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Consumer Information Regulations; Federal Motor Vehicle Safety Standards; Safety Rating Program for Child Restraint Systems; Notice and Final Rule

DEPARTMENT OF TRANSPORTATION

National Highway Traffic Safety Administration

[Docket No. NHTSA-2001-10053]

Consumer Information Regulations; Federal Motor Vehicle Safety Standards; Safety Rating Program for Child Restraint Systems

AGENCY: National Highway Traffic Safety Administration (NHTSA), DOT.

ACTION: Response to Comments, Notice of Final Decision.

SUMMARY: The Transportation Recall Enhancement, Accountability, and Documentation (TREAD) Act requires that, by November 2002, a safety rating for child restraints be established to create a consumer information program to provide practicable, readily understandable, and timely information to consumers. Consumers could use the information to make informed decisions on the purchase of child restraint systems (CRS). In addition, TREAD directed the Secretary of Transportation to take into consideration, ''whether to include a child restraint in each vehicle crash-tested under the New Car Assessment Program.'' In response to this mandate, the agency has decided to establish a consumer information program for add on child restraints based on ease of use. We believe that this consumer information program will encourage child restraint manufacturers to produce child restraints with features that make it easier for consumers to use and install, thereby, leading to increased correct use of child restraints and increased safety for child passengers. In addition, we have decided to perform two pilot programs to gather additional information about two other aspects of child passenger safety. One pilot program will subject child restraints to a 48 kmph (30 mph) sled test under the same test conditions as a proposed upgrade to FMVSS No. 213. The second pilot program will continue to include child restraints in the frontal crashes of our New Car Assessment Program. In 2003 and 2004, the agency will collect results from the vehicle tests and from the child restraint 30 mph (48 kmph) dynamic sled tests, as a pilot program, and not publish the results as consumer information. At the conclusion of the pilot program, and if analyses of the pilot program show this would be meaningful consumer information, the agency will seek public comments on a proposal for full implementation of the rating of vehicles for child protection and the dynamic child restraint test to commence in Model Year 2005. (By Model Year 2005, we mean October 2004 to coincide with the commencement of the fiscal year 2005 New Car Assessment Program.) We believe this consumer information will enable prospective purchasers to make better, informed choices about new child restraints and passenger vehicles.

FOR FURTHER INFORMATION CONTACT: Concerning issues related to the dynamic performance pilot program of the CRS, call Nathaniel Beuse of the New Car Assessment Program. For issues concerning the passenger vehicles pilot program, call Brian Park of the New Car Assessment Program. Both of these individuals can be reached at (202)-366-1740. For issues related to the ease of use rating, you may call Lori Miller of the Office of Planning and Consumer Standards at (202)-366-2191. You may send mail to these officials at: National Highway Traffic Safety Administration, 400 Seventh St., SW., Washington, DC 20590.

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I. Introduction

Congress has directed the National Highway Traffic Safety Administration (NHTSA) to develop a child restraint safety rating system that is practicable and understandable (Section 14(g) of the Transportation Recall Enhancement, Accountability, and Documentation (TREAD) Act, November 1, 2000, Pub. L. 106–414, 114 Stat. 1800) and that will help consumers to make informed decisions when purchasing child restraints. Section 14(g) reads as follows:

(g) Child restraint safety rating program. No later than 12 months after the date of the enactment of this Act, the Secretary of Transportation shall issue a notice of proposed rulemaking to establish a child restraint safety rating consumer information program to provide practicable, readily understandable, and timely information to consumers for use in making informed decisions in the purchase of child restraints. No later than 24 months after the date of the enactment of this Act the Secretary shall issue a final rule establishing a child restraint safety rating program and providing other consumer information, which the Secretary determines, would be useful to consumers who purchase child restraint systems.

This notice outlines the program that NHTSA will use to incorporate a new safety rating for child restraint systems. The agency will rate child restraints in 2003 for ease of use. In addition, we have decided to conduct two pilot

programs to gather additional information on the possibility of rating child restraints for dynamic performance, and, by installing such restraints in vehicles tested in our existing frontal New Car Assessment Program (NCAP), the possibility of rating these vehicles on their ability to protect children. NCAP currently gives consumers a crashworthiness rating for new vehicles in frontal and side impact crashes, and a crash avoidance rating in rollover. For Model Year (MY) 2003 and 2004 vehicles, we will conduct a pilot program and collect results for the vehicles subjected to NCAP frontal crashes with child restraints installed in the back seat. We will also conduct a second pilot program with child restraints subjected to a sled test. We plan to evaluate those results, but not publish them as part of NCAP during 2003 and 2004. If analyses of the pilot programs show either or both of these would be meaningful consumer information, we anticipate adding performance ratings for either or both in MY 2005 (By Model Year 2005, we mean October 2004 to coincide with the commencement of the Fiscal Year 2005 New Car Assessment Program.)

II. Discussion of General Issues Raised by Commenters

A notice was published November 6, 2001 (66 FR 56146), with the comment period closing January 7, 2002. Nineteen commenters replied. These responders were child restraint manufacturers, vehicle manufacturers, a testing laboratory, independent researchers, an insurance association, and consumer safety groups. Comments were provided regarding the agency's proposed rating system, and also cautioning that the agency should be alert to other issues. The other issues fell into two categories: (1) The most serious child safety problem comes from unrestrained children, and (2) retailers would only carry top-rated child seats, that would be the most expensive seats.

A. Major Safety Problem Is the Unrestrained Child

The Insurance Institute for Highway Safety (IIHS) argued, ''by far the biggest problem contributing to child injury and death in motor vehicle crashes is nonuse of restraints.'' IIHS cautioned that rating a child restraint might do nothing to get more children into a restraint. Evenflo, National Automotive Dealers Association (NADA), General Motors (GM), Children's Hospital of Philadelphia (CHOP), and Britax stated reservations similar to IIHS's.

The agency agrees that even the best child seat does little good if not used. The agency, manufacturers, local governments, and consumer groups have given a consistent message to the public to put children in age-appropriate restraints in the back seat of automobiles. This educational effort is bearing fruit: over the past decade the percentage of unrestrained child fatalities has decreased significantly.[1] Recent analysis found that, ''among children 0 to 3 years old, the percentage of fatalities where the child was unrestrained dropped from 58 percent in 1991 to 34 percent in 2000, mainly due to the increased usage of child restraint seats. This percentage dropped from 64 percent to 48 percent for the 4 to 8 year old age group, as lap and/or shoulder belt usage increased.'' Usage rates for child seats have also increased; in particular, during a rush hour survey, the under 5-age group had a child seat usage rate of 95% in 2000.[2] The agency and all safety groups must continue their efforts to get more children in age-appropriate restraint systems and to educate the public about the systems' proper use and installation.

Our belief is that an ease of use rating will help provide much needed guidance to consumers about certain child restraint features. We believe this guidance may help them choose the appropriate restraint for their child and vehicle. The goal is that an easy-to-use and an easy-to-adjust child seat will result in more children being properly restrained in the child seat. This increased correct use will increase the safety of child passengers. Our efforts to increase correct use of child restraints are not a substitute for our efforts to get all children in age-appropriate restraint systems. NHTSA and others will continue those efforts. This new child seat ratings program will add another element to our comprehensive program to increase restraint use among children and decrease child fatalities and injuries.

B. The Belief That Retailers Might Eliminate Lower-Priced Child Restraints

The Juvenile Products Manufacturers Association (JPMA) contended, ''* * * mass market retailers are free to pick and choose among the product models offered * * * Any of these retailers * * * could easily insist that it will handle only 'double five-star' child restraint models * * * Such a result would also likely lead to the elimination of lower-priced child restraints that have dynamic performance equal to or better than higher priced child restraints * * *.'' JPMA, GM, and the National Safe Kids Campaign voiced the same cautionary message, indicating that while the lower-priced CRS does an excellent job of protecting children, a safety rating system may have the unintended consequence of leaving some less-affluent families without a restraint. The groups giving child seats to lower-income families, ''* * * rely on those low-cost seats to distribute through their grass roots programs in order to reach families most in need.''

We do not believe that lower priced child restraints will be eliminated from the market. The agency purchased twenty child seats ranging in price from $23 to $250. Without divulging the cost of the child seats to the evaluators, we applied the ease of use protocol to rate the twenty CRS in a pilot study. In this limited investigation, our analysis showed no correlation between higher priced seats and higher rated seats. We also present information in the notice showing that low priced CRS could provide highly rated dynamic performance.

III. CRS Ease of Use Rating Program

A. Summary of Proposal

NHTSA modeled its proposed ease of use rating program on that used by the Insurance Corporation of British Columbia (ICBC) because ICBC developed reasonably objective criteria for what is ''good,'' ''acceptable,'' and ''poor,'' and NHTSA found ICBC's program to be repeatable. NHTSA proposed to rate ease of use features in four categories as A, B, or C, with A being the highest rating and C the lowest. NHTSA also proposed to take the ICBC rating one step further by combining the four category ratings into an overall ease of use rating. NHTSA proposed to rate each child restraint under the following four ease of use categories: Assembly, Evaluation of Labels/Instructions, Securing the Child, and Installation in Vehicle.

B. Summary of Comments

In general, the individual child restraint manufacturer's comments were similar to the Juvenile Products Manufacturers Association (JPMA). The child restraint manufacturers (Evenflo, Dorel Juvenile Group) commented that the proposed ease of use program was too subjective and they stated that they support a program that is based on objective criteria. In that respect, the

[1] Fatalities and Injuries to 0–8 Year Old Passenger Vehicle Occupants based on Impact Attributes, Technical Report DOT HS 809 410, National Center for Statistics and Analysis, 400 Seventh Street, SW., Washington, DC 20590, March 2002.

[2] *National Occupant Protection Use Survey—2000 Controlled Intersection Study,* Research Note DOT HS 809 318, National Center for Statistics and Analysis, 400 Seventh Street, SW., Washington, DC 20590.

child restraint manufacturers and JPMA provided recommendations to several areas of the proposal.

In general, the individual vehicle manufacturers comments were similar to the Alliance of Automobile Manufacturers (Alliance). The automobile manufacturers (General Motors, Toyota, Honda) and National Automobile Dealers Association supported an ease of use rating program. Ford did not state whether they supported the proposed program or not. Ford and the Alliance did state that they were unclear how the proposed program would apply to vehicle add-on and built in booster seats.

Advocates for Highway and Auto Safety, Safe Ride News, Child Passenger Protection Technical Consulting, Children's Hospital of Philadelphia (CHOP), Consumers Union, the Insurance Institute for Highway Safety (IIHS), and the ICBC generally supported the ease of use rating program. The Florida Child Passenger Safety and Resource Center suggested an alternative program; the National SAFE KIDS Campaign does not support an ease of use rating system, however, they do believe that communicating ease of use characteristics is important. Several commenters expressed their opinion that the ease of use ratings system should be presented in such a way as to not mislead consumers that it is a safety performance indicator.

The major issues discussed by the commenters are summarized below.

1. Inclusion of LATCH

NHTSA's proposal did not include ease of use evaluation criteria specific to Lower Anchors and Tethers for Children (LATCH).[3] Several commenters (General Motors, Advocates, CHOP, and the Alliance) recommended LATCH be included.

2. Forms for Each Type of Restraint

NHTSA's **Federal Register** Notice of November 6, 2001 included, as Appendix B, the proposed Ease of Use Rating Form. The first sheet of the form included a cover sheet to gather general information about the restraint; the type of restraint, make and model number, measurements, and size range for the restraint. The remaining sheets included the four proposed ease of use categories, the features under each category and the evaluation criteria for each feature. One of the choices for several of the feature criteria was non-applicable (n/a), intended to be the choice selected if that feature was not applicable to the restraint being evaluated. Also included in the notice was an Appendix C, which included an ease of use rating sample. This included a list of categories, the features under each category and sample scoring and rating for each. JPMA recommended NHTSA provide different criteria for the different types of restraints. They suggested that some child restraints would receive lower ratings because they may not have or need some features. Dorel concurred with JPMA, stating that they believe different types of child restraints will require separate, detailed criteria for each factor. Dorel stated, ''each type of child restraint has to have separate and distinct set of factors from which a rating will be assessed, otherwise certain types of child restraints will be unfairly rated.'' Evenflo recommended that NHTSA provide separate rear—and forward—facing ratings. Consumers Union ''urges inclusion of evaluation of ease of use of a convertible used rear-facing and forward-facing.'' Advocates also recommended that child restraints be rated in all positions recommended by the manufacturer.

3. Features and Feature Evaluation Criteria

NHTSA proposed to rate each child restraint in the same manner as ICBC, rating each child restraint based on two elements per feature, a fixed weighting factor for each feature and an ease of use rating for each feature that can change depending on the child restraint being rated. NHTSA proposed to rate child restraints under the following four ease of use categories: Assembly, Evaluation of Labels/Instructions, Securing the Child, and Installation in Vehicle. Each feature was given a fixed weighting factor as determined by the child restraint usability task force of ISO/TC22/SC12/WG1 (child restraints).[4] It is based on each ease of use feature being given an A, B, or C according to risk of injury and severity of misuse. [Component features that minimize misuse that would pose a high risk of injury if misused are given a fixed weighting factor of ''A.''] Each factor is assigned a numerical value, where A = 3 points, B = 2 points, and C = 1 point. In addition, NHTSA proposed to rate each feature in the four categories as A, B, or C, with A (3 points) being the highest rating and C (1 point) the lowest, using the same numerical values as used by ICBC. The form containing NHTSA's proposed rating system criteria can be found in Appendix A. Below is a summary of comments by category.

a. Assembly

ICBC recommended clarifying ''all functional parts * * * ready to use'' to confirm that a convertible child restraint, whether threaded for rear facing infant restraint use or forward facing restraint use is ''ready to use.'' ICBC also suggested rating the restraint based on the harness straps being set for the lowest rate range. JPMA requested a list of the components that will be evaluated under this feature. The proposed evaluation criterion for the ''ready to use'' feature states that a ''yes'' is an A and ''no'' is a C. Consumers Union recommended modifying the evaluation criteria to include a ''no tools required'' option.

JPMA recommended changing the evaluation criteria under ''owner's manual easy to find'' and ICBC recommended clarifying ''clearly visible location.'' JPMA also stated that ''obvious storage pocket for the manual'' should not be rated. Under the feature, ''obvious storage pocket for manual'' JPMA and Evenflo disagreed with downgrading the rating for child restraints using plastic clips to store instructions. Evenflo supports a rating based on accessibility of instructions when the child restraint is installed, but stated they were concerned about visibility of instructions and them being accessible to children. Evenflo suggested rating accessibility and visibility of the instructions at time of purchase under ''owner's manual easy to find.''

b. Evaluation of Labels/Instructions

Both ICBC and Evenflo recommended clarifying which features applied to labels and which applied to instructions. JPMA believes that NHTSA should prescribe exactly what it wants to see on labels and labels should not be part of a ratings program. Evenflo stated that they support a proposal to objectively evaluate consistency of information on labels. ICBC recommended under ''air bag warning in written instructions,'' that it not apply to booster seats. They also

[3] ''LATCH'' is a term used by industry and retail groups referring to the child restraint anchorage system required by Federal Motor Vehicle Safety Standard No. 225. LATCH stands for ''Lower Anchorages and Tethers for Children.'' The term is used to refer to vehicles equipped with the anchorage system (*e.g.*, ''LATCH vehicles'') and to child restraints equipped with attachments that connect to the anchorage system (*e.g.*, ''restrained with LATCH,'' or ''LATCH child restraints''). For convenience, we will use the term in this notice.

[4] Working group TC22/SC12/WGI, ''Child Restraint Systems,'' to the International Organization for Standardization (ISO), a worldwide voluntary federation of ISO member bodies, is considering developing an ease of use usability rating system for child restraint systems. The group has based its preliminary work on the rating system of ICBC, which is similar to NHTSA's work.

suggested adding a minimum size to the illustration. ICBC also recommended that ''information in written instructions and on labels match,'' be clarified to refer to size specifications only. Both JPMA and Evenflo expressed concerns about the ''durability of labels'' feature. NHTSA proposed that a restraint would receive an A rating if the child restraint labels were molded or embossed or a C rating if the labels were sticky or one or more are already peeling when the restraint is removed from the box. JPMA stated that a highest rating for molded or heat embossed would be very costly for child restraint manufacturers. Evenflo also stated that this feature should be addressed in rulemaking and not through an ease of use rating system. ICBC did not agree that molded or embossed labels were better than sticky labels stating that embossed labeling which is the same color as plastic of child restraint can be difficult to read. They suggested that durability of labels be handled by performance tests. Consumers Union recommended adding the following features to this category, ''Shows clear use of lower anchor system,'' and ''shows clearly when chest-clip has to be used.''

c. Securing the Child

JPMA stated, ''unless features under 'securing the child' can be converted to objective criteria they should not be included in the ratings program.'' They did agree with lowering the rating if the buckle can be secured in reverse. ICBC suggested that if the number of harness slots in the cover is not the same as the number of harness slots in the shell then the child restraint should automatically receive a C rating. Evenflo expressed concern that rating the number of harness slots would lead to consumer confusion. They also recommended investigating limitations imposed by patents for devices that reposition or adjust the harness. JPMA opposed a rating based on the number of harness slots. In addition to the proposed criteria rating ''harness adjustment easy to tighten and loosen when child restraint is installed,'' SAFE KIDS recommended a feature be included that rates ''easy access to shoulder harness height adjusters and harness tensioning devices.'' CHOP recommended NHTSA evaluate ease of use in regard to harness tightness. Consumers Union recommended moving ''ease of attaching/removing base'' from Securing the Child category to the Installation in Vehicle category. IIHS commented that these categories along with ''Installing in Vehicle'' are the most important categories.

d. Installing in Vehicle

NHTSA specifically asked for views and comment on the consideration of adding a feature ''Ease of tightening belt around child restraint.'' Advocates responded to this request by stating they support adding such a feature but did not provide any recommendations for objective criteria by which to evaluate this feature. Both JPMA and Evenflo stated that they disagree with the category because it lacks specific criteria. They suggested rating the following features: size of belt path, whether any belt positioning device allows seat belt slack, presence of feedback to identify proper seat back angle (rear facing only), presence or means to adjust back angle, and accessibility of tether adjustment when child restraint is installed in the vehicle. ICBC recommended, under ''ease of vehicle belt routing (hand clearance)'' that the male hand be better defined. CHOP recommended NHTSA evaluate ease of use in regard to child restraint tightness in the vehicle. Consumers Union recommended adding a new feature, ''fit to the vehicle.''

