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# Status Report

Insurance Institute for Highway Safety | Highway Loss Data Institute

## Meet Jasper

IIHS introduces new dummy for booster evaluations

**ALSO IN  
THIS ISSUE**  
Vol. 52, No. 8  
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- ▶ Gearshift interlocks could get more people to buckle up
- ▶ Some teens, parents think mixing pot and driving is OK

**A** specially designed dummy is simplifying IIHS booster evaluations. Dubbed Jasper, the dummy should make it easier for manufacturers to design seats that provide proper safety belt fit for young passengers.

IIHS began using Jasper to measure boosters during the latest round of evaluations. A total of 16 new boosters for 2017 are rated. Thirteen of them earn the highest rating of BEST BET, meaning they provide good belt fit for typical 4 to 8 year-olds in almost any car, minivan or SUV. The other three are rated Check Fit, meaning they could work for some children in some vehicles. None of the new seats are rated Not Recommended.

With the new additions, consumers can find ratings for a total of 151 boosters currently on the market, including 118 BEST BETs and nine GOOD BETs, which provide acceptable belt fit in most vehicles. Only one current seat — the Safety 1st Summit 65 — is Not Recommended and should be avoided. Four other seats rated Not Recommended were discontinued this year.

### **New dummy is better for the task**

Vehicle safety belts are designed for adults, and the job of a booster is to make them fit a child. IIHS has been rating boosters since 2008 on their ability to provide good lap and shoulder belt fit (see *Status Report* special issue: booster seats, Oct. 1, 2008).

Up until now, the Institute has measured belt fit using a crash test dummy that

**Until now, IIHS has used a crash test dummy for booster evaluations. It's expensive and not ideal for measuring belt fit. The new dummy is designed specifically for this purpose and is easier to use and cheaper to produce.**

represents a 6-year-old child. That dummy, known as the Hybrid III 6 year-old, is a complex tool designed for dynamic tests.

“The Hybrid III 6 year-old is expensive and more complicated than what we need and actually isn't ideal for measuring belt fit,” says IIHS Senior Research Engineer Jessica Jermakian.

“Jasper will be easier to use and cheaper to buy and obtain replacement parts for. Because it's more accessible, we hope that booster manufacturers will be able to use it in-house as part of the design process for new seats.”





# Booster ratings

There are 16 new models for 2017, including 13 BEST BET boosters and 3 Check Fit.

## BEST BET

Chicco GoFit (backless)  
Cosco Finale (highback)  
Cosco Finale DX (highback)  
Diono Monterey XT (backless mode)  
Diono Monterey XT (highback mode)  
Evenflo Spectrum (backless mode)  
Evenflo Spectrum (highback mode)  
Graco Wayz (backless mode)  
Graco Wayz (highback mode)  
Maxi-Cosi RodiFix (highback)  
Nuna AACE (backless mode)  
Nuna AACE (highback mode)  
Peg-Perego Viaggio Shuttle (backless)

## Check Fit

Harmony Folding Travel Booster (highback)  
Kiddy Cruiser 3 (highback)  
Ride Safer Delighter Booster (backless)



**BEST BETs** provide good belt fit for typical 4 to 8 year-olds in almost any car, minivan or SUV.

**GOOD BETs** provide acceptable belt fit in most cars, minivans or SUVs.

**Not Recommended** don't provide good belt fit and should be avoided.

**Check Fit** have varied results depending on child size and vehicle model.



The name “Jasper” is an acronym for Juvenile Anthropomorphic Seat-belt Position Evaluation Rig. IIHS worked with Humanetics, the maker of the Hybrid III 6 year-old, to develop Jasper, and the Michigan-based company manufactures and sells the new dummy. The 45-pound Jasper also represents a typical 6 year-old.

The Hybrid III 6 year-old has skin made of a material that can shrink over time and has moveable parts so that it moves like a human in a crash test. It also has a gap between the pelvis and the thigh that the belt can slip into. When using it for booster evaluations, a silicone shield must be placed over the gap.

In contrast, Jasper is 3D-printed out of a UV-cured liquid polymer that resists shrinkage and distortion. It has only a few movable parts and has a seamless pelvis, so

no additional lap shield is needed. The new dummy lacks arms, since they can get in the way during booster evaluations.

Another difference is that the scales for belt fit measurement are printed directly on Jasper. This way, it can be used like a ruler without the need for additional measuring tools.

## Sixteen new models in 2017

IIHS strives to cover the entire U.S. booster market with its ratings. This year, manufacturers added 16 seats to their line-ups. The 16 are made up of 12 distinct models; four are rated twice because they are dual-use boosters that can be used either in highback or backless mode.

The 13 new BEST BETs (nine distinct models) range in price from about \$40 for »

(« from p. 3) the highback Cosco Finale and the backless Chicco GoFit to \$250 for the highback Maxi-Cosi RodiFix. Among booster seats currently on the market, the Harmony Youth Booster and Diono Hip are the least expensive at \$13 each.

