Status Report

Insurance Institute for Highway Safety | Highway Loss Data Institute

Shop with confidence

More BEST BET boosters make buying one easier

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When IIHS began its booster seat ratings in 2008, most models failed to consistently provide good belt fit — the main purpose of a booster. This year, all new models evaluated by the Institute provide good or acceptable fit for typical 4 to 8 year-olds in most cars, minivans and SUVs.

Out of 23 new models evaluated, 20 earn the highest rating of BEST BET, meaning they are likely to provide good belt fit for a 4- to 8-year-old child in almost any car, minivan or SUV. An additional three models are rated GOOD BETs, meaning they provide acceptable fit in most vehicles. There are no new models in the Not Recommended category, nor are there any with the Check Fit designation, which identifies seats that may work for some children in some vehicles.

"Our ratings have succeeded in getting child seat manufacturers to prioritize belt fit when they design boosters," says Jessica Jermakian, IIHS senior research scientist. "The large number of BEST BETs on the market now makes it easier for parents to shop for a seat that will work for their child in virtually any vehicle."

Booster seats are designed for children who have outgrown harness-equipped restraints. Children ages 4-8 are 45 percent less likely to sustain injuries in crashes if they are in boosters than if they are using safety belts alone. Boosters serve as an important bridge until children are large enough for vehicle safety belts to fit properly by themselves. For some kids, that's not until age 12.

Until then, booster seats should be used to make safety belts fit correctly. Correct fit means the belt lies flat across a child's upper thighs, not across the soft abdomen, and the shoulder belt crosses snugly over the middle of a child's shoulder.

IIHS began issuing booster ratings after finding that many seats didn't consistently provide good belt fit (see *Status Report*, Oct. 1, 2008, at iihs.org). The ratings are based on evaluations of how three-point lap and shoulder belts fit a child-size test dummy seated in the booster on a stationary test fixture. Measurements are taken under four conditions spanning the range of safety belt configurations in passenger vehicles. The evaluations focus on belt fit and don't involve crash tests.

In addition to providing useful information for consumers, the ratings help manufacturers understand how to design seats for optimal fit. Most now use the Institute's

There are 23 new models for 2015, including 20 BEST BET boosters, and 3 GOOD BETs. There are no new models in the Check Fit or Not Recommended categories.

BEST BET

BubbleBum (backless)
Chicco KidFit (backless mode)
Chicco KidFit (highback mode)
Diono Cambria (backless mode)
Diono Cambria (highback mode)
Eddie Bauer Storage Booster (backless)
Evenflo Advanced Transitions (backless mode)
Evenflo Advanced Transitions (highback mode)
Evenflo Platinum Evolve (backless mode)
Evenflo Platinum Evolve (highback mode)
Graco Atlas 65 (highback)
Graco Tranzitions (backless mode)
Graco Tranzitions (highback mode)
Harmony Defender 360 (backless mode)
Harmony Defender 360 (highback mode)
Jané Montecarlo R1 (highback)
Lil Fan Box Seat (backless)
Little Tikes Highback Booster (backless mode)
Little Tikes Highback Booster (highback mode)
Little Tikes Backless Booster (backless)

GOOD BET

Cybex Solution M-Fix (highback)
Cybex Solution Q2-Fix (highback)
Safety 1st Grow and Go (highback)

The dual-use Chicco KidFit, new for 2015, is an IIHS BEST BET when used as either a highback or backless booster. See the full list of ratings for 2015 and carryover models at iihs.org/boosters.

The least expensive booster in the new crop is the Little Tikes Backless Booster, available at Walmart for $13.

Middle: An IIHS engineer measures belt fit.

Bottom: Some newer combination seats come with a place to stow harness straps when using the seat as a booster. This Graco Atlas 65 has a compartment behind the padding for that purpose.

evaluation protocol in their design process, and many have traveled to the IIHS Vehicle Research Center in Ruckersville, Va., to try out their prototypes on the test fixture.

The Institute's online ratings (iihs.org/boosters) include many models that were evaluated in past years and are still on the market. Including the 2015 crop, as well as carryover models, there currently are 82 BEST BETs and eight GOOD BETs. Six boosters are Not Recommended, and 31 are in the Check Fit category.

"We hope manufacturers will move quickly to redesign or end production of the Not Recommended boosters and also phase out Check Fit seats and replace them with BEST BETs that perform their job reliably," Jermakian says.