4. Weighting the Features

NHTSA proposed a weighting of the ease of use features similar to ICBC, where each child restraint is rated based on two elements per feature. Each feature is given a fixed weighting factor that remains the same for all child restraints. It is based on each ease of use feature being given an A, B, or C according to risk of injury and severity of misuse. [Component features that minimize misuse that would pose a high risk of injury if misused are given a fixed weighting factor of ''A.''] Each factor is assigned a numerical value, where A = 3 points, B = 2 points, and C = 1 point. The second element, which is based on rating the features of each child restraint, are similarly assigned a numerical value where an A rating = 3 points, a B rating = 2 points, and a C rating = 1 point. NHTSA proposed rating the category by taking the numerical value of the fixed weighting factor for each feature and multiplying it by the numerical value of that features rating. Point ranges for A, B, and C were determined through a 3-part split of the range of possible points for that factor, from the minimum (if all scores were coded ''C'') to the maximum (if all scores were coded ''A'') number of points. Appendix B of this final notice contains the ''NHTSA Ease of Use Rating Sample'' which was included in the proposed Notice. NHTSA also proposed using a ''limiting factor'' approach so that an overall rating could not be an A if more than one of the four categories was rated less than an A. Similarly, an overall rating could not be a B if more than one of the four categories was rated a C. There was only one comment addressing the weighting of the features. Consumers Union agreed that a seat should not receive an A rating if more than one out of the four categories is rated below an A or B and, they agreed with the determining factor for a B rating as well. They recommended this limiting factor approach be applied to the individual ease of use categories as well.

5. Low Cost Seats

General Motors responded to the agency's proposed ease of use rating system by stating, ''higher priced seats tend to have more non-safety related features that could affect ease of use rating.'' The National SAFE KIDS Campaign believes that with the rating system there will be a perceived correlation between higher rated seats and higher costs for child restraints. With this perception, they believe that low cost seats will less likely be produced. JPMA also expressed concern that lower cost seats would be forced from the market.

6. Subjectivity of Ease of Use Rating

JPMA, Evenflo, and Dorel Juvenile Group commented that the proposed ease of use program was too subjective and they stated that they support a program that is based on objective criteria.

7. Other Comments

Advocates recommended that along with the rating system NHTSA include recall information as a separately listed item that is rated. They suggested including recall information with each category. They also suggested that a product with no recalls would get high marks and a product with one or more recalls no points.

C. Focus Group Testing on Proposed Child Restraint Rating Program

Following the publication of the proposed rating program on November 6, NHTSA conducted research aimed at exploring the perceptions, opinions, beliefs, and attitudes of parents and caregivers regarding NHTSA's Proposed Ease of Use and Performance Ratings for child safety seats. This research was conducted in two phases. The first phase consisted of 21 in-depth, one-on-one interviews with caregivers who regularly transported children. These interviews took place in Baltimore, MD and explored how participants would interpret and use ratings. During the

interviews, draft versions of charts that provide the ease of use and performance ratings were tested. Using the findings of the in-depth interviews, minor changes were made to the chart displaying the ratings to make them easier to read. The findings of this research were used for phase two of this research and will be used to determine the direction of presenting consumer information concerning child safety seats.

The second phase involved conducting 12 focus groups to test ways to present ratings to consumers. Twelve focus groups were conducted, four in Minneapolis, MN, four in Phoenix, AZ, and four in Richmond, VA. Participants were recruited by a professional recruiting agency. Screening criteria used in selecting participants included: were a parent or caregiver of a child up to six years of age or expecting a child within the next three months; purchased or planned to purchase a child safety seat themselves or were as likely as the other parent or caregiver to purchase a child safety seat; regularly transported a child in an automobile (or planned to do so); did not work or volunteer for any organization involved in the regulation, advocacy, or policy setting for motor vehicles; did not work or volunteer for any organization involved in the regulation, advocacy, or policy setting for children's products; and were between 20 and 55 years of age. Key outcomes from these focus groups:

Choosing a Child Safety Seat

- For most participants, safety ranked among the top two or three considerations in purchasing a child safety seat, along with price and appearance.
- Most respondents did not believe that, in general, the more a seat costs the safer it is. They stated that additional costs for a child seat were mainly due to extra features such as cup holders or the make/brand of the seat. Many, however, believed that people other than themselves held the belief that the safety of the seat is correlated with its cost.
- Most participants said that ratings influence their decision-making process when making a purchase.
- Respondents overwhelmingly preferred the use of stars to rate the seats.
- Most participants believed safety ratings are assigned based on absolute criteria, *i.e.*, the product must meet certain specified requirements to get a given rating.

Ease of Use Rating

- Most participants reacted positively to the information tables they saw and said the Ease of Use Rating would help them when deciding on a child safety seat.
- Most participants preferred the chart that included the Ease of Use Criteria. They explained that they liked having as much information as possible, and because they valued some criteria over others, seeing all the individual ratings was more helpful.
- Most respondents said they understood that the Total Ease of Use Rating was derived from combining the ratings on each Ease of Use Criterion.
- Most reacted positively to the use of a letter grade scale for the Ease of Use Rating because it differentiated the Ease of Use Rating from the Performance Rating that would be assigned based on the child seats performance in dynamic tests.

Performance Rating of Child Restraints in Dynamic Testing

- The Performance Rating was well received by participants, with many saying that it was more important than the Ease of Use Rating. However, many said that they wanted more information on how the ratings are derived and what constitutes ''serious injury.''

Combining Ratings

- Most participants said they would not want a rating that combined performance and ease of use. They mentioned that they usually like more information to be available and that a combined rating might be misleading.

Brochure

- Participants stated that a brochure including one of the charts they viewed should also include information on different harness types, price ranges of individual seats, explanations of the tests that are done when a seat is rated, and explanations of the column headings on the chart. Respondents said that the brochure should use color and graphics and text should be in a bullet-point format.

D. Response to Comments and Final Ease of Use Rating Program

The agency reviewed and considered all the comments. NHTSA's responses to the comments are below. Along with the responses to the comments, the final ease of use rating program is also presented. The final Ease of Use rating and scoring forms used for child restraints can be found in Appendix C of this notice. This ease of use rating program will apply to add on child restraints only. In developing an ease of use ratings program, NHTSA did not consider built-in child restraints, thus the features and rating criteria are designed to evaluate only add on child restraints. In order for NHTSA to evaluate built-in child restraints, a modified set of criteria would need to be developed. Based on the time frame for implementing the child restraint ratings program, developing and testing criteria to rate built-in child restraints is not possible. However, rating built-in child restraints may be explored by the agency in the future.

1. LATCH

The agency concurs with the commenters' belief that the ease of use rating program should include an assessment of a child restraint's incorporation of LATCH. LATCH will be the standardized means of attaching child restraints to vehicle seats in the future, so it is reasonable to include LATCH in the rating program. To address LATCH, we expanded some features within the ''Evaluation of Labels,'' ''Evaluation of Instructions,'' and ''Installing in Vehicle''categories. Certain features in these categories were identified as being appropriate for addressing LATCH, in addition to assessing attachment of the child restraint by way of the belt system. These are discussed below. NHTSA is also considering incorporating other LATCH features into the ease of use program, such as ease of attaching LATCH attachments to the vehicle anchors. The agency will be considering the work of the ISO/WGI Usability Task Force in developing other ways of assessing LATCH in the agency's ease of use program. The agency will request comments on how other aspects of LATCH should be addressed in the future.

Two LATCH features have been added to the ''Evaluation of Labels'' category. The first is ''Shows how to prepare lower LATCH attachments for use.'' An A rating is ''visually obvious and able to use with illustration only, no need to read text, or no illustration required,'' a B rating is ''Illustrations plus written instructions provided, need to read text,'' and a C rating is ''Written instruction only provided or nothing.'' This feature's fixed weighting factor is A. The second added feature is ''Shows how to use lower LATCH attachments.'' An A rating is ''visually obvious and able to use with illustration only, no need to read text. This feature has the same B, and C rating criteria and fixed weighting factor as the first feature. To get an A rating under the feature ''shows how to use lower LATCH attachments,'' NHTSA believes that having an

illustration on the label showing the attachments connecting to the vehicle anchors will provide consumers with clear information about how this new technology is to be used. NHTSA believes that providing consumers with visual obvious and instruction on preparing and using this new technology is important for not only ease of use, but for correct use, which in turn results in increased safety for child occupants.

Three LATCH features have been added to the ''Evaluation of Instructions'' category. The first is, ''Instructions describe how to prepare lower LATCH attachments for use.'' An A rating is ''Visually obvious and able to use with illustration only, no need to read text, a B rating is ''Illustrations plus written instructions provided, need to read text,'' and a C rating is ''Written instruction only provided or nothing.'' The fixed weighting factor for this feature is a B.

The second is, ''Instructions show how to use lower LATCH attachments.'' The A, B, and C ratings are the same as the first as well as the fixed weighting factor. The fixed weighting factors are lower for these features (weighting factor is B) under the ''Evaluation of Instructions'' category than under the ''Evaluation of Labels'' category (weighting factor is A) because NHTSA is aware that many consumers look only at the labels for instruction and not the instruction manual.

The third is, ''Orientation for LATCH tether and lower attachments.'' An A rating is ''Correct orientation of LATCH tether and lower attachments clearly illustrated or text clearly states that it can be used in any orientation,'' a B rating is ''Correct orientation of LATCH tether and lower attachments explained only in text,'' and a C rating is ''No information regarding orientation of LATCH tether and lower attachments.'' This feature is not applicable if orientation cannot be changed. The fixed weighting factor for this feature is a B. This feature is similar to ''Buckle can be secured in reverse'' feature under ''Securing the Child.'' NHTSA included this feature because of experiencing some LATCH hardware which when reversed was difficult to un-attach. Orientation for LATCH tether is not applicable to rear facing restraints or booster seats.

Two LATCH features were also added to the ''Installing in Vehicle'' category: The first is, ''Can LATCH attachments interfere with harness.'' An A rating is ''No'' and a C rating is ''Yes.'' The fixed weighting factor for this feature is an A. This was included to coincide with the ''Separation of vehicle belt path from harness'' criteria for seat belts out of concern that if there is interference of the LATCH attachment (or seat belt) with the harness, it could prevent the harness from being properly adjusted on the child. The second is ''LATCH tether and lower attachments can be installed in reverse.'' An A rating is ''no, or yes but works in usual way,'' a B rating is ''yes, but usual release requires more effort,'' and a C rating is ''yes, and can't release.'' The fixed weighting factor for this feature is a A. This feature is similar to ''Buckle can be secured in reverse'' feature under ''Securing the Child.'' NHTSA has seen some LATCH hardware, which can be reversed and is difficult to un-attach if this is done. The tether features being rated do not apply to rear facing restraints. Also, if a child restraint does not have LATCH (*e.g.*, booster seats) then these features will not be rated.

2. Forms for Each Type of Restraint

While the agency published one set of forms encompassing all rating criteria, NHTSA was aware that not all features would apply to all restraints and thus had not intended to rate all child restraints with all criteria. NHTSA recognized that this caused confusion among commenters and agrees that separate forms should be used for the different types of restraints. NHTSA has revised its forms and the final ease of use rating program has three sets of forms, which can be found in Appendix C. One set will be used to rate infant or convertible restraints used rear facing. Another set will be used to rate convertible restraints forward facing, forward facing only, and transitional forward facing/booster with the harness. The third set will be used to rate booster seats and transitional forward facing/booster as a booster.

NHTSA also agrees with comments recommending rating dual or multiple purpose seats each way. Therefore, a convertible restraint will be rated both rear facing and forward facing. A combination forward facing/booster will be evaluated as a forward facing restraint and as a booster seat. NHTSA is also aware that some of the features apply to some child restraints but do not apply to others, for example, under ''Evaluation of Labels'' and ''Evaluation of Instructions,'' one of the features is ''shows which harness slots OK to use.'' When evaluating a convertible seat, there are harness slots in this type of seat that can only be used forward facing while the others are used for rear facing, therefore this feature applies and thus would be rated. When evaluating a forward facing only or transitional forward facing/booster with the harness it would be ''n/a'' because all the slots can be used in the forward facing position. This is taken into consideration when scoring. This issue is discussed later in the notice under the section titled ''Weighting the Features.''

3. Features and Feature Evaluation Criteria

Below, comments on the final features and feature evaluation criteria are addressed by category. This section also lists the final features within each category. Each of the forms, located in Appendix C has the categories, the features and the feature evaluation criteria listed.

a. Assembly

NHTSA concurs with ICBC that we should clarify the language under ''all functioning parts * * * ready to use.'' NHTSA also agrees that adding ''harness straps set for lowest rate range'' to this feature was a good idea. NHTSA believes that this is a sufficiently clear criterion to describe whether a restraint, when taken out of the box, is ready for a consumer to use. The proposed evaluation criterion for this feature was: an A was ''yes,'' and a C was ''No.'' There was no B rating. NHTSA has adopted Consumers Union's recommendation to add a ''no tools required'' criteria and has modified the evaluation criteria to reflect this. Under this feature, an A is ''yes,'' and B is ''No, tools not required,'' and C is ''No, tools required.'' For a convertible seat used rear facing this feature will be rated. Then, when evaluated as forward facing, this feature will not be rated. The same applies for a transitional forward facing/booster seat with harness. When this restraint is being rated as a forward facing restraint this feature will be rated. Then, when it is rated as a booster seat this feature will not be rated.

NHTSA has clarified the feature ''Owner's manual easy to find'' and the evaluation needed to get an A rating for that feature. The feature now states ''Owner's manual easy to find when taken out of box'' and ''A'' was clarified to say, ''Attached to child restraint in a clearly visible location.'' The evaluation criteria for B and C remain the same. ''Attached to child restraint in a clearly visible location'' does not mean the manual has to be in the storage compartment. In many cases NHTSA found manuals clearly visible in plastic bags attached to the child restraint harness when the restraint was taken out of the box. NHTSA would give these seats an A rating for this feature.

NHTSA believes that the feature ''storage pocket for the manual'' is an important feature to rate for ease of use

because if consumers can access and store the manual easily, they will be more likely to keep it with the restraint and refer to it if need be. NHTSA found that the term ''pocket'' was misleading in that we were referring to an actual storage system, not just a pocket. Therefore, NHTSA has replaced the word ''pocket'' with ''system.'' NHTSA reviewed JPMA and Evenflo's comments to provide a lower score to a child restraint that uses plastic clips as the tool for storing instruction manuals. After testing the ease of use in relation to plastic clips, NHTSA has modified its evaluation criteria. NHTSA found that in many cases it was easy to remove and replace the manuals on child restraints that used plastic clips for storage. Therefore, under ''Storage system for manual,'' the revised evaluation criteria are as follows: an A rating is ''manual removed and replaced easily,'' and a C rating is ''manual cannot be removed and replaced easily.'' There is no B rating. This revised evaluation criteria also addresses the concerns Evenflo had about accessibility and visibility of the instructions when the restraint is installed.

The rating forms, located in Appendix C include the categories, the features and the feature evaluation criteria. Listed below are the features under the Assembly category that will be in NHTSA's final rating program:

(1) All functioning parts including seat pad or cover attached and ready to use; harness in lowest usable slots; includes tether attached (tether attached applies to forward facing only restraints and transitional forward facing/booster seats used with the harness);

(2) Tether attached to child restraint (this applies to convertible seats used forward facing);

(3) Owner's manual easy to find when child restraint removed from box; and

(4) Storage system for manual.

b. Evaluation of Labels

Even though NHTSA requires certain information to be on child restraint labels and in the instructions (such as model number, date of manufacture, statement concerning manufacturer's recommendations for maximum mass and height of children who can use the restraint, etc.), we do not think it is possible to specify the exact content of labels. There are so many different designs of child restraints, each with unique features that must be used differently to get optimal protection for the child occupant. However, we believe that clear, concise, and consistent information with illustrations of children in child restraints can be very effective in aiding consumers to properly use and install a child restraint. Therefore, NHTSA will include evaluation of labels and instructions in its ease of use rating program.

The agency agrees with the comments about the need to clarify which features applied to labels and which applied to instructions. NHTSA has responded to this comment by making separate categories for each. NHTSA also found a need to have separate categories because we found that as we rated several child restraints in our pilot study of the rating system, which is discussed in detail further in the notice under the section titled ''Low Cost Seats and Repeatability,'' the child restraints received different ratings for the same feature. For example, for the feature ''Clear indication of child's size range'' we found that the same restraint may receive an ''A'' rating on its label and a ''C '' rating in the instructions.

