

**DEPARTMENT OF TRANSPORTATION****National Highway Traffic Safety Administration****49 CFR Part 571**

[Docket No. NHTSA–2023–0032]

RIN 2127–AL37

**Federal Motor Vehicle Safety Standards; Occupant Crash Protection, Seat Belt Reminder Systems**

**AGENCY:** National Highway Traffic Safety Administration (NHTSA), Department of Transportation (DOT).

**ACTION:** Notice of proposed rulemaking (NPRM).

**SUMMARY:** The Moving Ahead for Progress in the 21st Century Act of 2012 (MAP–21) directs NHTSA to initiate a rulemaking proceeding to amend Federal Motor Vehicle Safety Standard (FMVSS) No. 208, “Occupant crash protection,” to require a seat belt use warning system for rear seats. Pursuant to this mandate and following on an earlier Advance Notice of Proposed Rulemaking, NHTSA is proposing to require a seat belt warning system for the rear seats of passenger cars, trucks, most buses, and multipurpose passenger vehicles with a gross vehicle weight rating of 4,536 kilograms (10,000 pounds) or less. This document also proposes to enhance the existing front seat belt warning requirements, including requiring a seat belt warning for the front outboard passenger seat and increasing the duration of the warning.

**DATES:** You should submit your comments early enough to be received not later than November 6, 2023. In compliance with the Paperwork Reduction Act, NHTSA is also seeking comment on a revision to an existing information collection. For additional information, see the Paperwork Reduction Act section under the Regulatory Notices and Analyses section below. All comments relating to the information collection requirements should be submitted to NHTSA and to the Office of Management and Budget (OMB) at the address listed in the **ADDRESSES** section on or before November 6, 2023.

**DATES: Proposed effective date:** The first September 1 that is one year after the publication of the final rule for the front seat belt warning system requirements and the first September 1 that is two years after the publication of the final rule for the rear seat belt warning system requirements, with optional

early compliance permitted. Multi-stage manufacturers and alterers would have an additional year to comply.

**ADDRESSES:** You may submit comments electronically to the docket identified in the heading of this document by visiting the Federal eRulemaking Portal at <https://www.regulations.gov>. Follow the online instructions for submitting comments.

Alternatively, you can file comments using the following methods:

- *Mail:* Docket Management Facility: U.S. Department of Transportation, 1200 New Jersey Avenue SE, West Building Ground Floor, Room W12–140, Washington, DC 20590–0001.

- *Hand Delivery or Courier:* West Building Ground Floor, Room W12–140, 1200 New Jersey Avenue SE, between 9 a.m. and 5 p.m. ET, Monday through Friday, except Federal holidays. To be sure someone is there to help you, please call (202) 366–9826 before coming.

- *Fax:* (202) 493–2251.

Regardless of how you submit your comments, you should mention the docket number identified in the heading of this document.

Comments on the proposed information collection requirements should be submitted to: Office of Management and Budget at [www.reginfo.gov/public/do/PRAMain](http://www.reginfo.gov/public/do/PRAMain). To find this particular information collection, select “Currently under Review—Open for Public Comment” or use the search function. It is requested that comments sent to the OMB also be sent to the NHTSA rulemaking docket identified in the heading of this document.

**Instructions:** All submissions must include the agency name and docket number or Regulatory Information Number (RIN) for this rulemaking. For detailed instructions on submitting comments and additional information on the rulemaking process, see the Public Participation heading of the Supplementary Information section of this document. Note that all comments received will be posted without change to <https://www.regulations.gov>, including any personal information provided. Please see the Privacy Act heading below.

**Docket:** For access to the docket to read background documents or comments received, go to <https://www.regulations.gov>. You may also access the docket at 1200 New Jersey Avenue SE, West Building, Room W12–140, Washington, DC 20590, between 9 a.m. and 5 p.m., Monday through Friday, except Federal Holidays. Telephone: 202–366–9826.

**Confidential Business Information:** If you claim that any of the information in your comment (including any additional documents or attachments) constitutes confidential business information within the meaning of 5 U.S.C. 552(b)(4) or is protected from disclosure pursuant to 18 U.S.C. 1905, please see the detailed instructions given under the Public Participation heading of the **SUPPLEMENTARY INFORMATION** section of this document.

**Privacy Act:** Please see the Privacy Act heading under the Regulatory Analyses section of this document.

**FOR FURTHER INFORMATION CONTACT:** For non-legal issues, you may contact Ms. Carla Rush, Office of Crashworthiness Standards, Telephone: (202) 366–4583; Email: [carla.rush@dot.gov](mailto:carla.rush@dot.gov); Facsimile: (202) 493–2739. For legal issues, you may contact Mr. John Piazza, Office of Chief Counsel, Telephone: (202) 366–2992; Email: [John.Piazza@dot.gov](mailto:John.Piazza@dot.gov); Facsimile: (202) 366–3820. The address of these officials is: the National Highway Traffic Safety Administration, 1200 New Jersey Avenue SE, Washington, DC 20590.

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## I. Executive Summary

In 2020, there were 39,007 motor vehicle traffic fatalities in the United States.<sup>1</sup> This was 2,652 more fatalities than in 2019 (when there were 36,355 fatalities).<sup>2</sup> In 2021, motor vehicle traffic fatalities increased again to 42,939.<sup>3</sup> The traffic fatality count in 2021 is the highest since 2005 (43,510) and represents the second year-to-year increase since 2019.<sup>4</sup> The 10-percent fatality increase from 2020 to 2021 is the highest year-to-year percentage increase since FARS started data collection in 1975.<sup>5</sup> NHTSA has preliminarily estimated 42,795 fatalities in 2022, representing a small decrease of about 0.3% from 2021.<sup>6</sup> The Moving Ahead

for Progress in the 21st Century Act (MAP-21) directed NHTSA to initiate a rulemaking to require a seat belt warning for the rear seats in motor vehicles. In addition, the Department of Transportation has released a comprehensive National Roadway Safety Strategy to address the rise in roadway fatalities and injuries. Part of that strategy is to make vehicles safer.

Consistent with MAP-21 and the National Roadway Safety Strategy, this NPRM proposes to require a seat belt use warning system<sup>7</sup> for the rear seats of passenger cars, trucks, buses (except school buses, for various reasons detailed in the Applicability section of the preamble, including practicability and cost concerns), and multipurpose passenger vehicles (MPVs) with a GVWR of 4,536 kg (10,000 lb) or less. This NPRM also proposes several changes and enhancements to the existing front seat belt warning requirements, including increasing the duration of the audio-visual seat belt warning on vehicle start-up.

### *Safety Need for the Proposed Rule*

Using a seat belt is one of the most effective actions a motor vehicle occupant can take to prevent death and injury in a crash. Seat belts prevent occupants from being ejected from the vehicle, provide “ride-down” by gradually decelerating the occupant as the vehicle deforms and absorbs energy, and reduce the occurrence of occupant contact with harmful interior surfaces and other occupants. Seat belts are effective in most types of crashes, and greatly reduce the risk of fatal and non-fatal injuries compared to the risk faced by unrestrained occupants.

While seat belt use is meaningfully higher than it was a decade ago, there is room for improvement. Usage rates for seat belts in rear seats have consistently been below those for the front seats, and while front seat belt use rates increased early in the previous decade, for the last several years they have plateaued. According to data from NHTSA’s annual study of observed seat belt use, from 2012 to 2021, seat belt use was lower in the rear seat than in the front seat, ranging from a difference of about 9 percent in 2013 (78% vs. 87%) to about 14 percent in 2017 (75% vs. 89%).<sup>8</sup> During that time, front seat belt

use rates ranged from about 86% in 2012 to 91% in 2019. In 2021, front seat belt use was about 90%, and rear seat belt use was about 78%. Accordingly, every year, thousands of unrestrained motor vehicle occupants are killed in crashes, and tens of thousands of unrestrained occupants are injured (additional details on the target population are provided in the summary of benefits and costs later in this executive summary).

Many of these unbelted occupants are likely amenable to using a seat belt. Seat belt nonusers can be categorized as either “part-time” nonusers or so-called “hard-core” nonusers. Part-time nonusers generally express positive attitudes toward seat belts, but do not always buckle up, due to a range of reasons, such as short trips, forgetfulness, and being in a rush. Hard-core nonusers are those who generally do not acknowledge the benefits of seat belts and are opposed to their use. Consumer research suggests that most nonusers are part-time nonusers, not hard-core nonusers. This is true even for front seat occupants, for which there is a relatively high rate of observed seat belt use. For instance, NHTSA’s most recent survey of seat belt use found that approximately 83% of drivers who did not always use a seat belt reported using a seat belt most or some of the time, and only 17% were hard-core nonusers who used seat belts rarely or never.<sup>9</sup> The same is true for rear seat passengers who do not always use a belt, of whom 70% used a belt most or some of the time, while only 30% used a belt rarely or never.

Seat belt warning systems encourage seat belt use by reminding unbuckled occupants to fasten their belts and/or by informing the driver that a passenger is unbelted so that the driver can request the unbelted occupant to buckle up. The warnings provided by seat belt warning systems typically consist of visual and/or audible signals. Research by NHTSA and others shows that seat belt warning systems are effective at getting unbuckled occupants to fasten their seat belt.<sup>10</sup>

Federal Motor Vehicle Safety Standard (FMVSS) No. 208, “Occupant crash protection,” requires a short-duration audio-visual seat belt warning for the driver’s seat belt on passenger cars, most trucks and MPVs with a GVWR of 4,536 kg (10,000 lb) or less,

Intersection Study (Report No. DOT HS 813 344). National Highway Traffic Safety Administration.

<sup>9</sup> 2016 MVOSS, p.7 (calculated from Fig. 5).

<sup>10</sup> This research is identified and discussed in Section V and Section XIV.A, as well as the Preliminary Regulatory Impact Analysis docketed with this NPRM.

<sup>1</sup> Stewart, T. (April 2023). Overview of Motor Vehicle Traffic Crashes in 2021 (Report NO. DOT HS 813 435. National Highway Traffic Safety Administration, pg. 5.

<sup>2</sup> *Id.* at pg. 2.

<sup>3</sup> *Id.* at pg. 5.

<sup>4</sup> *Id.*

<sup>5</sup> *Id.* The 2021 fatality estimates are not entirely final, and may change somewhat as NHTSA receives further updates or corrections.

<sup>6</sup> See <https://www.transportation.gov/briefing-room/nhtsa-estimates-2022-show-roadway-fatalities-remain-flat-after-two-years-dramatic>.

Though NHTSA acknowledges fatalities essentially remained flat in 2022, NHTSA does not know if this trend will continue to remain flat or if there will be further increases in fatalities.

<sup>7</sup> Seat belt use warning systems may also be referred to in this preamble as seat belt “warning systems” (or SBWS) or seat belt “reminder” systems (or SBRSs).

<sup>8</sup> Boyle, L.L. (2022, August). Occupant restraint use in 2021: Results from the NOPUS Controlled

and buses with a GVWR of 3,855 kg (8,500 lb) or less. According to the FMVSS No. 208 standard, the visual component of the warning generally must be at least sixty seconds long, and the audible component must be at least four seconds long.

In general, voluntary adoption of warnings that go beyond this regulatory minimum, while considerable, has been mixed. Although the regulations do not require seat belt warnings for any seating position other than the driver's seat, almost all model year (MY) 2022 vehicles have a voluntarily-provided seat belt warning for the front outboard passenger seat. However, voluntary adoption for rear seats has been much slower, as only about 47% come equipped with a voluntarily-provided rear seat belt warning system (SBWS). Most vehicles already provide a seat belt warning for both front outboard seats that is much longer than the minimal required warning for the driver's seat belt, with the vast majority of vehicles including an alert that is at least 90 seconds. This suggests that the front seat belt warning minimum requirements in the FMVSS are outdated, as consumers seem clearly willing to accept audio-visual reminders that are far longer than the required four seconds.

In short, rear seat belt use rates have persistently been below those for the front seats, and progress on front seat belt use rates have slowed. Moreover, unbuckled occupants, in the front and rear seats, continue to be overrepresented in fatal crashes (51%), given the lower exposure of unbelted occupants relative to belted occupants (because front seat belt use was about 90% and rear seat belt use was 80%). Nevertheless, in spite of the effectiveness of seat belts and seat belt warnings, most new vehicles continue to lack a rear seat belt warning. Additionally, while most vehicles provide some level of enhanced reminders for the front seats, this level of enhanced protection has not occurred for all vehicles and is not standardized. This suggests a need for a beneficial safety technology that is not being met in the vehicle market. This NPRM is intended to meet this safety need and advance NHTSA's response to MAP-21.

#### *Legal Authority and Prior Regulatory History*

This proposal is issued pursuant to NHTSA's authority under the National Traffic and Motor Vehicle Safety Act (49 U.S.C. 30101 *et seq.*) (Safety Act), which authorizes NHTSA to establish Federal Motor Vehicle Safety Standards. The statute requires safety standards to be objective, practicable, and meet the

need for safety, among other things. NHTSA has tentatively concluded that the proposed requirements satisfy these statutory criteria.

This NPRM also continues NHTSA's response to a rulemaking mandate in MAP-21. MAP-21 required DOT (NHTSA, by delegation) to initiate a rulemaking proceeding to require rear seat belt warnings and directed the agency to issue a final rule unless the rule would not meet the Safety Act requirements for an FMVSS. In accordance with MAP-21, in 2013 NHTSA initiated a rulemaking proceeding when it submitted for public comment a proposal to undertake a study of the effectiveness of existing rear seat belt warning systems. In 2019, NHTSA continued with this rulemaking proceeding by publishing an Advance Notice of Proposed Rulemaking (ANPRM) seeking comment on a variety of issues related to potential rear seat belt warning requirements. NHTSA received 45 comments from a variety of organizations and individuals. Most commenters, including safety advocates, vehicle manufacturers and suppliers, and individual members of the public, supported a rear seat belt warning requirement.

This NPRM also responds to a rulemaking petition. Public Citizen and Advocates for Highway and Auto Safety have petitioned NHTSA to require a seat belt warning system for rear seats on passenger cars and MPVs with a GVWR of 4,536 kg (10,000 lb) or less. This proposal is NHTSA's further action on its grant of this petition.

#### *Summary of the Proposed Amendments*

This NPRM proposes amending the existing seat belt warning provisions in FMVSS No. 208. This proposal has two main components. The first proposes requiring a rear seat belt reminder for the rear seats. The second proposes changes and enhancements to the seat belt warning requirements for the front outboard seats, most notably an audio-visual warning that persists until the seat belts at any occupied front outboard seat are fastened. These proposed requirements would apply to passenger cars and trucks, buses (except school buses), and multipurpose passenger vehicles with a GVWR of 4,536 kg (10,000 lb) or less.

##### 1. Rear Seat Belt Reminder Requirements

The first component of this NPRM is a set of proposed requirements for a seat belt warning for rear seats. The proposed requirements have four main elements.

- *Visual warning on vehicle start-up to inform the driver of the status of the rear seat belts.* We propose three different compliance options from which manufacturers could choose for the rear seat belt warning system. The first would require the system to indicate how many or which rear seat belts are in use (the "positive-only" option). The second would require the system to indicate, for the occupied rear seats, how many or which rear seat belts are not in use (the "negative-only" option). The third would require the system to indicate, for the occupied rear seats, how many or which rear seat belts are in use and how many or which rear seat belts are not in use (the "full-status" option). Certain features would be required of all the options. Each system would have to provide a continuous or flashing visual warning, consisting of either icons or text, visible to the driver. The visual warning would have to last for at least 60 seconds, beginning when the vehicle's ignition switch is moved to the "on" or "start" position. The negative-only and full-status compliance options would require that the rear seats be equipped with a belt latch sensor and an occupant detection system (which facilitates these more informative warnings), while the positive-only option would only require that the rear seats be equipped with a belt latch sensor.

