



TECH

UPDATE

THE NEWSLETTER OF THE NATIONAL STANDARDIZED CHILD PASSENGER SAFETY TRAINING PROGRAM

Spring 2009 V2

Side-Impact Protection, Part One Side Air Bag Background

(Part Two: "Testing CRs for Side-Impact Protection" will be in the Summer 2009 Tech Update.)

While on a site visit to one of the nine testing labs that are under contract to NHTSA, we took the opportunity to get some background on side air bags (SABs). To provide the reader with the most complete information on this topic, we've enhanced the information derived from the interview with additional material from the www.nhtsa.gov and www.safercar.gov websites.

TU: Before we get to the dynamic testing of child restraints, please take a few moments to help our readers understand the value of side-impact air bags. From pictures of side-impact crashes I've seen, I would think that injuries would be related to the size and speed of the other vehicle as it strikes from the side.

Engineer: Good observation. Since protection in near-side side impacts is dependent more on the ability of the vehicle structure to prevent intrusion than on the use of a seat belt or child restraint, side air bags were developed to minimize impact to the head and/or torso of adult occupants when a vehicle is struck from the side. SABs are very effective in protecting the head from striking the window glass and the torso from severe impacts against the hard surfaces within and outside the vehicle, as well as in preventing ejection. Also, unlike frontal air bags, some curtain or tubular air bags momentarily remain inflated to provide further protection should the crash result in a rollover.

TU: Is this significant protection?

Engineer: Yes. NHTSA estimates that if all the vehicles on U.S roads were equipped with head-protection SABs, the lives of 700 to 1,000 people in side-impact crashes would be saved each year, as well as many more serious injuries prevented. NHTSA also estimates that in side-impact crashes

involving at least one fatality, nearly 60 percent of those killed have suffered brain injuries.

TU: Do all new vehicles come equipped with side-impact air bags?

Engineer: No. Many offer this innovative technology, but at this time NHTSA does not require SABs as standard safety equipment in vehicles.

TU: Are there any NHTSA Federal Safety Standards that cover SAB testing requirements?

Engineer: Not at this time. Currently, we only do voluntary testing of vehicles and child restraints at the manufacturers' request, using tests designed to assess the potential risk of SAB injuries to out-of-position occupants, especially children. The safety concern with SABs relates to passengers leaning against doors and whether, when the occupant is unusually close to the side of the vehicle, torso- or seat-mounted SABs might cause an "out-of-position" injury. The voluntary testing guidelines were developed by a group of auto industry engineers with the encouragement of then NHTSA Administrator Ricardo Martinez, M.D. and are known as the out-of-position (OOP) tests. The first OOP test results were released in 2003. Results for newer vehicles are available at www.safercar.gov.*

TU: How much are children at risk for injury from SABs?

Engineer: There's very little risk to children. NHTSA's Special Crash Investigation (SCI) Unit has been collecting real-life data about side-impact air bag crashes. Over a four-year period,

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the SCI Unit found the number of children and small adults harmed by side air bags to be extremely small and the injuries minor. On the other hand, SABs will enhance side-impact protection for properly restrained children. A SAB fills the space between the occupant and the side door/wall of a vehicle. A child in a child restraint (CR), snugly harnessed, will be out of the way of a deploying SAB.

As of 2008, NHTSA had investigated over 1,500 cases where SABs had deployed in crashes. Sixty of the cases involved children (ages 13 and younger). NHTSA has not seen any indication that current roof-mounted head SABs pose a risk to children, even if the SABs have not passed the out-of-position test. NHTSA continues to closely monitor real-world SAB deployments involving both children and adults.

However, parents/caretakers should also be aware that extensive injuries unrelated to SABs can still occur, depending on the padding and structure of the door and the amount of intrusion from the other vehicle entering the zone where an occupant is seated.