Variety of options

Top-rated boosters come in a variety of forms. Highback boosters have built-in shoulder belt guides, and their additional structure often makes it easier for children transitioning out of harness-equipped restraints to sit properly. Many manufacturers tout enhanced side impact protection on their highback seats, though IIHS doesn't evaluate those claims.

Backless boosters come with an attached clip to position the shoulder belt. It's important to look at how the shoulder belt fits on a child and to use the clip if it doesn't fall across the middle of the shoulder.

The new seats for 2015 include seven dual-use models. Each of them counts twice in the evaluations, with a separate rating for highback and backless modes.

As in earlier years, several are combination or 3-in-1 seats, which start out as harness-equipped restraints and can be converted to boosters when the child outgrows the harness.

One recent improvement to combination and 3-in-1 seats is the addition of a place to stow harness straps when they are not in use. This allows parents to use the seat as a booster without having to remove the harness completely.

The least expensive booster in the new crop is the Little Tikes Backless Booster, available at Walmart for $13. The Evenflo Platinum Evolve, a 3-in-1 seat that can be used as a forward-facing restraint, highback booster and backless booster, and the Safety 1st Grow and Go, which can be used as a rear-facing restraint, forward-facing restraint and a booster, each sell for about $170.

New names, new designs

One big manufacturer, Britax, has no new or redesigned seats this year, but the names of its existing models have changed. The Frontier 90 highback is now the Frontier Clicktight, the Pinnacle 90 highback is the Pinnacle Clicktight, and the Pioneer 70 highback is simply the Pioneer. All three are BEST BETs. The Britax Parkway SG and Parkway SGL, both dual-use boosters that are BEST BETs in highback mode and Check Fit in backless mode, also are carried over.

The BubbleBum, an inflatable booster designed for portability, has a redesigned lap-belt guide intended to be easier to use. Like the earlier version, which still is on the market, the new one is a BEST BET. ■

Rear underride guard mandate may extend to more trucks under NHTSA proposal

The federal government has outlined a possible plan to close a deadly loophole in truck safety rules by requiring rear underride guards on single-unit trucks.

Until now, the guards — steel bars that hang from the back of trucks to prevent a passenger vehicle from moving underneath in a crash — have been mandated only on semitrailers and certain single-unit trucks involved in interstate commerce. Most single-unit trucks aren't subject to the requirement.

Single-unit trucks make up nearly three-quarters of the registered heavy vehicle fleet. They include many types of trucks designed for specific tasks, including dump trucks, garbage haulers, local delivery trucks and concrete mixers.

The National Highway Traffic Safety Administration (NHTSA) estimates that underride guards on single-unit trucks would save five lives per year and prevent 30 injuries. Institute researchers say that estimate is low.

"Requiring rear underride guards is an important step that would reduce fatalities in large truck crashes," says Matthew Brumbelow, an IIHS senior research engineer. "We hope NHTSA will reconsider some of the assumptions it used to calculate how many lives could be saved before deciding whether or not to proceed with this regulation."

Specifically, NHTSA uses an estimate of the proportion of fatal crashes that involve severe underride that was derived from interviews taken long after the crash and thus may not be accurate, Brumbelow says. Also, in looking at how many of those fatalities could have been prevented by guards, the agency doesn't take into account crashes with impact speeds over 35 mph. IIHS crash tests at 35 mph suggest the guards would likely hold up at higher speeds.

In an official comment to NHTSA, IIHS took issue with the agency's estimate that a requirement for single-unit trucks would cost up to nearly $2,000 per truck. This calculation is based on weight estimates of underride guards that are much higher than actual measurements the Institute has taken.

The plan, which would require underride guards on single-unit trucks with a gross vehicle weight rating of 10,000 pounds or more, was laid out in an advance notice of proposed rulemaking issued in July. NHTSA also is proposing to require the same reflective tape currently required on semitrailers, an idea IIHS supports. NHTSA estimates that requirement could save as many as 14 lives per year by making trucks easier to see and thereby preventing crashes.

This notice is the first of two steps the agency said it would take when it granted a petition to consider more stringent underride rules last year (see *Status Report*, Oct. 9, 2014, at iihs.org).

Next, NHTSA is expected to propose an upgrade to the existing requirements for all truck underride guards, including those on semitrailers. IIHS research has shown that meeting the current standard isn't enough to prevent underride in many cases, particularly in offset crashes.