- *Audio-visual change-of-status warning.* We propose an audio-visual warning whenever a fastened rear seat belt is unfastened while the ignition switch is in the "on" or "start" position and the vehicle's transmission selector is in a forward or reverse gear. The warning would have to last for at least 30 seconds. We do not propose any requirements for the volume or tone of the warning. The intent of this warning is to alert the driver or other occupants to a change in belt status during a trip. The warning would not be required if a door is open, which would be the case if a rear passenger unfastened their belt in order to exit the vehicle.

- *Requirements related to electrical connections.* Readily removable rear seats would be required to either automatically connect to the electrical connections when the seat is put in place, or, if a manual connection is required, the connectors must be readily-accessible. Further, vehicles utilizing the negative-only compliance option would be required to provide a visual warning to the driver if a proper electrical connection has not been established for a readily removable rear seat.

- *Owner's manual requirements.* We propose that the vehicle owner's manual

(which includes information provided by the vehicle manufacturer to the consumer, whether in digital or printed form) describe the warning system's features, including the location and format of the visual warnings. We also propose that the owner's manual include instructions on how to make any manual electrical connections for readily removable seats.

## 2. Front Outboard Seat Belt Warning Requirements

We propose several changes and enhancements to the seat belt warning requirements for the front outboard seats. There are three main changes we are proposing.

- *Audio-visual warning on vehicle start-up for front outboard passenger seat.* Currently, only the driver's seat is required to have a seat belt warning, although almost all vehicles now provide a seat belt warning for the front outboard passenger seat as well.<sup>11</sup> We propose to require a seat belt warning for the front outboard passenger seat.

- *Increasing the duration of the audio-visual warning on vehicle start-up.* We propose enhancing the front seat warning requirements by requiring an audio-visual warning that remains active until the seat belt at any occupied front outboard seat is fastened. We are proposing this in light of a variety of factors, including the increase in roadway fatalities, the lack of improvement in front seat belt use rates, and the fact that the audio-visual warnings with which vehicle manufacturers are currently equipping vehicles significantly exceed the 4-second regulatory minimum (including a non-trivial share of currently sold vehicles with an indefinite-duration reminder). Vehicle manufacturers can adjust warning signal characteristics (such as frequency and volume) to make the warning both effective and acceptable to consumers.

- *Audio-visual change-of-status warning.* We also propose to require an audio-visual change-of-status warning whenever a front outboard seat belt is unbuckled during a trip (unless a front door is open, to account for an occupant unfastening the belt to exit the vehicle). The warning would be required to remain active until the seat belt is refastened.

<sup>11</sup> Based on data on total projected vehicle sales in the United States for model year 2022 from the agency's New Car Assessment Program *Purchasing with Safety in Mind: What to Look For When Buying a Vehicle* program.

## Proposed Effective Date

We propose an effective date of the first September 1 that is one year after the publication of the final rule for the front seat belt warning system requirements and the first September 1 that is two years after the publication of the final rule for the rear seat belt warning system requirements, with optional early compliance (See Section XV for details). Consistent with 49 CFR 571.8(b), multi-stage manufacturers and alterers would have an additional year to comply.

## Regulatory Alternatives

NHTSA considered a wide range of alternatives to the proposed requirements. The main alternatives NHTSA considered were the seat belt warning requirements in Economic Commission for Europe (ECE) Regulation R16 and Euro New Car Assessment Programme (NCAP). The proposed requirements are identical or similar to ECE R16 and Euro NCAP in many respects but differ from them in several ways. For instance, while the ECE rear seat belt warning regulations allow a warning for an unfastened seat belt at an unoccupied seat, this proposal would not allow this, because we tentatively believe that the resulting "false" warning would potentially annoy drivers and lead to behaviors that would decrease system effectiveness. Another way the proposal differs from ECE R16 is the duration of the front seat belt warning on vehicle start-up: R16 generally requires only a 30–60 second audio-visual warning; we propose a warning that lasts until the seat belt is buckled. The regulatory analysis quantifies the costs and benefits of three specific regulatory alternatives: requiring occupant detection for the rear seat belt warning system; requiring (for the front outboard seats) an audio-visual warning on vehicle start-up with a duration of 90 seconds; and requiring a seat belt warning for front center seats.

## Benefits and Costs of the Proposed Requirements

NHTSA estimates the target population and the benefits and costs of the proposed requirements in the stand-alone preliminary regulatory impact analysis (PRIA) that is being placed in the docket with this NPRM and is summarized in the NPRM.

Based on NHTSA's data on fatalities and injuries from motor vehicle crashes, adjusted to account for the benefits of

other mandatory safety technologies, there are, on average, 475 fatalities and 7,036 injuries to unrestrained rear seat occupants and 6,733 fatalities and 47,952 injuries to unrestrained front outboard seat occupants each year. This is the overall target population—the annual deaths and injuries that the proposed requirements are aimed at reducing.

NHTSA estimates the benefits it expects from the proposed seat belt warning requirements. The benefits are the fatalities and injuries that would be prevented by these proposed requirements. The benefits depend, principally, on the expected increase in seat belt use and the effectiveness of seat belts in preventing deaths and injuries.

For the rear seat belt warning system analysis, NHTSA used a "low" and a "high" estimate for the increase in rear belt use with the proposed warning system. For occupants 11 years and older, these were 3 and 5 percentage points, and for occupants from 6 to 10 years old, 0.3 and 0.4 percentage points.<sup>12</sup> For simplicity, NHTSA refers to these scenarios as "Low" and "High," or "3%" and "5%." The estimated annual benefits are presented in table 1.<sup>13</sup>

Another way to measure benefits is by calculating equivalent lives saved (ELS). Equivalent lives saved are the number of prevented fatalities added to the number of prevented injuries expressed in terms of fatalities (that is, with an injury expressed as a fraction of a fatality, so that the more serious the injury, the higher the fraction). The estimated equivalent lives saved assuming either a 3% or 7% discount rate are presented in table 2.

<sup>12</sup> Children in booster seats are part of the target population for this proposed rulemaking because they should be restrained with the seat belt and so would benefit from a seat belt reminder. The transition to a booster seat typically occurs from ages 4–7 years.

<sup>13</sup> The Abbreviated Injury Scale (AIS) is a classification system for assessing impact injury severity developed and published by the Association for the Advancement of Automotive Medicine and is used for coding single injuries, assessing multiple injuries, or for assessing cumulative effects of more than one injury. MAIS represents the maximum injury severity of an occupant at an AIS level, *i.e.*, the highest single AIS for a person with one or more injuries. MAIS 1 & 2 injuries are considered minor injuries and MAIS 3–5 are considered serious injuries.

TABLE 1—ESTIMATED ANNUAL BENEFITS—POTENTIAL LIVES SAVED AND INJURIES PREVENTED FOR POSITIVE-ONLY SBWS (REAR SEATS), WITH ESTIMATED 3% & 5% INCREASE IN BELT USE

Injury level	3% (Low)	5% (High)
MAIS 1 .....	23.2	34.3
MAIS 2 .....	40.2	60.3
MAIS 3 .....	5.6	8.4
MAIS 4 .....	5.5	8.2
MAIS 5 .....	0.2	0.3
Total Injuries .....	74.7	111.5
Fatal .....	22.3	33.6

TABLE 2—ESTIMATED ANNUAL BENEFITS—EQUIVALENT LIVES SAVED—POSITIVE-ONLY SBWS (REAR SEATS)

Belt use increase	3% Discount rate	7% Discount rate
3% increase (Low) .....	21.9	17.7
5% increase (High) .....	32.9	26.7

NHTSA also estimates the costs of the proposed requirements for rear seat belt warnings. NHTSA estimates that the minimum cost to comply with the rear seat belt warning requirements (the positive-only system) is \$166.44 million (M). This is based on a per-vehicle cost

of \$19.59 for 53.1% of 16M affected new vehicles.

Based on the forgoing, NHTSA performed benefit-cost and cost-effectiveness analyses. A benefit-cost analysis calculates the net benefits, which is the difference between the benefits flowing from injury and fatality

reductions and the cost of the rule. The net benefit estimates are presented in table 3. The cost-effectiveness analysis derives the cost per equivalent life saved, which is equal to the total cost of the rule divided by the total fatal equivalents that it prevents. These estimates are presented in table 4.

TABLE 3—NET BENEFITS—PROPOSED POSITIVE-ONLY REAR SBWS  
[2020 Dollars, in millions]

Seat position & belt use increase	Benefits 3% discount	Benefits 7% discount	Cost	Net benefits 3% discount rate	Net benefits 7% discount rate
3% increase (Low) .....	\$262.1	\$212.7	\$166.4	\$95.6	\$46.2
5% increase (High) .....	394.8	320.4	166.4	228.3	153.9

TABLE 4—COST-EFFECTIVENESS ANALYSIS (COST PER EQUIVALENT LIFE SAVED)—PROPOSED POSITIVE-ONLY SYSTEM (REAR SEATS)  
[2020 Dollars, in millions]

Seat position & belt use increase	ELS 3% discount	ELS 7% discount	Cost	Cost/ELS 3% discount	Cost/ELS 7% discount
3% increase (Low) .....	21.9	17.7	\$166.4	\$7.6	\$9.4
5% increase (High) .....	32.9	26.7	166.4	5.0	6.2

NHTSA is also proposing enhancing the driver seat belt warning requirements by requiring an audio-visual warning that remains active until the driver's seat belt is buckled and

extending the driver's seat belt warning requirements, as modified by this NPRM, to the front outboard passenger seat. NHTSA estimated the annual benefits of a seat belt warning for the

driver and outboard front passenger that remains active until the occupant's seat belt is buckled as shown in table 5 and table 6.

TABLE 5—ESTIMATED ANNUAL BENEFITS—LIVES SAVED AND INJURIES PREVENTED—INDEFINITE DURATION SBWS (FRONT OUTBOARD SEATS)

Injury level	Driver	Front passenger	Total
MAIS 1 .....	20.7	3.7	24.4
MAIS 2 .....	120.0	20.5	140.5
MAIS 3 .....	21.6	3.9	25.5

TABLE 5—ESTIMATED ANNUAL BENEFITS—LIVES SAVED AND INJURIES PREVENTED—INDEFINITE DURATION SBWS (FRONT OUTBOARD SEATS)—Continued

Injury level	Driver	Front passenger	Total
MAIS 4 .....	17.4	3.1	20.5
MAIS 5 .....	0.5	0.1	0.6
Total Injuries .....	180.2	31.2	211.4
Fatal .....	65.9	11.4	77.3

TABLE 6—ESTIMATED ANNUAL BENEFITS—EQUIVALENT LIVES SAVED—INDEFINITE SBWS (FRONT OUTBOARD SEATS)

	Undiscounted	3% Discount rate	7% Discount rate
Driver .....	78.7	65.2	52.8
Front Passenger .....	13.6	11.3	9.2
Total .....	92.3	76.5	62.0

NHTSA estimates that the incremental cost of the enhanced seat belt warning would be no greater than the currently available seat belt warning. Although a seat belt warning is currently not required for the front outboard passenger seats, we estimate that 96 percent of new vehicles are

equipped with them.<sup>14</sup> NHTSA estimates that the cost for equipping a front outboard passenger seat with a seat belt warning system is about \$2.13 per vehicle. To equip a seat belt warning system in the front outboard passenger seat positions on the remaining 4 percent of new vehicle fleet (16 million)

without such a warning is \$1.36 million (= \$2.13 × 0.04 × 16 million).

The total monetized benefits, costs, and net benefits (total monetized benefits—total cost) of the enhanced seat belt warning system for the driver and front passenger is shown in table 7.

TABLE 7—ANNUAL MONETIZED BENEFITS, COSTS AND NET BENEFITS—INDEFINITE SBWS (FRONT OUTBOARD SEATS) [2020 Dollars, in millions]

	Driver			Front Passenger			Driver and Front Passenger		
	Undiscounted	3%	7%	Undiscounted	3%	7%	Undiscounted	3%	7%
Passenger car Benefits .....	\$422.5	\$353.0	\$288.0	\$79.9	\$66.7	\$54.4	\$502.4	\$419.7	\$342.4
Light Truck & Van Benefits .....	520.4	427.6	344.8	83.4	68.5	55.2	603.8	496.1	400
Total Benefits .....	942.9	780.5	632.8	163.3	135.2	109.7	1,106.2	915.8	742.5
Total Costs .....	0	0	0	1.36	1.36	1.36	1.36	1.36	1.36
Net Benefits .....	942.9	780.5	632.8	161.9	133.9	108.3	1,104.8	914.4	741.1

The net benefits of the proposed rule requiring seat belt warning for rear seating positions and the enhanced seat

belt warning for the front outboard seats are shown in table 8.

TABLE 8—NET BENEFITS FROM THE PROPOSAL (SBWS FOR REAR SEATING POSITIONS AND INDEFINITE SBWS FOR FRONT OUTBOARD SEATING POSITIONS) [2020 Dollars, in millions]

	3% Discount rate	7% Discount rate
Front Outboard Seats .....	\$914.4	\$741.1
Rear Seats (3% increase in rear seat belt use) .....	95.6	46.2
Rear Seats (5% increase in rear seat belt use) .....	228.3	153.9
Total Net Benefits (3% increase in rear belt use) .....	1,010.0	787.4
Total Net Benefits (5% increase in rear belt use) .....	1,142.7	895.0

<sup>14</sup> Based on data on total projected vehicle sales in the United States for model year 2022 from the

agency's New Car Assessment Program *Purchasing*

*with Safety in Mind: What to Look For When Buying a Vehicle* program.

## II. Background

In 2020, there were 39,007 motor vehicle traffic fatalities in the United States.<sup>15</sup> This was 2,652 more fatalities than in 2019.<sup>16</sup> In 2021, motor vehicle traffic fatalities increased again to 42,939.<sup>17</sup> The traffic fatality count in 2021 is the highest since 2005 (43,510) and represents the second year-to-year increase since 2019.<sup>18</sup> The 10-percent fatality increase from 2020 to 2021 is the highest year-to-year percentage increase since FARS started data collection in 1975.<sup>19</sup> NHTSA has preliminary estimated 42,795 fatalities in 2022, representing a small decrease of about 0.3% from 2021.<sup>20</sup> The Department of Transportation has released a comprehensive National Roadway Safety Strategy to address this rise in roadway fatalities and injuries.<sup>21</sup> Part of that strategy is making vehicles safer.