NHTSA also agreed with comments related to our proposed durability rating. Therefore, we have modified the evaluation criteria. Under ''durability of labels,'' in this notice, an A rating is now ''sticky label not peeling or other method of technology label not peeling,'' and a C rating remains the same ''sticky label if one or more are already peeling when restraint is removed from box.'' There is no B rating.

NHTSA chose not to adopt Consumers Union's recommendation to add the following as a separate feature ''shows clearly when chest clip has to be used.'' However, we included this element as part of the feature ''Clear indication of child's size range,'' under both the categories ''Evaluation of Labels'' and ''Evaluation of Instructions.'' This feature is the only one where we rate an illustration of a child in the restraint. Under this feature we are looking for a picture of a child in the restraint (with use of harness clip) along with size measurements (*e.g.*, height and weight) for use. Listed below are the features under the Evaluation of Labels category in NHTSA's final rating program:

(1) Clear indication of child's size range;

(2) All modes of use clearly indicated (*e.g.*, rear-facing only, or RF vs. FF; FF + tether (vs. RF); FF + tether (v. booster); LATCH);

(3) Shows which harness slots OK to use (on forward facing form only);

(4) Instructions for routing both lap belt and lap/shoulder belt (tether use for FF);

(5) Shows how to prepare lower LATCH attachments for use (not on booster seat form);

(6) Shows how to use lower LATCH attachments (not on booster seat form);

(7) Visibility of seat belt routing for lap belt, lap/shoulder belt, and LATCH when child restraint is in position in vehicle (LATCH not on the booster form); and

(8) Durability of labels.

c. Evaluation of Instructions

NHTSA has chosen to apply the feature ''air bag warning in written instructions'' to forward facing/convertible child restraints used forward facing and to booster seats as well as rear facing restraints. While NHTSA requires an air bag warning only for seats that can be used rear facing, NHTSA recommends children ages 12 and under ride in the back seat, because an air bag can seriously injure or kill a child. Therefore, NHTSA believes it is important to rate this feature for all types of child restraints. Although NHTSA is going to rate ''air bag warning in written instructions,'' the agency is not going to add a size minimum to the rating criteria because we believe that the evaluation criteria under A, ''Separate, highlighted, and illustrated,'' are sufficient for rating this feature.

NHTSA agrees with ICBC 's recommendation to clarify that the feature ''information in written instructions and on labels match'' referred to size measurements, and NHTSA has added that on the form.

The rating forms, located in Appendix C include the categories, the features and the feature evaluation criteria. Listed below are the features under the Evaluation of Instructions category in NHTSA's final rating program:

(1) Clear indication of child's size range;

(2) All modes of use clearly indicated (*e.g.*, rear-facing only, or RF vs. FF; FF + tether (vs. RF); FF + tether (v. booster) and LATCH);

(3) Air bag warning in written instructions;

(4) Shows which harness slots OK to use (on forward facing form only);

(5) Instructions for routing both lap belt and lap/shoulder belt;

(6) Instructions describe how to prepare lower LATCH attachments for use (not on booster seat form);

(7) Instructions show how to use lower LATCH attachments (not on booster seat form);

(8) Orientation of LATCH tether and lower attachments (tether not on rear facing restraint form and LATCH not on booster seat form); and

(9) Information in written instructions and on labels match (size measurements)

d. Securing the Child

NHTSA concurs with ICBC's recommendation that if the number of harness slots in the cover do not match the number of harness slots in the shell, then the child restraint should automatically receive a C rating. NHTSA wants to ensure that consumers will not be confused and potentially misuse a seat because there are differences in the number of slots in the pad vs. the shell. NHTSA is also aware that fit is an important aspect to proper use and by having more variation in harness slot number this allows more choices for fit as a child grows. Therefore, the proposed feature has been modified to two features: ''Number of harness slots match (pad and shell)'' and ''Number of harness slots in shell.'' Under rating ''Number of harness slots match (pad and shell)'' an A is ''yes'' and a C is ''no.'' Under rating ''Number of harness slots in shell'' an A is ''at least 3 or 1 adjustable,'' a B is ''2'' and a C is ''1.''

NHTSA has examined the issue raised by commenters about patents for devices that reposition or adjust the harness. We do not believe our ratings raise a patent issue. The agency is not making reference to a specific product or device, only to a feature that would allow the harness straps to be adjusted without rethreading the straps.

NHTSA agrees with SAFE KIDS' comment recommending a feature be added that rates accessibility to the harness adjustment. NHTSA has added the following feature, ''When installed, easy access to harness adjustment for tightening and loosening,'' and A rating is ''yes'' and a C rating is ''no.'' There is no B rating.

NHTSA does not believe that it is possible to rate ease of use in regard to harness tightness. CHOP did not provide any objective rating evaluation criteria in support of its recommendation. Therefore NHTSA will not be adopting this recommendation.

NHTSA agrees with Consumers Unions' recommendation to move ''Ease of attaching removing base'' to the ''Installing in Vehicle'' category. NHTSA has moved this feature to the form applicable to rear facing child restraints. NHTSA appreciates IIHS' comment regarding the importance of this category and the ''Installing in vehicle'' category. However, NHTSA doesn't want to decide that certain categories are the ''most important.'' NHTSA believes that all the categories are important to proper use and installation of a child restraint.

Under NHTSA's final rating program the booster seat form only has one feature under this category: (1) Ease of conversion forward facing to booster or highback to backless.

The rating forms, located in Appendix C include the categories, the features and the feature evaluation criteria. Listed below are the features under the Securing the Child category in NHTSA's final rating program:

(1) Buckle can be secured in reverse;

(2) When installed, easy access to harness adjustment for tightening and loosening;

(3) Harness adjustment easy to tighten and loosen when child restraint is installed;

(4) Number of harness slots match (pad and shell);

(5) Number of harness slots in shell;

(6) Visibility of harness slots;

(7) Ease of conversion forward facing to rear facing (rear facing form)

—Ease of conversion from rear facing to forward facing (forward facing form);

—Ease of conversion from booster to forward facing (forward facing form);

(8) Ease of changing harness slot position;

(9) Ease of reassembly if pad/cover is removed for cleaning or rethreading of harness; and

(10) Ease of adjusting/removing shield.

e. Installing in Vehicle

NHTSA will not be including the proposed feature ''Ease of tightening belt around child restraint,'' because we could not come up with objective rating criteria and did not receive any recommendations from commenters. JPMA and Evenflo suggested features to rate under this category, the first being the size of the belt path. NHTSA will not be rating specific size of the belt path because we believe that belt path size is not the only factor involved in belt routing. We believe that child seat design is also a factor. A child seat could have a large enough belt path, but the design of the restraint may make it difficult to route the vehicle belt through. However, also under this feature, ICBC had recommended the ''male hand'' be better defined. We agree that the male hand could be better defined. Therefore, NHTSA will be using a human hand that represents the 95th percentile male dimensions as defined in Human Factors Design Handbook Wesley E. Woodson, Man Factors, Inc. McGraw Hill, 1981 to determine the rating for this feature.

NHTSA will retain the proposed feature ''does belt positioning device allow slack to occur?'' This is an evaluation criterion only for booster seats. NHTSA has also adopted the recommendation to add ''presence of feedback to identify proper seat back angle'' for rear-facing restraints. NHTSA has not adopted the recommendation to rate ''accessibility of tether adjustment when child restraint is installed in the vehicle'' because NHTSA believes that this may vary depending on the tether anchor location in the vehicle and therefore it would be very challenging to objectively rate this feature.

NHTSA chose not to include any feature related to tightness in vehicle and fit to vehicle because the geometry of vehicle seats varies so much from vehicle to vehicle. Under NHTSA's final rating program, the booster seat form only has two features under this category and both could be non-applicable depending on the seat being rated: (1) Ease of use of any belt positioning hardware on the child restraint, and (2) Does belt positioning device allow slack to occur?

The rating forms, located in Appendix C include the categories, the features and the feature evaluation criteria. Listed below are the features under the Installing in Vehicle category in NHTSA's final rating program. The features related to LATCH do not apply to booster seats:

(1) Separation of belt path from harness (on rear facing form applies to base also if applicable);

(2) Can lower LATCH attachments interfere with harness;

(3) Ease of vehicle belt routing (hand clearance) (on rear facing form applies to base also if applicable);

(4) Ease of attaching and removing from child seat from base (on rear facing form applies to base if applicable);

(5) Ease of use of any belt positioning feature including lock off;

(6) Tether easy to tighten and release (on forward facing form only);

(7) Presence of feedback for seat back angle (on rear facing form only); and

(8) LATCH tether and lower attachments can be installed in reverse.

4. Weighting the Features

NHTSA will adopt the procedure for weighting the features as proposed, with slight modifications to determining the point ranges for scoring as well as changes to the limiting factor approach for obtaining an overall ease of use score. The limiting factor approach could not be applied in the final notice because the final rating program has five ease of use categories instead of four as originally proposed.

Child restraints are rated for ease of use based on five categories: (1) Assembly, (2) Evaluation of Labels, (3) Evaluation of Instructions, (4) Securing the Child, and (5) Installing in the

Vehicle. Each category has several ease of use features that child restraints are evaluated on. As in the proposal, a score for each feature is based on two elements. The first element is a fixed weighting factor and is based on each ease of use feature being given an A, B, or C according to risk of injury and severity of misuse. Component features that could be associated with a high risk of injury if misused are given a fixed weighting factor of ''A.'' Each factor is assigned a numerical value, where A = 3 points, B = 2 points, and C = 1 point. The scoring forms to be used to rate child restraints are located in Appendix C along with the rating forms. Each features' fixed weighting factor can be found on the scoring forms. The second element, which is based on rating the features of each child restraint, are similarly assigned a numerical value where an A rating = 3 points, a B rating = 2 points, and a C rating = 1 point. As explained above, some features may include only two of these three ratings (A or C). Also, if a feature is not applicable, the points for that feature and the weighted factor are both treated as zero. NHTSA proposed a feature score by multiplying the numerical values of the feature rating by the fixed weighting factor. The weighted average for the category is calculated by taking the sum of the feature scores divided by the sum of the applicable fixed weighting factors. The weighted average will be between 1.00 and 3.00. Each category rating can then be given a rating of A, B, or C based on the weighted average.

A: Weighted Average from 2.40 to 3.00

B: Weighted Average from 1.70 to less than 2.40

C: Weighted Average less than 1.70

This differs from the proposal where point ranges for category rating A, B, or C were determined by a 3-part split of the range of possible points for that category.

The overall rating is calculated in a similar manner. The overall weighted average is equal to the sum of the feature scores for all features divided by the sum of the weighted factors for all applicable features. This will still be between 1.00 and 3.00. The overall rating uses the same ranges as the category ratings listed above. A sample of the revised ease of use scoring can be found in Appendix D.

Weight, W

Score, S

Weighted Score, $Ws = W \times S$

Weighted Average, $A = \frac{\sum Ws}{\sum W}$

5. Low Cost Seats and Repeatability/Subjectivity

To address commenters' concerns about the rating system producing a correlation between higher rated seats and the higher priced child restraints, the agency conducted a pilot study using the revised ease of use rating program to examine this issue. During this pilot study the agency also examined the repeatability/subjectivity of the ease of use rating program.

NHTSA purchased a total of 20 child restraints of varying price ranges from four different retail stores. The agency rated four infant only restraints ranging in price from $34.99 to $119.95; five convertible restraints ranging in price from $49.99 to $249.95; two forward facing only restraints ranging in price from $59.99 to $179.95; five transitional forward facing/booster seats ranging in price from $54.99 to $89.99; and four booster seats ranging in price from $22.99 to $124.95. NHTSA followed the proposed protocol for rating the child restraints in the pilot study, using draft-revised forms based on comments received from the notice. Following a one-day training to review the forms, each of the features and their evaluation criteria, two 2-person teams evaluated each child restraint. To determine the installation ratings, we used a representative seating device, as opposed to the current FMVSS No. 213 bench, since a FMVSS No. 213 bench seat was not available within the time constraints for this pilot study. The results of the pilot study did not show a correlation between higher priced seats and higher rated seats. Of the 20 seats rated in the pilot study, there were a range of A and B scores across the price ranges. Only one of the 20 restraints rated received an overall score of C, and it was a mid-priced convertible restraint. While the most expensive seat purchased did receive an overall A rating, there were A rated seats among the lower priced seats. Based on this, we do not believe that the concerns with lower priced child restraints being eliminated from the market are warranted.

Following the pilot study, the agency also concluded that an ease of use rating program would be repeatable. During the pilot study, to the extent that the teams ended up with a different rating (we did find minor differences within ratings of features within each category), the two teams jointly reexamined the child restraint before a rating was determined. The variations between the teams did not affect the overall rating. The findings in the pilot study were consistent with the findings when NHTSA conducted a hands-on evaluation of ICBC ratings program. We believe that the process of having two, or more, 2-person teams evaluating each child restraint is important to ensure repeatability and objectivity. Two teams of two will be used to rate the child restraints and if there are instances of non-concurrence, a third team of two will rate the restraint.

6. Other Comments

NHTSA agrees that informing the public about recalls of child restraints is important. However, NHTSA does not know how recalls could be incorporated into a ratings program. Recalls do not occur until after a child restraint is on the market. NHTSA plans to rate child restraints prior to or shortly after they are available on the retail market. In an effort to publish ratings information and make it available to the public in a timely fashion and following the same procedure as the compliance child seat testing, NHTSA will be ordering child restraints from the manufacturers before they are shipped to retailers. NHTSA plans to coordinate rating the child restraints and releasing the information with their availability to consumers at retailers.

NHTSA plans to continue improving our methods of informing the public about recalls. NHTSA currently has a list of child restraints that are available to consumers. As part of that list, if a seat on the market has been recalled, it is highlighted on the Web site. NHTSA plans to post the child restraint ratings on the Web site, and if a child restraint is recalled, the agency will highlight the rated child restraint on the Web site to alert consumers that a particular seat has been recalled.

7. Summary of Final Ease of Use Protocol

The final ease of use rating program consists of the following elements:

- Three sets of forms will be used to evaluate add-on child restraints. Combination child restraints will be rated in each mode of use. One set of forms will be used to rate rear-facing only and convertible child restraints in the rear-facing mode. Another set of forms will be used to rate convertible seats in the forward facing mode, forward facing only restraints, and combination forward facing/booster seats in the forward facing mode. The third set of forms will be used to rate booster seats and combination forward facing/booster seats in the booster seat mode.
- Five ease of use categories will be rated: (1) Assembly, (2) Evaluation of Labels, (3) Evaluation of Instructions, (4)

Securing the Child, and (5) Installing in Vehicle. Features related to ease of use within each category, including LATCH, will be rated.

• Two, or more, 2-person teams will be used to rate each child restraint. Prior to rating, the teams will have a day of training to review and examine the forms, review each of the features and their evaluation criteria, conduct practice ratings and answer questions. To determine ease of use installation ratings, NHTSA will install the restraint using the current FMVSS No. 213 bench. If and when the FMVSS No. 213 bench is updated, the team will use the updated test bench. No dummy will be used during this process.

• Each child restraint will receive a rating for each of the five ease of use categories as well as an overall ease of use rating. The weighted average for the category is calculated by taking the feature score divided by the sum of applicable fixed weighting factors. The weighted average will be between 1.00 and 3.00. Each category rating can then be given a rating of A, B, or C based on the weighted average.

A: Weighted Average from 2.40 to 3.00

B: Weighted Average from 1.70 to less than 2.40

C: Weighted Average less than 1.70

• The overall rating is calculated in a similar manner. The overall weighted average is equal to the sum of all feature scores divided by the sum of all fixed weighting factors. This will still be between 1.00 and 3.00. The overall rating uses the same ranges as the category ratings.

• NHTSA plans to begin implementing the ease of use rating program following the publication of this Notice. NHTSA plans to obtain child restraints from the manufacturers and begin rating them shortly before they are available to the public. NHTSA's plans for distribution of rating results can be found in section VII of this notice.

IV. CRS Dynamic Performance Rating Program

A. Summary of Proposal

In the notice document dated November 6, 2001, NHTSA proposed to rate the dynamic performance of child restraints using the same approach as NCAP crashworthiness. With this approach, child restraints would undergo an identical test procedure to that used in FMVSS No. 213, the compliance tests of child restraints, except for test speed. In FMVSS No. 213, child restraints are subjected to a specific pulse that has a change in velocity of 48 kmph (30 mph). In the agency proposal, child restraints would be rated using the FMVSS No. 213 test conditions however, the speed would be 8 kmph (5 mph) faster. NHTSA also sought comments on using the 48 kmph (30 mph) compliance test as a basis for a rating program.

The proposal was for a 56 kmph (35 mph) sled test using forward-facing child restraints. The CRS would be installed following the FMVSS No. 213 compliance test procedures and would be secured to the FMVSS No. 213 bench seat using the lower anchorages and a top tether (LATCH). NHTSA proposed that the Hybrid III three-year-old and the 12-month-old CRABI dummies be used in this sled-testing program to rate the CRS performance. A rating system would be based on two injury criteria: Head Injury Criterion (HIC) and chest acceleration. For each child dummy tested in a child restraint, the agency would find the combined probability of a head and chest injury and provide a star rating for that child restraint.

