

LATCH Usability Assessment

UMTRI is pleased to announce the availability of a new service to assess LATCH usability in vehicles. Using test protocols developed by the SAE Child Restraints Systems Committee, the ISO TC 22/SC 12/WG1, and UMTRI researchers working with the Insurance Institute for Highway Safety, we will assess the usability of LATCH in each vehicle seating position where hardware is available. The attached form indicates the scope of measurement for each seating position. Gathering these measures will allow calculation of the ISO vehicle rating score and comparison relative to SAE and IIHS recommendations.

Vehicles will be measured at UMTRI. Cost is \$1000 per vehicle, with an additional cost of \$250/seating position if a vehicle has more than 3 tether anchors. Deliverables include a report documenting the measures and summarizing results relative to proposed LATCH usability recommendations. For more information or to schedule a testing appointment, please contact Kathy Klinich (kklinich@umich.edu) or Miriam Manary (mmanary@umich.edu)

References

International Standards Organization. *Road Vehicles – Methods and Criteria for Usability Evaluation of Child Restraint Systems and Their Interface With Vehicle Anchorage Systems – Part 1 Vehicles and Child Restraints Equipped with ISOFIX Anchorages and Attachments*. Geneva, Switzerland; 2010. Report no. CD 29061-1.

Klinich KD, Manary MA, Flannagan CAC, Moore JL. *LATCH Usability in Vehicles*. Ann Arbor, MI: University of Michigan Transportation Research Institute; 2012. Report no. UM-2012-7.

Society of Automotive Engineers. *Guidelines for Implementation of the Child Restraint Anchorage System or LATCH System in Motor Vehicles and Child Restraint Systems*. Child Restraints Systems Committee, Draft recommended practice; 2009. Document no. J2893.

Sample Forms to allow evaluation relative to SAE, ISO, and IIHS recommendations on LATCH usability

Category		Target	2L		2R		Other:	
			Inboard	Outboard	Inboard	Outboard	Inboard	Outboard
Lower anchor measures	Clearance	>54°/75°						
	Rigid contact?	No						
	Depth	0-2 cm						
	Target force angle	NA/0						
	Force 1							
	Force 2							
	Force 3							
	Angle 1							
	Angle 2							
	Angle 3							
	Mean Force	<40#/ <17#						
	Lateral distance to nearest belt hardware?	> 70 mm						
	LA Marking?	ISO						
	LA covering?							
	LA visible?	Yes						
	Actions to use LA?	None						
	LA confusing hardware?	No						
Collinearity tool attach?	Yes							
CRF measures	Attach fixture?	Yes						
	Lateral CRF angle	<5°						
	Installed CRF pitch angle	5°-20°						
	Cushion to Z-point	<51 mm						

Category		Target	2L		2R		Other:	
Tether measures	Tether router Fits Tool	Yes						
	TA Marking?	ISO						
	TA covering?							
	TA visible?	Yes						
	Actions to use TA?	None						
	Distance from TA to HR?	> 165 mm						
	TA confusing hardware?	No						
Manual Assessments	Manual shows LA locations							
	Without text?							
	Manual shows TA locations							
	Without text?							
	Manual clear on tether routing							
	Tether routing wrt HR?							
	HR position?							



UMTRI Vehicle/CRS Fit Assessment Services

The National Highway Traffic Safety Administration (NHTSA) has proposed a voluntary consumer-information program in which vehicle manufacturers have been asked to suggest child restraint systems (CRS) that fit in particular vehicle models, beginning with MY 2012. The initial proposal indicates that a manufacturer must recommend at least three different CRS in each of three CRS price-range categories to participate and have their information posted by the NHTSA at safercar.gov.

To help manufacturers participate in this program, UMTRI is offering vehicle/CRS fit assessment services to vehicle manufacturers. Manufacturers would provide the test vehicle to UMTRI for a three-week period. Certified child passenger technicians (CPST) in UMTRI's Biosciences Group will perform 100 CRS installations in each of two rear-seat positions (likely one outboard position and the center position) for 200 total CRS installations. The number of installations required for each child restraint varies depending on its style. The client and UMTRI staff will agree on which CRS from the UMTRI inventory will be evaluated in the vehicle subject to the following general conditions:

- 3 installations per infant CRS
 - Seatbelt with base
 - Seatbelt without base
 - LATCH with base
- 4 installations per convertible CRS
 - Forward-facing LATCH
 - Forward-facing seatbelt
 - Rear-facing LATCH
 - Forward-facing seatbelt
- 3 installations per combination CRS
 - Forward-facing LATCH
 - Forward-facing seatbelt
 - Booster with seatbelt
- 5 installations per 3-in-1 CRS
 - Forward-facing LATCH
 - Forward-facing seatbelt
 - Rear-facing LATCH
 - Forward-facing seatbelt
 - Booster with seatbelt
- 1-2 per booster seat, depending whether the product can be used without its back

For the booster seat installations, in addition to the data proposed for collection by the NHTSA, a FARO Arm 3-D coordinate measurement system will be used to measure the belt fit provided by the booster seat using the Hybrid III 6YO dummy and the UMTRI child dummy seating procedure. Lap belt fit is measured relative to the ASIS (anterior superior iliac spines) of the ATD, while shoulder belt fit is measured relative to the ATD centerline at the base of the neck.

A typical set of installations would evaluate 8 infant CRS, 11 convertible CRS, 2 combination CRS, 2 3-in-1 CRS, and 8 booster seats for a total of 100 installations in each seating position. If assessments are needed for more than two seating positions, quotes for the additional cost and time requirements can be provided.

Clients will receive a spreadsheet of data for all CRS installations. They will also receive a summary report indicating which CRS fit in each position using each installation method. We do not guarantee that these CRS assessments will result in the minimum required number of CRS recommendations proposed by NHTSA.

UMTRI will retain a copy of the data collected for inclusion in a secure non-public database of vehicle/CRS interaction. These data will be used to identify trends in vehicle/CRS interactions and fit to help identify which CRS will fit most easily in vehicles with particular characteristics when conducting subsequent vehicle/CRS fit assessments. The database may also be used for research purposes, with the restriction that data would only be used in aggregate form and individual vehicles would not be identified in publications.

Currently, UMTRI has five certified CPS technicians and two more staff members are planning to be certified in Spring 2011. In addition, Dr. Kathleen Klinich and Ms. Miriam Manary have served as the principal investigators for several research projects dealing with vehicle/CRS interaction in the past two years, giving them specialized insight on relevant issues. Dr. Klinich and Ms. Manary will be supervising the vehicle/CRS fit testing and reporting of the vehicle/CRS fit assessments.

For more information, please contact Kathleen Klinich at kklinich@umich.edu or (734) 936-1113.