



# Child Passenger Safety TECH REPORT

## New Child Restraints Coming in 2000

The International Juvenile Products Show, held annually in Dallas in the fall, provided a look at the CRs that will be available the year ahead. The products displayed indicate that innovation is alive and well in the industry. *Please note: this article does not list every CR from each manufacturer.*

### Weight Limits Expand

The good news from this year's show, held October 22-26, 1999, is that the range of weights for various categories of products is expanding. Most striking: the entire range of the year-2000 line of convertible child restraints (CRs), with the exception of all **Kolcraft** and older **Century** models, is now certified to at least 30 pounds rear-facing.

**Cosco** now rates its convertible CRs to 35 pounds rear-facing. Its **Alpha Omega** system also has a higher upper limit. It is designed for use from 5 to 80 pounds. Harness and headrest are raised and lowered together, so harness straps do not have to be rethreaded for height adjustment. It is available with a tray shield or a 5-point harness.

The **Fisher-Price Futura**, expected in 2000, breaks new ground as the only forward-facing combination CR/booster that can be used to 60 pounds with a harness but **without** a top tether. The safety belt goes through the belt path from front to back to front. A tether is available to anchor the Futura more securely if vehicle belt fit presents a problem.

The **Cosco** line of belt-positioning boosters (BPBs) and the **Fisher-Price Safe Embrace** booster are rated to 80 pounds. The **Britax Roadster** booster is rated to 100 pounds and **Star Riser** to 80 pounds. Both have height-adjustable backrests.

**Century's STE 1000, 2000, 3000** and **3500**, and the **Encore** and **Ovation** T-shields remain rated to 22 pounds rear-facing; however, the tray shield and 5-point harness version of the **Encore** and **Ovation** are certified to 30 pounds. **Graco**, which now owns Century, offers a few CRs under its own name, including the **Cherish** car bed (for low-birthweight infants up

to 9 pounds).

Models in a colorful "race car line" of **Cosco** CRs are equipped with 5-point harnesses, like those worn by race drivers, along with logos used by racing circuit veterans Mark Martin and Dale Earnhardt. This NASCAR-style marketing effort may encourage parents to appreciate the effectiveness of 5-point harnesses.

### Tethers, LATCH\* Attachments

The new **Britax** infant-only seat, **Handle with Care**, also comes with a tether. Its convertible seats have Y-tethers attached at two points at the top of the shell for use both forward- and rear-facing. The **Handle with Care, Roundabout** convertible, and forward-facing **Freeway** come with built-in safety belt lock-offs. **Britax** specifies the minimum age of one year as well as a minimum weight for facing the child forward.

Only **Fisher-Price** appears ready to go in early 2000 with the LATCH universal attachment on its convertible model. It will use straps that hook for the lower attachments. **Evenflo** plans to have lower LATCH anchorages (straps) available on the **Medallion** convertible but will market it under a different name.

This spring Volvo will introduce two rear-facing CRs with an interchangeable base mounted with rigid LATCH attachments. The larger seat fits children nine months to three years.

### Infant Restraints

For infants, the **Evenflo On the Go, On My Way**, and **Position Right**, have adjustable recline features, as do a number of infant-only and convertible CRs made by other manufacturers.

The **Goor Infant CR**, by **Xportation**

### " LATCH "

#### New Term for Universal Anchors

LATCH stands for Lower Anchors and Tethers for CHildren. U.S. vehicle and child restraint manufacturers, along with NHTSA, have agreed to use the acronym LATCH to refer to the uniform CR attachments and vehicle anchorage systems previously called ISOFIX or UCRA. In other countries, the term is still ISOFIX.

**Safety Concepts**, is designed with an impact-absorbing outer shell for use in front passenger seats with air bags. It is not yet in production.