“You don’t have to spend a lot of money to get a quality booster seat. Unlike more complicated harness-equipped restraints, a booster is a simple device that doesn’t require special features to do its job,” Jermakian says.

“Boosters need to elevate the child and guide the lap belt so that it lies flat on the upper thighs and not up against the tummy and position the shoulder belt so that it fits snugly across the middle of the shoulder.”

More expensive models sometimes tout enhanced side protection, but there is no clear evidence that this improves safety. Some have LATCH connectors, but, unlike on harness-equipped restraints, they aren’t necessary on boosters and serve mostly to prevent seats from sliding around when they aren’t occupied. Convenience features such as cupholders and styling also push prices higher for some models.

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. Children should ride in boosters until a lap and shoulder belt fits correctly by itself. For some kids, that doesn’t happen until age 12 or so.

IIHS began its booster rating program after finding that many seats didn’t consistently provide kids good belt fit. In the first booster ratings, only a quarter of the seats evaluated earned the BEST BET designation.

Ensuring that children are in the right kind of child restraint for their age and size is a critical step for reducing highway crash deaths, which have been on the rise. Deaths of children ages 4 to 8 — the most common ages for booster users — rose to 13.8 per million children in 2016 from 11.5 in 2012. Deaths of children ages 9 to 12, many of whom still need boosters, rose to 12.4 per million children in 2016, compared with 9.7 in 2012. ■



## No belt? No go!

Gearshift interlocks could get more people to buckle up

An old idea is getting a new look to try to get everyone in front seats buckled up as about half of those killed in crashes are unbelted, despite laws in 49 states requiring safety belt use. An IIHS study of consumers finds that preventing an unbelted driver from shifting out of park increases the likelihood of belt use by more than 20 percent among people who don’t always use belts relative to an enhanced belt reminder.

In-vehicle technology to spur motorists to use belts has had a problematic history in the U.S. In the early 1970s when few people buckled up, the National Highway Traffic Safety Administration (NHTSA) required new vehicles to have auditory and visual belt reminders lasting at least a minute if front-seat occupants were unbuckled at ignition. Regulators followed this move with an unpopular 1973 mandate that all new cars without airbags or other passive restraints be equipped with an interlock that prevented a car from starting if front-seat occupants were unbelted.

Facing public backlash, Congress in 1974 banned NHTSA from requiring belt interlocks or even allowing automakers to use them to meet safety standards. Lawmakers restricted belt reminders, too.

A change under MAP-21, the 2012 highway reauthorization law, allows NHTSA to permit automakers to equip vehicles with belt interlocks as an alternative means to comply with certain federal safety standards (see *Status Report*, Sept. 20, 2012, at [iihs.org](http://iihs.org)). The technology prevents the use of a feature, such as the transmission, engine or entertainment system, if a belt isn’t secured. MAP-21 also allows NHTSA to require belt reminders with auditory warnings that last longer than the prior eight-second limit.

Although NHTSA hasn’t yet strengthened belt-reminder requirements or proposed a rule to permit belt interlocks, manufacturers are exploring the technologies.

General Motors is the first automaker since the law change to offer an interlock in the U.S., beginning with certain 2015 models sold only to fleets. The system isn’t available on mainstream vehicles. GM’s Seat Belt Assurance System prevents the driver from placing the vehicle





in gear for 30 seconds after ignition or when placed in “park” unless the driver and, if present, right front passenger are belted.

Forgetfulness is a common reason why part-time belt users don’t regularly use belts. Another reason cited is short trips.

Most new vehicles sold in the U.S. have enhanced reminders for the driver and front passenger that exceed federal requirements, and studies show that driver belt use is higher and fatality rates are lower in vehicles with enhanced belt reminders than in vehicles with reminders that meet minimum requirements (see *Status Report*, Feb. 9, 2002, June 13, 2006, and March 6, 2012). Studies of fleet drivers in Canada and the U.S. indicate that interlocks that prevent unbelted drivers from shifting into gear or driving faster than a set speed also increase belt use.

The goal of the latest IIHS belt study was to see if the GM gearshift interlock had a bigger effect on getting part-time belt users to buckle up than an enhanced belt reminder.

IIHS researchers recruited 32 part-time belt users in Maryland who had recently received a safety belt citation and reported not always using a belt. Every participant drove a Chevrolet Cruze with an enhanced reminder for one week. Half drove a different trim-level Cruze with the same enhanced reminder the following week, while the other half drove another Cruze with an interlock.

