

H-III6C AND WEIGHTED DUMMIES' RESPONSES IN BOOSTER SEATS—Continued

	Century Breverra Metro without shoulder belt retractor		Century Breverra Metro with shoulder belt retractor	
	H-III6C dummy	Weighted dummy	H-III6C dummy	Weighted dummy
Chest Deflection (mm):				
Average	29.8	38.0	29.0	36.6
Percent CV	5.4	7.9	10.5	5.0
Chest Acceleration (g):				
Average	45.93	48.58	50.15	49.23
Percent CV	10.9	6.9	1.1	7.7
Shoulder Belt Load (N):				
Average	4,486	5,498	4,632	5,770
Percent CV	10.8	7.2	2.3	4.3
Head Excursion (mm):				
Average	494	483	523	492
Percent CV	5.1	3.1	0.7	2.3
Knee Excursion (mm):				
Average	630	652	641	670
Percent CV	2.4	0.8	1.0	3.0

Both the Head Injury Criteria (HIC) 15 and HIC unlimited average values were lower for the weighted dummy than for the H-III6C dummy. The weighted dummy measured average HIC 15 values of 177 and 261 for tests without and with a shoulder belt retractor, respectively, while the H-III6C dummy measured average values of 241 and 303. The weighted dummy measured average HIC unlimited values of 554 and 695 for tests without and with a shoulder belt retractor, respectively, while the H-III6C dummy measured average values of 657 and 733. It is to be noted that both dummies recorded higher HIC averages when a shoulder belt retractor was used. The agency believes this is due to the sudden jerking loads imposed on the dummies when the retractor locks.

Neck tension and neck injury criteria (Nij) averages also were lower for the weighted dummy than for the H-III6C dummy in tests with and without shoulder belt retractors. Without a shoulder belt retractor, the weighted dummy measured an average Nij value of 0.83 and a peak neck tension of 1858 N (418 lbf), while the H-III6C dummy measured an average Nij value of 1.01 and a peak neck tension of 2455 N (552 lbf). With a shoulder belt retractor, both the weighted dummy and the H-III6C dummy measured an average Nij value of 0.93, and their peak neck tension values were similar as well: 2276 N (512 lbf) for the weighted dummy and 2281 N (513 lbf) for the H-III6C dummy. Based on these responses, the agency has tentatively concluded that the weighted dummy will produce either very similar or somewhat lower neck response values than those of the H-III6C dummy.

The weighted dummy also measured a greater average chest deflection than the H-III6C dummy in tests without and with a shoulder belt retractor. In tests without a retractor, the weighted dummy average chest deflection was 8.2 mm greater than the H-III6C dummy average (38.0 mm compared to 29.8 mm). In tests with a retractor, the weighted dummy average chest deflection was 7.6 mm greater than the H-III6C dummy average (36.6 mm compared to 29.0 mm).

The weighted dummy recorded higher shoulder belt loads than the H-III6C dummy. The weighted dummy measured average shoulder belt loads of 5498 N and 5770 N in tests without and with a retractor, respectively, while the H-III6C dummy measured average loads of 4486 N and 4632 N. The agency believes that the weighted dummy's higher average chest deflection and shoulder belt loads can be attributed to greater torso mass.

The weighted dummy average chest acceleration was slightly greater than the H-III6C dummy average in tests without a retractor (48.58 g compared to 45.93 g). However, in tests with a retractor, the H-III6C dummy average chest acceleration was slightly greater than the weighted dummy average (50.15 g compared to 49.23 g).

The weighted dummy average forward head excursion value was 11 mm lower than the H-III6C dummy average value (483 mm compared to 494 mm) in tests without a retractor. In tests with a retractor, the weighted dummy average head excursion value was 31 mm less than the H-III6C dummy average value (492 mm compared to 523 mm).

Conversely, the weighted dummy average knee excursion value was 22

mm greater than the H-III6C dummy average value in tests without a retractor (652 mm compared to 630 mm). In tests with a retractor, the weighted dummy average knee excursion value was 29 mm greater than the H-III6C dummy average value (670 mm compared to 641 mm).

The head kinematics during the sled tests were similar for both dummies. The chins of both dummies exhibited contact into the chests in all tests. Furthermore, both dummies tended to shift into the "pike" position (legs and torso pitching forward) during the rebound response. However, this leg flexion did not seem to have a significant bearing on the dummies' performance.

4. Overall Assessment

NHTSA's evaluation of the two dummies has led the agency to the following tentative conclusions.

The weighted dummy response to thorax impacts and torso flexion tests was slightly different from that of the H-III6C dummy. Accordingly, the agency has tentatively concluded that to better fit the weighted dummy's response within the calibration corridors, the response boundaries for thorax impact and torso flexion would need to be slightly adjusted. However, the agency believes that the performance corridors for the head drop, neck flexion and extension, and knee impact tests would require no alteration.

The weighted dummy response to thorax impacts and torso flexion tests were similar before and after a series of six sled tests using the Standard No. 213 pulse. These tests indicate that the consistency of the dummy's impact