



IIHS consumer information programs

Child Occupant Protection:
Latest knowledge and future opportunities
Göteborg, Sweden
20 September 2017

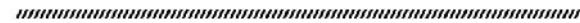
Jessica S. Jermakian

iihs.org

IIHS is an independent, nonprofit scientific and educational organization dedicated to reducing deaths, injuries and property damage from motor vehicle crashes. Established 1959.

HLDI shares and supports this mission by collecting and analyzing insurance data. Established 1972.

Both organizations are wholly supported by auto insurers and insurance associations.



IIHS crashworthiness tests



Rating vehicles

Good
Acceptable
Marginal
Poor



Structural performance

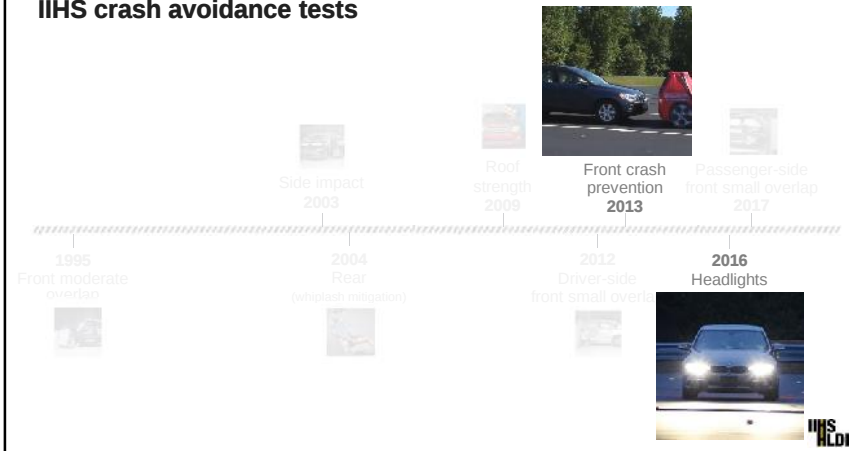
Injury measures from dummies



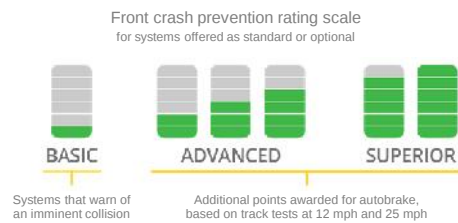
Restraints/dummy kinematics



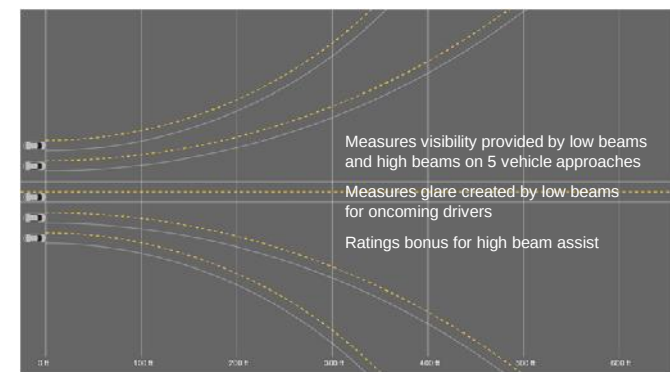
IIHS crash avoidance tests



Front crash prevention testing began in 2013



Headlight testing began in 2016



Requirements for 2018 *TOP SAFETY PICK* awards



- G** Good rating in five crashworthiness tests
- A** **G** Acceptable or Good headlight rating

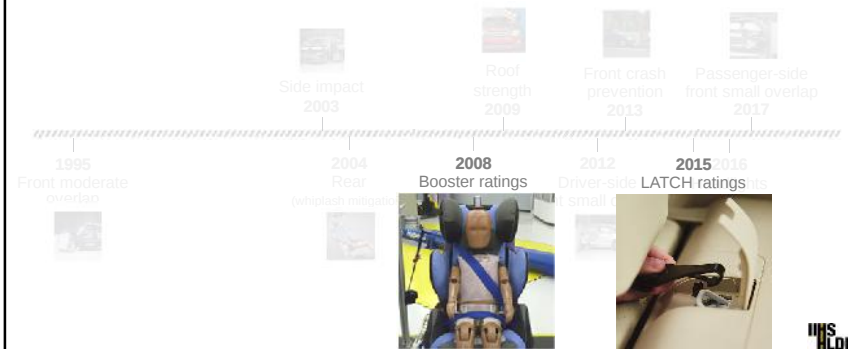


TOP SAFETY PICK requirements plus

- G** Good headlight rating
- A** **G** Acceptable or Good passenger small overlap



IIHS child passenger safety ratings



Improving seat belt fit for children in boosters



Belt-positioning boosters don't always fit

IIHS has rated boosters since 2008



Good belt fit
Lap belt flat on upper thighs;
Shoulder belt centered on chest, shoulder