Child restraints would also be subjected to a physical examination after the higher-speed sled test. This examination, as outlined in the FMVSS No. 213 testing procedure, would evaluate the structural integrity of the child restraint. The agency would make the child restraint's star rating available to the public in a manner similar to the NCAP vehicle results. Any safety concerns observed during the structural integrity evaluation would be noted, but would not affect the star rating.

B. Summary of Comments

This section will summarize the comments received relative to rating child restraints based on dynamic sled performance.

1. 48 kmph (30 mph) Sled Test

Evenflo, Ford, GM, Honda, Alliance of Automobile Manufacturers (Alliance), Consumers Union (CU), Child Passenger Protection Technical Consulting (CPPTC), Dorel Juvenile Group (DJG), the National Automobile Dealers Association (NADA), and National Safe Kids Campaign favored rating child restraints based on a 30 mph dynamic sled test as required in FMVSS No. 213. All felt that the current FMVSS No. 213 is a severe test, and has done a good job in protecting children. DJG and GM further stated that an initial rating of CRS performance based upon the current frontal impact requirements of FMVSS No. 213 could give consumers some useful information and does have merit. The Advocates for Highway and Auto Safety and CHOP, however, commented that FMVSS No. 213 is outdated and not representative of real world crashes. The Advocates for Highway and Auto Safety also commented that there would only be marginal difference in performance across a wide variety of CRS models if FMVSS No. 213 were used as a basis for a rating. Nevertheless, all commenters felt that a rating system based on 48 kmph (30 mph) sled test should be deferred until FMVSS No. 213 is upgraded as required by TREAD.

2. 56 kmph (35 mph) Sled Test

Some respondents to the notice, including Evenflo, the Alliance, JPMA, and CHOP, stated that the FMVSS No. 213 pulse is a very severe pulse. They maintained that increasing the speed to 56 kmph (35 mph) would not be a helpful indicator of expected performance in most real world crashes. They also stated that the majority of real world crashes involving children occur at speeds far lower than 56 kmph (35 mph).

Britax stated that the increased stiffness added to the restraint—required by the higher crash speeds—would lead to less inherent energy absorption by the restraint at lower speeds. Consequently, Britax believes that such an approach would pass more harmful energy to the children, resulting in more injuries to children in restraints due to the greater frequency of crashes at lower speeds.

The Advocates for Highway and Auto Safety, JPMA, Honda, and IIHS noted that NHTSA's own study found little discernable difference between the child restraint models tested at the higher-speed.

JPMA, DJG, Child Passenger Protection Technical Consulting, Royal Automobile Club of Spain, Honda, and CU supported the agency proposal to rate CRS via a 56 kmph (35 mph) sled test. JPMA believed that due to the Congressional mandate, a 56 kmph (35 mph) sled test rating had some merit due to its objectivity. Honda and DJG supported the higher speed sled test, because the agency's early data showed all seats would receive ''5 stars.'' DJG later stated that CRS manufacturers could focus on the ease of use rating.

3. Test Dummies and Injury Assessment Reference Values

Several commenters advocated the use of the Hybrid III family of dummies and their associated injury criteria. The Advocates for Highway and Auto Safety, GM, Toyota, the Alliance, and CU, all noted that the current FMVSS No. 213 still uses the Hybrid II family of dummies and not the more up-to-date Hybrid III dummies. GM noted that the

safety community had developed these dummies to meet the biomechanical impact response corridors that were scaled from the mid-size adult male to various sizes of child dummies, and that, the dummies' responses to forehead impact, neck flexion and extension, and blunt chest impact represent the responses of children of similar ages.

CU, the Alliance, and the Advocates for Highway and Auto Safety all suggested that the Injury Assessment Reference Values (IARV's) used for the rating program, should be the same as those outlined in the recent FMVSS No. 208 rulemaking, published May 12, 2000. These IARV's are different than the IARV's currently used in FMVSS No. 213.

Consumers Union (CU) suggested that child restraints should be tested with dummies that weigh the maximum weight specified for the restraint. CU said, ''there needs to be some objective, dependable assurance that child restraints will provide adequate safety when occupied by a child at the weight listed by the manufacturer as the maximum safe occupant weight. Two additional pounds can significantly increase the kinetic energy of the child in a crash, and as [CU's] 1995 testing demonstrated, can mean the difference between adequate protection and certain danger to that child.'' Ford noted that many convertible child restraints are recommended for use in the rear-facing direction for children up to 30 and 35 pounds.

4. Testing Procedure

In the agency's proposed rating, child restraints in the forward-facing LATCH (including top tether) mode only would be rated. Some commenters suggested that child restraints should be rated in more than one configuration. Commenters discussed each of these configurations and why child restraints should or should not be rated in such configurations.

Safe Ride News suggested that NHTSA rate child restraints both with and without top tethers. They stated that both tethered and non-tethered performance is important. Safe Ride News speculated that seeing the difference between tethered and non-tethered performance might inspire some consumers to install top tether anchors in their older vehicle. Child Passenger Protection Technical Consulting (CPPTC) also stated that showing the consumer the effect of a top tether is important.

Several responses favored rating child restraints tested using the lap belt instead of lower anchors. Evenflo stated that testing with LATCH presupposes that the bulk of the buying public has a new vehicle that can fully take advantage of LATCH. The National Safe Kids Campaign and the JPMA stated that parents would be securing their child restraints with the vehicle seat belts for many years. Toyota and CU suggested that NHTSA phase in the use of LATCH for a safety rating. They recommended that for the first several years of testing, child restraints be rated both by the results of testing with LATCH and by the result of testing with the lap belt. This dual testing should continue until the majority of cars on the road have LATCH available.

GM noted that a rating based on child restraints installed with LATCH would be of greater value to consumers, as an increasing percentage of vehicles become LATCH equipped. GM also said ''testing child restraints installed using only LATCH provisions would also reduce installation variability that could compromise performance assessment results.''

Honda and Toyota suggested that NHTSA rate rear-facing child restraints and the rear-facing mode of convertible seats. Honda provided real-world data that suggested fatalities to children in a rear-facing seat are as frequent as those in a forward-facing seat. Toyota mentioned that new parents might be most likely to seek out safety information on a child restraint, and that the agency should provide information that would be applicable to their situation. Honda speculated that new parents might misinterpret the lack of ratings for rear-facing seats to mean that there is no safe rear-facing restraint. ''Including rear-facing seats would build a rapport with new parents who would be more likely to return for information when they are searching for a forward-facing seat.''

The Alliance, the Advocates for Highway and Auto Safety, Evenflo, GM, the Royal Automobile Club of Spain (RACE), and Toyota suggested that NHTSA consider other crash modes for its rating of child restraints. These commenters advocated the development of a side impact CRS rating program. Evenflo suggested that NHTSA do an investigative study of real-world side crashes to learn if child seats protect children seated on the struck side of the vehicle. Toyota and GM recommended that the agency first adopt a side impact sled test for FMVSS No. 213 followed by a CRS rating program for side impacts.

5. Rating System

Comments were received regarding what injury measures should be used for the CRS rating program and whether or not the agency should use compliance margin to rate child restraints. Compliance margin is defined as the amount by which products go above and beyond the requirement of the standard in a compliance test. Four commenters specifically addressed compliance margin, and they did not support a child restraint rating system based on a compliance margin. The IIHS and Dorel Juvenile Group (DJG) argued that no one has proven that an increase in compliance margin translates to better overall performance in the real world. JPMA also stated that a rating that rewards based on the amount of the compliance margin might encourage designs that are not optimized for safe performance in the real world. In addition, JPMA also stated that a rating system based on compliance margin might not provide useful information to consumers because ''it may not distinguish among child restraints in a meaningful way.'' Britax commented that a compliance margin would not provide meaningful information, would not improve safety for children, and would not address the real-world vehicle population.

Comments were also received regarding what injury measures should be used for the CRS rating program. HIC and Chest G are currently used in the compliance tests and in the frontal NCAP vehicle tests. Toyota and the Alliance agreed with NHTSA that HIC and chest acceleration were a good basis for computing a child restraint rating. Honda, Safe Ride News, CPPTC, and CU suggested that head or knee excursion be added to the rating scheme. Compliance tests currently use both head and knee excursion to determine if a child restraint passes or fails. Toyota recommended that the agency conduct a real-world crash data analysis to determine if head contact with the vehicle interior due to head excursion is a significant contributor to child injuries. If the analysis showed that head excursion is a significant contributor, then head excursion should be used as a criterion to rate child restraints for dynamic performance.

Other commenters raised the possibility of including neck injury readings to rate child restraints. GM, Toyota, and the Alliance advocated the use of some sort of neck injury criteria in the rating and not just head and chest injury measures. GM also proposed that NHTSA initiate a study of motor vehicle field crash data better to quantify the extent of neck trauma in restrained children. Such a study ''should determine the crash severity level(s) at which neck injury begins to occur.''

JPMA submitted comments opposing the use of head excursion for rating a child restraint's dynamic performance. They stated, though no specific examples were given that, ''other performance attributes measured in FMVSS No. 213 tests, such as head excursion, should not be included [in the rating system] because doing so could lead to unintended adverse consequences.''

C. Analysis of Comments

1. 48 kmph (30 mph) Sled Test

Evenflo, Ford, GM, Honda, the Alliance, CU, CPPTC, JPMA, DJG, NADA, and National Safe Kids Campaign stated that if a rating system must be developed, a rating system based on an a 48 kmph (30 mph) FMVSS No. 213 sled test would be beneficial and prudent. All felt that the FMVSS No. 213 is a severe test and has done a good job protecting children. However, all commenters felt that the agency should delay the implementation of the rating until the proposed bench and pulse upgrades for FMVSS No. 213 are implemented. The agency agrees with the commenters that FMVSS No. 213 has ensured good safety protection for children. In addition, we acknowledge the commenters concerns that concurrent with the CRS rating, TREAD also mandates an upgrade to FMVSS No. 213. The upgrade to FMVSS No. 213 is a separate rulemaking effort that is mandated to be completed by November 1, 2002. The fundamental issue raised by the commenters is that since requirements and lead-time schedules for the FMVSS No. 213 upgrade will not be finalized prior to implementation of the CRS rating system, child seats would be evaluated according to their performance under the new requirements before those new requirements were final and had been explained in a notice. We agree that a CRS rating system based upon an upgraded FMVSS No. 213 should not occur until after any such changes to the standard have become effective. For this reason, we will perform a pilot program to evaluate the dynamic performance of child restraints. This pilot program will gather data in 2003 and 2004 and be based on the changes proposed in the FMVSS No. 213 rulemaking. In 2005, assuming the pilot program shows that the results could be used as useful consumer information, we expect full implementation of a rating program with a test procedure based on the finalized FMVSS No. 213.

2. 56 kmph (35 mph) Sled Test

Evenflo, the Alliance, CHOP and JPMA stated that increasing the test speed of FMVSS No. 213 an additional 8 kmph (5 mph) would not provide any additional information. We disagree with the commenters on this issue. Prior to issuing the notice on November 6, 2001, the agency conducted sled tests at both 48 kmph (30 mph) and 56 kmph (35 mph). These sled tests were based on the FMVSS No. 213 pulse. In those tests, we found that CRS dummy measurement responses had a greater dispersion when tested at the higher speed.

In addition, the commenters further stated that most real world crashes involving children occur at speeds less than 56 kmph (35 mph). The agency also analyzed 1988–2000 National Automotive Sampling System (NASS) Crashworthiness Data System. We looked at non-rollover, frontal crashes involving light vehicles where a child restraint was involved. The data was not further defined by age. The NASS data showed that 97% of the crashes involving a child restraint occurred at speeds less than 56 kmph (35 mph) compared to 94% at speed less than 48 kmph (30 mph). The agency recognizes the fact that most crashes occur at speeds less than 56 kmph (35 mph) and speeds less than 48 kmph (30 mph). This is also true for the adult population. However, the majority of adult fatal crashes occur at speeds of 48 kmph (30 mph) and greater. Unfortunately, we have insufficient data to know the velocity distribution of fatal CRS crashes.

DJG commented that a higher speed sled test would cause manufacturers to stiffen up the CRS to avoid structural failure of the CRS in the sled tests. The commenter hypothesized that a stiffer seat could have a negative influence on children in crashes at lower speeds. The agency is not aware of any data that would support the DJG assertion that stiffer child seats would have a negative influence on restrained children in lower crash velocities. In higher speed sled testing, the agency has observed some structural failures. Thus, we agree that CRS manufacturers would have to provide structural modifications to the seat. However, we do not have any quantification of the relative influence of the shell versus webbing stiffness, and believe that the structural stiffness of the seat shell would have considerably less influence on the overall occupant response measurements than the webbing material.

3. Test Dummies and Injury Assessment Reference Values

The Advocates for Highway and Auto Safety, GM, Toyota, the Alliance, and Consumer's Union advocated the use of the more biofidelic Hybrid III family of dummies, the CRABI dummy, and their associated injury criteria. FMVSS No. 213 currently uses the Hybrid II three-year-old child dummy, Hybrid II six-year-old child dummy, and the TNO non-instrumented, nine-month-old child dummy. The agency recognizes that the Hybrid III and CRABI child dummies are more biofidelic and have greater instrumentation capabilities than the Hybrid II dummy family. This was one of the primary reasons the agency proposed the CRABI and the Hybrid III dummy family, as an upgrade to FMVSS No. 213 and for the CRS dynamic rating.

However, the agency is also aware that only Hybrid II dummies have been used to date in NHTSA compliance tests for FMVSS No. 213. In addition, CRS manufacturers do not have any substantial experience testing child seats with Hybrid III dummies. NHTSA believes it is appropriate to take the time to run tests with the Hybrid III dummies, and make regulatory decisions about when to mandate use of the newer dummies as opposed to using the new dummies in a CRS rating program tests. Hence, NHTSA intends to conduct a pilot program in 2003 and 2004 using the test dummies proposed in the FMVSS No. 213 upgrade.

4. Testing Procedure

In the notice published November 6, 2001, the agency proposed to rate CRS in LATCH mode only. Safe Ride News, National Safe Kids Campaign, JPMA, Toyota and CU suggested that NHTSA use additional configurations in addition to LATCH to rate child restraints. NHTSA acknowledges that there are many vehicles being used today that do not have a top tether anchor and LATCH attachment for a child seat. However, beginning September 1, 2002, all child restraints and all vehicles manufactured will be required to have LATCH. Vehicles manufactured after September 1, 2000 are all required to have a top tether. The agency has performed several tests comparing tether and no-tether seats. These test results have shown that a tether decreases head excursion in addition to lowering HIC values. NHTSA tests have also shown that HIC and chest acceleration readings from child restraints tested with LATCH are similar to those tested with the lap belt and tether. The agency, however, must also consider the vehicle fleet. It will

take some time before the entire vehicle fleet will be equipped with lower anchorages and top tether, and we feel that consumers should have information on both LATCH and non-LATCH configurations. Therefore, the pilot program will examine and evaluate the LATCH and lap belt/tether configuration performance.

The Alliance, the Advocates for Highway and Auto Safety, Evenflo, GM, the Royal Automobile Club of Spain (RACE), and Toyota suggested that NHTSA include a side impact program to rate CRS. NHTSA agrees that the available data indicates that side impact represents a substantial portion of the total harm to children in crashes. Because of this, we are currently researching the dynamic performance of child restraints in crash modes other than a frontal crash. In response to the TREAD Act, NHTSA issued an ANPRM for side impact. Depending on the results of that research, we will consider whether we should rate CRS performance in a side impact configuration after this research is completed.

5. Rating System

Four commenters specifically addressed the use of compliance margin to rate child restraints. Because it would be easy to implement, the cost would be minimal, and it could provide meaningful information, the agency proposal listed compliance margin as an option for rating child restraints. A compliance margin rating would rate child restraints based on how much better they performed than required by the standard. In the notice, the agency showed that many seats passed by a large margin. This was true for both HIC and Chest G. Contrary to HIC and Chest G, the agency found head and knee excursion close to their respective limits set forth in the standard. However, the agency does not have a probability of injury risk curve for head or knee excursion. Of those commenters that specifically addressed compliance margin, none agreed with the premise of using it as the basis for a rating program. IIHS argued that there was no correlation between the margins of compliance a particular CRS seat had and its performance in the real world. We disagree with the commenter. The risk of injury is derived from human tolerance data. Just as injury numbers above the minimum standard correlate to an increased risk of injury, injury measures below the minimum level correlate to a lower risk of injury. IIHS further commented that it would be difficult for the agency to determine if a seat that passes the HIC requirement by 60% is safer than one that passes by 50%. As noted above, a seat that passes by a 60% compliance margin is safer than one with a 50% margin. However, we agree with IIHS that the magnitude of this difference would be small and it would be difficult to quantify precisely.

JPMA argued that a child restraint is a system, and that focusing on one or two parameters could adversely affect others. JPMA stated that manufacturers, for example, could get a wide compliance margin on head excursion, but that would increase the accelerations experienced by the head (HIC). We understand that system modifications to reduce one parameter could adversely affect other parameters with safety trade-offs. However, manufacturers would still have to meet the head excursion requirement for FMVSS No. 213. We feel that the head excursion limit in FMVSS No. 213 would prevent the manufacturers from taking such an approach.

JPMA also argued that if the agency used compliance margin to rate a CRS the agency would have to choose and rate the ''more important'' performance requirements of FMVSS No. 213. That is, is knee excursion more important than chest G? On this point, the agency also agrees with the commenter and also stated this fact in the notice. We agree that it would be difficult to choose what factor(s) among the many are most important and convey the information to the public.