Curbside Notes

About SABs and outboard seating positions:

- Suggest parents/caregivers look in their owner's manuals first to find what kind of SABs are in their vehicles. Most SABs also are labeled in the area where they are installed.
- SABs are designed to fill the space between the side of the vehicle and the passenger seating position.
- Advise parents/caregivers to always have their children properly restrained, regardless of the type of side air bags their vehicles have or the testing that may have been done. Keeping the child within the intended seating position is important in any case. SABs that have not passed the out-of-position testing will still enhance side-impact protection for properly restrained children.
- Parents of children in backless boosters or vests/harnesses should be cautioned not to let their children lean and rest their heads against the window/door in case there is a side-impact crash.
- Remind parents/caregivers that, like frontal air bags, side-impact air bags are meant to be only a supplemental restraint, so a seat belt or appropriate child restraint should ALWAYS be used.

- Encourage the purchase of vehicles with SABs if caregivers are considering getting a newer vehicle.

Resources: Use the www.safercar.gov website. (Click on Air Bags > Side-Impact Air Bags > Potential Risk in the column on the left side.)

***Editor's Note:** To find the status of air bag tests for a vehicle, use the "Search 5-Star Safety Ratings" section of www.safercar.gov. Search by entering specifics for a particular vehicle, then clicking on the name of the vehicle on the rating summary page for details. Scroll down to "Air Bags" and find "SAB Out-of-Position Testing." A "Meets Specification" or "M" for that category indicates that the out-of-position testing was satisfactory.

Did You Know?

Exceptions and Exemptions for Tether Anchors

LATCH means "lower anchors and tethers for children." Tether anchors (TAs) were required for at least two rear seating positions (three if there were three seating positions) in 80 percent of passenger cars manufactured on or after September 1, 1999. A year later, at least two TAs were required in all vehicles (pickup trucks, vans, and SUVs, as well as cars) under 8,500 pounds gross vehicle weight. Exemptions: (1) Some SUVs were permitted only two TAs for several additional years, even if there were three passenger positions in back; and (2) School buses weighing under 10,000 pounds are not required to have TAs, even though two LATCH positions are now required in those buses.

While the term LATCH covers the two kinds of anchors, there are instances when tether and lower anchors are not used together. The most obvious is the rear-facing CR, for which a tether is not part of the standard restraint system and for which tether anchors are NOT required. Another is convertible vehicles, which are exempt from the tether anchor requirement because it is often difficult to build in accessible TAs. Although a few convertibles have tether anchors, most do not, despite the fact that, in the case of convertibles with small back seats, a tether could improve installation of a forward-facing CR.

One other issue related to tethers is attachment to hardware that is not a TA. Some caregivers have inadvertently used cargo tie-downs or fittings for a removable seat as tether anchors. In sedans, TAs generally are easy to find on the filler panel behind the back seat. In other vehicles, the only ways

to identify tether hardware are to look for icons identifying TAs, consult the vehicle owner's manual, or use the Safe Ride News *LATCH Manual*.^{*} If in doubt, and if none of these resources mentioned above is available, do not connect the tether to any hardware that "looks" like a TA. Whenever a tether anchor is available, best practice is to always use it with a forward-facing CR.

A tether:

- can increase installation tightness, particularly where there are contoured vehicle seats or seat belts anchored forward of the bight.
- is critical in reducing forward motion in vehicles with small back-seat space.
- may improve performance if the CR is installed with a lap belt rather than a lap-shoulder belt. Some special needs CRs REQUIRE the use of a tether.

The CPS Curriculum describes as "best practice" following all manufacturer instructions regarding use of TAs for children weighing over 40 pounds. A "real world" perspective is available in the *LATCH Manual*.