### Convertibles

The **Fisher-Price Safe Embrace Convertible** appears structurally unchanged from preceding years, but the padding underneath the buckle and on shoulder straps has been eliminated. **Fisher-Price** now specifies one year minimum age for facing a child forward in this model. Its rear-facing weight limit is now 30 pounds. Like the **Britax** seats, the **Safe Embrace** has safety belt lockoffs on the sides of the shell, eliminating need for a locking clip.

**Evenflo** is making a number of changes: The **Scout**, now called the **Secure Choice**, is rated up to 30 pounds rear-facing and is priced low for the institutional market only. The **Conquest** uses the **Horizon** mold but will be less expensive; the **Horizon** will be continued at a higher price.

The **Safeline Sit'n'Stroll** combination car seat/stroller is now certified for rear-facing use only to 22 pounds. This is a reduction from the 30 pound limit of this seat before 1997, when it was the only CR with such a high limit. (In 1997, its limit dropped to 25 pounds.)

### Boosters

There now are only two backless belt-positioning boosters: the **Grand Explorer (Cosco)**, which has a removable shield, and **Right Fit (Evenflo)**, which has no shield.

The **Teddy Bear** high-back booster (**LaRoche Brothers**) is rated to 80 pounds. **LaRoche** also markets a bigger version, the **Grizzly Bear**, rated to 95 pounds.

New but not yet available in this country is the **Britax Laptop**, a shield made of impact-absorbing foam for use with the vehicle lap or lap/shoulder belt, rated to 65 pounds.

### On the Horizon

Several overseas companies exhibited their child restraints, but none are available yet in this country. Most innovative was the **Early Development** three-stage CR for children from birth through six

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## Technical Questions

**Q. Why are some of those forward-facing "combination CR/booster seats" labeled for children as light as 20 pounds when they do not specify a minimum age of one?**

**A.** "Combination child restraint/booster" devices are suitable for small children who reach 20 pounds after their first birthday. The "over age one and at least 20 pounds" rule of thumb for the use of forward-facing restraints is considered best practice by the American Academy of Pediatrics. However, child restraint manufacturers generally base their recommendations on weight, because the federal standard (FMVSS 213) is based on tests with dum-



## New products, from p. 8

years of age. The system comes as an infant-only seat and a forward-facing seat that lock into a single base. The base is secured to the vehicle with a rigid LATCH attachment. Later the forward-facing seat can be used without the LATCH base as a belt-positioning booster for older children. It is available only through Toyota Japan.

**Early Development** also showed the **Guardian Comfort** convertible CR and the **Double-up**, a booster with a reversible base that allows for height variations.

## New Accessory Wins Award

The **Mighty-Tite Car Seat Belt Ratchet**, from **Sunshine Kids Juvenile Products**, is a device for tightening the safety belt around a CR. It received an award for innovative design from the Juvenile Products Manufacturers Association. It may be useful for people with limited strength.

### Vehicles with LATCH Anchors

At this time, the 2000 Ford Windstar and Focus and the Volkswagen Beetle, Jetta, Golf, and Cabrio have lower LATCH anchor points installed. All new Audis and other VW models can have LATCH anchors retrofitted. Starting this spring, Volvo station wagons will have them also.

mies of specific weights. The rule does not deal with age or developmental concerns (see companion article, page 11).

Unfortunately, a parent who is looking for a seat that will fit her child for the longest possible time may want to move from an infant-only seat into a combination seat before her baby is old enough to be facing forward. Since many older brochures, books, and even child restraint instructions state that children can face forward when they can sit up unsupported, this may lead parents to put a child of seven or eight months into this type of product. Twenty pounds is the weight of the average baby at nine months of age, which means that more than half will reach that weight before age one.

Parent education should stress using a product for the infant that allows the rear-facing position up to 30 pounds. If manufacturer instructions for forward-facing products rely solely on weight for the minimum size, explain to parents why it is still preferable to face the baby rearward until age one.

**Q. I hear that some child restraints should not be used on a vehicle seat that has a fold-down armrest? What's the problem?**

**A.** This instruction is related only to rear-facing seats from Evenflo. It apparently is based on one case some years ago in which an armrest in an unidentified vehicle caused injury when it flopped down in a Canadian crash. No other manufacturer includes such a warning on its products.

