
TC97-205P	1997 Pontiac Grand Prix	44.7 / 98	1125 / -208	31 / -22	-8.0 / #N/A	0.031 / 0.024 / 0.020	#N/A / 35.2
TC97-206P	1997 Toyota Camry	210.7 / 1640	2950 / -4050	58 / -64	-9.4 / #N/A	0.087 / 0.061 / 0.047	#N/A / 35.1
TC97-208P	1997 VW Jetta	25.7 / 36	1104 / -105	14 / -33	-11.7 / #N/A	0.038 / 0.028 / 0.026	#N/A / 24.4
TC97-209P	1997 Ford Escort	27.6 / 45	1231 / -29	19 / -40	-8.5 / #N/A	0.028 / 0.026 / 0.022	#N/A / 22.7
Second-Generation Test / "Near" Position							
TC97-200P	1997 Merc Mystique [M]	29.8 / 63	489 / -241	32 / -4	-8.6 / #N/A	0.020 / 0.016 / 0.015	#N/A / 23.0
TC97-204P	1997 Chev Cavalier [M]	44.9 / 63	599 / -527	18 / -4	-8.2 / #N/A	0.020 / 0.015 / 0.013	#N/A / 19.1
TC98-101P	1998 Toyota Corolla	67.3 / 373	1901 / -1872	66 / -9	-18.0 / #N/A	0.057 / 0.046 / 0.042	#N/A / 32.4
TC98-109P	1998 Toyota Tacoma	45.8 / 101	1650 / -108	4 / -25	-23.3 / #N/A	0.309 / 0.256 / 0.214	#N/A / 40.8
TC98-202P	1998 Nissan Altima	46.6 / 124	35 / -1948	91 / -4	-5.7 / #N/A	0.020 / 0.016 / 0.015	#N/A / 24.4
TC98-203P	1998 Ford Escort	29.6 / 12	276 / -565	41 / -2	-12.3 / #N/A	0.022 / 0.018 / 0.015	#N/A / 15.7
TC98-204P	1998 Ford F150	24.3 / 19	631 / -83	13 / -5	-16.9 / #N/A	0.079 / 0.066 / 0.061	#N/A / 23.5
TC98-206P	1998 Ford Explorer 2WD	100.3 / 83	1028 / -1300	67 / -12	-9.6 / #N/A	0.057 / 0.049 / 0.039	#N/A / 28.4
TC98-207P	1998 Dodge Caravan	38.9 / 117	961 / -41	19 / -6	-18.6 / #N/A	0.098 / 0.075 / 0.061	#N/A / 22.0
TC98-208P	1998 Dodge Neon	184.7 / 200	1142 / -83	30 / -11	-15.0 / #N/A	0.074 / 0.057 / 0.056	#N/A / 37.1
TC98-209P	1998 Honda Accord	61.4 / 297	546 / -1311	32 / -33	-13.4 / #N/A	0.043 / 0.034 / 0.031	#N/A / 21.4
TC98-210P	1998 Nissan Sentra	53.2 / 119	791 / -8	24 / -10	-15.0 / #N/A	0.051 / 0.035 / 0.029	#N/A / 18.4
TC98-211P	1998 Pontiac Grand Prix SE	112.1 / 365	2315 / -18	36 / -58	-16.8 / #N/A	0.041 / 0.031 / 0.028	#N/A / 21.5

Notes :

M - Vehicle modified to reflect 1998 design changes.