This NPRM proposes to require a seat belt use warning system for the rear seats of passenger cars, trucks, buses (except school buses), and multipurpose passenger vehicles (MPVs) with a GVWR of 4,536 kg (10,000 lb) or less. This NPRM also proposes to enhance the existing front seat belt warning requirements, including requiring a seat

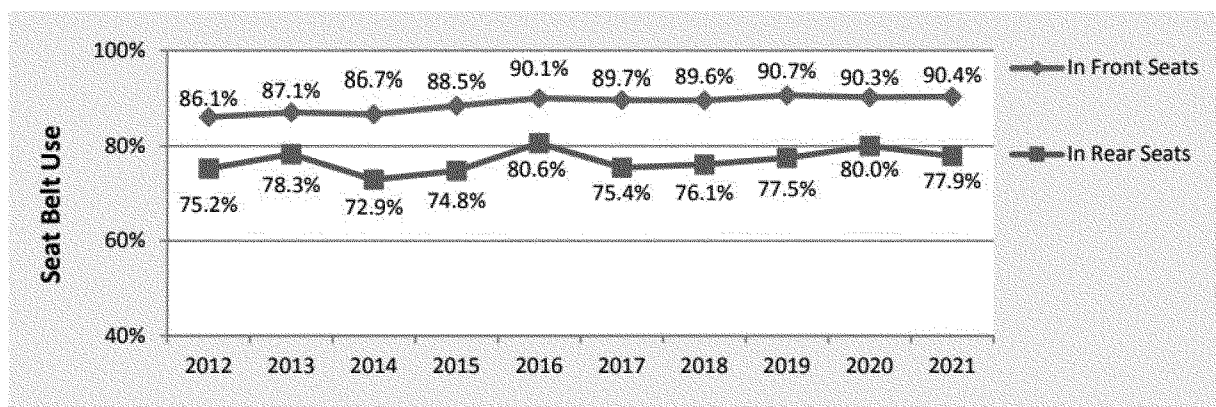
belt warning for the front outboard passenger seat and increasing the duration of the warning. This section provides a brief introduction to seat belt technology, evidence on seat belt use by vehicle occupants, and strategies to increase belt use.

Using a seat belt is one of the most effective actions a motor vehicle occupant can take to prevent death and injury in a crash.<sup>22</sup> Seat belts protect occupants in various ways. They prevent occupants from being ejected from the vehicle, gradually decelerate the occupant as the vehicle deforms and absorbs energy, and reduce the occurrence of occupant contact with harmful interior surfaces and other occupants.<sup>23</sup> Seat belts are effective in most types of crashes (although effectiveness varies for different types of crashes). Research has found that seat belts greatly reduce the risk of fatal and non-fatal injuries compared to the risk faced by unrestrained occupants. For rear seat occupants, seat belts reduce the risk of fatality by 55% (for passenger cars) and 74% (for light trucks and vans). For front seat occupants, drivers and right front passengers, seat belts reduce the risk of fatality by 44% (for

passenger cars) and 63% to 73% (for light trucks and vans). Seat belts reduce the risk of injuries by up to 63%.<sup>24</sup> While the PRIA makes use of these effectiveness rates, we note that the effectiveness of seat belts is not impacted by the proposed rule. Instead, benefits from the proposed rule are the result of the increase in seat belt use resulting from the warning.

While seat belt use is meaningfully higher than it was a decade ago, there is room for improvement. Usage rates for rear belts have consistently been below those for the front seats, and while front seat belt use rates increased early in the previous decade, for the last several years they have plateaued. According to data from NHTSA's National Occupant Protection Use Survey (NOPUS), from 2012 to 2021, seat belt use was lower in the rear seat than in the front seat, ranging from a difference of 8.8 percent in 2013 (78.3% vs. 87.1%) to 14.3 percent in 2017 (75.4% vs. 89.7%).<sup>25</sup> During that time, front seat belt use rates ranged from 86.1% in 2012 to 90.7% in 2019. In 2021, front seat belt use was 90.4% and rear seat belt use was 77.9 percent.<sup>26</sup> See Figure 1.

**Figure 1 –Seat Belt Use by Seating Position for Occupants 8 and Older, 2012-2021**



<sup>15</sup> Stewart, T. (April 2023). Overview of Motor Vehicle Traffic Crashes in 2021 (Report NO. DOT HS 813 435. National Highway Traffic Safety Administration, pg. 5.

<sup>16</sup> *Id.* at pg. 2.

<sup>17</sup> *Id.* at pg. 5.

<sup>18</sup> *Id.*

<sup>19</sup> *Id.* The 2021 and 2022 fatality estimates are not entirely final, and may change somewhat as NHTSA receives further updates or corrections.

<sup>20</sup> See <https://www.transportation.gov/briefing-room/nhtsa-estimates-2022-show-roadway-fatalities-remain-flat-after-two-years-dramatic>. Though NHTSA acknowledges fatalities essentially remained flat in 2022, NHTSA does not know if this trend will continue to remain flat or if there will be further increases in fatalities.

<sup>21</sup> <https://www.transportation.gov/sites/dot.gov/files/2022-02/USDOT-National-Roadway-Safety-Strategy.pdf>.

<sup>22</sup> See, e.g., 68 FR 46262 (Aug. 5, 2003). See also Buckling Up: Technologies to Increase Seat Belt Use. Special Report 278 at 18, Committee for the Safety Belt Technology Study, Transportation Research Board of The National Academies (2003) [hereinafter "Transportation Research Board Study"].

<sup>23</sup> Charles J. Kahane, Lives Saved by Vehicle Safety Technologies and Associated Federal Motor Vehicle Safety Standards, 1960 to 2012—Passenger Cars and LTVs—With Reviews of 26 FMVSS and the Effectiveness of Their Associated Safety Technologies in Reducing Fatalities, Injuries, and Crashes. 89 DOT HS 812 069 at 89, Department of Transportation, National Highway Traffic Safety

Agency (2015) [hereinafter "DOT Lives Saved Study"].

<sup>24</sup> See the Preliminary Regulatory Impact Analysis (PRIA) (in the docket for this rulemaking) for these effectiveness estimates.

<sup>25</sup> Boyle, L.L. (2022, August). Occupant restraint use in 2021: Results from the NOPUS Controlled Intersection Study (Report No. DOT HS 813 344). National Highway Traffic Safety Administration. NOPUS is the only nationwide probability-based observational survey of seat belt use in the United States. The survey observes seat belt use as it actually occurs at randomly-selected roadway sites, and involves a large number of occupants (68,804 in 2021). NOPUS observations are made during daylight hours and are not necessarily representative of high-risk driving times when belt use may be lower.

<sup>26</sup> *Id.*

Consumer survey research by NHTSA and others (such as the Insurance Institute for Highway Safety and academic researchers) suggests that many unbelted occupants are likely amenable to using a seat belt. Seat belt nonusers can be categorized as either “part-time” nonusers or so-called “hard-core” nonusers.<sup>27</sup> Part-time nonusers generally express positive attitudes toward seat belts, but do not always buckle up, due to a range of reasons, such as short trips, forgetfulness, and being in a rush.<sup>28</sup> Hard-core nonusers are those who “generally do not acknowledge the benefits of seat belts and are opposed to their use.”<sup>29</sup> Research by NHTSA and others suggests that most nonusers are part-time nonusers, not hard-core nonusers. This is true even for front seat occupants, for which there is a relatively high rate of observed seat belt use. For instance, NHTSA’s most recent survey of seat belt use found that approximately 83% of drivers who did not always use a seat belt reported using a seat belt most or some of the time, and only 17% were hard-core nonusers who used seat belts rarely or never.<sup>30</sup> Similarly, for those who did not always use a seat belt when riding as a passenger in the front, 89% used seat belts most or some of the time while only 11% used a seat belt rarely or never.<sup>31</sup> The same was true for rear seat passengers who did not always use a belt, of whom 70% used a belt most or some of the time, while only 30% used a belt rarely or never.<sup>32</sup> Moreover, of the survey respondents who reported “always” using a seat belt while driving, only 66% “always” used a seat belt when riding as a passenger in the rear seat.<sup>33</sup>

<sup>27</sup> See, e.g., Transportation Research Board Study at 3.

<sup>28</sup> See, e.g., Transportation Research Board Study at 32; Spado, D., Schaad, A., & Block, A. (2019, December). 2016 motor vehicle occupant safety survey; Volume 2: Seat belt report (Report No. DOT HS 812 727). National Highway Traffic Safety Administration, at p. 71 (Fig. 53); p. 76 (Fig. 54). This is a national telephone survey periodically conducted by NHTSA. Because, unlike NOPUS, it is not observational, the MVOSS is not the best indicator of national belt use. In addition, because of respondent bias, the large number of part-time users, and the tendency for survey respondents to over-report belt use, MVOSS use rates have typically been about 10 percentage points higher than those from NOPUS, which is an observational study, and therefore a more objective and accurate measure of belt use, MVOSS does, however, provide demographic detail that cannot be observed and insight into the reasons people do and do not use seat belts.

<sup>29</sup> Transportation Research Board Study at 40.

<sup>30</sup> 2016 MVOSS, p.7 (calculated from Fig. 5).

<sup>31</sup> *Id.* at p. 12 (calculated from Fig. 10).

<sup>32</sup> *Id.* at p. 13 (calculated from Fig. 11).

<sup>33</sup> *Id.* at p. 64 (Table 15). The MVOSS results are consistent with, though differ somewhat from, those in a similar survey conducted by the Agency for

NHTSA has, over time, tried a variety of such strategies, including sponsoring national media campaigns, supporting the enactment of state seat belt use laws and high-visibility enforcement, and facilitating or requiring vehicle-based strategies.<sup>34</sup> Some of these strategies are non-regulatory; some are regulatory. One example of a non-regulatory strategy is NHTSA’s annual Click It or Ticket mobilization, which includes a national advertising campaign backed up by high-visibility local enforcement of state seat belt laws. Adult rear-seat passengers are covered by seat belt laws in 32 states and the District of Columbia. Some of these states with mandatory rear seat belt laws include rear-seat specific messaging in their media campaigns. While such measures have helped make enormous progress, the persistent gaps in seat belt use suggest that additional approaches may be necessary.

Seat belt warning systems are a vehicle-based strategy to increase belt use. Seat belt warning systems encourage seat belt use by reminding unbuckled occupants to fasten their belts and/or by informing the driver that a passenger is unbelted, so that the driver can request the unbelted occupant to buckle up.<sup>35</sup> The warnings provided by seat belt warning systems typically consist of visual and/or audible signals. An optimized warning system balances effectiveness and annoyance, so that the warning is noticeable enough that the occupants will be motivated to fasten their belts, but not so intrusive that an occupant may attempt to circumvent or disable it or the public will not accept it.<sup>36</sup> Research by NHTSA and others shows that seat belt warning systems are effective at getting unbuckled occupants

Healthcare Research and Quality. Chu, M. *Characteristics of Persons Who Seldom or Never Wear Seat Belts, 2002*. Statistical Brief #62. December 2004. Agency for Healthcare Research and Quality, Rockville, MD. [http://meps.ahrq.gov/mepsweb/data\\_files/publications/st62/stat62.pdf](http://meps.ahrq.gov/mepsweb/data_files/publications/st62/stat62.pdf). The reader is referred to the discussion in Section XIV.A.2 and in the PRIA, section 4.3.

<sup>34</sup> NHTSA runs a Congressionally mandated High Visibility Enforcement (HVE) annual campaign focused on increasing seat belt use. The Click It or Ticket (CIOT) nationwide campaign has been in effect for about 20 years. It runs every year from Mid-May through the Memorial Day weekend, into the first week in June.

<sup>35</sup> Akamatsu, M., Hashimoto, H., and Shimaoka, S., “Assessment Method of Effectiveness of Passenger Seat Belt Reminder,” SAE Technical Paper 2012-01-0050, 2012, doi:10.4271/2012-01-0050.

<sup>36</sup> See, e.g., Transportation Research Board Study at 8, 25; Mark Freedman et al., Effectiveness and Acceptance of Enhanced Seat Belt Reminder Systems: Characteristics of Optimal Reminder Systems Final Report. DOT HS 811 097 at 2 (Feb. 2009) (hereinafter “DOT 2009 Seat Belt Study”).

to fasten their seat belt. (We take a closer look at this research in Section V and Section XIV.A, as well as the PRIA.)

Federal Motor Vehicle Safety Standard (FMVSS) No. 208, “Occupant crash protection,” requires a short-duration audio-visual seat belt warning for the driver’s seat belt on passenger cars and most light- and medium-duty trucks, MPVs, and buses. (Later in this section we discuss the current requirements in more detail.) The visual component of the warning generally must be at least sixty seconds long, and the audible component must be at least four seconds long. The regulations do not require seat belt warnings for any seating position other than the driver’s seat.

Although not required by NHTSA’s regulations, most currently produced vehicles have a seat belt warning for the front outboard passenger seat. Almost all (96.6%) MY 2022 vehicles offered for sale in the United States are equipped with a seat belt warning for the front outboard passenger seat. Further, almost all vehicles already provide an audio-visual seat belt warning for both front outboard seats that is longer than the minimum warning for the driver’s seat belt currently required in FMVSS No. 208. However, the persistence of the front seat belt warning, while greater than the very minimal durations required by FMVSS No. 208, is not consistent across currently produced vehicles. Specifically, a little over half of MY 2022 vehicles provide a visual warning that lasts until the belts at any occupied front outboard seat are fastened, and while almost all (about 93%) have an audible warning lasting at least a minute and a half, less than half have an audible warning that lasts at least two minutes.<sup>37</sup> This means that while many currently produced vehicles have significantly enhanced reminders, many do not. This, along with the plateauing front seat belt use numbers suggests that the current regulatory minima are too short, and that in the absence of a requirement, persistent audible reminders that could improve front seat belt use may not be widely provided in the market.

On the other hand, while almost all model year MY 2022 vehicles have a seat belt warning for the front outboard passenger seat, under half come equipped with a rear seat belt warning system. Rear seat belt warnings were first introduced in the United States by Volvo around 2009. Based on data on total projected vehicle sales in the United States for model year (MY) 2022

<sup>37</sup> See Section XI.C.1, Increasing the duration of the audio-visual warning on vehicle start-up.



from the agency's New Car Assessment Program (NCAP) *Purchasing with Safety in Mind: What to Look For When Buying a Vehicle* program, about 46.9 percent are equipped with a rear seat belt warning system.<sup>38</sup> Based on this MY 2022 data, fifteen vehicle manufacturers offer vehicles for sale in the United States with rear seat belt warning systems. Thus, while rear seat belt warnings have become more widely deployed in recent years, the majority of the current fleet still is not equipped with them.

The benefits of increasing seat belt use could be sizable. The National Academy of Sciences has noted that "even a small increase in belt use should have large benefits."<sup>39</sup> The size of the unbelted fatality problem for front seats means that even a very modest improvement in seat belt use will have a meaningful benefit. Our analysis found that even a 1% increase in belt usage for the driver's seat resulted in a significant number of lives saved. With respect to the rear seats, "while the overall proportion of person-trips taken as a rear-seat occupant in the U.S. is relatively low (12.9%), at-risk travel exposure by rear-seat passengers at a national level is substantial (approximately 39 billion annual person-trips)."<sup>40</sup> Moreover, children are proportionally much more likely to be rear seat passengers than adults,<sup>41</sup> and the increased prevalence of ridesharing services has likely increased the prevalence of rear-seat passengers.

In short, front seat belt use rates appear to have plateaued, and rear seat belt use rates have persistently been below those for the front seats. Moreover, unbuckled occupants continue to be overrepresented in fatal crashes (51%), given the lower exposure of unbelted occupants relative to belted occupants (because front seat belt use

was about 90% and rear seat belt use was 80%). Nevertheless, in spite of the effectiveness of seat belts and seat belt warnings, most new vehicles continue to lack a rear seat belt warning, and, while many provide significantly enhanced reminders for the front seats, many do not. This suggests a need for a beneficial safety technology that is not being met in the vehicle market. This NPRM is intended to meet that need.

In Section VI and Section XIV below, and in the PRIA, we take a detailed look at the estimated target population, effectiveness of front and rear seat belt warnings, and benefits and costs of this proposal.