For these reasons and as indicated in the notice, the agency believes that the use of compliance margin (*i.e.* rating seats on how close or far from the compliance limit the injury measures are) does not appear to be the most meaningful way to rate child safety seats. We will consider this further during our pilot program.

Comments were also received regarding what metrics should be used in the rating system. Toyota and the Alliance agreed with the agency that HIC and chest acceleration were a good basis for computing a child restraint rating. However, Honda, Toyota, Safe Ride News, JPMA, and Child Passenger Protection Technical Consulting suggested that head and/or knee excursion should be added to the rating scheme. The agency agrees that head and knee excursion limits in FMVSS No. 213 protect children from striking the vehicle's interior. However, HIC and chest acceleration can more easily be correlated to probability of injury than head and knee excursion. None of the commenters provided specific suggestions on how to incorporate head and knee excursions into a rating system. In addition, by developing the rating system based on HIC and chest acceleration, the agency can follow the same approach that is used for the adult dummies in the frontal NCAP. Therefore, NHTSA will not incorporate head and knee excursions into a safety rating for child restraints, but plans to use HIC and chest acceleration.

GM, Toyota, and the Alliance advocated the use of some sort of neck injury criteria in the rating and not just head and chest injury measures. GM also proposed that NHTSA initiate a study of motor vehicle field crash data better to quantify the extent of neck trauma in restrained children. Such a study ''should determine the crash severity level(s) at which neck injury begins to occur.'' The agency agrees that neck injuries for children in the field need to be examined and will therefore utilize several sources both inside and outside the agency like NHTSA's Special Crash Investigations and the Children's Hospital of Pennsylvania to assess neck injuries in children. The agency is also assessing the need to include neck injury criteria in frontal NCAP star ratings.

D. NHTSA's Decision on a CRS Dynamic Rating Program

In the notice published November 6, 2001, the agency suggested a 56 kmph (35 mph) sled test to rate child restraints. The 56 kmph (35 mph) option specified that the agency would rate child restraints based on sled tests performed in accordance with the FMVSS No. 213 standard, but at a speed 8 kmph (5 mph) faster than the standard specifies. It was proposed that these 56 kmph (35 mph) sled tests would be conducted using the three-year-old Hybrid III dummy and the 12-month-old CRABI dummy to assess CRS performance as it relates to head injury and chest acceleration. However, many respondents voiced concerns of using a 56 kmph (35 mph) FMVSS No. 213 crash pulse to rate child restraints, and most suggested a rating program be deferred until FMVSS No. 213 is upgraded as required by TREAD.

NHTSA shares the concerns raised by commenters, and agrees that a dynamic CRS rating should be deferred until incorporation of the FMVSS No. 213 upgrades required by TREAD. Another option that we seriously considered was to develop a dynamic CRS rating using the current FMVSS No. 213 with the Hybrid II dummies. However, the current standard does not have an instrumented dummy for rear facing infant seats, meaning that a dynamic rating would be limited to only forward facing CRS for 3-year-old and 6-year-old children. We believe that consumers

would have an equally high, if not higher, interest in obtaining dynamic rating information for rear facing infant seats, and that an inability to provide ratings for this segment of CRSs would cause a great deal of confusion for consumers.

Furthermore, NHTSA has other concerns with providing a dynamic CRS rating at this time. In considering development of a dynamic rating using the current standard, we found that all child restraints would have received either a four or five star rating. This is consistent with the finding from field studies showing that CRSs, when used and used properly, are very effective in providing protection to children. Given that all CRS would receive either a four or five star rating, we have concerns that such a dynamic rating would not be meaningful to consumers.

Another concern is that in addition to facing potential upgrades to FMVSS No. 213 as required by TREAD, CRS manufacturers have also been recently required to incorporate LATCH into all CRS. Further burdening these manufacturers with a dynamic rating using the older Hybrid II dummies while the manufacturers are modifying their designs to account for the possible use of newer dummies would be a diversion with no apparent safety benefit.

In consideration of the above, NHTSA has decided not to implement a dynamic component to the CRS rating at this time, but rather to rely upon the Ease of Use rating to satisfy the TREAD mandate. As noted previously, the agency has published an NPRM to upgrade FMVSS No. 213. The agency plans to conduct a pilot dynamic test program in 2003 and 2004 using the test seat assembly, test dummies and IARV's as proposed in the upgraded FMVSS No. 213 and adopted by the agency in its final rule pertaining to that rulemaking.

We believe the performance of the CRS in a dynamic test is an important and meaningful part of an overall rating of child safety. If our pilot program goes as anticipated, we will go forward in 2005 with a consumer information program for the dynamic rating of child restraint systems. We will re-notice this program to define the test procedures, test dummies, configurations and IARV's for that consumer information program.

The dynamic pilot test program for CRS will be conducted at the 48 kmph (30 mph) test speed and in accordance with the upgraded FMVSS No. 213 test procedures adopted by the agency. The pilot program will use the 12-month-old CRABI, the Hybrid III three-year-old, and the Hybrid III six-year-old child dummies. Lower anchorages and top tethers (if provided) will be used to restrain all child seats. In addition, we will also use a lap belt only configuration (no tether) [or (with tether)] for all these seats. The results of this pilot program will be made available only as research, and no ratings will be assigned to any of the tested CRS.

V. Vehicle Rating System for Child Protection

A. Summary of Proposal

The TREAD Act specified that the agency consider ''whether to include child restraints in each vehicle crash tested under the New Car Assessment Program'' [14(b)(9)], and to ''issue a final rule establishing a child restraint safety rating program and providing other consumer information which the Secretary determines would be useful [to] consumers who purchase child restraint systems.'' Therefore, in addition to the child restraint rating system, the agency proposed a program that would rate new vehicles based on their protection of child passengers when restrained in a CRS in the rear seat when in a frontal crash.

Under this proposed vehicle rating system, the agency would ask vehicle manufacturers for a recommendation of at least three forward-facing child restraints. We would require that (1) at least one of the recommended child restraints have a retail price of less than $60 and (2) a different CRS manufacturer make each of the three restraints. The agency would choose one of these three CRS to use in the NCAP frontal crash for child protection.

We proposed to place the forward-facing child restraint on the vehicle seat directly behind the right front passenger. A 3-year-old Hybrid III dummy would be placed in the child restraint system. After the vehicle crash, a five star rating would be applied to the vehicle based on HIC and chest G values measured by the child dummy. Risk curves would be developed based on the injury assessment reference values developed for child dummies in FMVSS No. 208. Under this proposed rating system, in addition to the two ratings now provided based upon the performance of the driver and the right front passenger, the subject vehicle would receive one additional rating for the child dummy in the rear occupant seat.

Finally, after each vehicle crash test, we proposed to examine the child restraint for structural integrity. We would conduct the physical evaluation for structural integrity specified in the test procedure of FMVSS No. 213.

B. Summary of Comments

This section summarizes the comments that addressed the rating of vehicles based on child restraint performance. Of the nineteen commenters to the notice, sixteen specifically addressed the proposed vehicle rating system.

Britax, Juvenile Products Manufacturers Association (JPMA), SAFEKIDS, and Evenflo suggested that CRS performance depends on vehicle performance. They agreed that NHTSA's research showed that CRS performance varies significantly with vehicle crashworthiness design, including such factors as vehicle stiffness, rear seat detail, and belt configuration. GM and National Automobile Dealers Association (NADA) also suggested that vehicle weight influences CRS performance. Child Passenger Protection Technical Consulting (CPPTC) also voiced a concern that rating a child restraint based on how well it performs in a vehicle is not a feasible method, due to the significant influence of vehicle performance as shown in Euro NCAP.

JPMA explained that child seat companies are typically small-scale companies compared to the vehicle manufacturers. Most child seat companies do not have the resources to do expensive vehicle testing to design better child seats. They said, ''* * * child restraint manufacturers can't reasonably conduct tests that would predict NHTSA's ratings under an NCAP-based system, because NHTSA (or the vehicle manufacturer) could choose to place any child restraint in any motor vehicle, and child restraint manufacturers could not reasonably or feasibly conduct crash tests. * * *''

NADA said that not all child restraints would be tested if NHTSA were to evaluate child restraints in vehicle testing. They further explained that this condition would be an unfair and incomplete test because not all child restraints would be subjected to the same conditions. Testing every child restraint in every vehicle would result in a great many tests. NADA also expressed concern that testing child restraints in NCAP vehicles would ignore the fact that most child seats are bought for use in used vehicles. Dorel, CU, Alliance, GM, JPMA, and Advocates also supported this view. Honda said that under the proposed rating system; child restraints with poor performance would never be tested in vehicle testing because vehicle manufacturers would never select those CRSs.

IIHS said rating child restraints in vehicle testing would not advance world harmonization. IIHS advised that, based on Australian NCAP and Euro NCAP rating programs, rating child seats in vehicles had many disadvantages. They said, ''* * *One is that, because so few vehicles are tested and only one or two restraints can be installed for each test, the tests can provide useful information for only a small number of vehicle/child restraint combinations. * * *''

The Children's Hospital of Philadelphia (CHOP) and Child Passenger Protection Technical Consulting (CPPTC) suggested that the agency examine head and knee excursion in vehicle testing due to variability in vehicle interior design. CPPTC said, ''Head excursion is the most important criterion for forward-facing child restraints, as it indicates overall structural integrity and how well the restraint is likely to keep the child's head out of harm's way.'' They suggested that evaluating head excursion is more important than evaluating chest acceleration. CPPTC said field data confirm that contact head injury is the most common type of serious injury among restrained children.

Honda, Toyota, and Advocates said rear-facing mode child restraints and booster seats should also be rated. Advocates interpreted that TREAD mandates NHTSA to rate all CRS types, not just forward-facing restraints. Honda declared that, since NHTSA understands that many fatalities are occurring to restrained children less than three years of age, the agency also has to evaluate rear-facing child restraints. Toyota said most new parents are likely to look for information on rear-facing seats. Such information should be made available. If NHTSA were to provide this information, Toyota explains that those parents would be more educated about child safety seats and would eventually seek more information on the safety of child seats.

Several CRS manufacturers and consumer advocates suggested that testing child restraints in vehicles would be beneficial. Evenflo and ARCCA, Inc. said that adding CRS to vehicle testing would be beneficial in understanding how child restraints are influenced by vehicle crashworthiness. In addition, ARCCA, Inc. favors the incorporation of child restraints into NCAP tests. ARCCA stated that NCAP tests more closely replicate real world conditions than the FMVSS No. 213 compliance tests.

CHOP, CU, and Advocates said that performing CRS in-vehicle testing is good for future research on improving child occupant safety. CHOP commented that, ''* * * including child restraints in NCAP tests is important to build a fund of knowledge. This will lead to a better understanding of the interaction of various child restraints with the various types of vehicles, their space, and seat stiffness.'' Advocates added that conducting vehicle testing with child seats would provide important information such as CRS and vehicle seat interaction and assessment of head and knee excursion in vehicle crashes. They suggested that such information would be extremely valuable for prospective car buyers, especially for parents who transport their young children.

C. Analysis of Comments

Most of the commenters generally disagreed with rating child restraints in vehicle testing. We agree with these comments that vehicle tests would not be an appropriate means of rating CRS performance. The notice indicated that the agency felt ''the most effective consumer information system is one that gives the consumer a combination of information about child restraints' ease of use and dynamic performance, with the dynamic performance obtained through higher speed sled testing and/or in-vehicle NCAP testing.'' In describing the proposal for CRS performance in NCAP frontal vehicle testing, the notice said that ''unlike the rating systems proposed for the sled tests * * *, this option would rate the vehicle equipped with a CRS as a system in protecting the child.''

CHOP and CPPTC comments suggested that head and knee excursion are important parameters to monitor due to variability in vehicle interior designs. While we agree that this is true, we do not believe that these parameters are the most critical measurements to be made. Excursion of the child within the vehicle compartment, along with the available interior space, will determine whether the child strikes an interior component of the vehicle compartment. Indeed, to maximize child protection and reduce the average head acceleration, the optimal design is a system that maximizes head excursion without permitting a head strike on an interior component. However, the space within the compartment is limited. The HIC measurement would show whether the dummy's head struck an interior component. Thus, for built-in seats, head excursion is not measured in FMVSS No. 213, since HIC reflects head contact events. For built-in seats, HIC by itself provides a measure of both excursion and available compartment space.

The agency does not fully agree with the IIHS comments about in-vehicle testing not being suited for world harmonization. As indicated above, the agency does not believe that in-vehicle testing is an appropriate test for rating the CRS alone. To the extent that the IIHS comments were meant to reflect that point, we agree. However, both the Euro NCAP and Australian NCAP program vehicle ratings incorporate the vehicle's ability to protect CRS restrained children. Since the proposed in-vehicle rating would also provide such an indication, we believe that, in this respect, the proposed vehicle rating for child protection in frontal testing would be similar to the Euro NCAP and Australian NCAP ratings.

Finally, Honda, Toyota, and Advocates suggested that rear-facing CRS and booster seats should also be rated. As indicated above, we do not believe that in-vehicle testing is appropriate for rating the CRS. Rather, the in-vehicle test rates the vehicle's contribution to protecting the restrained child in a crash. We concur with the commenters desire to have the vehicle rating reflect the protection afforded to children restrained in child restraints in addition to forward facing child seats. We will examine the feasibility of this in the pilot program described below.

D. NHTSA's Decision on a Vehicle Rating System for Child Protection

As indicated in the November 6, 2001, notice, optimal child protection requires that the child be properly placed in an appropriate restraint, that the CRS perform well, and that the vehicle work in concert with the CRS to protect the restrained child. In the notice, the agency presented an analysis of results of both dynamic sled and in-vehicle CRS testing. The dynamic sled testing showed tighter clustering of the CRS responses than observed in the vehicle tests. We inferred that the greater range of HIC response in the vehicle tests was not due to the child restraint, but was due to vehicle crash characteristics, such as crash pulse, belt geometry (important for child restraints that use a lap/shoulder belt), seat contour, and seat cushion stiffness. A vehicle with good crashworthiness characteristics appeared to provide better child occupant protection independent of the CRS.

Occupant protection fundamentals require that the vehicle restraints and dynamic crash characteristics operate as a system to provide energy management for optimal protection of the occupant. For children, the CRS and vehicle must

work together as a complete system to protect the child. To accomplish this, CRS and vehicle manufacturers must work together to ensure that an optimal design of the CRS/vehicle system is developed for maximum child protection. Consumers wishing to select the best protection systems available for their children need to have not only a rating of the CRS, but also a rating of the CRS/vehicle system. We believe this was the intent of the TREAD mandate that the agency consider ''whether to include child restraints in each vehicle crash tested under the New Car Assessment Program,'' and to ''provide other consumer information which the Secretary determines would be useful [to] consumers who purchase child restraint systems.''

Given this, NHTSA anticipates that, in addition to providing a rating of child restraint systems, we will try to rate vehicles on their ability to protect child occupants in a frontal crash. We proposed an approach for rating vehicles for crash protection for children in the notice, with an additional star rating to be added to the vehicle's NCAP score. The additional star rating would be based upon the likelihood that a CRS restrained child occupant would receive severe (AIS ≥4) injuries in a frontal crash.

Notwithstanding this belief, however, NHTSA is concerned that it is premature to begin assigning NCAP ratings to vehicles at this time. We are aware of little testing in the public domain to assess the vehicles' role in protecting child occupants in the rear seats. Further, we have not finished our analysis of the results of our testing to date, which showed that some vehicles that provide good front seat occupant protection provide relatively poor rear seat occupant protection. We would prefer to gather more information on vehicles with child seats in the rear, do a thorough analysis of the results, and publish our conclusions to allow a public review before we implement a ratings program in this area.

To gather additional information and a better understanding of what vehicle attributes contribute to good rear seat occupant protection, NHTSA will collect data during the 2003 and 2004 model year NCAP frontal crash tests on child protection in the rear seat, but will not publish any child protection vehicle ratings based on that testing. During the 2003 and 2004 model years, the agency will select a range of seats to be used and final selection will be based on a set of objective criteria yet to be developed.

Using a single forward-facing seat also leads us to plan to use a single test dummy (the Hybrid III three-year-old) to allow comparisons among the vehicles, and to make those comparisons reflect the difference in vehicle performance. NHTSA believes that vehicle performance with the three-year old in a forward-facing seat will be representative of the vehicles' ability to provide child occupant protection for other sizes and ages of children in other CRS, including rear-facing and booster seats. However, we will gather data to verify or disprove this belief during the pilot program. Specifically, we will continue to use the additional rear seating positions to collect data for research purposes on the performance of various size dummies in rear-facing, booster, and built-in CRS. Should we proceed as we currently expect, we will add the element of rear seat child protection to frontal NCAP beginning in the 2005 model year. We will publish a notice to get public comments on the test procedures and rating criteria, including what size or sizes of child dummies should be used for the rating.

VI. Combined Child Restraint Rating

A. Summary of Proposal

In the proposal, NHTSA stated that we were not currently planning to do an overall summary rating combining ease of use and dynamic performance. The agency had not been able to develop an acceptable methodology for a summary rating. We requested comments and suggestions on this issue.

B. Summary of Comments

General Motors and JPMA commented that they did not support a combined rating system. Toyota proposed a combined rating concept that included injury criteria, head excursion and ease of correct use. Toyota believes that a combined rating could help parents select safer child restraints. Consumers Union supports a combined ease of use and dynamic testing rating system and also proposed one. They included recommendations for arriving at a single summary rating. They also recommended a numerical procedure to convert individual ratings to a continuous scale that was then converted to an overall star rating.