Curbside Notes

Using tethers:

- Use a tether on forward-facing CRs if an appropriate tether anchor is available.
 - Don't use a tether anchor if there is hardware that could be intended for another purpose, such as securing cargo or installing a removable back seat, AND if resources are not available to correctly identify tether anchors.
 - NHTSA does not recommend the use of 15-passenger vans for transporting children in CRs.
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Kids in Nontraffic Incidents

NHTSA tracking noncrash/nontraffic injuries and fatalities

NHTSA recently released the first report from the Not-in-Traffic Surveillance (NiTS) virtual data collection system. This system provides details about fatalities and injuries that occur in nontraffic crashes and noncrash incidents. While incidents involving children in and around parked cars have been the focus of attention recently, the report details the diverse scenarios and types of victims involved in the majority of incidents.

Motor vehicle-related fatalities and injuries can

occur in a variety of situations. The three major categories of such fatalities and injuries are traffic crashes, nontraffic crashes, and noncrash incidents. Since 1975, NHTSA has collected extensive information on fatalities that occur in traffic crashes through the Fatality Analysis Reporting System (FARS). Beginning in 1979, the National Automotive Sampling System (NASS) has provided national estimates of the number and nature of traffic crash injuries.

Data regarding nontraffic crashes and noncrash incidents had not routinely been collected by NHTSA until recently. In 2007, Congress required the Secretary of Transportation to establish and maintain a database of motor vehicle-related fatalities and injuries that occur in nontraffic incidents under the Cameron Gulbransen Kids Transportation (K.T.) Safety Act. NHTSA now estimates 262 children ages 14 or younger are killed and 115,000 are injured in nontraffic/noncrash incidents each year.

Nontraffic crashes include single vehicle crashes on private roads (responsible in 2007 for most fatalities), two-vehicle crashes in parking lots, and vehicles running into or over pedestrians in driveways. (The report does not include all-terrain off-road vehicles.) Nontraffic crashes resulted in an estimated 1,159 fatalities and 98,000 injuries annually. About half of the nontraffic crash fatalities and about one-third of the nontraffic crash injuries involved nonoccupants, such as pedestrians or bicyclists.

NHTSA realized all nontraffic crash reports could not be accounted for through databases and, therefore, calculated a statistical adjustment using the differences between death certificates and FARS fatalities reported and those fatalities anticipated in reviewing police reports.

More than half of noncrash fatalities occurred when a vehicle fell on a person who was under it or from unintentional carbon dioxide poisoning. The most common types of noncrash injuries seen in emergency departments were injuries while entering or exiting a vehicle (estimated at 164,000 per year), injuries from closing doors (estimated at 148,000 per year), and injuries from overexertion, such as while unloading cargo or pushing a disabled vehicle (estimated at 88,000 per year). Some other noncrash incident fatalities studied included falls from vehicles, fire in vehicles, and children left in hot vehicles or caught in automatic windows.

Another data source is the NHTSA Special Crash Investigation (SCI) program, which has studied

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selected NiTS incidents since October 2006. The SCI investigations have focused especially on children injured or killed as a result of backovers, power window strangulations, hyperthermia, and trunk entrapment. According to the Feb. 4, 2009, updated NHTSA website, there had been 697 possible NiTS incidents reported to SCI resulting in 84 in-depth investigations and 71 reports published. Of 64 cases reported by SCI at a 2008 Lifesavers Conference session, 50 cases were backover incidents, 45 of which involved children, as shown below.

Children's age range	Number of Children Involved
<1 year old	1
1-3 years old	31
4-8 years old	12
9-13 years old	1

Curbside Notes

Not-in-traffic incidents:

- Caution parents/caregivers that it is not safe for children to play with power windows, in trunks, and in and around vehicles.
- Refer to the following websites for additional information and programs:

<http://www.safekidsweb.org/cubscouts/default.asp>

<http://www.nhtsa.gov/staticfiles/DOT/NHTSA/NCSA/Content/NiTS/811085.pdf>

<http://www.safercar.gov> (for information on NHTSA's new consumer information program Keeping Kids Safe Inside and Out)

<http://www.kidsandcars.org>

<http://www.nsc.org>

Seat Belts and Pregnant Women**

A recent study provided evidence that seat belt use by pregnant woman could reduce fetal mortality and morbidity caused by automobile crashes. Almost 370 fetuses die each year in auto crashes (compared to approximately 160 infants under age one year). An estimated 62 percent of these fetal deaths occur among the 20 percent of pregnant women who are unbelted.