### III. Regulatory and Legislative History

#### *Current Driver's Seat Belt Warning Requirements*

FMVSS No. 208 is intended to reduce the likelihood of occupant deaths and the likelihood and severity of occupant injuries in crashes. The standard took effect in 1968 and from its inception required seat belts in passenger cars.<sup>42</sup>

The standard currently requires a seat belt warning for the driver's seat belt on passenger cars;<sup>43</sup> trucks and MPVs with a GVWR of 4,536 kg (10,000 lb) or less (except for some compliance options which do not require the warning);<sup>44</sup> and buses with a GVWR of 3,855 kg (8,500 lb) or less and an unloaded weight less than or equal to 2,495 kg (5,500 lb).<sup>45</sup> The regulations do not require seat belt warnings for any seating position other than the driver's seat.<sup>46</sup>

Manufacturers have two compliance options for the driver's warning.<sup>47</sup> The first option requires that if the key is in the "on" or "start" position and the seat belt is not in use, the vehicle must provide a visual warning for at least 60 seconds, and an audible warning that lasts 4 to 8 seconds. Under the second option, when the key is turned to the "on" or "start" position, the vehicle must provide a visual warning for 4 to 8 seconds (regardless of whether the driver seat belt is fastened) and an audible warning lasting 4 to 8 seconds if the driver seat belt is not in use.<sup>48</sup>

#### *Early NHTSA Experiences With Seat Belt Warnings*

Between 1967 and 1974, NHTSA promulgated a series of different occupant protection regulations that specified as compliance options various combinations of active and passive occupant crash protection, seat belt interlocks, and seat belt warnings.<sup>49</sup> A seat belt warning was first required in 1971, when NHTSA sought to increase seat belt use by adopting occupant protection compliance options that included the use of a seat belt warning for the front outboard seating positions.<sup>50</sup> This seat belt warning option required audible and visible warning signals that lasted for as long as the occupant was unbelted, the ignition was "on," and the transmission was in forward or reverse. In 1972, NHTSA adopted occupant protection options for passenger cars that included (for cars that did not provide automatic protection) an interlock system that would prevent the engine from starting if any of the front seat belts were not fastened.<sup>51</sup> Contrary to the agency's expectations, the initial vehicle introduction of these systems in the early 1970s was not well-received by the public. In particular, continuous buzzers and ignition interlocks annoyed many consumers to the point of their disabling or circumventing the systems.

As a result of the negative consumer reaction, Congress adopted a provision, as part of the Motor Vehicle and School Bus Safety Amendments of 1974, prohibiting NHTSA from prescribing a motor vehicle safety standard that required, or permitted as a compliance option, seat belt interlocks or audible seat belt warnings lasting longer than eight seconds.<sup>52</sup> In response, NHTSA amended FMVSS No. 208 in 1974 to require that only the driver seating

compliance option. Automatic belts are rarely, if ever, installed in current production vehicles, and NHTSA's regulations limit the seating positions for which automatic belts may be used to rear seats.

<sup>49</sup> "Active protection" refers to features, such as manual seat belts, that require action by the occupant, while "automatic protection" or "passive protection" refers to safety features that do not require any action by the occupant other than sitting in a designated seating position. Seat belt interlocks prevent starting or operating a motor vehicle if an occupant is not using a seat belt. For a fuller discussion of the history of the active and passive protection requirements in FMVSS No. 208, see Stephen R. Kratzke, *Regulatory History of Automatic Crash Protection in FMVSS 208*. SAE Technical Paper 950865, International Congress and Exposition, Society of Automotive Engineers, Detroit, Michigan, Feb. 27–March 2 (1995).

<sup>50</sup> 36 FR 4600 (May 10, 1971).

<sup>51</sup> 37 FR 3911 (Feb. 24, 1972).

<sup>52</sup> These amendments were codified at 49 U.S.C. 30124. As explained below, the provisions were amended in 2012 by the Moving Ahead for Progress in the 21st Century Act.

<sup>38</sup> Through the NCAP program, NHTSA sends annual requests for safety information about new vehicles to vehicle manufacturers. This includes specific questions on seat belt reminder systems. The focus of this request for information is for vehicle models that will be sold in the upcoming model year that have a GVWR of 4,536 kg (10,000 lbs.) or less, and this data generally covers all such vehicles offered for sale in the U.S. for MY 2022. Throughout this document we will refer to this data as our "NCAP data" or "Purchasing with Safety in Mind: What to Look For When Buying a Vehicle" data or information.

<sup>39</sup> Transportation Research Board Study at 19 (citing Donna Glassbrenner, 2002. *Safety Belt and Helmet Use in 2002—Overall Results*. DOT HS 809 500. Washington, DC: U.S. Department of Transportation, National Highway Traffic Safety Administration).

<sup>40</sup> Matthew J. Trowbridge & Richard Kent, *Rear-Seat Motor Vehicle Travel in the U.S.: Using National Data to Define a Population at Risk*. *Am. J. Prev. Med.* 37(4), 321–3 (2009).

<sup>41</sup> Trowbridge & Kent at 322.

<sup>42</sup> 32 FR 2408, 2415 (Feb. 3, 1967).

<sup>43</sup> S4.1.5.1(a)(3); S7.3.

<sup>44</sup> S4.2.6; S7.3.

<sup>45</sup> S4.2.6 (with the exception of some compliance options).

<sup>46</sup> See, e.g., Interpretation Letter from NHTSA to R. Lucki, July 24, 1985 ("Thus, the intent was to require a warning system for only the driver's position."). All NHTSA interpretation letters cited in this preamble are available at <http://isearch.nhtsa.gov/search.htm>.

<sup>47</sup> 49 CFR 571.208, S7.3.

<sup>48</sup> The warning requirements for automatic belts in S4.5.3 mirror, with some differences, the first

position be equipped with a seat belt warning system providing a visual and audible warning, with the audible warning not lasting longer than eight seconds.<sup>53</sup> The limited-duration driver's seat belt warning requirement has remained in the standard, with some changes, since 1974. Since that time FMVSS No. 208 has not been amended to require seat belt warnings for any passenger seating positions.

#### Recent Regulatory History

In 2001, the House Committee on Appropriations directed NHTSA to contract with the Transportation Research Board (TRB) of the National Academy of Sciences to conduct a study on the benefits and acceptability of minimally intrusive vehicle technologies to increase seat belt use.<sup>54</sup> The Committee also requested that the study consider potential legislative and regulatory actions to facilitate installation of devices to encourage seat belt use. The TRB report (published in 2004) found that new seat belt use technologies existed that could increase belt use without being overly intrusive.<sup>55</sup> It recommended that rear seat belt warning systems be developed and that NHTSA undertake a broad, multi-year program of research on the effectiveness and acceptability of different seat belt warning systems to establish a basis for future regulation. It also recommended that Congress amend the Safety Act to eliminate the 8-second limit on the length of the audible warning.

In 2002 and 2003, NHTSA sent letters to several vehicle manufacturers encouraging them to enhance seat belt warning systems beyond the FMVSS No. 208 minimum requirements.<sup>56</sup> The agency facilitated the voluntary adoption of enhanced warnings through a series of legal interpretations that determined that the Safety Act did not prohibit manufacturers from implementing enhanced warning systems as long as the manufacturer provided some means of differentiating the voluntarily-provided signal from the required signal (for example, by a clearly distinguished lapse in time between the two signals).<sup>57</sup> (An "enhanced" system is one with visual and/or audible warning signals that exceed the durations specified in FMVSS No. 208, S7.3, and/or that applies to seating positions other than

the driver's seat. A "basic" system is one that simply meets the minimum requirements in FMVSS No. 208.) Many vehicle manufacturers subsequently implemented enhanced seat belt warnings for the driver and right front outboard seating positions. Based on information submitted to the agency in connection with NCAP, for MY 2022, 99.6 percent of participating vehicle models offered for sale in the United States had an enhanced warning (audible and/or visual) for the driver, right front passenger, or both.

In 2005, Congress passed legislation—the Safe, Accountable, Flexible, and Efficient Transportation Equity Act—a Legacy for Users (SAFETEA-LU)<sup>58</sup>—that required NHTSA to evaluate the effectiveness and acceptability of several different types of enhanced seat belt warnings offered by a number of manufacturers. In response, the agency conducted a comprehensive multi-phase research study (explained in Section V below).

On November 21, 2007, Public Citizen and Advocates for Highway and Auto Safety (Advocates, and, collectively, petitioners) petitioned NHTSA to amend FMVSS No. 208 to require a seat belt warning system for rear seats on passenger cars and MPVs with a GVWR of 4,536 kg (10,000 lb) or less.<sup>59</sup> The petitioners noted that primary enforcement laws typically do not cover rear seat occupants and that studies have indicated that warnings for rear seat belts would significantly increase rear passenger seat belt use. The petitioners stated that rear seat belt warnings are technologically feasible and would be less costly if they were required in all vehicles. The petitioners provided a range of estimates of how much a rear seat belt warning system could increase rear belt use. The petitioners stated that rear seat belt warnings would save hundreds of lives each year and that a large percentage of the lives saved would be children. As noted in the ANPRM,<sup>60</sup> NHTSA granted the petition.

On June 29, 2010, the agency published a Request for Comments document (RFC) on the petition.<sup>61</sup> The RFC discussed the agency's research and findings regarding requiring rear seat belt warnings and solicited comments.

The agency received 26 comments. Five commenters opposed requiring rear seat belt warnings: Ford Motor

Company, General Motors, the Alliance of Automobile Manufacturers (Alliance), the Association of International Automobile Manufacturers,<sup>62</sup> and a commenter from the general public. These commenters believed that a requirement for rear seat belt warnings was premature and that it should remain voluntary, and some supported using NCAP to encourage their penetration in the market. Among those that supported requiring rear seat belt warnings were IEE S.A., Consumers Union, the Insurance Institute for Highway Safety (IIHS), the Automotive Occupant Restraint Council (now known as the Automotive Safety Council), and the American Academy of Pediatrics.

In 2012, Congress passed the Moving Ahead for Progress in the 21st Century Act (MAP-21).<sup>63</sup> That legislation contains two provisions regarding seat belt warning systems. First, it repeals the 8-second durational limit for the driver's seat belt audible warning.<sup>64</sup> Second, it requires the Secretary of DOT to initiate a rulemaking proceeding to amend FMVSS No. 208 to provide a safety belt use warning system for designated seating positions in the rear seat.<sup>65</sup> It directs the Secretary to either issue a final rule, or, if the Secretary determines that such an amendment does not meet the requirements and considerations of 49 U.S.C. 30111,<sup>66</sup> to submit a report to Congress describing the reasons for not prescribing such a standard.

In accordance with MAP-21, in early 2013 NHTSA initiated a rulemaking proceeding when it submitted for public comment a proposal to undertake a study regarding the effectiveness of existing rear seat belt warning systems.<sup>67</sup> (The results of this study are discussed in Section V below.) In 2017, the Center for Auto Safety and Kids and Cars filed a petition for a writ of mandamus in the United States Court of Appeals for the District of Columbia Circuit to compel DOT to initiate and complete a rulemaking to require a rear

<sup>62</sup> The Association of International Automobile Manufacturers subsequently became the Association of Global Automakers (Global). The Alliance and Global have merged to become the Alliance for Automotive Innovation.

<sup>63</sup> Public Law 112-141 (2012).

<sup>64</sup> *Id.* at section 31202(a)(2) (repealing portion of 49 U.S.C. 30124).

<sup>65</sup> *Id.* at section 31503. Authority has been delegated to NHTSA. 49 CFR 1.95.

<sup>66</sup> Section 30111 requires that a Motor Vehicle Safety Standard meet the need for safety, be stated in objective terms, and be practicable, among other requirements. *See infra* Section VIII.

<sup>67</sup> 78 FR 5865 (Jan. 28, 2013).

<sup>53</sup> 39 FR 42692 (Dec. 6, 1974).

<sup>54</sup> House Report 107-108, June 22, 2001.

<sup>55</sup> Transportation Research Board Study at 9.

<sup>56</sup> *See* Docket No. NHTSA-2002-13226.

<sup>57</sup> *See* Docket Nos. NHTSA-2001-9899, NHTSA-2002-13379, NHTSA-2003-14742, NHTSA-2003-15006, and NHTSA-2003-15156.

<sup>58</sup> Public Law 109-59, 10306 (2005).

<sup>59</sup> Docket No. NHTSA-2010-0061-0002.

<sup>60</sup> 84 FR 51076 (Sept. 27, 2019).

<sup>61</sup> 75 FR 37343 (June 29, 2010) (Docket No. NHTSA-2010-0061).

seat belt warning.<sup>68</sup> The Court subsequently denied the petition without prejudice to renewal in the event of significant additional agency delay.<sup>69</sup> In 2019, NHTSA published an Advance Notice of Proposed Rulemaking seeking comment on a variety of issues related to potential rear seat belt warning requirements. The ANPRM is discussed in Section VII.

#### IV. ECE Requirements and Euro NCAP

##### *ECE Requirements*

The European Union has issued an updated version of Regulation No. 16<sup>70</sup> of the Economic Commission for Europe of the United Nations (UNECE) that requires seat belt reminder systems in all front and rear seats on new cars.<sup>71</sup> The seat belt reminder system is required to have both a start-of-trip warning and a change-of-status warning for both the rear and front seats, though the exact requirements differ somewhat for rear and front seats.

*Rear seat requirements.* R16 specifies a two-level warning. The first-level warning is a visual warning and the second-level warning is an audio-visual warning. The first-level warning applies at the start of a trip and the second-level warning applies when a fastened belt becomes unfastened during a trip. The first-level warning must activate when the seat belt of any of the rear seats is not fastened and the ignition switch or master control switch is activated. The first-level warning must last at least 60 seconds or until the belt is fastened (or the seat is no longer occupied, if equipped with occupant detection). The second-level warning must activate when a belt becomes unfastened and certain specified speed or distance thresholds are met and must last for 30 seconds unless other specified criteria are met (*e.g.*, the belt is re-fastened).

*Front seat requirements.* The front seat belt warning requirements are similar to the rear seat warnings, with some differences. First, the first-level visual warning is only required to last 30 seconds, not 60 seconds. Second, the second-level warning applies to unfastened belts at the start of the trip as well as to changes in belt status.

The regulation also contains a variety of other requirements relating to the seat belt warning systems (*e.g.*, telltales,

exemptions for certain vehicles and seating positions). R16 also allows for short and long-term deactivation of both front and rear warnings.

The ECE requirements are discussed in more detail where relevant in later sections of this preamble.

##### *Euro NCAP*

Euro NCAP introduced bonus points for seat belt warnings in 2002. The Euro NCAP protocol for Safety Assist systems describes which features a seat belt reminder must have to qualify for extra points.<sup>72</sup>

*Rear seat warnings.* For rear seats, a visual signal must start once the ignition switch is engaged. The visual signal must be at least 60 seconds long. Occupant detection is not required for rear seats, but systems that feature rear seat occupant detection are eligible for higher scores. For systems without occupant detection, the visual signal must clearly indicate to the driver which seat belts are in use and not in use. For systems with occupant detection on all rear seating positions, the visual signal does not need to indicate the number of seat belts in use or not in use, but the signal must remain active if a seat belt remains unfastened on any of the occupied seats in the rear. No visual signal is required if all the rear occupants are belted. For systems with rear seat occupant detection, a 30-second audible signal needs to activate before the vehicle reaches a speed of 25 km/h or before it travels 500 meters when any occupied seat has an unbuckled belt.<sup>73</sup> When any seat belt experiences a change of status at vehicle speeds above 25 km/h, an audio-visual signal is required, with the visual signal lasting 60 seconds and the audible warning lasting 30 seconds, unless certain conditions are met.

*Front seat warnings.* The Euro NCAP protocol requires that, in order to receive points, at the start of a trip the system must provide a visual seat belt warning that lasts until the belt is fastened<sup>74</sup> and an audible warning that activates when certain conditions are met and generally must last at least

about 90 seconds (the exact duration depends on a variety of specified criteria, such as vehicle speed or distance travelled). It also specifies an audio-visual change-of-status warning that meets the requirements of the initial start of trip warning.