C. NHTSA Will Not Combine Rating

NHTSA reviewed the comments received. While the agency believes a combined rating may have merit, we believe that further evaluation into the methodology would be needed. In addition, subsequent to the proposed Notice, NHTSA conducted focus groups and found that most participants did not want a rating that combined performance and ease of use. They mentioned that they usually like more information to be available and that a combined rating might be misleading. Also, given the factors described in Section IV.D, we have decided to continue dynamic testing of CRS on a pilot basis rather than providing dynamic ratings at this time. Based on these factors NHTSA will not have a combined rating.

VII. Distribution and Schedule

A. Summary of Proposal

In the Notice published on November 6, 2001, NHTSA discussed the two publications that are produced related to safety ratings for vehicles and vehicle safety features specific to children. One publication is a print brochure titled Buying a Safer Car that provides NCAP ratings and safety feature information for new vehicles. The other is a brochure titled *Buying a Safer Car for Child Passengers* that provides new vehicle safety features and other information relevant to children.

The agency also stated that we believe new printed information about child restraint ratings would be needed. Unlike vehicles, child restraint models do not tend to change on an annual cycle, therefore, NHTSA would have to pick a date and only include in a print brochure child restraints that are available in the marketplace at that time. The Notice also indicated that in Canada the largest concentration of child restraints were introduced in the months of May and June. We requested comments on whether this timing was also accurate for the United States.

Lastly, in the Notice, NHTSA noted that a print brochure could be used in addition to our Web site. The Web site can be updated on a continuous basis. Therefore, we could test child restraints as they become available and add new models to the Web site when testing is complete.

B. Summary of Comments

NHTSA did not receive any comments on whether the timing, May and June, for the introduction of a large concentration of child restraints on the market was accurate. The National SAFE KIDS Campaign did voice their concern about releasing timely information to consumers. They suggested that to do this, child restraints would need to be rated prior to being placed on retail shelves.

In addition to seeking comments on the accuracy of when child restraints are introduced into the marketplace, NHTSA conducted research aimed at exploring the perceptions, opinions, beliefs, and attitudes of parents and

caregivers regarding our Proposed Ease of Use Rating and the Performance Rating for child safety seats (see Section III C for full summary of focus group findings). Relative to how this ratings program is presented to and would be received and used by consumers, we found that overall most participants said that ratings influence their decision-making process when making a purchase. Also, respondents overwhelmingly preferred the use of stars to rate the seats. Specific to ease of use ratings, most participants preferred the chart that included the ease of use criteria. They explained that they liked having as much information as possible, and because they valued some criteria over others, seeing all the individual ratings was more helpful. Also, most reacted positively to the use of a letter grade scale for the Ease of Use Rating because it differentiated the Ease of Use Rating from the Performance Rating. Specific to the performance rating, many believed that it was more important than the Ease of Use Rating. However, many said that they wanted more information on how the ratings are derived. Participants stated that a brochure should include information on different harness types, price ranges of individual seats, and explanations of the tests that are done when a seat is rated. Respondents also said that the brochure should use color and graphics and text should be in a bullet-point format.

C. Rating and Distribution Plan

NHTSA agrees with the National SAFE KIDS Campaign in that timing of information is an important element of the ratings program. Also of importance is how this information is presented to the consumer. After considering the comment received and the focus group findings, NHTSA's rating and distribution plan is as follows:

- NHTSA plans to obtain child restraints from the manufacturer and begin rating them before they are available to the public. The process for doing this will be similar to how NHTSA receives child restraints from the manufacturers for compliance testing. A letter will be sent to the manufacturers requesting a list of new child restraints that will be introduced into the marketplace. NHTSA will also request these seats be shipped to a designated testing location. NHTSA plans to conduct testing and evaluations beginning this fall and publish a print brochure in the spring of 2003. From discussions with manufacturers and retailers, early spring is a transition time for stocking retail shelves with new child restraints.

- The brochure will provide explanatory information to consumers as well as have charts listing the ratings of child safety seats. The brochure will list child seats by type: (1) Infant only, (2) convertible, (3) forward facing only, (4) combination forward facing booster, and (5) booster, followed by their ratings. NHTSA may include additional information about the child restraint such as harness type, weight ranges for the restraint, etc. NHTSA already has on its Web site, a listing of child restraints with features and will be considering combining this information with the ratings in print and on the Web site.

- There will be several ratings listed for each child restraint. Each ease of use category (there are 5) as well as an overall ease of use score will be listed. Also in 2005, we anticipate that each restraint will also have star ratings from the dynamic tests. Because multimode child restraints will be rated in each mode it is recommended for use, one seat may have 16 total ratings. For example, a convertible child restraint will have six ease of use ratings (5 categories and 1 overall) for rear-facing and the same amount for forward-facing, for a total of 12. The convertible seat will also have two dynamic tests for each mode for a total of four. Refer to Table 1 in the November 6, 2001, Notice to see the testing protocol for each type of restraint.

- The brochure, which will be updated on annual basis, will be posted on the NHTSA Web site as well as distributed through our outreach mechanisms (*e.g.*, Regional offices, State Highway Safety Offices, National Organizations, etc.).

- Following initial publication of the print brochure, throughout the remainder of the year (until October), NHTSA will continue to rate any new child restraints that will be introduced into the market. Following our rating, the results will be posted on the Web site as well as announced through a press release.

VIII. Conclusion

In response to the TREAD Act, NHTSA has decided to establish a consumer information program for add on child restraints based on their ease of use. We believe that this consumer information program will encourage child restraint manufacturers to produce child restraints with features that make it easier for consumers to use and install, thereby, leading to increased correct use of child restraints and increased safety for child passengers. Secondly, we believe that child protection is a systems approach. It involves both the child restraint manufacturer and the vehicle manufacturer. We feel that consumers would value information from both of these entities. Therefore, we have decided to perform two pilot programs to gather additional information about these two aspects of child passenger safety. One pilot program will subject child restraints to a 48 kmph (30 mph) sled test under the same test conditions as a proposed upgrade to FMVSS No. 213. The second pilot program will continue to include child restraints in the frontal crashes of our New Car Assessment Program. We will collect information from these two pilot programs in 2003 and 2004 and not publish the results as consumer information. At the conclusion of the pilot programs, and if analyses of the pilot program show this would be meaningful consumer information, the agency will seek public comments on a proposal for full implementation of the rating of vehicles for child protection and the dynamic child restraint test to commence in Model Year 2005. (By Model Year 2005, we mean October 2004 to coincide with the commencement of the Fiscal Year 2005 New Car Assessment Program). We believe this consumer information will enable prospective purchasers to make better, informed choices about new child restraints and passenger vehicles.

Authority: 49 U.S.C. §§ 32302, 30111, 30115, 30117, 30166, and 30168, and Pub. L. 106–414, 114 Stat. 1800; delegation of authority at 49 CFR 1.50.

Issued on: October 29, 2002.

Noble N. Bowie,

Acting Associate Administrator for Rulemaking.

BILLING CODE 4910–59–P

Appendix A

Proposed Ease of Use Rating Form

NHTSA Child Restraint Usability Rating Form – 2001

Date _____ Evaluated by _____ Seat # (on tag) _____

Manufacturer _____ DOM _____

Make & Model _____ Model # (on CRS) _____

If optional base, model # on base _____ DOM on base _____

Style: ❑ Infant (RF) ❑ Convertible (RF/FF) ❑ Combination (FF harness/booster) ❑ Booster ❑ Other

Harness: ❑ 5-point ❑ "V" or 3-point ❑ T-shield ❑ OH shield ❑ Shield booster ❑ No shield booster

Measurements (imperial units for North American consumer guide) – *take out slack in seat cover*

Total number of crotch strap positions ❑ 1 ❑ 2 ❑ n/a (booster only)

Distance crotch strap opening on base to seat bight Position 1 _____ Position 2 _____ ❑ na

Lower harness slot height (bottom center slot to seat bight) _____ Upper harness slot height _____ ❑ n/a

Seat height (from seat bight) _____ ❑ n/a (no back-booster)

Size range given in owner' manual: _____ **Date on manual:** _____

	WEIGHT (kg and lb)		HEIGHT (cm and inches)	
	Minimum	**Maximum**	**Minimum**	**Maximum**
RF				
FF				
Booster				

❑ Yes ❑ No, note any differences _____

_____

Infant restraint has optional base ❑ Yes ❑ No ❑ n/a (eg convertible)

Type: ❑ Booster Only
❑ Combination (harness/booster)

Style: ❑ No-back with non-removable shield
❑ No-back with removable shield
❑ No-back NO shield
❑ High back with soft back
❑ High back with hard back

Booster recommened for use with: Lap/torso ❑ Yes ❑ No ❑ not shown on seat
Lap belt ❑ Yes ❑ No ❑ not shown on seat

If shield booster, recommended t/belt position: ❑ front of child ❑ behind child ❑ not shown on seat ❑ n/a

NHTSA CHILD RESTRAINT USABILITY RATING FORM – 2001

Assemly *(When first out of box)*

	A	B	C	Notes
All functional parts including seat pad or cover attached and ready to use	Yes*		No	*parent may still need to adjust system to fit child
Tether attached to child restraint	Yes		No	n/a
Owner's manual easy to find	Attached to child restraint in a clearly visible location	Attached to child restraint but not clearly visible	In box, not attached	
Obvious storage (pocket) for manual	Easily accessible when installed in all modes and manual can be removed and replaced easily	Easily accessible when installed in all modes but manual cannot be removed and replaced easily (any use of plastic clips as the sole means of storing the instructions will not be higher than "acceptable")	Not accessible when installed in all modes	

Evaluation of Labels/Instructions

	A	B	C	Notes
Clear indication of child's size range	Separate clear text with illustrations of child in upper range	Separate clear text Independent paragraph	Size range buried in other text	
All mode/s of use clearly indicated e.g., rear-facing only or forward- and rear-facing if convertible	CRS illustration in complete vehicle seat (not FSP) Mode/s clear, no need to read text	CRS illustration in outline vehicle seat (could be front seat) Need to read text	No illustration, text only May be illustrated, but not all modes shown	*Infant restraint = RF* *Convertible = RH and FF (+tether could be separate illustration)* *Combination = FF (+harness/tether and booster)*
Air bag warning in written instructions	Separate, highlighted & illustrated	Separate & highlighted	Buried in other text or no warning	
Show harness slots okay to use for occupant size	Clear illustration or markings – no need to read text	Markings of top slot – need to read text	Other, includes text only or in manual only	n/a, all harness slots can be used
Instructions for routing for both lap belt and lap/shoulder belt in all modes	All modes illustrated clearly with CR in seat S/belt (tether) in illustration with s/b ***No need to read***	All modes illustrated with CR in seat (tether may have own illustration of s/belted CRS in seat) ***Need*** to read text	Not all illustrated (e.g. tether not shown)	*All modes = RF/FF & lap, lap/torso* *and for **infant restraint** if torso belt shown behind CRS, alternative if torso belt not long enough* *and for **FF harness systems** + tether* *and for **booster** – whether or not okay for both lap and lap/torso seat belt*

NHTSA CHILD RESTRAINT USABILITY RATING FORM – 2001

Evaluation of Labels/Instructions *(Continued)*

		A	B	C	Notes
Visability of seat belt routing (for lap belt and lap/torso) when CRS in position in vehicle i.e. is seat belt routing obvious	Without base	Clear routing illustration or clear contrast belt path marking ***both*** sides No need to read text	Markings or some form of routing illustration ***both*** sides Need to read text	Other incl illustration only ***one*** side or illustrations do not match CRS or belt direction or hidden by seat cover	
	Installing add-on base (alone) or n/a	Clear routing illustration or clear contrast belt path marking ***both*** sides No need to read text	Markings or some form of routing illustration ***both*** sides Need to read text	Other incl illustration only ***one*** side or illustrations do not match CRS or belt direction or hidden by seat cover	
Visibility of tether use		Yes		No	
Information in written instructions and on labels match		Yes		No	
Durability of labels		All labels molded or embossed	Sticky label	Sticky label if one or more are already peeling when restraint removed from box	

Securing the Child

	A	B	C	Notes
Buckle can be secured in reverse	No, or yes but usual release works with same degree of effort	Yes, but usual release requires more effort	Yes, but can't use release mechanism	
Harness adjustment easy to tighten or loosen when child restraint installed	One had to tighten Max 2 to loosen	Two hands to tighten, but easy No re-threading	Other	*Do not count one hand to support CRS*
Number of harness slots/ usable slots	3	2*	Top only	*2nd slot okay to 30 lb then top only
Ease of attaching/removing base (infant restraint systems only)	One had to attach Max two to release – handle easy to access	One hand to attach Max two to release – handle not easy access	Other includes need to tilt or tip to release	n/a, not an infant restraint n/a, no base offered with this infant restraint
Ease of conversion rear-facing to forward-facing or forward-facing to booster and back again	One had to change Easy to access	1-2 hands to change – not easy access or binds	Other	n/a, single mode
Visibility of harness slots	Clear view of both slots (slots aligned)	Clear view cloth slots, not aligned with plastic slots	Something in way when sold, e.g. pad, head hugger	n/a, no harness slots (booster only)

NHTSA CHILD RESTRAINT USABILITY RATING FORM – 2001

Securing the Child *(Continued)*

	A	B	C	Notes
Ease of changing harness slot position	No need to rethread Possible for one person to do	Possible for one person to do, easy to attach/remove Large slots easy to thread	Other, slot size too small for easy threading Loose mandatory pieces Could misroute through buckle	
Ease of reassembly if pad/cover removed for cleaning	No loose parts Easy to attach/ remove – clear slots No realignment necessary	No loose parts Slots may be misaligned	Loose parts, need hand tool Slot size too small for easy threading Could misroute through buckle	
Ease of adjusting/removing shield	Clear illustration simple action shield marked	Need to read text, simple action, shield not marked	Other tool/s required	n/a, no shield n/a, shield not adjustable

Installing in Vehicle

		A	B	C	Notes
Separation of vehicle belt path	***Without base***	No contact possible	Cover to avoid contact	Possible contact including crotch strap	
	Installing add-on base (alone) or n/a	No contact possible	Cover	Possible contact	
Ease of vehicle belt routing (hand clearance)	***Without base***	Male hand can route s/b through including flap in seat, nothing in way	Male hand fit but need to move CRS (no x-tilt), or move padding	Hand does not fit	
	Installing add-on base (alone) or n/a	Male hand can route s/b through including flap in seat	Male hand fit but need to move CRS (no x-tilt)	Hand does not fit	
Ease of seat belt routing (boosters)		Single action (could be done by child in seat)	Includes 2 hands to operate belt positioning hardware	Detachable or multiple steps	
Ease of use of any belt-positioning hardware on CRS including lock-off		One hand to use	Two hands to use	Detachable or multiple steps	n/a, no belt positioning hardware
Tether easy to tighten (& release)		One hand to tighten	Two hands but easy	Other	
Does belt-positioning device allow excessive slack to occur including lock off		Guides only		Slack could be introduced	n/a, no belt positioning hardware
Ease of tightening belt around CRS		???	????	???	