The vehicle manufacturers do not consider the armrest to be a problem. Some use inertial locks in their vehicles so armrests do not unfold in a crash.

Technicians can suggest that concerned parents check the vehicle instructions to see if there is any warning against use of a rear-facing restraint in the center position with an armrest. Explain the potential concern of Evenflo and also tell them that in general the center of the back seat is well documented as the safest position in a vehicle during a crash. Let parents decide where to install their baby's restraint after you have given them complete information.

## NHTSA Issues Side Air Bag Advisory

Out-of-position children seated in close proximity to a side-impact air bag may be at risk of serious or fatal injury, especially if the child's head, neck or chest is very close to the air bag when it deploys. This is the advice issued by NHTSA on October 14. Because of the variations in design and performance of side air bags, the agency asked manufacturers to notify consumers whether it is safe for children to sit next to side air bags.

NHTSA also asked manufacturers of vehicles with rear side air bags to ship the vehicles to dealers with those air bags deactivated unless the manufacturer has determined that the bags impose no significant risk to children. It requested manufacturers to offer deactivation of rear side-impact air bags to current owners if the owner felt children would be at risk.

How close is too close? This is usually understood as meaning sitting unusually near the side of the vehicle or leaning against it. A properly restrained child in a BPB or lap/shoulder belt could potentially ride in this position.

Only a few vehicles currently come with rear-seat side air bags as standard or optional equipment. Manufacturers indicate that they have done extensive tests and found ways to minimize the risk to children. Some have built-in sensors for out-of-position occupants. Parents should check their vehicle owner's manual or call the manufacturer's customer information line if they have questions. In addition, they should make sure their children are properly restrained and make sure they do not lean against the side of the vehicle.

**Reference:** [www.dot.gov/affairs/nhtsa](http://www.dot.gov/affairs/nhtsa)



## Database of CPS Technicians Changing

There will be a transition of the list of certified CPS Techs who have signed waivers to allow their names to be listed publicly. Beginning at the end of January, the AAA list of people who have signed waivers will be used on the NHTSA web site. A separate list will not be kept.



## Using Child Restraints on School Buses: What CR Technicians Need to Know

As more and more preschool-age children are being transported to school and child care programs in school buses, school districts are aware of the need to transport these children safely. Child passenger safety technicians may be asked to help local districts use child restraints correctly on buses.

NHTSA has conducted tests and prepared guidelines for the use of child restraints on school buses. Crash tests of preschool-size dummies in school bus seats and various restraints showed that children under 40 pounds are safest in the school bus when transported in child restraints.

Based on this research, NHTSA now recommends that preschool children be transported in properly used CRs that meet FMVSS 213. In response to questions from school and child care transportation offices, the agency published *Guidelines for the Safe Transportation of Pre-school Age Children in School Buses\** in February, 1999. The goal was to assist school and other transportation managers in developing and implementing policies and procedures for the transportation of young children in school buses.

### The Role of the CPS Technician

The release of the NHTSA guidelines has led many school transportation providers to review their use of child restraints. In some cases, they want to insure that they are using their current CRs correctly. In others, they are just beginning to use child restraints, so child passenger safety technicians may be asked to help select appropriate restraint systems for a specific bus or to help instruct school bus drivers and monitors in correct use of CRs. Since technician training does not focus on this topic, this article may help technicians feel more confident about helping.

### Background for Technicians

Small school buses (under 10,000 pounds gross vehicle weight) are required

\* This document is available on the NHTSA web site, [www.nhtsa.dot.gov](http://www.nhtsa.dot.gov) or from Diane Wigle (see Contacts, next page)

by federal regulation to have lap belts in all seating positions. There is no federal requirement for large buses (over 10,000 pounds) to have lap belts.