Using these statistics, University of Michigan researchers analyzed 57 crashes involving women at least 20 weeks pregnant and estimated that, annually, 192 fetal deaths (51%) might be prevented if all pregnant women used three-point seat belts.

This study, the most in-depth look so far at the details of fetal injury and crash dynamics, found that crash severity is the strongest factor affecting fetal outcome, and that seat belts reduce the risk of adverse fetal outcomes by 84 percent. In all but the most severe crashes, pregnant women who wore seat belts survived the crash without serious injury to themselves or their fetuses.

Curbside Notes

About pregnant women and seat belts:

- Teach pregnant women to correctly use a lap-shoulder seat belt. The lap belt must fit snugly across the hips and route underneath the bulge of the belly; the shoulder belt must be positioned across the center of the chest, between the breasts, and above and to the side of the belly.
- Reassure pregnant women that studies have shown that it is much safer for the baby if they wear seat belts.
- Pregnant women should remove or unfasten coats to make sure the clothing doesn't interfere with good belt routing.
- Help educate obstetric and family practice physicians and nurse practitioners about the importance of providing seat belt education to pregnant patients.
- Remind all adult vehicle occupants that air bags are a supplemental restraint to be used with the seat belt.
- Remind pregnant women to seek medical care if they are involved in a crash, even if there is no apparent injury.
- Refer to the 2007 National Child Passenger Safety Certification Training Student Manual, Chapter 12, "Kids in Seat Belts," pp. 188-189 for correct seat belt fit for all occupants.

Reference: *Klinich, KD; Flannagan, CAC; Rupp, JD; et al. "Fetal Outcome in Motor-Vehicle Crashes: Effects of Crash Characteristics and Maternal Restraint." American Journal of Obstetrics & Gynecology. 2008, 198: 450.e1-450.e9.*

***Safe Ride News, July/August 2008*

Features of 2009 Vehicles Relating to CPS **

Auto shows offer excellent opportunities to assess and compare features of current models that increase or decrease ease of installation for child restraints. Overall, vehicles today offer a much safer environment for all passengers, but there are some

features that are especially important for CR installation of which CPS technicians should be aware.

Some, but not many, model year 2009 vehicles have more than the minimum two LATCH positions—17 vehicles according to results of a manufacturers' survey done by Safe Ride News Publications and published in the 2009 *LATCH Manual*. About half of the vehicles that offer three LATCH positions are not three-row vehicles, but sedans or hatchbacks with LATCH in all rear passenger positions. Several, the Audi Q7, Honda Pilot, and Mercedes Benz GL-class and R-class, offer four LATCH positions, while the Toyota Sienna minivan has five positions.

The predominant method used to indicate lower anchors appears to be 1/2-inch diameter plastic dots—without icons—on seatbacks above each bar. Other labeling methods include cloth tags and labeled plastic caps.

Twenty-four 2009 vehicle models have more than the minimum number of tether anchors (TAs), compared to 15 models in 2007. This suggests that vehicle manufacturers are recognizing the need for more child restraint tethering options. Eleven current models offer five or more tether anchors. Labeling methods for these also vary: covered or uncovered, clearly labeled or not. Some TAs, even though not visible, have no labeling at all. There are also many vehicles in which unmarked tether anchors are located close to other hardware that might be confused with tether anchors.