Poor belt fit
Lap belt too high on abdomen;
Shoulder belt too low on shoulder



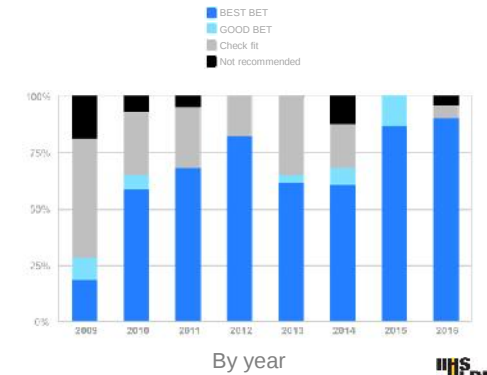
Belt fit measurement rig

Movable anchorages to match range observed in vehicles



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Improvements in booster seats



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JASPER

Juvenile Anthropomorphic Seatbelt Position Evaluation Rig

- ▶ New device for static belt fit measurements
 - Developed in collaboration with Humanetics
 - Lower cost solution than Hybrid III 6 year-old
 - Shorter lead time on parts
 - Materials less prone to shrinkage and distortion
- ▶ Geometry based on the Hybrid III 6 year-old
- ▶ 3D printed UV-cured liquid polymer
- ▶ Lap and shoulder belt scales printed directly into the pelvis and chest



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IIHS LATCH ease-of-use ratings

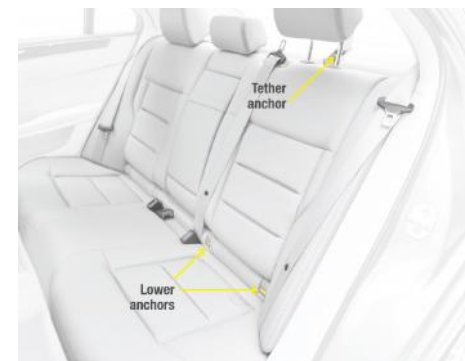
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Lower Anchors and Tethers for Children (LATCH)



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Lower Anchors and Tethers for Children (LATCH)



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Usability of vehicle LATCH systems

- ▶ Identify LATCH characteristics associated with correct use
 - Surveyed characteristics of LATCH hardware and rear seat geometry in over 100 model year 2010-13 passenger vehicles
 - Laboratory studies of child restraint installations by volunteers
- ▶ Validate important LATCH characteristics in real-world sample
 - Child restraint installations inspected on arrival at Safe Kids child seat checkups during 2010-12
 - Study vehicles were those surveyed in usability studies
- ▶ Develop vehicle LATCH rating system

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LATCH ease-of-use criteria

- ▶ Lower anchors must have
 - Depth in seat bight less than 2 cm (¾ inch)
 - Attachment force less than 40 lbs (178 N)
 - Clearance angle greater than 54°
- ▶ Tether anchors must
 - Be located in an easy-to-find location on the rear deck in sedans or middle of the seatback in other vehicle types
 - Have no hardware that could be confused for a tether anchor or the tether anchor must be clearly labeled
- ▶ If the vehicle has a tether router, it must accommodate the tether router tool passing through



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Lower anchor accessibility

Toyota Sienna vs. Dodge Grand Caravan



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Easy-to-find tether anchors

BMW X5



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Hard-to-find tether anchors

Toyota Sienna



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Overall vehicle rating

Based on LATCH hardware required by federal government

G GOOD	vehicle meets all ease-of-use criteria for 2 LATCH positions in 2 nd row and 1 additional tether anchor
A ACCEPTABLE	2 LATCH positions meet most of the criteria
M MARGINAL	at least 1 LATCH position meets only a couple criteria
P POOR	at least 1 LATCH position meets only 1 or none of the criteria



June 2015



September 2016



Tether anchors in consistent locations and clearly labeled

Audi Q7



2015

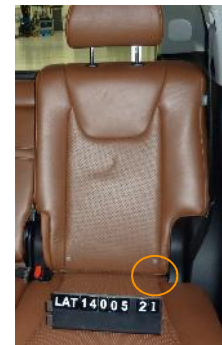


2017



Better access to lower anchors

Lexus RX



2015



2016



New designs are emerging

Toyota Prius



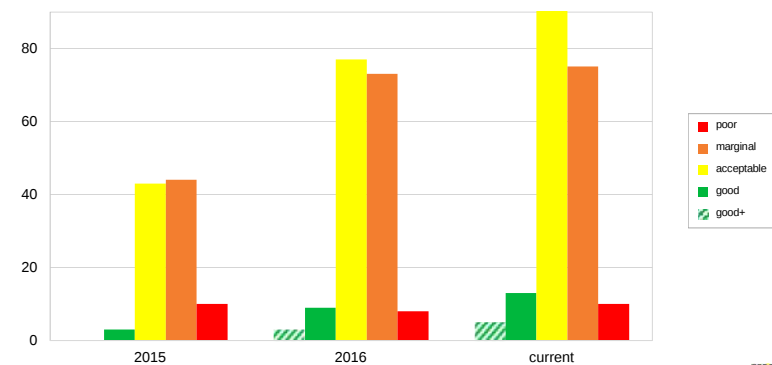
2015



2016

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LATCH ease-of-use ratings by year



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Insurance Institute for Highway Safety
Highway Loss Data Institute

More information and links to our
YouTube channel
and Twitter feed at iihs.org

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