

# INSURANCE INSTITUTE FOR HIGHWAY SAFETY

## NEWS RELEASE

March 6, 2005

### **NEW RESULTS OF SIDE IMPACT CRASH TESTS: 14 OF 16 SMALL CARS ARE RATED POOR IN TEST THAT SIMULATES CRASH WITH SUV; NONE OF THE 16 IS GOOD**

ARLINGTON, VA — Most small car designs earned poor ratings in side impact crash tests recently conducted by the Insurance Institute for Highway Safety. Only the Chevrolet Cobalt and Toyota Corolla, both equipped with optional side airbags with head protection, performed well enough to earn the Institute's second highest rating of acceptable. Without the optional airbags, the Cobalt



**The Dodge Neon is one of 14 small cars that earned poor ratings in the Institute's side impact crash test.**

and Corolla are rated poor for side impact protection.

Another 12 small cars also earned poor ratings: Dodge Neon, Ford Focus, Hyundai Elantra, Kia Spectra, Mazda 3, Mitsubishi Lancer, Nissan Sentra, Saturn ION (tested with and without side airbags), Suzuki Forenza, Suzuki Aerio, and Volkswagen New Beetle.

Three more small cars will be tested in side impacts later this year. The Mini Cooper and Subaru Impreza will

have new design features that are intended to improve side impact protection. The Honda Civic will be a completely redesigned model.

"These side impact results are similar to the results in 1997 when the Institute first rated small cars in the frontal offset crash test," says Institute

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chief operating officer Adrian Lund. "Back then, no small car earned a good frontal crash test rating. Now almost every small car earns a good rating in the frontal test. As manufacturers redesign their vehicles, we expect that small cars will get better in the side impact test too."

In the Institute's side impact test, a moving deformable barrier strikes the driver side of a passenger vehicle at 31 mph. The barrier weighs 3,300 pounds and has a front end that is shaped to simulate the front end of a typical pickup or SUV. In each side-struck vehicle are two instrumented dummies the size of a small (5th percentile) woman, one positioned in the driver seat and one in the rear seat behind the driver.

**New frontal test results:** The Institute also conducted frontal offset crash tests of the Cobalt and Spectra. The Cobalt was tested because it's a new design. Kia requested the test of the Spectra after modifying the design of the airbag system. Before this change, the Spectra was rated poor in the frontal test.

In the frontal offset test, the vehicle strikes a deformable barrier at 40 mph. The vehicle is offset, so only 40 percent of the front end strikes the barrier on the driver side. In offset tests a smaller area of the front end must manage the crash energy, compared with full-width tests. Injury measures are taken from a dummy representing an average-size male (50th percentile) positioned in the driver seat.

**Cobalt and Corolla are acceptable with side airbags:** Side curtain-style airbags designed to protect the heads of front- and rear-seat occupants are optional on these vehicles (front seat-mounted torso airbags are included with the airbag option on the Corolla). When side airbags are optional, the Institute tests without the option and will conduct a second test with the optional airbags if the manufacturer requests it and reimburses the Institute for the cost of the vehicle. General Motors requested second tests of the Cobalt and Saturn ION. Toyota requested a second test of the Corolla.

"With the curtain airbags the heads of the dummies in the front and rear seats of the Cobalt and Corolla were cushioned, and head injury measures were low," says Lund. "Head injuries are a factor in many deaths in real-world side impact crashes, and side airbags designed to protect the head make a big difference."

In the Cobalt, forces on the driver dummy's torso indicated the possibility of rib fractures or internal organ injuries. In the Corolla, there was the possibility of a fractured pelvis. Protection for the rear passenger was good in both cars.

"GM and Toyota still need to beef up the side structures to improve their side impact ratings from acceptable to good," says Lund.

In the Institute's frontal offset test, the Cobalt and Corolla are rated good and "best picks." The Cobalt's seat/head restraints are rated good based on a test that simulates a rear impact, and the Corolla's are poor. Taken together with ratings in the side impact test, the Cobalt and Corolla equipped with optional side airbags now are the highest rated small cars overall in the Institute's crashworthiness ratings.