Appendix A.5 - Other (Special) Tests / 5th Percentile Female Hybrid III ATD

Special Test Series	Head Response		Neck Response		Chest Response		
	SAE 1000		SAE 1000	SAE 600	SAE 600 / SAE 180	SAE 600 / SAE 180 / SAE 60	SAE 600 / SAE 180
TC Test Number / Test Vehicle	Resultant Head No Clip Acc. (g)	HIC (15 ms)	Axial Force Positive/Negative (N)	Calculated Occipital Moment Positive/Negative (Nm)	Mid-Sternum Deflection (mm)	Mid-Sternum VC (m/s)	Resultant Chest No Clip Acc. (g)
48 Km/h Frontal Barrier Crash Test Series							
Driver Side : No Air Bag System Fitted / Air Bag Fitted - No Air Bag Deployment (Not triggered or suppressed)							
TC96-125D 1996 Ford Taurus [N1]	111.3	/ 698	2447 / -816	14 / -30	#N/A / -39.6	#N/A / #N/A / 0.264	51.9 / #N/A
TC97-108D 1997 Hyundai Elantra	109.9	/ 384	2399 / -308	28 / -40	#N/A / -52.7	#N/A / #N/A / 0.643	64.0 / #N/A
Passenger Side : No Air Bag System Fitted / Air Bag Fitted - No Air Bag Deployment (Not triggered or suppressed)							
TC97-108P 1997 Hyundai Elantra	59.1	/ 338	2047 / -162	70 / -28	#N/A / -31.0	#N/A / #N/A / 0.192	66.2 / #N/A
Offset Frontal Deformable Barrier Crash Test Series							
Driver Side : 24 km/h ; 40% Offset Test - No Air Bag System Fitted / Air Bag Fitted - No Air Bag Deployment (Not triggered or suppressed)							
TC96-204D 1996 Dodge Avenger	62.7	/ 206	644 / -597	18 / -11	#N/A / -7.9	#N/A / 0.228 / 0.010	20.2 / #N/A
Driver Side : 32 km/h ; 40% Offset Frontal Test - First-Generation Test / Air Bag Deployment							
TC95-021D 1995 Mazda Miata	116.3	/ 490	4170 / -425	15 / -45	#N/A / -25.9	#N/A / #N/A / 0.204	97.7 / #N/A
Driver Side : 32 km/h ; 40% Offset Test - No Air Bag System Fitted / Air Bag Fitted - No Air Bag Deployment (Not triggered or suppressed)							
TC95-127D 1996 Mazda Miata	46.2	/ 115	809 / -501	24 / -9	#N/A / -12.2	#N/A / #N/A / 0.018	17.1 / #N/A
TC96-202D 1996 Dodge Avenger	55.5	/ 179	790 / -470	10 / -18	#N/A / -9.9	#N/A / 0.500 / 0.014	19.7 / #N/A
Driver Side 40 km/h ; 40% Offset Test - No Air Bag System Fitted / Air Bag Fitted - No Air Bag Deployment (Not triggered or suppressed)							
TC96-205D 1996 Suzuki Esteem	49.2	/ 191	892 / -279	14 / -8	#N/A / -22.9	#N/A / 0.223 / 0.055	23.6 / #N/A
TC96-207D 1996 Chev Cavalier	52.6	/ 131	978 / -235	33 / -7	#N/A / -20.0	#N/A / 0.053 / 0.033	21.5 / #N/A
TC96-209D 1996 Merc Mystique	45.1	/ 135	978 / -355	16 / -14	#N/A / -20.6	#N/A / 0.028 / 0.091	28.8 / #N/A
TC96-210D 1996 Dodge Avenger	54.1	/ 235	527 / -321	16 / -21	#N/A / -13.1	#N/A / 0.227 / 0.018	22.1 / #N/A
Driver Side : 48 km/h ; 40% Offset Test - No Air Bag System Fitted / Air Bag Fitted - No Air Bag Deployment (Not triggered or suppressed)							
TC95-002D 1995 Merc Mystique	48.5	/ 205	488 / -29	15 / -13	-29.1 / #N/A	0.215 / #N/A / 0.164	#N/A / 32.2
Driver Side : 56 km/h ; 40% Offset Test - No Air Bag System Fitted / Air Bag Fitted - No Air Bag Deployment (Not triggered or suppressed)							
TC97-163D 1997 Merc Mystique	42.8	/ 141	593 / -36	24 / -16	-34.1 / #N/A	0.255 / 0.057 / 0.215	#N/A / 31.2
Driver Side : 40% Offset Test - First-Generation Test / Specialty Test : Simulated Bracing Posture							
TC96-212D 1996 Dodge Avenger	68.8	/ 258	3821 / -29	15 / -92	-37.7 / #N/A	0.547 / 0.103 / 0.409	#N/A / 45.5
Front Right Passenger Side : 40 km/h ; 40% Offset Test - No Air Bag System Fitted / Air Bag Fitted - No Air Bag Deployment (Not triggered or suppressed)							
TC96-021P 1996 Toyota Tacoma	26.8	/ 45	816 / -317	32 / -6	#N/A / -24.1	#N/A / #N/A / 0.064	20.1 / #N/A
TC96-207P 1996 Chev Cavalier	24.1	/ 35	866 / -229	33 / -8	#N/A / -22.6	#N/A / #N/A / 0.041	19.3 / #N/A
Front Right Passenger Side : 48 km/h ; 40% Offset Test - No Air Bag System Fitted / Air Bag Fitted - No Air Bag Deployment (Not triggered or suppressed)							
TC95-002P 1995 Merc Mystique	28.4	/ 57	939 / -41	30 / -8	-11.9 / #N/A	0.038 / 0.024 / 0.022	#N/A / 26.2
Front Right Passenger Side : 56 km/h ; 40% Offset Test - No Air Bag System Fitted / Air Bag Fitted - No Air Bag Deployment (Not triggered or suppressed)							
TC97-163P 1997 Merc Mystique	91.0	/ 353	1114 / -270	48 / -10	-14.1 / #N/A	0.044 / 0.030 / 0.029	#N/A / 31.9

Notes :

N1 - No deployment of driver-side airbag. Fault attributed to lack of adequate power in power supply substituted for original vehicle battery.