#### V. NHTSA Research on Effectiveness and Acceptance of Seat Belt Warning Systems

NHTSA has taken a variety of actions to research the effectiveness and acceptance of seat belt warnings.

In 2002 the agency chartered an integrated project team to recommend strategies for increasing seat belt use.<sup>75</sup> The team's report, issued in 2003, observed that "[d]espite the significant increases over the past twenty years, safety belt use in the United States falls short of that in some industrialized nations."<sup>76</sup> The report also noted that there are a "wide range of initiatives . . . that have the potential to raise and/or sustain safety belt use rates." The report went on to identify several such initiatives, which it classified as either behavioral or vehicle-based. The behavioral strategies included upgrading existing State seat belt laws, high-visibility enforcement campaigns, a national communications plan, employer policies and regulation, and insurance industry collaboration. The vehicle-based strategies included encouraging vehicle manufacturers to voluntarily install enhanced seat belt warning systems, providing consumer information on vehicles equipped with enhanced warning systems as part of NCAP, and continued monitoring and assessment of the effectiveness and acceptability of enhanced seat belt warnings through research.

In response to the 2005 SAFETEA-LU mandate, NHTSA undertook a multi-phase research study of seat belt warnings. NHTSA published several reports on these studies. Three are particularly relevant to this's NPRM. The first is a large-sample (approximately 40,000 observations) national observational study on the effectiveness of front seat belt warnings.<sup>77</sup> The study covered several states in different parts of the country. The vehicles in the study sample had a wide variety of seat belt warning

<sup>72</sup> European New Car Assessment Programme Assessment Protocol—Safety Assist, Version 9.1, November 2021.

<sup>73</sup> For front seat belts, the assessment protocol requires both a visual and an audible warning signal. The front occupant visual signal must remain active until the seat belt is fastened. The audible signal for the front occupants has two stages, an initial and final audible signal, which have different onset criteria. The initial audible signal must not exceed 30 seconds and the final audible signal must be at least 90 seconds. To prevent unnecessary signals, the system must also be capable of detecting whether the front passenger seat is occupied.

<sup>74</sup> Sction 3.4.2.1.

<sup>75</sup> See 68 FR 46262 (Aug. 5, 2003).

<sup>76</sup> U.S. Department of Transportation, National Highway Traffic Safety Administration, July 2003. Initiatives to Address Safety Belt Use, *available at* [www.regulations.gov](http://www.regulations.gov) (docket NHTSA-2003-14621).

<sup>77</sup> Mark Freedman *et al.* The Effectiveness of Enhanced Seat Belt Reminder Systems Draft Report: Observational Field Data Collection Methodology and Findings. DOT HS-810-844. Washington, DC: National Highway Traffic Safety Administration.

<sup>68</sup> *In re Kids and Cars, Inc.*, No. 17-1229, Doc. 1702061 (D.C. Cir. filed Oct. 30, 2017).

<sup>69</sup> *In re Kids and Cars, Inc.*, No. 17-1229 (D.C. Cir. June 5, 2018).

<sup>70</sup> ECE Regulation No. 16, Revision 10.

<sup>71</sup> The regulation was introduced in two phases: September 1, 2019 for new vehicle types (*i.e.*, applied to all vehicle models that get a new type approval) and September 1, 2021 for all newly produced and registered vehicles.

systems. These included warning systems that had only the minimum features required by FMVSS No. 208, as well as twenty different enhanced warning systems. Because of the detail of the data gathered (e.g., occupant demographic and vehicle-specific information), the analysis was able to control for confounding factors. The second study uses an experimental or focus-group-based approach to study consumer acceptance as well as effectiveness.<sup>78</sup> The third report summarized and extended the analyses from the previous two reports.<sup>79</sup> This series of research studies shows, among other things, that the presence of an enhanced front seat belt reminder system increased front outboard passenger seat belt use by about 3 to 4 percentage points more than in vehicles with only a driver seat belt warning system meeting the minimum requirements in S7.3.

In 2015 the agency completed an additional report on a study of the effectiveness and consumer acceptance of rear seat belt warnings.<sup>80</sup> This study utilized a telephone survey of the drivers of vehicles with and without rear seat belt warning systems. The study found that overall, drivers of vehicles with a rear seat belt warning system were satisfied with the system and noticed an increase in rear seat belt use. For example, among drivers of vehicles with a rear seat belt warning, approximately 80% were satisfied with the system and 65% reported that the rear seat belt warning made it easier to encourage rear seat passengers to buckle up. About one-quarter of drivers (24%) of vehicles equipped with a rear seat belt warning system noticed an increase in rear seat belt use. When asked about their experience with the change of seat belt buckle status alert, close to half of the drivers of vehicles with a rear seat belt warning system (49%) said that their system had indicated, within the past year, that a passenger had unfastened his/her seat belt. Overall, of those who reported experiencing a change of seat belt status alert (49%), over three-quarters of these drivers (77%) said that the unbuckled passenger eventually did refasten her seat belt,

either on her own or at the driver's request.

In 2021, NHTSA published an update of the 2009 Belt Warning Study.<sup>81</sup> The purpose of the report was to examine the front seat belt warning system features associated with greater effectiveness in increasing seat belt use. Because of limitations with the collected data, the findings of the report were relatively limited. However, the report found (consistent with the earlier research) that “systems with sound, icon, and text had generally higher seat belt use rates than systems without all of these features.”

The results of this research are discussed in more detail throughout the preamble. The relevant research reports have also been placed in the docket for this rulemaking.

## VI. Safety Need

As noted earlier, rear seat belt use has consistently been lower than front seat belt use. NHTSA estimated the target populations for rear and front outboard passenger seat belt warnings, as well as the effectiveness of the warnings. This section provides a summary of these estimates. For additional discussion of the methodology used to derive these estimates, see the discussion in the Preliminary Regulatory Impact Analysis as well as the studies placed in the docket.

To estimate the target populations for the rear and front passenger seats—that is, the number of unrestrained occupants who could be expected to potentially benefit from the proposed seat belt warning requirements—NHTSA examined data from the Fatality Analysis Reporting System (FARS)<sup>82</sup> and the National Automotive Sampling System (NASS) Crashworthiness Data System (CDS)<sup>83</sup> from 2011 to 2015. Because seat belts are effective at preventing deaths and injuries in all types of motor vehicle crashes,<sup>84</sup> the

target populations include fatalities and injuries from different crash modes. We examined fatalities and injuries for occupants in passenger cars, trucks, buses, and MPVs with a GVWR of 4,536 kg (10,000 lb) or less (the vehicles [with some exceptions] to which the proposed requirements would apply). We adjusted these to account for future decreases in fatalities and injuries projected to occur in the absence of the proposed requirements due to the introduction of other mandatory safety technologies (e.g., electronic stability control, ejection mitigation side curtain air bags).

Based on FARS and NASS-CDS data from 2011 to 2015, on average 1,002 unrestrained rear occupants were killed in crashes and 7,821 were injured annually.<sup>85</sup> After adjusting these to account for future decreases in fatalities and injuries projected to occur in the absence of the proposed requirements due to the introduction of other mandatory safety technologies, there were, on average, 475 fatalities and 7,036 injuries to unrestrained rear seat occupants each year. This is the overall target population for the proposed rear seat belt warning requirements.

Turning to the target population for the driver and front outboard passenger seat, from 2011 to 2015, annually an average of 7,503 unrestrained drivers were killed in crashes and an average of 1,453 unrestrained front outboard passenger seat occupants were killed in crashes and 63,436 unrestrained drivers and front outboard passenger occupants were injured.<sup>86</sup> After adjusting these to account for future decreases in fatalities and injuries projected to occur in the absence of the proposed requirements due to the introduction of other mandatory safety technologies, there were, on average, 6,733 fatalities and 47,952 injuries to unrestrained front outboard seat occupants each year. This is the overall target population for the proposed front outboard passenger seat belt warning requirements.

## VII. ANPRM

On September 27, 2019, in accordance with the grant of the petition from Public Citizen and Advocates for Highway and Auto Safety and continuing with the proceeding that MAP-21 required to be initiated, NHTSA published an ANPRM for requiring rear seat belt warning systems.<sup>87</sup> The ANPRM sought

severe near-side impacts or other catastrophic crashes. *Id.* at 112.

<sup>78</sup> See PRIA, Appendix D.

<sup>79</sup> See PRIA, Appendix D.

<sup>80</sup> 84 FR 51076 (Sept. 27, 2019).

<sup>78</sup> N. Lerner *et al.* 2007. Acceptability and Potential Effectiveness of Enhanced Seat Belt Reminder System Features. DOT HS 810 848. Washington, DC: National Highway Traffic Safety Administration [hereinafter DOT 2007 Acceptability Study].

<sup>79</sup> DOT 2009 Belt Warning Study, *supra* note 36.

<sup>80</sup> Paul Schroeder & Melanie Wilbur. 2015. Survey of Principal Drivers of Vehicles with a Rear Seat Belt Reminder System. Washington, DC: National Highway Traffic Safety Administration.

<sup>81</sup> Polson, A., Lerner, N., Burkhardt, E., Piesse, A., Zador, P., & Janniello, E. (2021, October). Enhanced seat belt reminder systems: An observational study examining the relationship with seat belt use (Report No. DOT HS 812 808). National Highway Traffic Safety Administration, Pg. 40.

<sup>82</sup> See NHTSA, NCSA Reports and Publications, <https://www.nhtsa.gov/FARS>. FARS contains data on a census of fatal traffic crashes within the 50 States, the District of Columbia, and Puerto Rico. To be included in FARS, a crash must involve a motor vehicle traveling on a traffic way customarily open to the public, and must result in the death of an occupant of a vehicle or a non-occupant within 30 days of the crash.

<sup>83</sup> The CDS target population is defined as police-reported motor vehicle traffic crashes involving at least one passenger car, pickup, van, or SUV (also called CDS applicable vehicles) that was towed from the scene due to damage.

<sup>84</sup> DOT Lives Saved Study at 106 (front seats); *Id.* at 112 (rear seats). Seat belts are less effective in

comment on a variety of issues related to a requirement for a rear seat belt warning system, including potential requirements for such systems, the vehicles to which they should apply, their effectiveness, the likely consumer acceptance, and the associated costs and benefits. It also sought comment on removing the 8-second maximum duration for the driver's seat belt warning specified in FMVSS No. 208 S7.3 to reflect MAP-21's repeal of the statutory limitation that was the basis for this provision.

The comment period closed on November 26, 2019. NHTSA received 45 comments: five comments from vehicle manufacturers; two from school transportation associations; two from vehicle manufacturer associations; seven from safety advocacy groups; seven from automotive industry suppliers and trade associations; one comment each from a foreign country, insurance institute, consumer program, and bus manufacturer; and eighteen comments from individual members of the public.

Most commenters, including safety advocates, vehicle manufacturers and suppliers, and individual members of the public, supported a rear seat belt warning requirement. Some commenters (including a bus manufacturer, a bus supplier, an association of school bus operators, and some individual commenters) recommended that the requirements not apply to heavy vehicles such as buses or school buses, citing concerns with installation, costs, the driver's role, and maintenance.

Vehicle manufacturers and suppliers commented that the requirements should harmonize with ECE R16, while some other commenters (predominantly safety advocacy groups) supported departures from the ECE R16 requirements, arguing that harmonization should not come at the expense of safety. Thus, while most commenters supported requiring a visual warning on vehicle start-up and an audio-visual change-of-status warning for a belt that is unfastened when the vehicle is moving, some commenters favored requiring enhanced features such as an audio-visual warning on vehicle start-up and occupant detection.

A few commenters (Advocates, Kids and Cars, Center for Auto Safety) pointed out the delays with this rulemaking and the urgency for a final rule. Most vehicle manufacturers supported removing the upper limit on the duration of the audible warning for the driver's seat belt.

## VIII. NHTSA's Statutory Authority

NHTSA is proposing this's NPRM pursuant to its authority under the National Traffic and Motor Vehicle Safety Act.

Under 49 U.S.C. chapter 301, Motor Vehicle Safety (49 U.S.C. 30101 *et seq.*), the Secretary of Transportation is responsible for prescribing motor vehicle safety standards that are practicable, meet the need for motor vehicle safety, and are stated in objective terms.<sup>88</sup> "Motor vehicle safety" is defined in the Motor Vehicle Safety Act as "the performance of a motor vehicle or motor vehicle equipment in a way that protects the public against unreasonable risk of accidents occurring because of the design, construction, or performance of a motor vehicle, and against unreasonable risk of death or injury in an accident, and includes nonoperational safety of a motor vehicle."<sup>89</sup> "Motor vehicle safety standard" means a minimum performance standard for motor vehicles or motor vehicle equipment.<sup>90</sup> When prescribing such standards, the Secretary must consider all relevant, available motor vehicle safety information.<sup>91</sup> The Secretary must also consider whether a proposed standard is reasonable, practicable, and appropriate for the types of motor vehicles or motor vehicle equipment for which it is prescribed and the extent to which the standard will further the statutory purpose of reducing traffic accidents and associated deaths.<sup>92</sup> The responsibility for promulgation of Federal motor vehicle safety standards is delegated to NHTSA.<sup>93</sup> In making the proposals in this's NPRM, the agency carefully considered all the aforementioned statutory requirements. They are discussed in more detail throughout the preamble and in the regulatory analyses. In addition, MAP-21 directed NHTSA to initiate a rulemaking to require a seat belt warning for the rear seats in motor vehicles (see Section III, Regulatory and Legislative History).

## IX. Overview of Proposed Requirements

As previously mentioned, this NPRM proposes amending the existing seat belt warning provisions in FMVSS No. 208. This proposal has two main components. The first proposes requiring a seat belt reminder for the

rear seats. The second proposes changes and enhancements to the seat belt warning requirements for the front outboard seats. These proposed requirements would apply to passenger cars and trucks, buses (except school buses), and multipurpose passenger vehicles with a GVWR of 4,536 kg (10,000 lb) or less.

### Rear Seat Belt Reminder Requirements

The first component of this NPRM is a set of proposed requirements for a seat belt warning for rear seats. The proposed requirements have four main elements.

- *Visual warning on vehicle start-up to inform the driver of the status of the rear seat belts.* We propose three different compliance options for the rear seat belt warning system. The first would require the system to indicate how many or which rear seat belts are in use (the "positive-only" option). The second would require the system to indicate, for the occupied rear seats, how many or which rear seat belts are not in use (the "negative-only" option). The third would require the system to indicate, for the occupied rear seats, how many or which rear seat belts are in use and how many or which rear seat belts are not in use (the "full-status" option). Certain features would be required of all the options. Each system would have to provide a continuous or flashing visual warning, consisting of either icons or text, visible to the driver. The visual warning would have to last for at least 60 seconds, beginning when the vehicle's ignition switch is moved to the "on" or "start" position. The negative-only and full-status compliance options would require that the rear seats be equipped with a belt latch sensor and an occupant detection system (which facilitates these more-informative warnings), while the positive-only option would only require that the rear seats be equipped with a belt latch sensor.

- *Audio-visual change-of-status warning.* We propose an audio-visual warning whenever a fastened rear seat belt is unfastened while the ignition switch is in the "on" or "start" position and the vehicle's transmission selector is in a forward or reverse gear. The warning would have to last for at least 30 seconds. We do not propose any requirements for the volume or tone of the warning. The intent of this warning is to alert the driver or other occupants of a change in belt status during a trip. The warning would not be required if a door is opened, which would be the case if a rear passenger unfastened their belt in order to exit the vehicle.

<sup>88</sup> 49 U.S.C. 30111(a).