Appendix B

Proposed Ease of Use Rating Sample

NHTSA Ease of Use Rating Sample

Evaluation Category	Feature	Possible Points for Feature	Example Rating	Example Rating: Points for Each Feature	Feature Weight	Example Rating: Weighted Points for Each Feature	Category Point Range for C Rating	Category Point Range for B Rating	Category Point Range for A Rating	Example Rating: Result for this Category
Assembly										
	All functional parts including seat pad or cover attached and ready to use	1, 3	C	1	2	2				
	Tether attached to child restraint	1, 3	C	1	2	2				
	Owner's manual easy to find	1, 2, 3	A	3	1	3				
	Obvious storage (pocket) for manual	1, 2, 3	C	1	2	2				
	Total					9	7 to 11	12 to 16	17 to 21	C
Labels/ Instructions										
	Clear indication of child's size range	1, 2, 3	A	3	2	6				
	All mode/s of use clearly indicated e.g., rear-facing only or forward- and rear-facing if convertible	1, 2, 3	A	3	2	6				
	Air bag warning in written instructions	1, 2, 3	A	3	2	6				
	Show harness slots okay to use for occupant size	1, 2, 3	C	1	3	3				
	Instructions for routing for both lap belt and lap/shoulder belt in all modes	1, 2, 3	A	3	2	6				
	Visibility of seat belt routing (for lap belt and lap/torso) when CRS in position in vehicle i.e., is seat belt routing obvious	1, 2, 3	C	1	3	3				
	Visibility of tether use	1, 3	A	3	2	6				
	Information in written instructions and on labels match	1, 3	A	3	2	6				
	Durability of labels	1, 2, 3	B	2	2	4				
	Total					46	20 to 33	34 to 47	48 to 60	B
Securing the Child										
	Buckle can be secured in reverse	1, 2, 3	C	1	3	3				
	Harness adjustment easy to tighten or loosen when child restraint installed	1, 2, 3	B	2	3	6				
	Number of harness slots/usable slots	1, 2, 3	B	2	1	2				
	Ease of attaching/removing base (infant restraint systems only)	1, 2, 3	C	1	3	3				
	Ease of conversion rear-facing to forward-facing or forward-facing to booster and back again	1, 2, 3	A	3	3	9				
	Visibility of harness slots	1, 2, 3	A	3	2	6				
	Ease of changing harness slot positions	1, 2, 3	A	3	2	6				
	Ease of reassembly if pad/cover removed for cleaning	1, 2, 3	C	1	3	3				
	Ease of adjusting/removing shield	1, 2, 3	A	3	1	3				
	Total					41	21 to 35	36 to 49	50 to 63	B
Installing in Vehicle										
	Separation of vehicle belt path	1, 2, 3	B	2	3	6				
	Ease of vehicle belt routing (hand clearance)	1, 2, 3	B	2	2	4				
	Ease of seat belt routing (boosters)	1, 2, 3	B	2	2	4				
	Ease of use of any belt-positioning hardware on CRS, including lock-off	1, 2, 3	A	3	1	3				
	Tether easy to tighten (& release)	1, 2, 3	C	1	3	3				
	Does belt-positioning device allow slack to occur	1, 3	C	1	3	3				
	Ease of tightening belt around CRS	1, 2, 3	A	3	2	6				
	Total					29	16 to 26	27 to 37	38 to 48	B
Overall Rating										B
Qualifiers:										
To be rated B, no more than one out of four categories can be rated C										
To be rated A, no more than one out of four categories can be rated less than A										

Appendix C

Final Ease of Use Rating and Scoring Forms

NHTSA Ease of Use Rating Form – 2002

Complete if Infant Restraint or Convertible RF Mode

Date _____ Evaluated by _____ Seat # (on tag) _____

Manufacturer _____ DOM _____

Make & Model _____ Model # (on CRS) _____

If optional base, model # on base _____ DOM on base _____

Style: ❑ Infant (RF) ❑ Convertible (RF/FF) ❑ Car Bed

Infant restraint has optional base ❑ Yes ❑ No

Harness: ❑ 5-point ❑ "V" or 3-point ❑ T-shield ❑ OH shield

Measurements

Total number of crotch strap positions ❑ 1 ❑ 2

Distance crotch strap opening on base to seat bight Position 1 _____ Position 2 _____

Lower harness slot height (bottom center slot to seat bight) _____ Upper harness slot height _____ ❑ n/a

Seat height (from seat bight) _____ ❑ n/a (no back-booster)

Size range given in owner's manual: **Date on manual:** _____

	WEIGHT (kg and lb)		HEIGHT (cm and inches)	
	Minimum	Maximum	Minimum	Maximum
RF				

NHTSA Ease of Use Rating Form – 2002

Complete if Infant Restraint or Convertible RF Mode

Make & Model _____ Seat # (on tag) _____

Assembly *(When first out of box)*

	A	B	C	Notes
All functional parts including seat pad or cover attached and ready to use; rear facing slots for lowest weight range	Yes*	No, tools not required	No, tools required	*parent may still need to adjust system to fit child
Owner's manual easy to find when taken out of box	Attached to child restraint in a clearly visible location	Attached to child restraint but not clearly visible	In box, not attached	
Storage system for manual	Manual removed and replaced easily		Manual cannot be removed and replaced easily	

Evaluation of Labels

	A	B	C	Notes
Clear indication of child's size range e.g., picture of child in seat use of harness clip weight range	Separate clear text with illustrations of child in upper range		Separate clear text Independent paragraph	
All mode/s of use clearly indicated e.g., rear-facing only or rear-facing vs. forward-facing, LATCH	CRS illustration in complete vehicle seat (not FSP) Mode/s clear, ***No need*** to read text	CRS illustration in outline vehicle seat (could be front seat) ***Need*** to read text	No illustration, text only May be illustrated, but not all modes shown	
Instructions for routing for both lap belt and lap/shoulder belt	Illustrated clearly with CR in vehicle seat Lap, lap/ shoulder belts ***No need*** to read text	Illustrated, outlined or no vehicle seat ***Need*** to read text	Not all modes illustrated Unclear or incorrect instructions	
Shows how to prepare lower attachments for use	Visually obvious and able to use with illustration only, no need to read text OR No illustration required	Illustration plus written instructions provided, need to read text	Written instructions only provided or nothing	In "A" category one or two words OK for extra clarification
Shows how to use lower attachments	Visually obvious and able to use with illustration only, no need to read text	Illustration plus written instructions provided, need to read text	Written instructions only provided or nothing	In "A" category one or two words OK for extra clarification

NHTSA Ease of Use Rating Form – 2002

Complete if Infant Restraint or Convertible RF Mode

Evaluation of Labels *(Continued)*

		A	B	C	Notes
Visability of seat belt routing (for lap and lap/shoulder belts), and lower LATCH attachments, when CRS in position in vehicle i.e. Is seat belt routing, LATCH attachments obvious?	***Without base***	Clear routing illustration or clear contrast belt path marking ***No need*** to read text	Markings or some form of routing illustration ***Need*** to read text	Illustrations do not match CRS or belt direction or are hidden by seat cover	LATCH n/a
	Installing add-on base (alone)	Clear routing/ LATCH attachment illustration or clear contrast belt path marking ***No need*** to read text	Markings or some form of routing illustration ***Need*** to read text	Illustrations do not match CRS or belt direction or are hidden by seat cover	n/a
Durability of labels		Sticky label not peeling or other method of technology label not peeling		Sticky label if one or more are already peeling when restraint removed from box	

Evaluation of Instructions

	A	B	C	Notes
Clear indication of child's size range e.g., picture of child in seat use of harness clip weight range	Separate clear text with illustrations of child in upper range		Separate clear text Independent paragraph	
All mode/s of use clearly indicated e.g., rear-facing only or rear-facing vs. forward-facing, LATCH	CRS illustration in complete vehicle seat (not FSP) Mode/s clear, ***No need*** to read text	CRS illustration in outline vehicle seat (could be front seat) ***Need*** to read text	No illustration, text only May be illustrated, but not all modes shown	
Air bag warning in written instructions	Separate, highlighted & illustrated	Separate & highlighted	Buried in other text or no warning	
Instructions for routing for both lap belt and lap/shoulder belt	Illustrated clearly with CR in vehicle seat Lap, lap/ shoulder belt ***No need*** to read text	Illustrated, outlined or no vehicle seat ***Need*** to read text	Not all illustrated Unclear or incorrect instructions	
Instructions describe how to prepare lower LATCH attachments for use	Visually obvious, able to use with illustration only	Illustration plus written instructions provided	Written instructions only provided or nothing	In "A" caterogy one or two words OK for extra clarification
Instructions show how to use lower LATCH attachments	Visually obvious, able to use with illustration only	Illustration plus written instructions provided	Written instructions only provided or nothing	In "A" caterogy one or two words OK for extra clarification

NHTSA Ease of Use Rating Form – 2002

Complete if Infant Restraint or Convertible RF Mode

Evaluation of Instructions *(Continued)*

	A	B	C	Notes
Orientation for LATCH lower attachments	Correct orientation of LATCH lower attachments clearly illustrated or text clearly states that it can be used in any orientation	Correct orientation of LATCH lower attachments explained only in text	No information regarding orientation of LATCH lower attachments	n/a if orientation cannot be changed
Information in written instructions and on labels match (size measurements)	Yes		No	

Securing the Child

	A	B	C	Notes
Buckle can be secured in reverse	No, or yes but usual release works with same degree of effort	Yes, but usual release requires more effort	Yes, but can't use release mechanism	
When installed, easy access to harness adjustment for tightening and loosening	Yes		No	
Harness adjustment easy to tighten or loosen when child restraint is installed	One hand to tighten/loosen, or automatically adjusts Max 2 to loosen	Two hands to tighten/loosen, but easy No re-threading	Other	*Do not count one hand to support CRS*
Number of harness slots match (plastic and pad)	Yes		No	
Number of harness slots in shell	At least 3 or 1 adjustable	2	1	
Visibility of harness slots	Clear view of all slots (slots aligned)	Clear view cloth slots, not aligned with plastic slots	Something in way when sold, e.g. pad, head hugger	
Ease of conversion forward-facing to rear-facing	One hand to change Easy to access	1-2 hands to change – not easily access-ible or binds	Other	n/a, single mode
Ease of changing harness slot position	No need to re-thread Possible for one person to do	Possible for one person to do, easy to attach/remove Large slots easy to thread	Other, slot size too small for easy threading Loose mandatory pieces Could misroute through buckle or could incorrectly resecure, requires multiple threading of harness	

NHTSA Ease of Use Rating Form – 2002

Complete if Infant Restraint or Convertible RF Mode

Securing the Child *(Continued)*

	A	B	C	Notes
Ease of re-assembly if pad/cover removed for cleaning or rethreading of harness	No loose parts Easy to attach/ remove – clear slots No realignment necessary	No loose parts Slots may be misaligned	Loose parts, need hand tool Slot size too small for easy threading Could misroute through buckle	
Ease of adjusting/removing shield	Clear illustration, simple action, shield marked	Need to read text, simple action, shield not marked	Other tool/s required	n/a, no shield n/a, shield not adjustable

Installing in Vehicle

		A	B	C	Notes
Separation of vehicle belt path from harness	***Without base***	No contact possible		Possible contact including crotch strap	
	Installing add-on base (alone)	No contact possible	Cover	Possible contact	n/a
Can lower LATCH attachments interfere with harness	***Without base***	No		Yes	n/a
	Installing add-on base (alone)	No		Yes	n/a
Ease of vehicle belt routing (hand clearance)	***Without base***	Male hand can route s/b through including flap in seat, nothing in way	Male hand fit but need to move CRS (no x-tilt), or move padding	Hand does not fit	
	Installing add-on base (alone)	Male hand can route s/b through including flap in seat	Male hand fit but need to move CRS (no x-tilt)	Hand does not fit	n/a
Ease of attaching/removing infant seat from base		One hand to attach Max two to release – handle easy to access	One hand to attach Max two to release – handle not easily accessible	Other includes need to tilt or tip to release	n/a, no base offered with this infant restraint
Ease of use of any belt positioning feature on CRS including lock-off		One hand to use	Two hands to use	Detachable or multiple steps	n/a, no belt positioning hardware
Presence of feedback for seat back angle	***Seat***	Yes		No	
	Base	Yes		No	n/a
LATCH lower attachment can be installed in reverse		No, or yes but works in usual way	Yes, but usual release requires more effort	Yes, and can't release	

NHTSA Ease of Use Rating Form – 2002

Complete if Convertible FF Mode , Forward Facing Only or Transitional with Harness

Date _____ Evaluated by _____ Seat # (on tag) _____

Manufacturer _____ DOM _____

Make & Model _____ Model # (on CRS) _____

Style: ❑ Convertible (RF/FF) ❑ FF only ❑ Combination (FF harness/booster)

Harness: ❑ 5-point ❑ "V" or 3-point ❑ T-shield ❑ OH shield ❑ Shield booster

Measurements

Total number of crotch strap positions ❑ 1 ❑ 2

Distance crotch strap opening on base to seat bight Position 1 _____ Position 2 _____ ❑ n/a

Lower harness slot height (bottom center slot to seat bight) _____ Upper harness slot height _____ ❑ n/a

Seat height (from seat bight) _____

Size range given in owner's manual: **Date on manual:** _____

	WEIGHT (kg and lb)		HEIGHT (cm and inches)	
	Minimum	Maximum	Minimum	Maximum
FF				

NHTSA Ease of Use Rating Form – 2002

Complete if Convertible FF Mode , Forward Facing Only or Transitional with Harness

Make & Model _____ Seat # (on tag) _____

Assembly *(When first out of box)*

	A	B	C	Notes
All functional parts including seat pad or cover attached and ready to use; harness in lowest usable slots; includes tether attached (FF only)	Yes*	No, tools not required	No, tools required	*parent may still need to adjust system to fit child n/a if convertible
Tether attached to restraint	Yes		No	n/a if single mode
Owner's manual easy to find when taken out of box	Attached to child restraint in a clearly visible location	Attached to child restraint but not clearly visible	In box, but not attached	
Storage system for manual	Manual removed and replaced easily		Manual cannot be removed and replaced easily	

Evaluation of Labels

	A	B	C	Notes
Clear indication of child's size range e.g., picture of child in seat use of harness clip weight range	Separate clear text with illustrations of child in upper range		Separate clear text Independent of illustration or no illustration	
All mode/s of use clearly indicated e.g., FF + tether (v. RF) FF + tether (v. booster) LATCH	CRS illustration in vehicle seat (not FSP) Mode/s clear, no need to read text	CRS illustration in outline vehicle seat (could be front seat) Need to read text	No illustration, text only May be illustrated, but not all modes shown (e.g. tether not shown)	
Shows which harness slots OK to use	Clear illustrations or markings ***No need*** to read text	Markings of top slot ***Need*** to read text	Text only or missing	n/a, all can be used
Instructions for routing both lap belt and lap/shoulder belt	Illustrated clearly with CR in vehicle seat and tether in illustration ***No need*** to read text	Illustrated, outlined or no vehicle seat Tether may have own illustration ***Need*** to read text	Not all modes illustrated (e.g. tether not shown) or unclear instructions	
Shows how to prepare lower attachments for use	Visually obvious and able to use with illustration only, no need to read text OR No illustration required	Illustrations plus written instructions provided, need to read text	Written instructions only provided or nothing	In "A" category one or two words OK for extra clarification

NHTSA Ease of Use Rating Form – 2002

Complete if Convertible FF Mode , Forward Facing Only or Transitional with Harness

Evaluation of Labels *(Continued)*

	A	B	C	Notes
Shows how to use lower attachments	Visually obvious and able to use with illustration only, no need to read text	Illustrations plus written instructions provided, need to read text	Written instructions only provided or nothing	In "A" category one or two words OK for extra clarification
Visability of seat belt routing (for lap and lap/shoulder belts), and LATCH attachments, when CRS in vehicle position i.e. Is seat belt routing, LATCH attachments obvious?	Clear routing illustration or clear contrast belt path, LATCH marking ***No need*** to read text	Markings or some form of routing illustration ***Need*** to read text	Illustrations do not match CRS or belt direction or are hidden by seat cover	
Durability of labels	Sticky label not peeling or other method of technology label not peeling		Sticky label if one or more are already peeling when restraint removed from box	

Evaluation of Instructions

	A	B	C	Notes
Clear indication of child's size range e.g., picture of child in seat use of harness clip weight range	Separate clear text with illustrations of child in upper range		Separate clear text Independent paragraph	Must have illustration with at least weight
All mode/s of use clearly indicated e.g., FF + tether (v. RF) FF + tether (v. booster) lower LATCH	CRS illustration in vehicle seat (not FSP) Mode/s clear, no need to read text	CRS illustration in outline vehicle seat (could be front seat) Need to read text	No illustration, text only May be illustrated, but not all modes shown (e.g. tether not shown)	
Shows which harness slots OK to use	Clear illustrations or markings ***No need*** to read text	Markings of top slot ***Need*** to read text	Text only or missing	n/a, all can be used
Air bag warning in written instructions	Separate, highlighted & illustrated	Separate & highlighted	Buried in other text or no warning	
Instructions for routing both lap belt and lap/shoulder belt	Illustrated clearly with CR in vehicle seat and tether in illustration ***No need*** to read text	Illustrated, outlined or no vehicle seat Tether may have own illustration ***Need*** to read text	Not all modes illustrated (e.g. tether not shown) or unclear instructions	
Instructions describe how to prepare lower attachments for use	Visually obvious, able to use with illustrations only	Illustrations plus written instructions provided	Written instructions only provided or nothing	In "A" caterogy one or two words OK for extra clarification

NHTSA Ease of Use Rating Form – 2002

Complete if Convertible FF Mode , Forward Facing Only or Transitional with Harness

Evaluation of Instructions *(Continued)*

	A	B	C	Notes
Instructions show how to use lower attachments	Visually obvious, able to use with illustrations only	Illustrations plus written instructions provided	Written instructions only provided or nothing	In "A" caterogy one or two words OK for extra clarification
Orientation for LATCH tether and lower attachments	Correct orientation of LATCH tether and lower attachments clearly illustrated or text clearly states that it can be used in any orientation	Correct orientation of LATCH tether and lower attachments explained only in text	No information regarding orientation of LATCH tether and lower attachments	n/a if orientation cannot be changed
Information in written instructions and on labels match (size measurements)	Yes		No	

Securing the Child

	A	B	C	Notes
Buckle can be secured in reverse	No, or yes but usual release works with same degree of effort	Yes, but usual release requires more effort	Yes, but can't use release mechanism	
When installed, easy access to harness adjustment for tightening and loosening	Yes		No	
Harness adjustment easy to tighten or loosen when child restraint is installed	One hand to tighten/loosen, or automatically adjusts Max 2 to loosen	Two hands to tighten/loosen, but easy No re-threading	Other	*Do not count one hand to support CRS*
Number of harness slots match (plastic and pad)	Yes		No	
Number of harness slots in shell	At least 3 or 1 adjustable	2	1	
Visibility of harness slots	Clear view of all slots (slots aligned)	Clear view of cloth slots, not aligned with plastic slots	Something in way when sold, e.g. pad, head hugger	
Ease of conversion from rear-facing to forward-facing	One hand to change Easy to access	1-2 hands to change – not easily access-ible or binds	Other	n/a, single mode
Ease of conversion from booster to forward-facing	Easy to access Illustrations provided on seat showing change made	Easy to access No illustration provided on seat	Access difficult or need instructions	n/a

NHTSA Ease of Use Rating Form – 2002

Complete if Convertible FF Mode , Forward Facing Only or Transitional with Harness