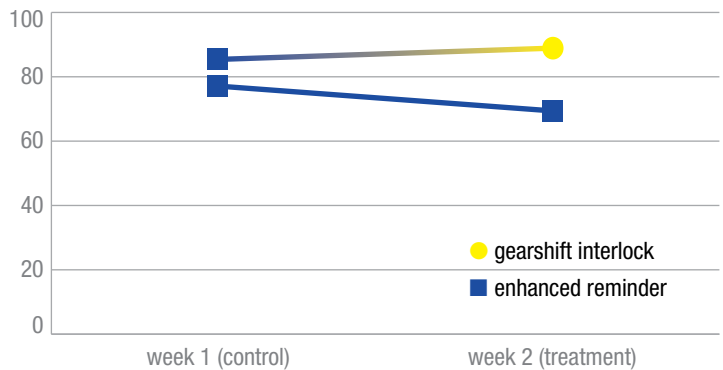
The enhanced reminder consisted of three 20-second cycles spaced one minute or more apart. Each cycle began with five auditory chimes played during a seven-second period and a red “tell-tale” belt icon in the instrument display that flashed for 20 seconds.

“The participants thought they were test-driving the Cruze to compare two trim lines of the car. They didn’t know we were observing their belt use,” says David Kidd, a senior research scientist with the Institute and the study’s lead author.

The interlock increased the likelihood that a part-time belt user donned a belt at least once during travel, that is, from the time the car was placed into gear until it was last put in park, by 21 percent relative to the enhanced reminder. A second analysis examined »

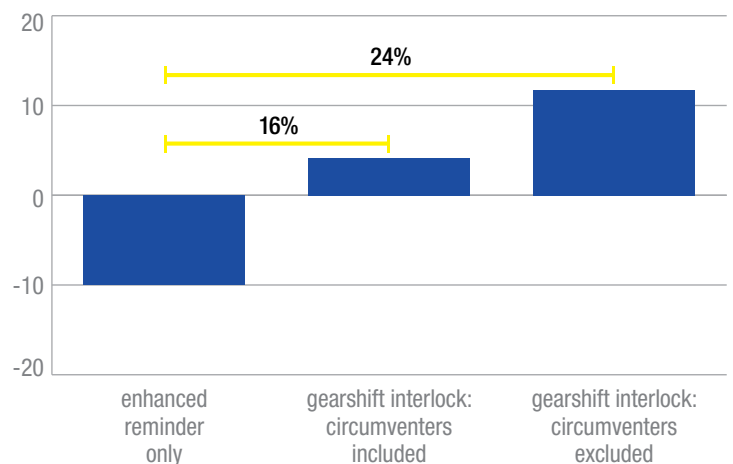
### The gearshift interlock increased safety belt use by 16 percent among part-time belt users

Driver belt use, by study week



### Preventing motorists from circumventing the gearshift interlock would yield a bigger increase in belt use among part-time users

Percent change in belt use between weeks



# Some teens, parents think mixing pot and driving is OK

**A**lthough a majority of teens recognize that impaired driving is dangerous, roughly a third of teens and a quarter of parents of licensed teen drivers think it is legal to drive under the influence of marijuana in states that permit recreational use of the drug for adults, a survey by Liberty Mutual Insurance and Students Against Destructive Decisions (SADD) found.

Eighty-eight percent of the 2,800 high schoolers surveyed and 93 percent of the 1,000 parents surveyed agreed that alcohol-impaired driving is dangerous, while 68 percent of teens and 76 percent of parents said that driving under the influence of marijuana is risky.

The nationwide survey, conducted during April and May 2017, points to the need to better educate teens and their parents about how marijuana affects driving, Liberty Mutual and SADD say.

A 2016 IIHS survey of drivers 18 and older found similar attitudes about marijuana use (see *Status Report*, Dec. 8, 2016, at [iihs.org](http://iihs.org)). Nationally, driving after using marijuana wasn't perceived as negatively as driving after consuming alcohol.

"Impairment of any kind is a significant problem on the road," says David Zuby, the Institute's executive vice president and chief research officer. "Whether someone is impaired by alcohol, marijuana or other drugs, they should not be behind the wheel."

Among the teens surveyed, 22 percent said that driving under the influence of marijuana is common among their friends.

"Starting a dialogue early and engaging teens about the dangers of driving high before they have their license can be an effective way to reinforce the message prior to getting behind the wheel," says Dr. Gene Beresin, senior adviser on adolescent psychiatry with SADD.

All 50 states and the District of Columbia have per se laws making it a crime to drive with a blood alcohol concentration (BAC) at or above a specified level, currently 0.08 percent (0.08 g alcohol per 100 ml blood). Utah passed a law in March 2017 making it a crime to drive with a BAC of 0.05 percent or above. The law will take effect on Dec. 30, 2018.