**Neon is worst performer:** The Neon has "major problems beginning with its structure. This car is a disaster," Lund says. "The structure is poor, and both dummies' heads were hit by the barrier during the crash test. High forces were recorded on the head, torso, and pelvis of the driver dummy. If this had been a real driver in a real crash, it's likely it wouldn't have been survivable."

While combination head and torso side airbags for the front occupants are available on the Neon, DaimlerChrysler did not ask for a second test with the airbags.

"With a poor structure, the company probably didn't think side airbags would make a big difference in the Neon's performance," Lund says. Pointing to the Neon's marginal rating in the Institute's frontal test, he adds that "if safety is a priority, the Neon is a small car to be avoided."

**Vehicles need good structure as well as side airbags:** Four of the vehicles that earned poor side crashworthiness ratings (Elantra, Forenza, New Beetle, and Spectra) are equipped with standard side airbags with head protection. These cars are rated good or acceptable for head injury measures recorded on the driver dummies. The Saturn ION with optional side airbags also earned an acceptable rating for driver head injury. However, the structures of all of these vehicles allowed too much intrusion during the test. Forces recorded on the driver dummies' torsos and/or pelvic areas were high.

"Side airbags can protect the head, but if the vehicle structure doesn't hold up well then serious injuries to other body regions still can occur," Lund points out. "With better structures along with the side airbags, the performances of these vehicles would improve."

**Side airbags are reducing risks in real-world crashes:** Institute research shows that side airbags with head protection are reducing deaths by about 45 percent among drivers of cars struck on the driver side. Before the availability of head-protecting airbags, there was virtually nothing to prevent people's heads from being struck by intruding vehicles or rigid objects like trees or poles in serious side impacts. Side airbags that protect the chest and abdomen, but not the head, also are reducing deaths but are less effective (about a 10 percent reduction in deaths). Plus well-designed doors with appropriate padding can provide good protection for the chest and abdomen.

Head-protecting airbags are necessary for effective side impact protection, but torso airbags are not. For example, the Corolla the Institute tested was equipped with torso airbags. The Cobalt wasn't. Both had head-protecting curtain airbags. Both earned acceptable ratings.

**Cobalt is 'best pick' in frontal test:** This is General Motors' new entry in the small car category. It's a big improvement over the Chevrolet Cavalier, which still is being sold. The Cavalier is rated poor for frontal crashworthiness.

"The Cobalt's structure held together very well in the frontal test," Lund says. The driver's survival space was maintained, and there was minimal to moderate intrusion into the footwell area. The dummy's movement was well controlled during the crash, and all injury measures were low. The Cobalt is rated good and earned the added designation of "best pick."

**Spectra's frontal crash performance improves:** When the Institute tested the Kia Spectra last year, it was the first vehicle since 2001 to earn a poor rating in the frontal test. Among other factors, forces on the dummy's head were high when it bottomed out the airbag and then struck the door frame. Kia redesigned the driver airbag and asked the Institute to test the Spectra again.

"In this new test, the Spectra's performance was better but not improved enough to earn a good rating," Lund points out. "Another high head acceleration occurred when the dummy's head bottomed out the airbag but, overall, injury measures were lower, dummy movement was somewhat better controlled, and the Spectra moves from a poor rating to acceptable" (the improved rating applies to Spectras built after January 2005).

**How vehicles are evaluated in the side impact test:** Each vehicle's overall side evaluation is based on injury measures recorded on two instrumented SID-IIIs dummies, assessment of head protection countermeasures, and the vehicle's structural performance during the impact. Injury measures obtained from the two dummies, one in the driver seat and the other in the rear seat behind the driver, are used to determine the likelihood that the driver and/or passenger would have sustained serious injury to various body regions. The movements and contacts of the dummies' heads during the crash also are evaluated. This assessment is more important for seating positions without head-protecting airbags which, assuming they perform as intended, should prevent injurious head contacts. Structural performance is based on measurements indicating the amount of B-pillar intrusion into the occupant compartment. Some intrusion into the compartment is inevitable in serious side impacts, but any intrusion that does occur should be uniform both horizontally and vertically and shouldn't seriously compromise the driver or passenger space.