Securing the Child *(Continued)*

	A	B	C	Notes
Ease of changing harness slot position	No need to re-thread Possible for one person to do	Possible for one person to do, easy to attach/remove Large slots easy to thread	Other, slot size too small for easy threading Loose mandatory pieces Could misroute, requires multiple threading of harness or could incorrectly resecure	
Ease of re-assembly if pad/cover removed for cleaning or rethreading of harness	No loose parts Easy to attach/ remove – clear slots No realignment necessary	No loose parts Slots may be misaligned	Loose parts, need hand tool Slot size too small for easy threading Could misroute through buckle	
Ease of adjusting/removing shield	Clear illustration, simple action, shield marked	Need to read text, simple action, shield not marked	Other tool/s required	n/a, no shield n/a, shield not adjustable

Installing in Vehicle

	A	B	C	Notes
Separation of vehicle belt path from harness	No contact possible		Possible contact including crotch strap	
Can lower LATCH attachments interfere with harness	No		Yes	
Ease of vehicle belt routing (hand clearance)	Male hand can route s/b through including flap in seat, nothing in way	Male hand fit but need to move CRS (no x-tilt), or move padding	Hand does not fit	
Ease of use of any belt positioning feature on CRS including lock-off	One hand to use	Two hands to use	Detachable or multiple steps	n/a, no belt lock feature
Tether easy to tighten (& release)	One hand to tighten/loosen	Two hands but easy	Other	
LATCH tether and lower attachments can be installed in reverse	No, or yes but works in usual way	Yes, but usual release requires more effort	Yes, and can't release	

NHTSA Ease of Use Rating Form – 2002

Complete if Booster or Transitional Mode

Date _____ Evaluated by _____ Seat # (on tag) _____

Manufacturer _____ DOM _____

Make & Model _____ Model # (on CRS) _____

Type:
- ❑ Booster Only
- ❑ Combination (harness/booster)
- ❑ Other, energy absorbing restraint

Style:
- ❑ No-back with non-removable shield
- ❑ No-back with removable shield
- ❑ No-back NO shield
- ❑ High back with soft back
- ❑ High back with hard back
- ❑ No base

Booster recommended for use with:

Lap/shoulder	❑ Yes	❑ No	❑ not shown on seat
Lap belt	❑ Yes	❑ No	❑ not shown on seat

If shield booster, recommended shoulder belt position: ❑ front of child ❑ behind child ❑ not shown on seat ❑ n/a

Measurements

Seat height (from seat bight) ❑ n/a (no back-booster)

Size range given in owner's manual: **Date on manual:** _____

	WEIGHT (kg and lb) (Optional for belt-positioning seats)		HEIGHT (cm and inches)	
	Minimum	Maximum	Minimum	Maximum
Booster				

NHTSA Ease of Use Rating Form – 2002

Complete if Booster or Transitional Mode

Make & Model_____ Seat # (on tag) _____

Assembly *(When first out of box)*

	A	B	C	Notes
All functional parts including seat pad or cover attached and ready to use	Yes*	No, tools not required	No, tools required	*parent may still need to adjust system to fit child n/a if combination seat
Owner's manual easy to find when taken out of box	Attached to child restraint in a clearly visible location	Attached to child restraint but not clearly visible	In box, but not attached	
Storage system for manual	Manual removed and replaced easily		Manual cannot be removed and replaced easily	

Evaluation of Labels

	A	B	C	Notes
Clear indication of child's size range e.g., picture of child in seat weight and height range	Separate clear text with illustrations of child in upper range		Separate clear text Independent paragraph	Belt positioning seat may show height only
Mode of use clearly indicated (i.e. with lap belt or lap/shoulder belt, and if transitional seat, booster v. FF with harness)	CRS illustration in complete vehicle seat (not FSP) Mode/s clear, ***No need*** to read text	CRS illustration in outline vehicle seat (could be front seat) ***Need*** to read text	No illustration, text only May be illustrated, but not all modes shown	
Instructions for routing lap/shoulder belt and lap if applicable	Illustrated clearly with CR in vehicle seat Lap/shoulder belt in illustration ***No need*** to read text	Illustrated, outlined or no vehicle seat ***Need*** to read text	Not all modes illustrated, unclear or incorrect instructions	Whether or not OK for both lap and lap/shoulder seat belt
Visability of seat belt routing (for lap and lap/shoulder belts) when CRS in position in vehicle i.e. Is seat belt routing obvious?	Clear routing illustration or clear contrast belt path marking ***No need*** to read text	Markings or some form of routing illustration ***Need*** to read text	Illustrations do not match CRS or belt direction or hidden by seat cover	
Durability of labels	Sticky label not peeling or other method of technology label not peeling		Sticky label if one or more are already peeling when restraint removed from box	

NHTSA Ease of Use Rating Form – 2002

Complete if Booster or Transitional Mode

Evaluation of Instructions

	A	B	C	Notes
Clear indication of child's size range	Separate clear text with illustrations of child in upper range		Separate clear text Independent paragraph	
Mode of use clearly indicated (i.e. with lap belt or lap/shoulder belt, and if transitional seat, booster v. FF with harness)	CRS illustration in complete vehicle seat (not FSP) Mode/s clear, ***No need*** to read text	CRS illustration in outline vehicle seat (could be front seat) ***Need*** to read text	No illustration, text only May be illustrated, but not all modes shown	
Air bag warning in written instructions	Separate, highlighted & illustrated	Separate & highlighted	Buried in other text or no warning	
Instructions for routing both lap belt and lap/shoulder belt	Illustrated clearly with CR in vehicle seat Lap, lap/shoulder belt in illustration ***No need*** to read text	Illustrated, outlined or no vehicle seat ***Need*** to read text	Not all modes illustrated, unclear or incorrect instructions	Whether or not OK for both lap and lap/shoulder seat belt
Information in written instructions and on labels match (size measurements)	Yes		No	

Securing the Child

	A	B	C	Notes
Ease of conversion forward facing to booster or highback to backless	Easy to access illustrations provided on seat showing mode change	Easy access no illustrations provided on seat	Access difficult or need instructions	n/a

Installing in Vehicle

	A	B	C	Notes
Ease of use of any belt-positioning hardware on CRS	One hand to use	Two hands to use	Detachable or multiple steps	n/a, no belt positioning hardware
Does belt-positioning device allow slack to occur	No		Yes	n/a, no belt positioning hardware

Booster Seat Scoring Form

CRS #		**BOOSTER or TRANSITIONAL MODE**		
A=3,B=2,C=1		A = 3, B = 2, C = 1		
Weighting Factor		**Feature**	**0-N/A A (3) B (2) C (1)**	
		Assembly	**Score**	**Weighted Score**
A	3	Is seat assembled ready to use		0
B	2	Owner's manual easy to find		0
B	2	Storage system for manual		0
			Total	0
			Weighted Ave	0.00
			Score	C
		Evaluation of Labels		
A	3	Clear indication of child's size range		0
A	3	mode/s of use clearly indicated		0
A	3	Instructions for routing s/b		0
A	3	Visibility of seat belt routing		0
B	2	Durability of labels		0
			Total	0
			Weighted Ave	0.00
			Score	C
		Evaluation of Instructions (manual)		
B	2	Clear indication of child's size range		0
B	2	mode of use clearly indicated		0
B	2	Air bag warning in written instructions		0
B	2	Instructions for routing of s/b		0
B	2	Information in written instructions and labels match		0
			Total	**0**
			Weighted Ave	0.00
			Score	C
		Securing the Child		
B	2	Ease of conversion from high back to backless		0
		(could be n/a)	Score	C
		Installation in vehicle		
B	2	Ease of use of belt positioning device		0
A	3	Does belt positioning device allow slack		0
		(note could be n/a for both)	Total	**0**
			Weighted Ave	0.00
			Score	C
			TOTAL	0
			Weighted Ave	0.00
			Overall Score	C

Rear Facing Scoring Form

CRS #		**INFANT REAR FACING or CONVERTIBLE RF**		
A=3,B=2,C=1		Ratings A = 3, B = 2, C = 1		
Weighted Factor		**Feature**	**0-N/A A (3) B (2) C (1)**	
		Ready to use	**Score**	**Weighted Score**
A	3	Assembled ready to use		0
B	2	Owner's manual easy to find		0
B	2	Storage system for manual		0
			Total	0
			Weighted Ave	0.00
			Score	**C**
		Evaluation of Labels		
A	3	Clear indication of child's size		0
A	3	All modes clearly indicated		0
A	3	Instructions for routing s/b		0
A	3	Shows how to prepare attachments		0
A	3	Shows how to use attachments		0
		Visibility of seat belt routing/LATCH		
A	3	without base (latch n/a)		0
A	3	base alone *(infant seat w/base would have 2 scores)*		0
B	2	Durability of labels		0
			Total	0
			Weighted Ave	0.00
			Score	**C**
		Evaluation of Instructions (manual)		
B	2	Clear indication of child's size		0
B	2	Mode/s of use clearly indicated		0
B	2	Air bag warning in written instructions		0
B	2	Instructions for routing belts		0
B	2	Instructions describe how to use attachments		0
B	2	Instructions show how to use attachments		0
B	2	Orientation for LATCH		0
B	2	Information in written instructions and labels match		0
			Total	0
			Weighted Ave	0.00
			Score	**C**
		Securing the child		
A	3	Buckle can be secured in reverse		0
A	3	When installed, easy access to harness adjustment		0
A	3	Harness adjustment easy to tighten and loosen		0
B	2	No. of harness match (pad and shell)		0
A	3	No. harness slots in shell		0
B	2	Visibility of harness slots		0
A	3	Ease of conversion forward-facing to rear-facing		0
B	2	Ease of changing harness slot position		0
A	3	Ease of reassembly		0
B	2	Ease of adjusting/removing shield		0
			Total	0
			Weighted Ave	0.00
			Score	**C**
		Installation in vehicle		
		Separation of vehicle belt path from harness:		
A	3	without base		0
A	3	base alone *(infant seat w/ base would have 2 scores)*		0
		Can lower LATCH attachments interfere with harness		
A	3	seat		0
A	3	base		0
		Ease of vehicle belt routing:		
B	2	without base		0
B	2	base alone *(infant seat w/ base would have 2 scores)*		0
A	3	Ease of attaching/removing from base		0
B	2	Ease of use of any belt positioning feature		0
		Presence of seat back angle:		
A	3	seat		0
A	3	base		0
A	3	Can lower LATCH attachments be installed in reverse		0
			Total	0
			Weighted Ave	0.00
			Score	**C**
			TOTAL	**0**
			Weighted Ave	0.00
			Overall Score	**C**

Forward Facing Scoring Form

CRS #		**CONVERTIBLE FF, FF ONLY or TRANSL w/HARNESS**		
ALL CRS				
A=3,B=2,C=1		Ratings A = 3, B = 2, C = 1		
Weighting Factor		**Feature**	**0-N/A A** **(3) B** **(2) C** **(1)**	
		Ready to use	**Score**	**Weighted Score**
A	3	Assembled ready to use (n/a if convertible)		0
A	3	Tether attached and ready to use (n/a if single mode)		0
B	2	Owner's manual easy to find		0
B	2	Storage system for manual		0
			Total	0
			Weighted Ave	0.00
			Score	C
		Evaluation of Labels		
A	3	Clear indication of child's size		0
A	3	All modes clearly indicated		0
A	3	Shows harness slots OK to use		0
A	3	Instructions for routing s/b		0
A	3	Shows how to prepare attachments		0
A	3	Shows how to use attachments		0
A	3	Visibility of seat belt routing/LATCH		0
B	2	Durability of labels		0
			Total	0
			Weighted Ave	0.00
			Score	C
		Evaluation of Instructions (manual)		
B	2	Clear indication of child's size		0
B	2	Mode/s of use clearly indicated		0
B	2	Shows which harness slots OK to use		0
B	2	Air bag warning in written instructions		0
B	2	Instructions for routing belts		0
B	2	Instructions describe how to prepare attachments		0
B	2	Instructions show how to use attachments		0
B	2	Orientation for LATCH		0
B	2	Information in written instructions and labels match		0
			Total	0
			Weighted Ave	0.00
			Score	C
		Securing the child		
A	3	Buckle can be secured in reverse		0
A	3	When installed, easy access to harness adjustment		0
A	3	Harness adjustment easy to tighten and loosen		0
B	2	No. of harness slots match (shell and pad)		0
A	3	No. of harness slots in shell (max.)		0
B	2	Visibility of harness slots		0
A	3	Ease of conversion rear-facing to forward-facing		0
A	3	Ease of conversion from booster to forward-facing		0
		If single mode no ease of conversion score:		
B	2	Ease of changing harness slot position		0
A	3	Ease of reassembly		0
B	2	Ease of adjusting/removing shield		0
			Total	0
			Weighted Ave	0.00
			Score	C
		Installation in vehicle		
A	3	Separation of vehicle belt path from harness		0
A	3	Can lower LATCH attachments interfere with harness		0
B	2	Ease of vehicle belt routing		0
B	2	Ease of use of any belt positioning feature		0
A	3	Tether easy to tighten and loosen		0
A	3	Can lower LATCH attachments be installed in reverse		0
			Total	0
			Weighted Ave	0.00
			Score	C
			TOTAL	0
			Weighted Ave	0.00
			Overall Score	C

Appendix D

Final Ease of Use Rating Sample

Final Ease of Use Rating Sample

Evaluation Category	Feature	Possible Points for Feature	Example Feature Rating	Example Rating: Points for Each Feature	Fixed Weighting Factor	Example Feature Score= Feature Rating x Fixed Weighting Factor	Weighted Avg. = Feature Score/ Sum of (appl.) fixed Weighting Factors	Category Score	Overall Weighted Avg. = Sum of all Feature Scores /Sum of all Fixed Weighting Factors	Overall Rating
Assembly										
	All functional parts including seat pad or cover attached and ready to use; harness in lowest slots; includes tether attached	1, 2, 3/ n/a	B	2	3	6				
	Tether attached and ready to use	1,3, n/a	n/a		3	n/a				
	Owner's manual easy to find when taken out of box	1, 2, 3	A	3	2	6				
	Storage system for manual	1, 3	G	1	2	2				
	Total					**14**	**14/7 = 2.00**	**B**		
Labels										
	Clear indication of child's size range	1, 3	A	3	3	9				
	All mode/s of use clearly indicated e.g., FF + tether (vs. RF) FF + tether (vs. booster); LATCH	1, 2, 3	B	2	3	6				
	Show which harness slots OK to use	1, 2, 3,n/a	n/a	n/a	3	n/a				
	Instructions for routing both lap and lap/shoulder belt	1, 2, 3	C	1	3	3				
	Shows how to prepare lower attachments for use	1, 2, 3	B	2	3	6				
	Shows how to use lower attachments	1, 2, 3	B	2	3	6				
	Show which harness slots OK to use									
	Visibility of seat belt routing for lap belt and lap/shoulder, LATCH when crs in vehicle position	1, 2, 3	C	1	3	3				
	Durability of labels	1, 3	A	3	2	6				
	Total					**39**	**39/20 = 1.95**	**B**		
Instructions										
	Clear indication of child's size range	1, 3	A	3	2	6				
	All mode/s of use clearly indicated e.g., FF + tether (vs. RF) FF + tether (vs. booster); LATCH	1, 2, 3	A	3	2	6				
	Show which harness slots OK to use	1, 2, 3, n/a	n/a	n/a	2	n/a				
	Air bag warning in written instructions	1, 2, 3	C	1	2	2				
	Instructions for routing both lap and lap/shoulder belt	1, 2, 3	B	2	2	4				
	Instructions describe how to prepare lower attachments for use	1, 2, 3	B	2	2	4				
	Instructions show how to use lower attachments	1, 2, 3	B	2	2	4				
	Orientation for LATCH tether and lower attachments	1, 2, 3	B	2	2	4				
	Information in written instructions and on labels match	1, 3	A	3	2	6				
	Total					**36**	**36/16 = 2.25**	**B**		
Securing the Child										
	Buckle can be secured in reverse	1, 2, 3	A	3	3	9				
	When installed, easy access to harness adjustment for tightening and loosening	1,3	A	3	3	9				
	Harness adjustment easy to tighten or loosen when child restraint installed	1, 2, 3	B	2	3	6				
	Number of harness slots match	1, 3	A	3	2	6				
	Number of harness slots in shell	1, 2, 3	B	2	3	6				
	Visibility of harness slots	1, 2, 3	B	2	2	4				
	Ease of conversion rear-facing to forward-facing	1, 2, 3, n/a	n/a	n/a	3	n/a				
	Ease of conversion from booster to forward-facing	1, 2, 3, n/a	A	3	3	9				
	Ease of changing harness slot position	1, 2, 3	B	2	2	4				
	Ease of reassembly if pad/cover removed for cleaning or rethreading	1, 2, 3	C	1	3	3				
	Total					**56**	**56/24 = 2.33**	**B**		
Installing in Vehicle										
	Separation of vehicle belt path from harness	1, 3	A	3	3	9				
	Can lower LATCH attachments interfere with harness	1, 3	A	3						
	Ease of vehicle belt routing	1, 2, 3	A	3	2	6				
	Ease of use of any belt-positioning hardware on CRS, including lock-off	1, 2, 3,n/a	n/a	n/a	2	n/a				
	Tether easy to tighten (& release)	1, 2, 3	A	3	3	9				
	LATCH tether and lower attachments can be installed in reverse	1, 2, 3	A	2	3	6				
	Total					**30**	**30/10 = 3.0**	**A**		
	Overall Rating								**175/77= 2.27**	**B**
	Weighted Averages:									
	A = from 2.40 to 3.00									
	B = from 1.70 to less than 2.40									
	C = less than 1.70									

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