In the advance notice on single-unit trucks, NHTSA estimated the effect of guards that meet Canada's standard, which is stronger than the current U.S. standard for the guards required on semitrailers. While the Canadian standard is an improvement over the U.S. standard, IIHS research has shown that it is possible to build guards that do a better job than those meeting either standard when it comes to preventing underride in certain offset crash scenarios (see *Status Report*, March 14, 2013).

Single-unit trucks like these are exempt from National Highway Traffic Safety Administration requirements for rear underride guards. The agency is considering closing that loophole. Underride guards prevent smaller vehicles from going underneath a truck in a crash.

"We hope that NHTSA will consider a more comprehensive solution for both single-unit trucks and semitrailers than simply adopting the Canadian standard," Brumbelow says.

NHTSA's advance notice of proposed rulemaking is available at regulations.gov, Docket No. NHTSA-2015-0070. The IIHS comment can be found there or at iihs.org. ■

Good head restraints linked to 11 percent reduction in injuries in rear-end crashes

One countermeasure continues to make a measurable difference when it comes to preventing neck strains and sprains when an occupant's vehicle is rear-ended in traffic, a new IIHS-HLDI study of insurance claims indicates. Seat/head restraint combinations that earn the top rating of good in IIHS tests reduce injury claim rates by 11 percent compared with vehicles with poor-rated seats/head restraints. What is more, women and younger occupants appear to be enjoying the biggest benefits.

The analysis updates and expands on prior research by IIHS and HLDI indicating that seat/head restraint combinations that earn good ratings in IIHS tests reduce the chances that drivers will sustain neck injuries if their vehicles are rear-ended (see *Status Report*, March 15, 2008, at iihs.org). IIHS rates vehicles good, acceptable, marginal, or poor based on both front-seat head restraint geometry and test results (see *Status Report*, Nov. 20, 2004). IIHS added a dynamic test in 2004.

A decade ago, more than half of the seats/head restraints IIHS evaluated were rated poor and only 9 percent were rated good. Now, 95 percent of 2015 models are rated good, and none are rated poor. This is largely due to the Institute's ratings program and an upgraded U.S. regulation requiring front-seat head restraints to be higher and closer to the back of people's heads in all new vehicles as of September 2010.

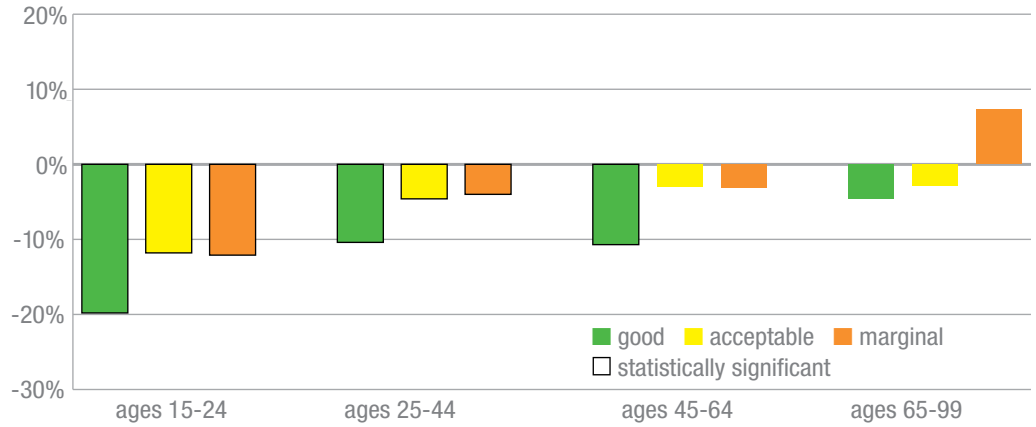
"The latest findings show that seat/head restraint combinations that rate good in IIHS evaluations are helping to reduce the overall injury rate in crashes," says David Zuby, IIHS chief research officer and one of the co-authors of the new study.

Analysts examined an insurance claim database of more than 600,000 rear-impact crashes to determine the likelihood of an associated injury claim. Results were based on 2001-14 model year cars and SUVs using property damage liability and personal injury protection claims. Property damage liability covers damage caused by the insured vehicle to someone else's vehicle or property. Personal injury protection coverage is sold in states with no-fault insurance systems and covers injuries to occupants of the insured vehicle regardless of who is at fault.

