

Research on LATCH Usability

In April 2012, the IIHS reported on findings from a joint LATCH-use study it conducted with the University of Michigan Transportation Research Institute. "Keys to Better LATCH" identified and measured key factors in the usability of LATCH and then studied volunteers to see how these factors predicted the quality of CR installations.

In 2014, the IIHS published two follow-up reports (one on LA attachment use and the other on tether use), which further affirmed the findings of the 2012 study. The studies help prepare the IIHS for a possible next step, which is to explore a ratings system to evaluate LATCH setups in common family vehicles.

Key factors: Depth, clearance, and force

The first part of the 2012 study focused on the ease of use of lower anchors and identified three factors: depth, clearance, and force. To prepare to assess the factors in vehicles, the researchers used these measurable criteria:

- **Depth:** The LA bars should be no more than three-quarters of an inch deep in the seat bight.
- **Clearance:** Nothing should obstruct access to the LAs, including seat belt straps and buckles, other vehicle hardware, and the material of the seat cushions. (A 54-degree angle around the LA bars was examined to determine whether there was proper clearance.)
- **Force:** Caregivers should be able to attach the connectors using less than 40 pounds of force.

Measurement in popular family vehicles

Researchers looked at 98 of the most popular MY 2010-2011 family vehicles to see how they rated on each criteria. Models spanned the range of vehicle types: passenger cars, minivans, SUVs, wagons, and pickups.

Only 21 of the vehicles passed all three of the ease-of-use criteria. Seven of the family vehicles didn't meet any of the criteria, with the remainder (70) failing either one or two criteria. LAs were visible in 36 of the vehicles.

The general lack of LAs for center installations was noted in the report. Only seven of the vehicles had a dedicated LATCH system in a center rear seating position, while nine others allowed the inner bars of outboard LATCH systems to be used as LAs for the center seating position. (The report didn't note that this option is only valid if the manufacturer of the CR also allows this practice.) There were 21 minivans and SUVs that had no option for center use of LATCH.

The report also found that only 16 of the 98 vehicles had more than the two LATCH systems required by FMVSS 225. Only 10 had more than three tether anchors.

The criteria predicted proper use

The second part of the 2012 study looked at how the indicators correlated with usage. The researchers recruited 36 adult volunteers representing a range of ages and educational/socioeconomic backgrounds to install CRs in a sample set of vehicles. All had experience using CRs for their own children. The volunteers could use the CR owner's manuals, but were given no further assistance. Each volunteer used the LATCH system to install three types of CRs into three of 12 study

vehicles, which were selected to represent a range of styles and usability based on ease-of-installation criteria.

The study found that volunteers were 19 times more likely to correctly install CRs in vehicles that passed all three of the identified ease-of-use criteria, compared with vehicles that didn't meet any of the criteria. Overall, LA connectors were attached correctly 60 percent of the time. However, CRs were installed correctly (with tight fit, proper angle, proper use of the tether, etc.) only 13 percent of the time.

The IIHS worked with Safe Kids Worldwide to publish a study in 2014 of these correlations in real-world settings. At checkup events during 2010 to 2012, researchers found that, in vehicles that met all three criteria, LATCH was used 80 percent of the time, and 53 percent of the CRs were installed correctly. When none of the key criteria was met, LATCH was used only 65 percent of the time, and only 41 percent of the CRs were used correctly. CRs installed using LA attachments were nearly twice as likely to be correctly installed as those installed using a seat belt (63 percent versus 34 percent).

Tether use especially low

The 2012 IIHS study found that the tether was used on only 48 percent of the forward-facing CRs installed. Of the tethers that were used, only 54 percent were used correctly, for an overall proper tether use rate of only 22 percent.

In a 2014 follow-up study, participants who were encouraged to attach a tether as part of observed forward-facing CR installations did so correctly only 57 percent of the time. The presence of other vehicle hardware that was mistaken for a TA was a major cause of misuse. An alarming 89 percent of webbing-loop style TAs (the type found in many pickups) were misused. The study also observed single-strap tethers to be 10 times more likely to be used properly than V-shaped types. This might be influenced by the fact that most vehicle owner's manuals describe only the use of the more common single-strap style.

The IIHS reports can be found by going to www.iihs.org and searching past issues of *Status Report* (April 12, 2012; February 20, 2014; and April 8, 2014).

**THIS INFORMATION IS EXCERPTED FROM THE
2015 LATCH MANUAL. COPYRIGHT SRN, 2015**