Two states, New York and New Jersey, have required new large school buses to be purchased with lap belts for a number of years. Florida, California, and Louisiana added safety belts to their requirements for new large buses in 1999, but the belts will not be required until after 12/31/00.)

Retrofitting lap belts on large school buses is problematic (see below) and **is not recommended**. CPS Technicians may find cases in which lap belts have been installed inappropriately on existing buses. They may find one belt spanning an entire three-child seat or belts installed with inappropriate hardware or knotted around the seat frame. In these cases, it is important to point out the liability in using the belts and encourage the school transportation system to contact the distributor or manufacturer to learn if and how lap belts could be installed safely.

### Types of Child Restraints for School Bus Use

Using a small school bus whenever possible will eliminate the problem of how to anchor the CR to the bus seat. However, often infant and preschool passengers must be transported on large buses.

The same general rules for the selection and correct use of CRs for passenger cars apply to school buses. Some CRs fit better in a school bus than others. If anything, it can be more difficult to find the right CR for a school bus and more challenging to properly attach the CR to the bus. School buses offer many challenges, including very straight seats backs, closely spaced seats, and lap belts that may not be easy to reach or adjust.

Tethers cannot be used because there are no tether anchors in school buses. The directions that come with CRs are specific to passenger cars and light trucks. Despite the presence of tethers, CRs must continue to pass the 32" head excursion test with-

out a tether. (NHTSA crash tests have not shown a problem with head excursion for untethered child restraints on large school buses.)

School transportation managers must decide whether the transportation provider or the child's parent/guardian should provide the CR. It is easiest and safest for the school transportation provider to purchase and maintain all CRs. By limiting use to one or two kinds of CR, the transportation service:

- reduces the number of devices that bus drivers and monitors must be trained to use
- allows selection of a model or models that meet federal standards and will fit properly on buses used by the school system
- assures registration of the CRs with the manufacturer for recall notification
- allows the transportation department to maintain the equipment in good working order and remedy any recalls
- eliminates the risk that the CR has been used in a crash

Many school systems use a vest-type CR. The E-Z-On Vest and Besi Vest are the most widely used. They fit children over about age 2 (minimum waist size 22 inches). They can be used with a lap belt and a strap (called a cam-wrap) that wraps around the seat, to which the shoulder straps are hooked. The cam wrap also can be used if no lap belt is present. In that case, the vest is attached to the cam wrap at the hips as well as shoulders. The vests come in different sizes to fit children ranging from 20 to 160 pounds. The vest **MUST** be secured at the shoulders and hips.

### Large School Buses Without Belts

If transportation providers must use large school buses that do not have lap belts, they have two alternatives:

- install an integrated seat (preferred)
- use a vest with a cam-wrap

Integrated child safety seats are available for school buses and have the advantage of eliminating incompatibility. There are two sources: C.E. White Company and Thomas Built Buses. The C.E. White seat has a 5-point harness and can be installed



in any school bus. Its harness is certified for a 20-50 pound child facing forward. A rear-facing CR can be buckled in with an added lap belt. The Thomas Built system (called MOMS) can be installed only on Thomas buses. It uses two Century CR models (an infant and a convertible seat) attached with special straps to buckles built into the bus seat.

Retrofitting lap belts is not advisable. Lap belts can be added safely only to a bus seat that is "seat belt ready." Some buses come with seats that were reinforced at the time of manufacture, but most do not. The only way to correctly retrofit a school bus seat with lap belts is by getting reinforced seats from the vehicle manufacturer. It is very important to call the manufacturer or the distributor from which the bus was purchased regarding retrofitting reinforced seats.

Armed with this information and the guidelines mentioned above, a CPS technician can be very helpful to school transportation supervisors. However, it may not be possible to have a ready answer to every question. When in doubt, CPS technicians can always say "I don't know, but I'll try to find out."