<sup>89</sup> 49 U.S.C. 30102(a)(9).

<sup>90</sup> Section 30102(a)(10).

<sup>91</sup> Section 30111(b)(1).

<sup>92</sup> Section 30111(b)(3)-(4).

<sup>93</sup> See 49 CFR 1.95.

- *Requirements related to electrical connections.* Readily removable rear seats would be required to either automatically connect the electrical connections when the seat is put in place, or, if a manual connection is required, the connectors must be readily-accessible. Further, vehicles utilizing the negative-only compliance option would be required to provide a visual warning to the driver if a proper electrical connection has not been established for a readily removable rear seat.

- *Owner's manual requirements.* We propose that the vehicle owner's manual (which includes information provided by the vehicle manufacturer to the consumer, whether in digital or printed form) describe the warning system's features, including the location and format of the visual warnings. We also propose that the owner's manual (which includes information provided by the vehicle manufacturer to the consumer, whether in digital or printed form) include instructions on how to make any manual electrical connections for readily removable seats.

#### *Front Outboard Seat Belt Warning Requirements*

We propose several changes and enhancements to the seat belt warning requirements for the front outboard seats:

- *Audio-visual warning on vehicle start-up for front outboard passenger seat.* Currently, only the driver's seat is required to have a seat belt warning, although almost all vehicles now provide a seat belt warning for the front outboard passenger seat as well. Accordingly, we propose to require a seat belt warning for the front outboard passenger seat. In addition, for an ADS-equipped vehicle that has no manually-operated driving controls, we are proposing that the front passenger warning apply to "any" front outboard passenger.

- *Increasing the duration of the audio-visual warning on vehicle start-up.* We propose enhancing the front seat belt warning duration by requiring an audio-visual warning that remains active until the seat belt at any occupied front outboard seat is fastened. We are proposing this in light of a variety of factors, including the increase in roadway fatalities, the lack of improvement of front seat belt use rates, and the fact that the audio-visual warnings with which vehicle manufacturers are currently equipping vehicles significantly exceed the 4-second regulatory minimum (including a non-trivial share of currently sold vehicles with an

indefinite-duration reminder). Vehicle manufacturers can adjust warning signal characteristics (such as frequency and volume) to make the warning both effective and acceptable to consumers. We are also proposing some additional requirements for the warning related to increasing the duration (for example, specifying at least a 20 percent duty cycle for the warning).

- *Audio-visual change-of-status warning.* We also propose to require an audio-visual change-of-status warning whenever a front outboard passenger seat belt is unbuckled during a trip (unless a front door is opened, to account for an occupant unfastening the belt to exit the vehicle). The warning would be required to remain active until the seat belt is refastened.

- *Driver seat belt warning for medium-sized buses.* FMVSS No. 208 currently does not require a driver seat belt warning for medium-sized buses (roughly, buses that weigh between 3,855 kg (8,500 lb) and 4,536 kg (10,000 lb)). We are now proposing to require that these buses be equipped with a driver seat belt warning. NHTSA is unaware of any such buses that do not already have an FMVSS No. 208-compliant driver seat belt warning.

#### *Effective Date*

We propose an effective date of the first September 1 that is one year after the publication of the final rule for the front seat belt warning system requirements and the first September 1 that is two years after the publication of the final rule for the rear seat belt warning system requirements, with optional early compliance. For example, if the final rule were published on October 1, 2022, the effective date would be September 1, 2024 for the front seat belt warning system requirements and September 1, 2025 for the rear seat belt warning system requirements. Consistent with 49 CFR 571.8(b), multi-stage manufacturers and alterers would have an additional year to comply.

## **X. Proposed Rear Seat Belt Warning**<sup>94</sup>

### *A. Overview*

The proposed rear seat belt warning requirements have four main components: a visual warning on vehicle start-up to alert and inform the

driver of the status of the rear seat belts; an audio-visual change-of-status warning when a rear seat belt is unbuckled during a trip; requirements for the electrical connections for readily removable seats; and owner's manual requirements. We also propose requirements for several characteristics of this warning, such as duration and triggering conditions. We also discuss related issues such as hardening the system against user circumvention, consumer acceptance, and technological and economic feasibility.

The proposed changes would apply to all rear designated seating positions in passenger cars, trucks, buses (except school buses), and MPVs with a GVWR of 4,536 kg (10,000 lb) or less.

### *B. Applicability*

The ANPRM sought comment on the vehicles to which a rear seat belt warning requirement should apply. The current FMVSS No. 208 generally requires rear seat belts in passenger cars, trucks, MPVs, buses less than 10,000 lb, over-the-road buses between 10,000 lb and 26,000 lb, and buses greater than 26,000 lb (except school, perimeter-seating, and transit buses). We observed that high-occupancy vehicles might pose challenges for implementing a rear warning system due to the potential complexities of the visual signal, number of seats, and other issues. At the same time, such vehicles could be at least as likely—if not more likely—to have rear occupants. With respect to school buses, a rear seat belt warning requirement might place additional cost burdens on school systems, potentially leading to reductions in school bus service, with a concomitant increased risk to students.<sup>95</sup> We also noted that school buses utilize compartmentalization to reduce the risk of crash injury, even to the unbelted.

The ECE R16 rear belt warning requirements apply to M1 and N1 vehicle categories (passenger cars, multipurpose passenger vehicles, vans, pick-ups and light trucks), with exemptions for ambulances, hearses, and motor-caravans, as well as all seats for vehicles used for transport of persons with disabilities, vehicles intended for use by the armed services, civil defense, fire services and forces responsible for maintaining public order.<sup>96</sup>

<sup>94</sup> Comments are from the ANPRM unless otherwise noted. As discussed in more detail in the regulatory alternatives section, many commenters (OEMs and trade groups) generally recommended harmonizing with R16 and/or other NCAP programs. In the following sub-sections, we include comments that specifically recommended harmonizing with R16 or Euro NCAP with respect to the particular issue being discussed.

<sup>95</sup> See 76 FR 53102 (Aug. 25, 2011) (denial of a petition for rulemaking to mandate the installation of three-point seat belts for all seating positions on all school buses).

<sup>96</sup> § 8.4.1.2.

## Comments

Advocates commented that the requirements should apply, at a minimum, to all passenger vehicles, and should apply in all vehicles in which data indicates belt non-use is occurring. Freedman Seating Company (a manufacturer of seating for the transportation industry) favored a requirement for all vehicles (and, presumably, seating positions) requiring Type 2 seat belts.<sup>97</sup> A number of commenters recommended that the requirements harmonize with R16. Two commenters stated that, consistent with ECE R16–07, vehicles such as ambulances, hearses, and police cars should be exempt from any requirements. Two commenters similarly stated that the rule should only apply to vehicles under 10,000 pounds GVWR (with some specific exclusions for certain vehicle types). A commenter argued that while there might be benefits to a requirement for commercial vehicles and buses, it could pose considerable challenges for those vehicles, so any requirements for larger vehicles should be considered in a separate rulemaking.

We also received several comments specifically about applicability to buses. One comment stated that seat belt reminder systems should be included in vehicles 10,000 lb and under, including high-occupancy vehicles such as 15-passenger vans and school buses, given the likelihood of vulnerable (*e.g.*, children) rear seat passengers and the difficulty for the driver to determine if occupants are belted. Other commenters opposed a requirement for some or all buses. A commenter opposed requirements for any buses based on what it characterized as the complexity, cost, potential for driver distraction, and lack of data supporting effectiveness.<sup>98</sup> A commenter stated that rear seat belt warnings should not be required in motorcoaches;<sup>99</sup> while technically feasible, such a requirement would be costly and not suitable. The

<sup>97</sup> A Type 1 seat belt assembly is a lap belt for pelvic restraint, and a Type 2 seat belt assembly is a combination of pelvic and upper torso restraints (3-point belt). Type 2 belts are required for most rear seats in passenger cars. S4.1.5.5. Type 2 belts are also required for most rear seats on buses required to have rear seat belts. Type 2 belts are also required on most rear seats in trucks and MPVs less than or equal to 10,000 lb. Type 2 belts generally are not required on side-facing seats.

<sup>98</sup> Blue Bird's comment was unclear, because it also specifically commented that it was opposed to any changes which expand the requirements of FMVSS No. 208 for buses with a GVWR greater than 3,855 kg (8,500 lb), including the proposed requirement for rear passenger seat belt warning systems.

<sup>99</sup> We assume that this refers to traditional motorcoaches which are over 10,000 lb.

commenter's concerns were similar to those that detailed for school buses (see below).

Several commenters argued that school buses should be excluded from any requirements. They made a variety of arguments on this point.

The commenters argued that a requirement for school buses would be prohibitively expensive. One commenter stated that it could dissuade pupil transporters from voluntarily equipping large buses with seat belts, as well as provoke objections to laws that require them. Several comments questioned the technical feasibility and the potential for malfunctions and false alarms. A commenter stated that because of the complexity of any system required for a vehicle with a large number of rear seating positions, improper detection is a real possibility. Two commenters similarly said that the sensors might not be sophisticated enough to deal with the variations found in the school bus operating environment, because children that ride in school buses are of varying ages and sizes, with NSTA noting the possibility of false alarms. A commenter stated that the school bus interior is a harsh environment and the necessary wiring and connections are subject to failure by exposure or tampering; this failure for hardwired systems could be eliminated through use of wireless technology, but transmitting devices are also subject to failure, and require power. However, some commenters noted that rear warnings for school buses may be technically feasible and are, to some extent, currently available.

Two commenters also raised potential unintended consequences of school bus driver distraction. A commenter brought up that driver distraction is perhaps the greatest concern for the implementation of warning device technology in school buses. The primary function of the school bus driver is to safely transport the student passengers; the bus driver must be able to fully focus on driving, so each activation of a warning would require a bus driver to transfer focus to the display source to read the data, understand the data, then interpret the data to the exact student/location in the bus. At that point, the driver would need to direct the student to buckle up if that is the actual need. This situation could occur simultaneously with several students. In driving situations with high-density urban traffic or high-speed rural two-lane roads with much commercial vehicle traffic, the potential for a crash could significantly increase.

A couple of commenters questioned the ability of school bus drivers to ensure that student occupants use the

seat belts. A commenter questioned what a driver faced with a seat belt warning should do: Would the driver be required to walk the aisle like an airplane flight attendant inspecting the entire bus and requiring students to buckle up? Would the driver be required to refuse to move the bus until all belts are buckled? The commenter also questioned whether it is the responsibility of the driver or the passenger to obey any applicable state law (along with parental and school information and encouragement) and ensure the belt is fastened. Another commenter similarly stated that the driver's ability to ensure seat belt use is limited; the student passengers' failure to comply often comes after repeated requests to do so from school bus drivers or aides. A few commenters also had concerns about potential legal liability for operators and drivers. A commenter stated that school districts would need to determine if the failure of a warning system to properly function would require that the seating position be rendered unusable, and another commenter said that it was unclear if the presence of a seat belt warning system would make the driver legally liable in a crash for injuries to unbelted students. The commenter further wondered whether the addition of such a system would force school systems to hire bus monitors to supervise belt use, adding a significant cost to state and local budgets. Along these lines, the commenter recommended a hold-harmless provision in the regulations to cover school bus operators for instances where a student passenger evades a seat belt restraint system and sustains injuries.

Related to this, two commenters mentioned the possibility of circumvention in school buses. One commenter noted the ability of passengers to defeat the systems (either intentionally or unintentionally); sophisticated sensor design would be required to warn the driver of non-use in these cases. Another commenter said that an occupant could buckle the belt behind him/her, thus turning off the alarm without having complied with the purpose of the alarm.

A commenter stated that a seat belt warning on school buses would lead to routing delays, due to additional time required at each stop to ensure that students were belted. The commenter also noted the potential effects of stopped buses (especially during rush hours). Another commenter said that system malfunctions would result in a school bus being removed from service and raised the possibility of a malfunction occurring mid-trip, which

would present the operator the issue of whether to continue operating the bus or not.

#### Agency Response

This proposal applies to all rear designated seating positions in passenger cars and all rear designated seating positions certified to a compliance option requiring a seat belt in trucks, buses, and MPVs with a GVWR of 4,536 kg (10,000 lb) or less, except for school buses and law enforcement vehicles. We propose to apply the proposed requirements to these categories of vehicles because these vehicles are required to have seat belts at all rear designated seating positions and (except for some buses) a seat belt warning for the driver's seat.<sup>100</sup> We note that some types of trucks and MPVs (motor homes, walk-in van-type trucks, vehicles designed to be sold exclusively to the U.S. Postal Service, or vehicles between 8,500–10,000 lbs carrying a chassis-mount camper)<sup>101</sup> and over-the-road buses that are also prison buses<sup>102</sup> are not required to have rear seat belts. The proposed applicability is largely consistent with ECE R16, except that we are not proposing to exempt special-purpose vehicle types such as ambulances because they are typically customized after first sale.<sup>103</sup>

We believe it is particularly important to include vehicles with a GVWR greater than 3,855 kg (8,500 lb), but less than or equal to 4,536 kg (10,000 lb)—including buses other than school buses—because this includes high occupancy vehicles (*e.g.*, large capacity passenger vans and large sport utility vehicles [SUVs]).<sup>104</sup> We also believe an increasing number of large trucks and vans are used as personal vehicles and are not solely used for work-related purposes. In addition, multiple rear seats or rows make it more difficult for the driver to ascertain rear seat belt use, so a warning could prove especially

useful in these vehicles. We also recognize that the intent of the MAP–21 mandate is to improve protection for rear occupants; given the proven benefits of seat belts, we tentatively believe the warning should be broadly applied. We acknowledge that vehicles with a larger number of rear seats may encounter visual signal complexities. Accordingly, our intent is to propose performance requirements that provide manufacturers with the flexibility to design a warning system that is appropriate for each vehicle type. We chose to limit the application of the passenger seating requirements to light-duty vehicles (less than or equal to 10,000 lb). Several commenters were all in agreement with excluding vehicles over 10,000 lb; it is consistent with the petition and with the applicability of the current seat belt warning system requirements.

We have tentatively decided to exclude all school buses (including those weighing under 10,000 lb [small school buses]) because of practicability issues. First, the agency is concerned about the costs to school systems, which could lead to reductions in school bus service, resulting in greater risk to students. Second, we are concerned about the burdens such systems might place on the driver. For example, with a rear seat belt warning system without occupant detection (the minimum compliance option that we are proposing in this NPRM), the school bus driver would have to verify that all the passengers are using their seat belts based on the system's visual signal that identifies how many or which rear seat passengers are belted. We tentatively agree with the commenters who argued that is not practicable. This concern might be mitigated, in part, by a more robust system utilizing occupant detection, but we do not believe that would be practicable at this time.<sup>105</sup> Third, school buses of all sizes offer passengers compartmentalization protection to reduce the risk of crash injury, even to the unbelted. Such protection is not offered in other vehicles. Finally, we note various other concerns raised by the commenters and summarized above, including the possibility of school buses being out of service due to malfunctioning reminder systems, and potential liability issues for school districts.

Law enforcement vehicles would also be exempt from the proposed requirements because of concerns with practicability: the rear seats are mainly used to transport passengers that are

under arrest and normally handcuffed, so if the policy of the police agency is that prisoners be transported with their seat belts fastened then the officer would be responsible for fastening the seat belt around the prisoner(s) and thus would already be aware of the belt status of the rear seat occupants. The term “law enforcement vehicle” is already defined in FMVSS No. 208 to mean “any vehicle manufactured primarily for use by the United States or by a State or local government for police or other law enforcement purposes.”

We seek comment on our proposed applicability requirements.