Seat belt design appears more uniform, with almost all lap-shoulder belts having switchable retractors rather than locking latchplates. Also, since model year 2009 is the second year that lap-shoulder belts are required in all rear seating positions as a result of Anton's Law, appropriate seat belts for booster seats are in all back seat positions. This helps reinforce efforts by NHTSA and many other organizations to increase booster use among 4- to 8-year-old children. At the same time, some seat belt buckle designs and locations present challenges for CR installation. While buckles are more likely to be on shorter stalks than in the past, many are now recessed into the seat cushion forward of the seat bight. In many vehicles, buckles are tilted forward at a set angle (approximately 45 degrees). This may increase comfort and

belt fit for adults, but could make it harder to tighten the seat belt for a child restraint. CPS technicians should be aware of the benefit of using lower LATCH anchors to avoid this problem. Technicians should keep in mind that, if it is necessary to use such a belt system despite its problematic fit, a tether would be particularly useful for improving installation for a forward-facing CR. Two instances in which this could occur: use of a CR for a child weighing over the limit of the lower anchors, or installation in a center rear position with no lower anchors.

One other design element of note is the prevalence of contours and bulges in center back seats due to the installation of wide flip-down armrests with cup holders. These may make installation of a CR in the center back seat more difficult. Such armrests also may decrease comfort for children using seat belts or backless boosters in that position.

** *Safe Ride News, November/December 2008*

Curbside Notes

On new vehicle designs:

- Encourage tether use in all forward-facing installations.
 - Refer to the owner's manual to determine correct tether anchor locations.
 - Teach parents/caregivers the way to lock a switchable retractor system, even if they are currently using the LATCH system.
 - Do not assume a center position is a designated LATCH position. Use the seat belt there, unless both the CR and vehicle manufacturers state that it is safe to use the seating position with lower LATCH attachments. If the owner's manual does not specify this, refer to the 2009 *LATCH Manual*. Check fit of a CR in the center rear, given possible impact of seat contours and/or armrests on installation/child comfort.
 - Refer to the 2007 National Child Passenger Safety Certification Training Student Manual, Chapter 4, "Seat Belt Systems With Pre-Crash Locking Features," p.41, and Chapter 5, "Seat Belt Systems Without Pre-Crash Locking Features," p.57.
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When Best Practice and the Real World Collide

Collision Over Nonregulated Products

As the last official step in their CPS class, students seemed eager to share their newly learned skills as the car seat check began. Soon two vehicles arrived. The first included a newborn-looking infant riding rear facing, and immediately there were quiet comments from students: "Check out those dangling toys! We should look in the instructions about the handle being up." "Wow, look at those double head inserts and big harness covers. Their colors don't match the CR!" "Uh oh, Dad's head restraint is too low."

The instructors just observed until called to check the students' work before the car left. The leading student technician presented his documentation: "Dad reinstalled CR/1-inch test, harnesses snug, handle/toys ok per manufacturer instructions, Dad removed head inserts and larger harness covers after explanation of nonregulated products, was shown how to use rolled infant blanket and diapers beside the baby's head/body for the trip home. Dad extended own head restraint to correct level." The "almost techs" were off to an excellent start.

The next vehicle presented some bigger challenges. Suction-cup style side window shades hung on both outboard windows. Two towels were double folded under a forward-facing convertible, which was installed in an outboard position using a belt-tightening tool. The techs seemed in deep discussion with the mom.

Final documentation read: "Parent was advised about best practice, but refused to remove window shades. Instructions verify towel acceptable. Mom allowed the belt-tightening tool and one towel to be removed and the other towel to be repositioned with only one layer under CR. Mom reinstalled CR using LATCH and tether to 1-inch test." When asked why they allowed the mom to leave with the two shades still attached, the lead student tech answered, "That was her tough choice. She agreed to talk it over with her husband. My job was to advise and educate and then document." Wow. These new "techies" were really "getting it."

Curbside Notes

Nonregulated products:

- Many CRs sold for infants come with padded inserts for small babies. These are dynamically

tested with the CR and are considered "regulated."