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## Manufacturers:

C.E. White Co., 419/492-2157

Thomas Built Buses, 336/889-4871

E-Z-On Products, 800/323-6598

Besi Manufacturing, 800/543-8222

## RECALL: Kolcraft Infant Restraints

A handle defect in 754,000 Kolcraft infant-only restraints made between January 1, 1993 and June 30, 1999. The Rock N Ride infant seats are not part of the recall, while seats made since July 1, 1999 have newly designed handle mechanisms. This defect affects products when used as carriers, NOT when used as car seats.

Model numbers involved (check for first few numbers matching this list): 1312X, 1382X, 1383X 1384X, 1385X, 368XX, 43XXX, 7700X. Some are part of stroller-combination products. Kolcraft will provide a simple repair kit at no charge. Owners should contact Kolcraft at **877-776-2609** (24 hour toll-free line).

There have been over 3000 reports of problems and 42 injuries, ranging from skull fracture to scraps and bruises. More information from CPSC (800/638-2772 or [www.cpsc.gov](http://www.cpsc.gov)) or NHTSA (888/327-4236 or [www.nhtsa.dot.gov](http://www.nhtsa.dot.gov)).

## Facing a Baby Rearward to Age One: Understanding the Recommendation

Best practices for child restraint use keep changing, but it is very difficult to eliminate outdated advice. Outdated advice stating that babies can be turned to the forward-facing position at 20 pounds or when they can sit up unaided still appears in some pamphlets, child care books, CR instructions, and vehicle manuals. Not all physicians are aware of the current recommendation.

The use of age one as a guide for facing a child forward in a CR was proposed by SafetyBeltSafe U.S.A. in 1993 based on case studies documented in Europe and North America.<sup>1</sup> It was formalized by the AAP in its policy statement, "Selecting and Using the Most Appropriate Car Safety Seats for Growing Children,"<sup>2</sup> published in May 1996. Age one is not a magic moment when the spinal column is completely protected. It was suggested as a recognizable benchmark that could be met with products in the near term.

In 1996-97, the rear-facing weight limit on most convertibles was raised from 20 to 22 pounds. This followed the introduction of new dummies for use in FMVSS 213 tests. In 1997, several convertibles appeared with weights up to 30 pounds. The increasing willingness of manufacturers to go beyond the federal testing criteria for child restraints has brought changes since then. In 2000, most of the new convertible seats will accommodate a rear-facing 30-pound baby.

The ability of a baby to sit up alone does NOT indicate that the spinal column has developed enough to protect the spi-

nal cord. As Kathy Weber of the University of Michigan explained in a recent letter to the editor of JAMA, "It is important to face very young children rearward, not because of weak neck musculature, but because of incomplete ossification [hardening] of their vertebrae and their lax connecting ligaments. In a severe crash, forward motion of the head when the shoulders are held back can generate enough force on the neck to pull these flexible elements apart, leaving the spinal cord as the last link. Even minor stretching of the spinal cord can result in rupture and paralysis, while complete spinal cord separation and death can also occur."<sup>3</sup>

While spinal cord injury is rare in forward-facing babies, it is well documented. Since there are no data indicating such severe injuries in the rear-facing position, it makes sense to keep babies facing the rear as long as possible. With evolution of the standard and products, it eventually may be possible to keep children rear-facing up to age two or three, as in Sweden.

The extended use of current, rear-facing convertible CRs beyond age one (and over 20 pounds) would be limited by the seated height of the child, whose head should be below the top of the CR shell.

## References

<sup>1</sup> K. Weber et al, Investigation of Dummy Response and Restraint Configuration Factors Associated with Upper Spinal Cord Injury in Forward-Facing Child Restraint, Child Occupant Protection, 1993, SAE, 986.

<sup>2</sup> PEDIATRICS, Vol. 97 No. 5, May 1996, and on the AAP web site: [www.aap.org](http://www.aap.org) (click on professional education).

<sup>3</sup> Letters to the editor, Journal of the American Medical Association (JAMA), Nov. 10, 1999, or <http://jama.ama-assn.org/issues>.