**Institute's frontal test complements government test:** Each vehicle's overall frontal evaluation is based on results of a 40 mph frontal offset test into a deformable barrier. The evaluation is based on three aspects of performance — measurements of intrusion into the occupant compartment, injury measures from a Hybrid III dummy positioned in the driver seat, and analysis of slow-motion film to assess how well the restraint system controlled dummy movement during the test.



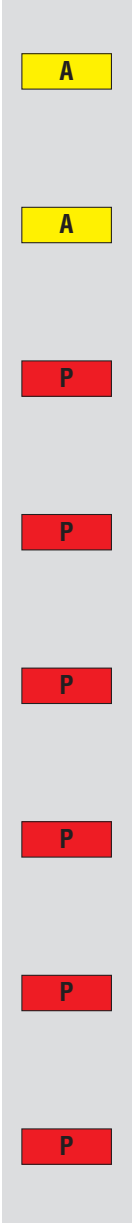






























The federal government has been testing new passenger vehicles in 35 mph full-front crash tests since 1978. This New Car Assessment Program has been a major contributor to crashworthiness improvements, in particular improved restraint systems in new passenger vehicles. The Institute's offset tests, conducted since 1995, involve 40 percent of a vehicle's front end hitting a deformable barrier at 40 mph. This test complements the federal test involving the full width of the front end hitting a rigid barrier. Both tests are contributing to improvements in crashworthiness, in particular improved crumple zones and safety cages.

The same 40 mph offset crash test is used to evaluate new cars by the European Union in cooperation with motor clubs, by an Australian consortium of state governments and motor clubs, and by a government-affiliated organization in Japan.

**End of 6-page news release on small car crashworthiness  
3-page attachment: crashworthiness ratings of 16 small cars  
VNR on March 7, 2005 at 10-10:30 am EST (C) IA 5/Trans. 19;  
and again at 1-1:30 pm EST (C) IA 5/Trans. 19; fed in rotation**

**For more information go to [www.iihs.org](http://www.iihs.org)**

ATTACHMENT: CRASHWORTHINESS EVALUATIONS, P.1 OF 3

Small cars	FRONT EVALUATION	SIDE EVALUATION	REAR CRASH PROTECTION
<p><b>CHEVROLET COBALT</b>  <b>TESTED WITH OPTIONAL SIDE AIRBAGS</b>                      FRONT: 2005 models; test vehicle = 2,813 lbs.                      SIDE: 2005 models; test vehicle = 2,826 lbs.                      REAR: 2005 models</p>	 	 	
<p><b>TOYOTA COROLLA</b>  <b>TESTED WITH OPTIONAL SIDE AIRBAGS</b>                      FRONT: 2003-05 models mfg. after Dec. 2002; test vehicle = 2,582 lbs.                      SIDE: 2005 models; test vehicle = 2,601 lbs.                      REAR: 2005 models</p>	 		
<p><b>CHEVROLET COBALT</b>  <b>TESTED WITHOUT OPTIONAL SIDE AIRBAGS</b>                      FRONT: 2005 models; test vehicle = 2,813 lbs.                      SIDE: 2005 models; test vehicle = 2,813 lbs.                      REAR: 2005 models</p>	 		
<p><b>VOLKSWAGEN NEW BEETLE</b>  <b>TESTED WITH STANDARD SIDE AIRBAGS</b>                      FRONT: 1998-2005 models mfg. after June 1998; test vehicle = avg. 2,762 lbs.                      SIDE: 2004-05 models; test vehicle = 2,853 lbs.                      REAR: 2004-05 models</p>	 		 depends on seat 
<p><b>SUZUKI AERIO</b>  <b>TESTED WITH STANDARD SIDE AIRBAGS</b>                      FRONT: 2002-05 models; test vehicle = 2,694 lbs.                      SIDE: 2005 models; test vehicle = 2,720 lbs.                      REAR: 2002-05 models</p>	 		
<p><b>MITSUBISHI LANCER</b>  <b>TESTED WITHOUT OPTIONAL SIDE AIRBAGS</b>                      FRONT: 2002-05 models; test vehicle = 2,751 lbs.                      SIDE: 2002-05 models; test vehicle = 2,736 lbs.                      REAR: 2002-05 models</p>	 		
<p><b>MAZDA 3</b>  <b>TESTED WITHOUT OPTIONAL SIDE AIRBAGS</b>                      FRONT: 2004-05 models; test vehicle = 2,853 lbs.                      SIDE: 2005 models mfg. after Aug. 2004; test vehicle = 2,800 lbs.                      REAR: 2004-05 models</p>	 		
<p><b>FORD FOCUS</b>  <b>TESTED WITHOUT OPTIONAL SIDE AIRBAGS</b>                      FRONT: 2000-05 models; test vehicle = 2,707 lbs.                      SIDE: 2000-05 models; test vehicle = 2,707 lbs.                      REAR: 2001-05 models</p>			