All states and D.C. have drug-impaired driving laws, too, but the specific provisions for marijuana and other drugs differ. Eighteen states have zero tolerance or non-zero per se laws for THC or a metabolite, according to information compiled by the Governors Highway Safety Association ([www.ghsa.org/html/stateinfo/laws/dr\\_perse\\_laws.html](http://www.ghsa.org/html/stateinfo/laws/dr_perse_laws.html)). THC, or Tetrahydrocannabinol, is the primary psychoactive component of cannabis.

Research shows that legalizing recreational use of marijuana is associated with more crashes. A 2017 analysis by the Highway Loss



Data Institute found that insurance claim rates under collision coverage rose about 3 percent overall after recreational marijuana sales began in Colorado, Oregon and Washington, the first three states to permit recreational use of the drug for adults 21 and older (see *Status Report*, June 22, 2017).

## Interlocks should be intrusive enough to get the attention of unbelted drivers and front passengers, but at the same time they shouldn't aggravate the vast majority of people who always use belts.

(« from p. 5) if the interlock increased the amount of travel time the driver was belted compared with the enhanced-reminder group. By this measure, belt use in the reminder group decreased from 77 percent in week 1 to 69 percent in week 2. In the interlock group, belt use increased from 85 percent in the first week to 89 percent in the second week — a 16 percent rise in belt use

compared to what would be expected based on drivers in the enhanced-reminder group.

"We were encouraged that the gearshift interlock was more effective at increasing belt use than the enhanced reminder. That said, some drivers in the study occasionally did things to circumvent the interlock. Six of the 16 part-time belt users who experienced the gearshift interlock sat on the belt, waited for the system to deactivate or unbuckled during the trip at least once," Kidd says.

The researchers would have seen a bigger bump in belt use — 24 percent — if the drivers had been unable to circumvent the gearshift interlock.

If every vehicle in the United States had a gearshift interlock that increased front-seat belt use by 16 percent, at least 718 lives could be saved each year, the Institute estimates. An additional 358 lives could be saved if interlocks couldn't be bypassed by front-seat occupants determined to ride unbelted.

Kidd and his team also recruited 16 drivers who reported always using their belts to evaluate if they found the interlock acceptable. All of the full-time belt users experienced the interlock, mainly because they were in the habit of buckling up after shifting into gear.





The growing state legalization of marijuana for recreational use points to the need to better educate teenagers and their parents that just like alcohol, marijuana and driving shouldn't mix. Twenty-two percent of teens surveyed by Liberty Mutual and SADD said driving under the influence of marijuana is common among their peers. Alcohol is viewed as a bigger risk than pot when it comes to impaired driving.

Support for legalizing recreational marijuana use nationwide is at a record high and gaining ground. In an October Gallup poll, 64 percent of Americans surveyed said marijuana use should be legal, up from 60 percent in 2016 (<http://news.gallup.com/poll/221018/>

[record-high-support-legalizing-marijuana.aspx](http://news.gallup.com/poll/221018/)). A majority of Americans have consistently supported legalizing marijuana since 2013, the polling firm says.

Eight states and Washington, D.C., have legalized marijuana for all uses, and an additional 21 states have comprehensive

medical marijuana programs as of November. An additional 17 states permit limited access for medical use.

The Teen Driving Study is available at [www.libertymutualgroup.com/about-lm/news/news-release-archive/articles/weed-out-the-confusion](http://www.libertymutualgroup.com/about-lm/news/news-release-archive/articles/weed-out-the-confusion). ■

“Part-time belt users are the population we want to reach with interlock technology,” Kidd says. “Interlocks should be intrusive enough to get the attention of unbelted drivers and front passengers, but at the same time they shouldn't aggravate the vast majority of people who always use belts.”

About 4 in 5 study participants agreed or strongly agreed that having a gearshift interlock was acceptable, and only 1 in 5 agreed or strongly agreed that they wouldn't enjoy driving their vehicle if it had a gearshift interlock. The responses were roughly the same among full- and part-time belt users.

Researchers also asked participants for their opinions of enhanced belt reminders in general and other types of belt interlocks. More than 80 percent of people surveyed favored enhanced belt reminders, but only 32 percent said they would support an ignition interlock. More than half of participants surveyed said they would support a gearshift interlock, entertainment system interlock or speed interlock limiting vehicles to 15 mph until the driver buckles up.

In an earlier IIHS survey, fewer than half of all full-time belt users said they would support using ignition interlocks to increase driver belt use, while 53 percent said

they would support less-intrusive transmission or speed interlocks. However, few part-time belt users said they would support the technologies (see *Status Report*, Jan. 24, 2013).

For drivers and their front-seat passengers, using a lap and shoulder belt reduces the risk of fatal injury in a crash by 45 percent in a car and 60 percent in a pickup truck, van or SUV.

For a copy of “The effects of a gearshift interlock on seat belt use by drivers who do not always use a belt and its acceptance among those who do” by D.G. Kidd et al., email [publications@iihs.org](mailto:publications@iihs.org). ■

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**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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