



## NEWS RELEASE

December 17, 2008

### **NEW CRASH TESTS OF SMALL CARS: GOOD RATINGS IN FRONTAL TESTS BUT MANY MODELS NEED BETTER SIDE AND REAR CRASH PROTECTION**

ARLINGTON, VA — Most new small cars now earn good ratings in frontal crash tests but not when it comes to side and rear crashes. The Insurance Institute for Highway Safety recently completed front, side, and rear tests of seven 2009 model small cars: Chevrolet HHR, Chrysler PT Cruiser, Ford Focus, Hyundai Elantra, Saturn Astra, Suzuki SX4, and Toyota Matrix. All earn the highest rating of good for occupant protection in frontal crashes. Only the SX4 and Matrix and its twin Pontiac Vibe also earn good ratings for protection in side crashes (see attached ratings). Among seat/head restraints evaluated, only those in the Focus earn a good rating for protection in rear impacts. The Institute also tested the Mini Cooper, a minicar that earns good ratings for front and rear crashworthiness but not for side protection.

"Automakers have made big improvements to small cars to better protect people in frontal crashes," says Institute senior vice president Joe Nolan. "They've also added stronger structures and standard head-protecting side airbags to help in side crashes, which are tougher on smaller, lighter cars."

Eleven of the 21 current small car models the Institute has rated earn good ratings for side protection. "This is a huge improvement from our last comprehensive round of small car crashworthiness evaluations in 2006," Nolan says. "Then only 3 of the 19 tested earned a good rating in the side evaluation. Most earned a poor rating."

The Institute's side test is especially challenging for small cars because the barrier that strikes the test vehicle represents the front end of a pickup truck or SUV. Side airbags designed for head protection are crucial because the barrier crashes into the side of the car right at the head level of the two dummies that are positioned in the driver seat and in the rear seat behind the driver.

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"Side airbags were mostly optional in the 2006 round of small car tests," Nolan says. "A major change is that side airbags are standard in all of the seven small cars we tested this time around."

Small cars have grown especially popular as gasoline prices fluctuate and consumers become more conservation-minded. Nolan cautions that even though current models do a better job of protecting people in front, side, and rear crashes than earlier ones, small cars inherently afford less crash protection than bigger, heavier vehicles. "There's no escaping the laws of physics," Nolan says. "People in larger, heavier cars fare better in crashes with other vehicles and in single-vehicle crashes than people in smaller ones."

**PT Cruiser earns poor ratings for side, rear protection:** The Chrysler PT Cruiser is the only small car in the recent test series to earn poor marks in both side and rear evaluations. In the side test, measures recorded on the driver dummy indicate that in a real-world crash of similar severity, rib fractures and internal organ injuries would be likely, along with a possible pelvic fracture. The rear passenger dummy's head contacted the C-pillar during the test because this car doesn't have rear-seat side airbags. Measures recorded on the dummy indicate that serious neck injuries and a fractured pelvis would be possible in a crash of this severity.

The PT Cruiser's seat/head restraints are the only ones the Institute tested this time around that earn the lowest rating of poor for occupant protection in rear crashes. The seat/head restraint combinations in the Chevrolet HHR and Suzuki SX4 earn the next lowest rating of marginal. Looking at the larger group of 21 current small car models the Institute has rated, the PT Cruiser still has the worst seat/head restraint rating.

"The PT Cruiser doesn't offer the same crash protection level as other small cars," Nolan says. "For consumers who want to drive small cars, there are many good alternatives to the PT Cruiser, including the six *TOP SAFETY PICK* winners the Institute announced last month. There are lots of good choices, too, among midsize and large cars."

*TOP SAFETY PICK* recognizes vehicles that do the best job of protecting people in front, side, and rear crashes based on good ratings in Institute tests. Winners also must have electronic stability control (ESC), which research shows significantly

reduces crash risk. The 2009 small car winners are the Honda Civic 4-door (except the Si model), Mitsubishi Lancer, and Toyota Corolla, all with optional ESC, and the Scion xB, Subaru Impreza, and Volkswagen Rabbit 4-door, all with standard ESC.

**ESC should be standard:** Among the small cars in this round of tests, only the Chevrolet HHR and Pontiac Vibe have standard ESC. It isn't available at all on the PT Cruiser and optional on the rest, including the Vibe's twin Toyota Matrix. ESC helps reduce rollovers, especially fatal single-vehicle ones. When ESC senses a vehicle is becoming unstable, it automatically engages to help a driver regain control and put the vehicle back in the intended travel direction. ESC lowers fatal rollover crash risk by as much as 70 percent. "Cars aren't involved in rollovers as often as SUVs and pickups, but when they do roll the consequences can be deadly," Nolan notes. "The smallest cars that most need this crash avoidance feature often don't have it."

**Rear crashworthiness needs improving:** Many automakers haven't paid as much attention to protection in rear crashes, compared with front and side, Nolan points out. Good seat/head restraints are key to preventing whiplash injuries. Neck sprain or strain is the most frequently reported crash injury in US insurance claims. When a vehicle is struck in the rear and driven forward, its seats accelerate occupants' torsos forward. Unsupported, the head will lag behind the forward torso movement, and the differential motion causes the neck to bend and stretch. The higher the torso acceleration, the more sudden the motion, the higher the forces on the neck, and the more likely a neck injury is to occur. Keeping the head and torso moving together is crucial to reducing whiplash injury risk. To accomplish this, the geometry of a head restraint has to be adequate — high enough to be near the back of the head. Then the seat structure and stiffness characteristics must be designed to work in concert with the head restraint to support an occupant's neck and head, accelerating them with the torso as the vehicle is pushed forward.