NEWLY TESTED

 GOOD  
 ACCEPTABLE  
 MARGINAL  
 POOR

ORDER OF VEHICLES REFLECTS RATINGS IN FRONT, SIDE, AND REAR TESTS. FOR MORE DETAILED CRASHWORTHINESS EVALUATIONS OF SMALL CARS AND EVALUATIONS OF OTHER GROUPS OF VEHICLES, GO TO WWW.IIHS.ORG.

**FRONTAL RATINGS** are based on performance in a 40 mph frontal offset crash test into a deformable barrier. **CAUTION:** Frontal ratings cannot be compared across vehicle type and weight categories because the kinetic energy involved in the frontal test depends on the speed and weight of the test vehicle, and the crash is more severe for heavier vehicles. Given equivalent frontal ratings for heavier and lighter vehicles, the heavier vehicle typically will offer better protection in real-world crashes.

**SIDE RATINGS** are based on performance in a crash test in which the side of the vehicle is struck by a moving deformable barrier with a front end that represents the front of a typical SUV or pickup. The moving barrier strikes the vehicle at 31 mph in a perpendicular impact. **NOTE:** Side ratings can be compared across vehicle type and weight categories while frontal ratings cannot.

**REAR CRASH PROTECTION RATINGS** are based on a two-step evaluation. In the first step restraint geometry is rated. Seats with good or acceptable geometric ratings then are subject to a dynamic test. Seats with head restraints rated marginal or poor, based on geometry, aren't tested because they cannot protect taller occupants.