The injury-reduction benefits were greatest for good-rated seats/head restraints. Those with acceptable or marginal ratings had injury rates that were 4.4 percent and 3.7 percent lower, respectively, than seats/head restraints rated poor.

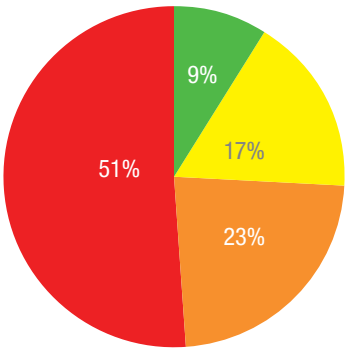
Estimated change in injury rate compared with poor head restraints, by rated driver gender

Estimated change in injury rate compared with poor head restraints, by rated driver age

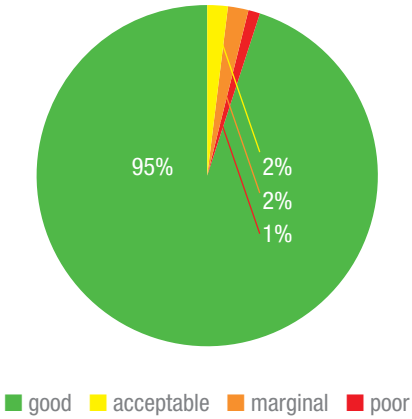


Improved head restraints

More than half of 2005 models rated poor...



...Now nearly all 2015 models rate good



Zuby points out that the database doesn't contain information on exactly who in the vehicle was injured — for example, whether they were the driver — or the type of injury. Prior studies indicate that neck sprains and strains, or whiplash, are the most frequently reported injuries to insurers. Most often these injuries occur in rear-end collisions, but they can happen in other types of crashes, too.

When a vehicle is struck in the rear and pushed forward, occupants' torsos move forward with their seats. If a person's head isn't supported by a head restraint, the head lags behind the torso, 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.

The key to reducing whiplash injury risk is to move the head and torso together. To accomplish this, the geometry of a head restraint has to be adequate — high enough and near the back of the head. Then the seat structure and stiffness 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. That's why good head restraints are so important.

Analysts broke down benefits by the gender and age of the rated driver on the insurance policy and examined rear crashes that resulted in more-severe injury claims (higher than $2,000). The gender and age analysis is based on the characteristics of the rated driver, the person assigned to the vehicle for insurance purposes but not necessarily driving at the time of a crash.

Women fared better than men in the study, with lower injury rates for good, acceptable and marginal-rated seats compared with poor-rated seats. For males, only good-rated seats were associated with statistically lower injury rates. Injury rates were 13 percent lower for women and 9 percent lower for men in vehicles with good-rated seats/head restraints.

This greater reduction in injuries for females is encouraging since earlier studies have shown that neck injuries are more likely among women in rear impacts than men.

Rated driver age also affects injury outcomes. In the study, good-rated seats had lower injury rates than poor-rated seats in vehicles with drivers in age groups 15-24, 25-44 and 45-64. Drivers ages 15-24 had the largest reduction at 20 percent, followed by ages 45-64 at 11 percent, and ages 25-44 at 10 percent.

The results for more serious injuries followed a similar pattern among gender and age groups. Looking at crashes involving claims of $2,000 or more, analysts found 16 percent fewer insurance claims were filed for neck injuries among females in vehicles with good-rated seats/head restraints compared with people in vehicles with poor seats/head restraints. Looking at age groups, drivers 25-44 years old and 46-64 years old had the largest reductions in injury rates when comparing good-rated seats/head restraints and poor-rated seat/head restraint combinations.

For a copy of "IIHS head restraint ratings and insurance injury claim rates" by R.E. Trempel et al., email publications@iihs.org. ■

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Inquiries/print subscriptions:
StatusReport@iihs.org

Editor: Kim Stewart
Writer: Sarah Karush
Art Director: Steve Ewens

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IIHS is an independent, nonprofit scientific and educational organization dedicated to reducing the losses — deaths, injuries and property damage — from crashes on the nation's roads.

HLDI shares and supports this mission through scientific studies of insurance data representing the human and economic losses resulting from the ownership and operation of different types of vehicles and by publishing insurance loss results by vehicle make and model.

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