"In stop and go commuter traffic, you're more likely to get in a rear-end collision than any other kind of crash," Nolan says. "It's not a major engineering feat to design seats and head restraints that afford good protection in these common crashes." For example, when Toyota redesigned the Corolla for 2009 it incorporated active head restraints to help guard against whiplash injuries. Active head restraints are designed to move closer to the backs of occupants' heads in rear-end crashes.

**Mini Cooper results:** This minicar was redesigned for the 2007 model year, and it earned a good rating for frontal crash protection in a previous test. New side and rear tests were conducted to assess further design changes made for the most recent models. This minicar earns a good rating for rear protection and an acceptable rating for side protection. Measures recorded on the driver dummy indicate that a fractured pelvis would be possible in a side crash of the same severity, but there's low risk that other significant injuries would occur to the driver. For the rear passenger, rib fractures and/or internal organ injuries would be possible. ESC is newly standard for the 2009 model year.

**How vehicles are evaluated:** The Institute's frontal crashworthiness evaluations are based on results of 40 mph frontal offset crash tests. Each vehicle's overall evaluation is based on measurements of intrusion into the occupant compartment, injury measures recorded on a Hybrid III dummy in the driver seat, and analysis of slow-motion film to assess how well the restraint system controlled dummy movement during the test. Side evaluations are based on performance in a crash test in which the side of a vehicle is struck by a barrier moving at 31 mph. The barrier represents the front end of a pickup or SUV. Ratings reflect injury measures recorded on two instrumented SID-IIIs dummies, assessment of head protection countermeasures, and the vehicle's structural performance during the impact.

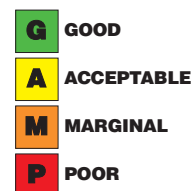
Rear crash protection is rated according to a two-step procedure. Starting points for the ratings are measurements of head restraint geometry — the height of a restraint and its horizontal distance behind the back of the head of an average-size man. Seat/head restraints with good or acceptable geometry are tested dynamically using a dummy that measures forces on the neck. This test simulates a collision in which a stationary vehicle is struck in the rear at 20 mph. Seats without good or acceptable geometry are rated poor overall because they can't be positioned to protect many people.

**End 4-page news release on crashworthiness ratings of small cars**  
**Attachment: front, side, and rear crashworthiness evaluations**  
**VNR on 12/17/08 at 10:30-11 am EST (C) AMC 3/Trans. 5 (dl3800H)**  
**repeat at 1:30-2 pm EST (C) AMC 3/Trans. 5 (dl3800H); dedicated**

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

ATTACHMENT: CRASHWORTHINESS EVALUATIONS, p.1 of 1

	FRONT EVALUATION	SIDE EVALUATION	REAR CRASH PROTECTION	ELECTRONIC STABILITY CONTROL
<b>Small cars</b>				
<b>SUZUKI SX4</b> WITH FRONT AND REAR HEAD CURTAIN AIRBAGS & FRONT TORSO AIRBAGS front, side, and rear: 2007-09 models	<b>G</b>	<b>G</b>	<b>M</b>	optional
<b>TOYOTA MATRIX PONTIAC VIBE</b> WITH FRONT AND REAR HEAD CURTAIN AIRBAGS & FRONT TORSO AIRBAGS front and side: 2009 models	<b>G</b>	<b>G</b>	not tested	opt: Matrix; std: Vibe
<b>FORD FOCUS</b> WITH FRONT AND REAR HEAD CURTAIN AIRBAGS & FRONT TORSO AIRBAGS front, side, and rear: 2008-09 models	<b>G</b>	<b>A</b>	<b>G</b>	opt: 2009; n/a: 2008
<b>CHEVROLET HHR</b> WITH FRONT AND REAR HEAD CURTAIN AIRBAGS (STANDARD IN 2009 MODELS; OPTIONAL IN 2006-08 MODELS) front, side, and rear: 2006-09 models	<b>G</b>	<b>A</b>	<b>M</b>	std: 2009; opt: 2008; n/a: 2006-07
<b>HYUNDAI ELANTRA</b> WITH FRONT AND REAR HEAD CURTAIN AIRBAGS & FRONT TORSO AIRBAGS front, side, and rear: 2007-09 models	<b>G</b>	<b>M</b>	<b>A</b>	optional
<b>SATURN ASTRA</b> WITH FRONT AND REAR HEAD CURTAIN AIRBAGS & FRONT TORSO AIRBAGS front, side, and rear: 2008-09 models	<b>G</b>	<b>M</b>	<b>A</b>	optional
<b>CHRYSLER PT CRUISER</b> WITH FRONT COMBINATION HEAD AND TORSO AIRBAGS (STANDARD IN 2008-09 MODELS; OPTIONAL IN 2006-07 MODELS) front, side, and rear: 2006-09 models	<b>G</b>	<b>P</b>	<b>P</b>	unavailable
<b>Minicar</b>				
<b>MINI COOPER</b> WITH FRONT AND REAR HEAD CURTAIN AIRBAGS & FRONT TORSO AIRBAGS front: 2007-09 models side: 2008-09 models (mfg. after July 2008) rear: 2009 models	<b>G</b>	<b>A</b>	<b>G</b>	std: 2009; opt: 2007-08



**ORDER OF THE VEHICLES REFLECTS RATINGS IN FRONT, SIDE, AND REAR TESTS FOR MORE DETAILED CRASHWORTHINESS EVALUATIONS, 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 subjected to a dynamic test. Seats with head restraints rated marginal or poor, based on geometry, aren't tested because they cannot protect taller occupants.