ATTACHMENT: CRASHWORTHINESS EVALUATIONS, P.2 OF 3















Small cars	FRONT EVALUATION	SIDE EVALUATION	REAR CRASH PROTECTION
<p><b>HYUNDAI ELANTRA</b>  <b>TESTED WITH STANDARD SIDE AIRBAGS</b>                      FRONT: 2004-05 models; test vehicle = 2,894 lbs.                      SIDE: 2001-05 models; test vehicle = 2,892 lbs.                      REAR: 2001-05 models</p>	G	P	P
<p><b>TOYOTA COROLLA</b>  <b>TESTED WITHOUT OPTIONAL SIDE AIRBAGS</b>                      FRONT: 2003-05 models mfg. after Dec. 2002; test vehicle = 2,582 lbs.                      SIDE: 2003-05 models; test vehicle = 2,584 lbs.                      REAR: 2005 models</p>	BEST PICK frontal G	P	P
<p><b>KIA SPECTRA</b>  <b>TESTED WITH STANDARD SIDE AIRBAGS</b>                      FRONT: 2005 models mfg. after Jan. 2005; test vehicle = 2,864 lbs.                      SIDE: 2004-05 models mfg. after Nov. 2003; test vehicle = 2,870 lbs.                      REAR: 2005 models</p>	A	P	A
<p><b>SUZUKI FORENZA</b>  <b>TESTED WITH STANDARD SIDE AIRBAGS</b>                      FRONT: 2004-05 models; test vehicle = 2,853 lbs.                      SIDE: 2005 models; test vehicle = 2,822 lbs.                      REAR: 2004-05 models</p>	A	P	P
<p><b>SUZUKI RENO</b>                      FRONTAL EVALUATION APPLIES TO 2005 MODELS</p>			
<p><b>NISSAN SENTRA</b>  <b>TESTED WITHOUT OPTIONAL SIDE AIRBAGS</b>                      FRONT: 2000-05 models; test vehicle = 2,650 lbs.                      SIDE: 2000-05 models; test vehicle = 2,610 lbs.                      REAR: 2002-05 models</p>	A	P	P
<p><b>SATURN ION</b>  <b>TESTED WITH OPTIONAL SIDE AIRBAGS</b>                      FRONT: 2005 models; test vehicle = 2,787 lbs.                      SIDE: 2003-05 models; test vehicle = 2,767 lbs.</p>	A	P	to be tested later in 2005
<p><b>SATURN ION</b>  <b>TESTED WITHOUT OPTIONAL SIDE AIRBAGS</b>                      FRONT: 2005 models; test vehicle = 2,787 lbs.                      SIDE: 2003-05 models; test vehicle = 2,747 lbs.</p>	A	P	to be tested later in 2005
<p><b>DODGE NEON</b>  <b>TESTED WITHOUT OPTIONAL SIDE AIRBAGS</b>                      FRONT: 2000-05 models; test vehicle = 2,659 lbs.                      SIDE: 2000-05 models; test vehicle = 2,654 lbs.                      REAR: 2001-05 models</p>	M	P	P
<p><b>DODGE SRT-4</b>                      FRONT AND SIDE EVALUATIONS APPLY TO 2003-05 MODELS</p>			

NEWLY TESTED

G GOOD  
 A ACCEPTABLE  
 M MARGINAL  
 P POOR



**ATTACHMENT: CRASHWORTHINESS EVALUATIONS, P.3 OF 3**

Small cars	FRONT EVALUATION	SIDE EVALUATION	REAR CRASH PROTECTION
<p align="center"><b>SUBARU IMPREZA</b> FRONT: 2002-05 models mfg. after Sept. 2001; test vehicle = 2,981 lbs. REAR: 2004-05 models</p>	 	<div style="border: 1px solid black; padding: 5px; width: fit-content; margin: auto;">design changes under way; to be tested late 2005</div>	 depends on model 
<p align="center"><b>MINI COOPER</b> FRONT: 2002-05 models; test vehicle = 2,496 lbs. REAR: 2002-05 models</p>	 	<div style="border: 1px solid black; padding: 5px; width: fit-content; margin: auto;">design changes under way; to be tested late 2005</div>	
<p align="center"><b>HONDA CIVIC</b> FRONT: 2001-05 models; test vehicle = 2,507 lbs. REAR: 2003-05 models</p>	 	<div style="border: 1px solid black; padding: 5px; width: fit-content; margin: auto;">design changes under way; to be tested late 2005</div>	
<p align="center"><b>VOLKSWAGEN JETTA</b> FRONT: late 1999-2005 models mfg. before Nov. 2004 test vehicle = 2,932 lbs.</p>	 	<div style="border: 1px solid black; padding: 5px; width: fit-content; margin: auto;">new Jetta to be introduced spring 2005; it will be a midsize car</div>	
<p align="center"><b>CHEVROLET CAVALIER</b> FRONT: 1995-2005 models; test vehicle = 2,716 lbs. REAR: 2001-05 models</p>		<div style="border: 1px solid black; padding: 5px; width: fit-content; margin: auto;">dropped after 2005 model; replaced by Cobalt</div>	

	<b>GOOD</b>
	<b>ACCEPTABLE</b>
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