#### C. Requirements

This NPRM proposes a visual warning on vehicle start-up and an audio-visual change-of-status warning if a belt is unbuckled during a trip. We also propose a variety of requirements with respect to the warning triggering conditions, duration, telltale, and electrical connections, among other things.

##### 1. Visual Warning on Vehicle Start-Up

This NPRM proposes a visual warning to alert and inform the driver, upon vehicle start-up, to the status of the rear seat belts. We also propose minimum performance requirements for several aspects of this warning.

##### a. Compliance Options for the Type of Information Conveyed

The ANPRM sought comment on whether NHTSA should require a warning at the start of the trip, whether such a warning should be visual-only or audio-visual, and what type of information the visual warning should convey. NHTSA identified three potential types of warnings. One would require the system to indicate how many or which rear seat belts are in use (a “positive-only” system). The second would require the system to indicate, for the occupied rear seats, how many or which rear seat belts are not in use (“negative-only”). The third requires the system to indicate, for the occupied rear seats, how many or which rear seat belts are in use and how many or which rear seat belts are not in use (“full-status”). The second and third types of warnings identified would require that the system be capable of determining which rear seating positions are occupied (*i.e.*, would require an occupant detection system). NHTSA also sought comment on whether some or all of the compliance options should require occupant detection.

ECE R16 requires a visual warning at the start of a trip, but not an audible

<sup>100</sup> Buses with GVWRs greater than 8,500 lb and less than or equal to 10,000 lb are currently not required to have a driver's seat belt warning. See FMVSS 208, S4.4.3.1. We propose to close this loophole. See Section XI.B.

<sup>101</sup> S4.2.7.1.

<sup>102</sup> S4.4.3.3; S4.4.5.1.

<sup>103</sup> See 49 U.S.C. 30112(b)(1) (a FMVSS does not apply to, among other things, “the sale, offer for sale, or introduction or delivery for introduction in interstate commerce of a motor vehicle or motor vehicle equipment after the first purchase of the vehicle or equipment in good faith other than for resale”).

<sup>104</sup> Fifteen-passenger vans are classified as buses under the FMVSS because they are designed for carrying more than ten persons. See 49 CFR 571.3 (“*Bus* means a motor vehicle with motive power, except a trailer, designed for carrying more than 10 persons.”) (*italics in original*).

<sup>105</sup> More discussion of occupant detection systems is provided in Section XIV.B.



signal.<sup>106</sup> The visual warning must remain active until none of the belts that triggered the warning are unfastened, the seat(s) which triggered the warning are no longer occupied, or 60 seconds has elapsed.<sup>107</sup> The visual warning must “indicate at least all rear seating positions to allow the driver to identify, while facing forward as seated on the driver seat, any seating position in which the safety-belt is unfastened.”<sup>108</sup> Occupant detection is not required, but in vehicles that do have occupant detection the warning does not need to indicate unfastened belts for unoccupied seating positions.<sup>109</sup> This warning may be canceled by the driver.<sup>110</sup>

Euro NCAP’s rating protocol also requires a visual warning at the start of a trip. The requirements are similar to ECE R16. Euro NCAP’s rating protocol does not require occupant detection but incentivizes systems that use occupant detection by awarding additional points for this feature. For systems without occupant detection, the visual signal must show belts in use and not in use.<sup>111</sup> For systems with occupant detection, the visual signal does not need to indicate the number of seat belts in use or not in use, but the signal must remain active as long as the seat belts remain unfastened on any of the occupied seats in the rear;<sup>112</sup> no visual signal is required if no rear occupants are detected.<sup>113</sup> Systems with occupant detection must also provide a 30-second audible signal at the start of the trip before specified speed or distance thresholds have been crossed.<sup>114</sup> Alternatively, if occupant detection is provided the manufacturer may use the same warning strategy as specified for the front seats.<sup>115</sup>

## Comments

Most commenters explicitly endorsed a warning on start-up, and none

opposed it, although the comments differed on whether it should have an audible component. Two comments recommended harmonizing with the ECE R16 requirement for a visual-only warning on start-up. A commenter stated that NHTSA should provide flexibility in terms of the type of information that is required to be communicated by the reminder system, including positive-only, negative-only, and full-status systems, with consideration for both occupant-detection and non-occupant-detection centric approaches. Based on the definitions provided within the ANPRM, the baseline standard for R16 could be met through a non-occupant detection, positive-only system, but would not prohibit additional technology features to provide additional functionality. Another commenter agreed that positive-only, negative-only, and full-status systems each could have strengths and limitations; the priority should be that all of these variations effectively allow the driver to identify which seats are unfastened (in the case without occupant detection), or if any occupied seats are unfastened (with occupant detection). The commenter noted that R16 does not establish such definitions of systems, but rather specifies the base requirement that the driver should be able to identify which seats are unfastened. The comment stated that NHTSA should not set criteria too broadly, which could restrict manufacturers to implementing a full-vehicle display, even if occupant detection is applied, in which case a single seat belt telltale indicator is sufficient.

Three commenters recommended a visual-only warning. A commenter stated that a visual warning, such as a telltale, should exist as an initial warning, and a combination of audible and visual warnings could exist as a “second-level” warning. Another commenter stated that visual displays are efficient at conveying information that is complex, that deals with locations in space, or that does not require immediate action. The comment stated that, while audio-visual warnings are more effective than visual-only warnings, visual displays are less intrusive and perceived as less annoying than audible warnings, so that a visual-only warning would minimize the impact of false warnings that could negatively impact consumer acceptance. The commenter also stated that, while visual displays alone have not been found to be effective for motivating occupants to use a seat belt, the driver

may use this information to encourage unbuckled rear occupants to use a seat belt.

Several commenters favored requiring an audio-visual warning at the start of the trip. Four commenters supported the specification of the most effective warnings and noted that audio-visual warnings are more effective than visible warnings alone. Two commenters stated that a visual-only warning would be easily missed by a driver who is focused on driving safely.

Three commenters recommended requiring a “negative” warning with occupant detection. A commenter said that such systems would reduce false signals and annoyance. Another commenter similarly supported a warning on startup and commented that while a positive-only warning icon at the start of a ride would be helpful, it would not be as valuable as a warning triggered by negative-only status as a way to change the behavior of those occupants who are lax or reluctant to buckle up.

## Agency Response

This rule proposes to require a visual warning (without an audible component) upon vehicle start-up. NHTSA decided to propose the three compliance options identified in the ANPRM for the type of information the warning must convey. Each proposed system has strengths and limitations. The positive-only system would be the least technically complex of the three proposed options. Since it would only need to detect whether a seat belt is in use, it would only require a seat belt latch sensor. With a positive-only system, the driver would need to determine how many rear seat occupants there are and then determine if that number equals the number of seat belts that are reported by the warning system as buckled. This compliance option would not necessitate occupant detection; we tentatively believe that there are still design and technological challenges associated with implementing occupant detection technology in rear seats (this is discussed in more detail in Section XIII, Regulatory Alternatives).

The negative-only and full-status systems would provide the driver with more information, and thus might be more effective than the positive-only system for at least two reasons. First, they would directly inform the driver whether any rear seat occupants were unbuckled, without the driver having to compare the number or location of occupants and fastened belts. Second, as discussed in more detail below, warning systems equipped with occupant

<sup>106</sup> Section 8.4.4.1; Section 8.4.2.3.1.

<sup>107</sup> Section 8.4.2.3.1; § 8.4.2.3.2.

<sup>108</sup> Section 8.4.4.2.

<sup>109</sup> Section 8.4.4.2.

<sup>110</sup> Section 8.4.4.3.

<sup>111</sup> Section 3.4.3.1.4.

<sup>112</sup> Section 3.4.3.1.3.

<sup>113</sup> Section 3.4.3.1.1.

<sup>114</sup> Section 3.4.3.2.3. The thresholds are (at the choice of the OEM) either a forward speed of 25 km/h or forward motion for 500 m.

<sup>115</sup> Section 3.4.3.2.3. For front seat belts, the assessment protocol requires both a visual and an audible warning signal (see Section 3.4.2). The visual signal must remain active until the seat belt is fastened. The audible signal has two stages, an initial and final audible signal, which have different onset criteria. The initial audible signal must not exceed 30 seconds and the final audible signal must be at least 90 seconds. To prevent unnecessary signals, the system must also be capable of detecting whether the front passenger seats are occupied.

detection are more amenable to audible warnings and enhanced warning features. However, we tentatively believe that systems such as these that provide a negative warning—that is, a warning for an unfastened belt—are only appropriate for systems utilizing occupant detection. This is because we tentatively believe that it is not appropriate to provide a warning for an unfastened seat belt at an unoccupied seat because such “false positives” could be a nuisance for the driver and might either desensitize the driver to the warning signal or lead them to circumvent or defeat the system—especially since the majority of trips do not have rear seat occupants. The proposal would therefore permit a warning for an unfastened belt only if the seating position were equipped with occupant detection. Accordingly, it would not, for example, permit a system without occupant detection that displayed the status of all the rear seat belts to be certified as a positive-only system coupled with a voluntary warning for unfastened seat belts.

With respect to comments in favor of requiring audio-visual warnings, we agree that warnings with an audible component are generally more effective. However, requiring an audio-visual warning would necessitate requiring occupant detection because the resulting “false positives”—having an audible warning activate for an unfastened belt at an unoccupied seat—would annoy the driver and could decrease the effectiveness of the warning. Thus, this NPRM does not require an audible warning on startup. However, manufacturers would be free to provide an audible warning on startup if they so choose, especially if the vehicle is equipped with occupant detection in the rear. This approach harmonizes with R16 and Euro NCAP.

We acknowledge that there are systems currently deployed in both the United States and Europe that would not comply with the proposed compliance options. In particular, manufacturers appear to be deploying systems without occupant detection that provide a warning for an unfastened belt. When the ANPRM was published, the rear seat belt warning systems in vehicles sold in the United States used what would be classified in this proposal as a positive-only warning system. Our current, preliminary review, however, indicates that manufacturers are now providing visual warnings that indicate unfastened seat belts, and not necessarily with occupant detection. For example, the visual warning displays on some MY2022 Honda and Porsche vehicles appear to

indicate the status of all the rear seat belts, but the owner’s manual does not indicate that the vehicle is equipped with occupant detection in the rear seats. This information is consistent with Honda’s comment that the compliance options should allow the driver to identify which seats are unfastened (in the case without occupant detection).

Similarly, it appears that, as suggested in the comments, European vehicle manufacturers are deploying systems that indicate seat belts that are fastened, seat belts that are not fastened, or the status of all rear seat belts, both with and—importantly—without occupant detection.<sup>116</sup> For example, the MY 2021 Peugeot 3008 appears to have a system that indicates the status of all the rear seat belts but does not indicate in its owner’s manual that it has occupant detection in the rear seats. Both ECE R16 and Euro NCAP appear to permit a broad range of systems, including those providing warnings for unfastened belts at unoccupied seats. R16 requires that the visual warning “indicate at least all rear seating positions to allow the driver to identify, while facing forward as seated on the driver seat, any seating position in which the safety-belt is unfastened.” Euro NCAP similarly requires systems without occupant detection to provide a visual warning showing both the belts in use and not in use. Nevertheless, we tentatively believe that the proposed deviation from R16 and some current United States and European systems is warranted because we tentatively believe it is not appropriate to provide a warning for an unfastened belt at an unoccupied seat.

Although the three proposed compliance options are not identical to the R16 and Euro NCAP requirements, we believe that a system that complies with the proposed requirements could also comply with R16 and Euro NCAP. With respect to R16, each of the three proposed compliance options would “allow the driver to identify, while facing forward as seated on the driver seat, any seating position in which the safety-belt is unfastened.” While the reference to an “unfastened” belt might be read to preclude a positive-only system—that is, it might be read to mean that the system must explicitly inform the driver of an unfastened belt, such as would be the case in the systems we are calling “negative-only” or “full-status”—after reviewing the types of systems available in the European market we believe this is not the case. Similarly, the negative-only

<sup>116</sup> Approximately 70% of Euro NCAP-tested vehicles had occupant detection in the rear seats.

and full-status compliance options appear consistent with Euro NCAP because they would provide a warning for an unfastened seat belt at an occupied seat.<sup>117</sup> However, the positive-only compliance option does not appear to be consistent with Euro NCAP because Euro NCAP requires that systems without occupant detection show the rear seat belts in use and not in use, and the positive-only compliance option would not permit a visual signal for an unfastened seat belt.<sup>118</sup>

NHTSA seeks comment on all of these issues. While we have tentatively concluded that the proposed compliance options would help mitigate false warnings and the possibly attendant consumer acceptance issues, we are considering altering the proposed compliance options to accommodate systems that are currently being deployed, or that manufacturers may wish to deploy in the future. For example, we are considering allowing visual warnings that indicate which seat belts are unfastened without occupant detection. We therefore seek comment on what visual warnings vehicle manufacturers are using in the United States and Europe and whether they employ occupant detection. We also seek comment on why vehicle manufacturers have decided to use visual warnings that indicate unfastened seat belts without the use of occupant detection and whether they have received complaints from consumers about false warnings, or requests to deactivate the system. Is there any consumer acceptance data to support or oppose allowing visual warnings that indicate unfastened seat belts without the use of occupant detection in the rear seats? We also seek comment on whether there are any other aspects of the proposed compliance options with which current or anticipated future systems would not comply. Is there a preferable set of options that is sufficiently objective to satisfy the Safety Act? NHTSA also seeks comment on how manufacturers interpret the R16 requirements, to the extent that the agency’s characterization of them is contrary to industry understanding or practice. NHTSA also seeks comment on whether the proposed regulatory text is sufficiently objective and unambiguous.

#### b. Triggering Conditions

In the ANPRM we indicated that requiring the warning at the beginning of each journey or trip the vehicle makes is intuitively appealing because it

<sup>117</sup> Section 3.4.3.1.3.

<sup>118</sup> See Euro NCAP section 3.4.3.1.4.

would help assure that occupants are safely restrained prior to any potential vehicle crash. However, we sought comment on the possible advantages of delaying the warning to a time when the driver or occupants are less distracted and therefore might pay more attention to the warning.

R16 requires that the visual warning activate when a belt is not fastened and the ignition or master control switch activated.<sup>119</sup> Euro NCAP similarly requires that the warning start at the commencement of a journey when the ignition switch is engaged (whether or not the engine is running) and any of the rear belts are not fastened.<sup>120</sup> However, Euro NCAP allows for short breaks in the journey (up to 30 seconds) to account for events such as engine stalling where the reminder is not required to start again.<sup>121</sup> For both R16 and Euro NCAP, for vehicles that have occupant detection in the rear seats, the visual warning does not need to indicate unfastened seat belts for unoccupied seating positions.<sup>122</sup>

#### Comments

Many ANPRM commenters either specifically recommended harmonizing with R16 or recommended triggers that harmonized with R16. Three commenters specifically recommended harmonizing with R16. Many other commenters recommended that the trigger be based on the ignition switch. One commenter explained that this would provide flexibility for novel approaches for classifying vehicle motion. A few commenters stated that it was necessary for the warning to activate before the vehicle was in motion; for example, it was noted that vehicle crashes can happen quickly (e.g., backing out of a parking spot), so vehicle occupants should be buckled up anytime the vehicle is in motion. A commenter also stated that delaying the warning until the vehicle is in drive mode could leave drivers unable to ensure all passenger belts are fastened. Delaying the warning might warrant additional study, but if the study suggests changing the warning timing, it should do so for all vehicle occupants. A commenter stated that any triggering condition other than initiation at the beginning of a trip when the ignition switch is moved to the “on” or “start” position would necessitate occupant detection.