- The term "after-market products" has been replaced in the 2007 CPS curriculum with "nonregulated products." Even though a product may bear a label stating it "meets all applicable federal standards," there is no federal standard to cover crash-protection aspects of these products at this time.
- Educate parents/caregivers about reasons for not using nonregulated products, but let them know it is up to them to make the "tough choices." Be sure to document their decisions.
- Note: some manufacturer instructions suggest a towel may be used beneath CRs. The current best practice regarding protecting the vehicle cushion is to recommend no more than a single layer of toweling.
- Best practice is to use a rolled towel or blanket to position a smaller infant in his/her CR. In the real world, sometimes a soft rolled diaper may be used as a substitute.
- Some CR manufacturers produce soft toys and extra padding for their CR models. Use is allowed if both CR and item brand names match and the item is specifically made for the manufacturer's CR line.
- Make clear that long, nonregulated harness covers may interfere with positioning of the harness clip and may even prevent tightening the harnesses appropriately. Hint: look to see if the covers match the fabric of the CR.
- Advise parents/caregivers that both CR and vehicle manufacturers have stated that belt-tightening devices should not be used to install any CR in any vehicle. Demonstrate how to correctly tighten a LATCH or how to make the seat belt tighter.
- Refer to the 2007 National Child Passenger Safety Certification Training Student Manual, Chapter 3, "Who Makes the Rules?" p.38.

Tools for Techs

• Safety of pregnant women and unborn babies in crashes

The NHTSA website provides a pdf pamphlet to educate pregnant women on correct seat belt use. <http://www.nhtsa.dot.gov>

The Advocates for Auto Safety During Pregnancy website includes case studies,

statistics, and a share-a-story feature. <http://www.pregnantcrash.org>

- **Replacement vehicle owner's manuals**

Available on this site for the following makes and brands: Acura, Honda, Ford, Jaguar, Lincoln, Mercury, General Motors, GMC, Oldsmobile, Hummer, SAAB, Lexus, Toyota, Scion, Hino, Hyundai, Isuzu, and Mitsubishi Motors. Technicians and parents/caregivers need to know the vehicle's model, year, and vehicle body type in order to view or order free manuals. <http://www.motorcraftservice.com>

Save the Dates!

1. 2009 Kidz in Motion (KIM) Conference

August 29-31, 2009, Fort Worth, Texas, at the Omni Fort Worth Hotel

NICU Pre-Conference Session, August 28-29, 2009

Technician Toolbox Pre-Conference Session, August 29, 2009

Pre-conference session requires preregistration. See details on conference website.

Visit www.kidzinmotion.org for more information or call 407-306-9824.

CEUs (approximately 10 to 15) will be available (see conference agenda). kimconf@hiwaay.net

2. CPS Week 2009 — Make your plans now!

September 12-18, 2009

Seat Check Saturday, September 12, 2009

3. Twice each year, in June and December, the CPS Board will draw the e-mail address of one technician or instructor who is signed up for the board's e-mail automatic notification list.

4. The winner will be contacted by e-mail and be given up to one month to present proof of two completed quizzes.

5. Each winner will have the \$40 or \$60 fee paid for her/his next recertification, when all other requirements for recertification are completed.

We thank Safe Kids Worldwide for making this recertification prize possible.

Be a Winner! Read the Tech Update!

Send comments or suggestions for Tech Update to Mary at mary@saferidenews.com.

Sign Up for Free Recertification Drawing

Join the listserv at www.cpsboard.org and the team of techs and instructors who read Tech Update for CEUs. This makes you eligible to WIN a free CPS recertification—a \$40 or \$60 value from Safe Kids Worldwide.

1. If you have not done so already, sign up for the e-mail list for automatic notification of updates to the CPS Board website: www.cpsboard.org/elist.htm.

2. Read two issues of Tech Update and take the quizzes found on the "Online Recertification CEUs" page: <http://www.cpsboard.org/ceus.htm>. Maintain and file quizzes for proof of participation.

- *Tech Update* is published by the National Highway Traffic Safety Administration and the Child Passenger Safety Board (www.cpsboard.org) for certified Child Passenger Safety Technicians and Instructors.

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