However, a few commenters suggested alternative approaches. One commenter recommended against requiring a warning before a driver shifts a vehicle into drive because a transmission-less electric vehicle can quickly shift to drive. Requiring the warning before the vehicle is shifted to drive would potentially amount to a seat belt drive interlock and potentially delay shifting into drive. The commenter believed this is unnecessary, could result in driver frustrations that diminish acceptance, and lead to hasty detection that increases the potential for error. Another commenter stated that the warning would be most effective if it were triggered when the seat is occupied, the belt is unfastened, and the vehicle’s power is on. Yet another commenter stated that the triggering condition should be vehicle unlocking and for a period following relocking. Finally a commenter stated that the warning should be deactivated or disallowed if all occupants are properly buckled.

#### Agency Response

NHTSA proposes that the warning begin when the vehicle’s ignition switch is moved to the “on” or “start” position. This same condition appears in the existing driver seat belt warning requirements and is similar to ECE R16 and Euro NCAP. We are not proposing to follow R16 and refer to a “master control switch” because we do not believe it is necessary to introduce this new term into FMVSS No. 208 for the proposed amendments to the standard. Also similar to those protocols, if the system has occupant detection, no warning is required for unoccupied seats under the full-status and negative-only compliance options. As a commenter suggests, this would likely lead to more effective warnings because it mitigates false warnings and eases the burden on the driver to reconcile what the warning depicts with the actual status of the rear seat passengers. We believe basing the trigger on the ignition switch is preferable to delaying the warning until the vehicle is placed in gear because the proposed requirement would make it more likely that the occupants fasten their belts before the vehicle is in motion.<sup>123</sup>

With respect to the commenter on transmission-less electric vehicles quickly shifting to drive, the warning is triggered by the ignition, not the transmission gear position and would not impede the driver from shifting to drive. NHTSA also disagrees with the commenter that the system would be

triggered by the vehicle being unlocked. This could require a warning before any occupants had entered the vehicle, and thus would likely not serve its purpose of warning the driver and occupants given the limited duration of the warning. Such a requirement would also not harmonize with the existing driver belt warning system and the ECE R16 and Euro NCAP requirements.

For the negative-only system, we propose to require a visual warning indicating which occupied seats have an unfastened seat belt for the required duration or until the belts at all occupied rear seating positions are in use. Therefore, like the R16 requirement, if all occupied seats have fastened seat belts no visual warning would be required.

#### c. Seat Occupancy Criteria and Interaction With Child Restraint Systems

The negative-only and full-status compliance options would require the warning system to determine whether a seat position is occupied. Because the existing seat belt warning requirements in FMVSS No. 208, S7.3 apply only to the driver seat, they do not contemplate an occupant detection system (because driver seat occupancy could traditionally be assumed).

There are three main detection scenarios an occupant detection system would be exposed to in the rear seats: adults, teenagers, and older children of various heights and weights; children seated in a child restraint system (CRS); and objects such as packages, pets, or unoccupied CRSs. This section will discuss how the occupant detection capability for negative-only and full-status systems should perform for these different scenarios and our proposed weight and height criteria for compliance testing of rear seat belt warning systems certified to either the negative-only or full-status compliance options.

The ANPRM identified a need to objectively specify when a seat is occupied for the purposes of testing negative-only and full-status rear seat belt warning systems for compliance. The ANPRM requested comment on several options for seat occupancy criteria based on those specified in FMVSS No. 208 for compliance testing of low-risk deployment and suppression air bag systems in the presence of children or small-stature adults. These fall into three main categories. First, FMVSS No. 208 specifies 1-, 3-, and 6-year-old child anthropomorphic test devices (test dummies) (weighing, respectively, 22 lb [10 kg], 36 lb [16.3 kg], and 52 lb [23.6 kg]). Second, it

<sup>119</sup> Section 8.4.2.3.1.

<sup>120</sup> Section 3.4.1; Section 3.4.3.1.1.

<sup>121</sup> Section 3.4.1.

<sup>122</sup> Section 8.4.4.2 (R16; section 3.4.3.1.1 (Euro NCAP).

<sup>123</sup> See DOT 2009 Seat Belt Study at 65.

specifies a 5th percentile female test dummy (weighing 108 lb [50 kg]). Third, it specifies height and weight requirements for a child used as an alternative for the 6-year-old child test dummy for compliance testing of advanced air bag systems utilizing static suppression (weighing between 46.5 lb and 56.5 lb [21 kg and 25.6 kg] and between 45 in and 49 in [114 cm and 124.5 cm] tall).<sup>124</sup>

ECE R16 specifies three alternative methods for testing rear seats with occupant detection: placing a load of 40 kg (88 lb) on the seat; placing an object or human representing a 5th percentile adult female (the HIII-5F specified in 49 CFR part 572, as adjusted for the ECE test); or an alternative method specified by the vehicle manufacturer.<sup>125</sup> Euro NCAP defines occupancy as the use by an occupant larger, taller, or heavier than a 5th percentile female.<sup>126</sup>

The ANPRM also sought comment on whether a rear seat belt warning would reliably detect a child restraint system attached by a child restraint anchorage system, or LATCH. The intent of this question was to determine whether a seat belt warning system might register a false alarm for a LATCH-installed CRS. Neither R16 nor Euro NCAP have requirements with respect to the system's interaction with LATCH-installed CRSs.

#### Comments

We received a number of comments related to seat occupancy criteria and the detection capabilities the system should have.

With respect to seat occupancy criteria, several commenters supported harmonizing with ECE R16 and/or basing the criteria on a 5th female dummy (88 lb–105 lb). Several commenters suggested harmonizing with the ECE R16 criteria. A commenter stated that the occupant size that the system is required to detect should not be less than the occupant size that would use the seat belt as the only restraint. Another commenter stated that for children seated in booster seats or high-back boosters (with belt positioning guides), the CRS often directly utilizes the belt provided in the vehicle. In these cases, a rear belt reminder system may be useful for reminding the driver to ensure the child seated in that seating position is either restrained or providing an alert that the restraint status has changed during a trip (*i.e.*, belt became unbuckled). A commenter recommended specifying

the 5th percent female detection criteria for several reasons: starting with the 5th female would cover a large share of the target population; belt usage is high for children as long as they are in a CRS (so a warning system appears less needed); the 5th percent female includes a large share of the teenage population; it would harmonize with FMVSS No. 208 and international NCAP programs; and it would result in more robust systems with respect to false positives.

On the other hand, various commenters recommended that the occupancy criteria be based on children that might reasonably be expected to use seat belts. Two commenters suggested that the occupancy criteria be based on the smallest weight of a child that can reasonably be expected to be restrained by a seat belt rather than a CRS. One of the commenters stated that a weight of 20 lb (9 kg) is consistent with all state laws for CRS use. Another commenter stated that the criteria should reflect a minimum weight equal to that of a Hybrid III 6-year-old child (about 52 lb). However, as noted below, commenters believed that using weight alone was not enough. A commenter did not agree with criteria based on a 6-year-old, and instead suggested the HIII 3-year-old dummy (36 pounds, or 16 kg) as the minimum weight threshold, stating that this dummy's weight roughly represents the 95th percentile 2-year-old and the 5th percentile 5-year-old. The commenter stated a 6-year-old was not appropriate as nearly 60% of 4- and 5-year-old children do not ride in a CRS with a harness, so many of the most vulnerable seat belt users (very young children using the belt alone or in conjunction with a booster) would fail to trigger the alarm if unbuckled. A commenter stated that the specifications should represent the occupant population at risk from non-use of rear seat belts, and stated that NHTSA's 2017 passenger vehicle fatality data indicates that restraint non-use exceeds the national average (47%) in the population of occupants starting at age 8–12; the unrestrained percentage for younger occupants is 36% for 4–7-year-olds and 22% for occupants less than 4 years old. A commenter suggested that the criteria should register children that would presumably be placed in a child restraint system (*i.e.*, children as young as 4 years old). Another commenter recommended that NHTSA's testing reflect the full range of body types as well as child restraint systems that could be present in rear seats.

We also received a variety of comments about the detection capabilities the system should have. Several commenters argued that the

system should be required to detect CRSs. Three commenters supported requiring LATCH detection. Two of those commenters stated that the reminder system should be able to recognize when a car safety seat is installed with LATCH instead of the seat belt and should not activate under those conditions in order to avoid nuisance (false) warnings. A commenter said that when a CRS is installed using the lower anchors of the LATCH system, the seat belt is typically not in use, so a non-discerning sensor would conclude that an unbuckled occupant is present (because a CRS is heavy enough to be classified as an occupant by an occupant detection system).<sup>127</sup> A commenter recommended that the occupant detection system provide a warning if the CRS is improperly latched.

On the other hand, several commenters believed that the system should not be required to detect a CRS. Three commenters stated that the system should not be required to detect a CRS, with two of the commenters noting variation in CRS designs and the fact that neither ECE R16 nor Euro NCAP require CRS detection capabilities. These three commenters opposed requiring LATCH detection because it would provide little benefit with significant added costs. One of the commenters added that LATCH systems are not typically latched/unlatched frequently, so it is far more uncommon to be in the unlatched state. Additionally, as only the latch could potentially be detected, and yet the remaining parts of the child restraint are unmonitored, it may give a false assurance to the user that the child is fully restrained. Two of the commenters said that if this were required, the system would need to distinguish different types of CRS available in the market, which would be difficult to implement. A commenter that opposed requiring occupant detection on buses, commented that buses with LATCH seats would require a detection system capable of differentiating whether an occupant is unbuckled or secured using the LATCH attachments; whether an occupant is unbuckled or secured using the securement harness provided with the seat; and between removed seats and those with incorrect electrical connections. Another commenter stated that CRSs pose a challenge to occupant

<sup>127</sup> Safe Ride News also appeared to suggest that in conjunction or in the alternative, the system should be able to be deactivated or allow the driver to dismiss (acknowledge) the warning. NHTSA's tentative conclusion to not adopt these approaches is explained in Section X.E, Resistance to intentional and inadvertent defeat and deactivation.

<sup>124</sup> FMVSS No. 208 S29.1(e).

<sup>125</sup> Annex 18.

<sup>126</sup> Section 3.4.1.3.

detection systems, which would need to account for all of the different uses of the rear seat; a false-positive warning on a child properly restrained using the LATCH system (who would not be buckled in with the seat belt) could discourage the consumer from using LATCH.

Finally, some commenters advocated requiring more sophisticated detection capabilities in order to limit false positives. Two of these commenters suggested that the system should be able to discern the difference between an occupant and objects such as packages. Another commenter said that NHTSA should also limit false activations when seats are occupied by child seats or other items. A commenter stated that NHTSA should allow for a child seat mode that suppresses the warning.

#### Agency Response

As an initial matter, it is important to understand the different types of CRSs, how seat belts are used with them, and the size/age of the children for which each type of CRS is typically appropriate.<sup>128</sup>

There are essentially three types of CRSs: rear-facing CRSs, forward-facing CRSs, and booster seats.<sup>129</sup> Rear-facing and forward-facing CRSs are child seats that are installed using either LATCH<sup>130</sup> or a seat belt to secure it in place.<sup>131</sup> Booster seats raise and position a child so the vehicle's lap-and-shoulder belt fits properly.

NHTSA recommends that children remain in a rear-facing CRS until they reach the top height or weight limit allowed by the CRS manufacturer.<sup>132</sup> NHTSA also recommends that children remain in a forward-facing car seat with a harness and tether until they reach the

top height or weight limit allowed by the car seat's manufacturer. Most forward-facing CRS are rated for children up to 49 in (124 cm) and 65 lb (29 kg).<sup>133</sup> Once a child outgrows the forward-facing car seat with a harness, the child can travel in a booster seat and use a seat belt. NHTSA identifies an age range of 4–7 years old for when this transition to a booster typically occurs, depending on the height and weight of the child and the respective limits of their forward-facing car seat. Once a child outgrows the booster seat they can sit directly in the seat and use the seat belt alone; NHTSA identifies an age range of eight to thirteen and older for when this typically occurs.

In the remainder of this section we discuss, first, the proposed weight and height criteria NHTSA proposes to use in compliance testing of rear seat belt warning systems certified to the negative-only or full-status compliance options and, second, what ability (if any) such systems should have to detect a CRS.

#### Weight and Height Criteria

NHTSA believes the rear seat belt warning system should be able to detect an occupant that should be restrained with a seat belt alone and provide seat belt use information to the driver that is appropriate for that type of system. This target population is comprised of adults, teenagers, and children in booster seats. Children in booster seats are part of the target population because they should be restrained with the seat belt and so would benefit from a seat belt reminder. As mentioned above, the transition to a booster seat typically occurs from ages 4–7 years. Children in rear-facing and forward-facing CRSs are not part of the target population because these children are restrained by the CRS harness, not the seat belt. The intent of the reminder is not to warn of CRS misuse, but to warn of occupants not restrained by a belt alone.

Accordingly, we are proposing that a rear designated seating position would be considered “occupied” when an occupant who weighs at least 46.5 lb (21 kg), and is at least 45 in (114 cm) tall, is seated there. These criteria are proxies for a six-year-old child, which roughly corresponds to a typical age at which a child would transition from a forward-facing CRS to a booster seat. We have taken these criteria from FMVSS No. 208, which uses them to specify the smallest child that may be used as an alternative to the 6-year-old dummy in

static suppression tests under FMVSS No. 208. The proposed test does not specify the use of a booster seat because we are aware that children can be prematurely transitioned to a seat belt without the use of a booster,<sup>134</sup> and we believe it is desirable to test the lower end of the possible weight range that encompasses children that could conceivably be restrained with a seat belt alone. As we explain below in Section XII.B, Test Procedures, the agency proposes using either a person or any anthropomorphic test device specified in part 572 that meets these proposed weight and height criteria.<sup>135</sup>

These criteria specify a smaller occupant than does R16. We tentatively believe that harmonizing with R16 and using a heavier dummy would not capture the child segment of the population that is in booster seats; that is, seat belt use may occur for occupants smaller than the criteria specified by R16. We also do not believe it is necessary to use a larger-size occupant because a system capable of recognizing a six-year-old should also be capable of recognizing larger occupants.

At the same time, we tentatively believe that the proposed criteria are preferable to criteria reflecting a younger occupant (lower weight). The smallest dummy that would meet the proposed weight and height criteria is the 6-year-old dummy specified in part 572. The next smallest dummy represents a 3-year-old child (*i.e.*, the Hybrid III three-year-old), but we believe it would not be appropriate to specify the use of the 3-year-old because a child represented by this ATD should be seated in a forward- or rear-facing CRS, not a booster seat.

#### Ability of the System To Detect a CRS

NHTSA also does not propose to require any sort of CRS detection capabilities at this time.

We tentatively believe that a forward- or rear-facing CRS installed with the seat belt would not cause problematic false warnings; rather it would just register the CRS as a buckled passenger.

Similarly, we believe that a forward- or rear-facing CRS installed with LATCH would not pose issues necessitating any specific requirements related to the LATCH system, such as LATCH sensors. There are a few reasons for this. First, we do not believe

<sup>128</sup> All 50 states, the District of Columbia, and all United States territories have laws requiring children to be secured in the appropriate car seats or booster seats for their ages and sizes while riding in vehicles. Most states now require children to ride in appropriate car seats or booster seats until as old as age eight (Alaska covers children up to 15 years old as long as they fall within their specified height and weight criteria).

<sup>129</sup> Within these types are CRS designs that can be used for multiple purposes, such as convertible CRSs that can be used as a rear-facing and forward-facing CRS and combination CRSs that can be used as a forward-facing CRS and booster seat.

<sup>130</sup> Many in the child passenger safety community refer to the child restraint anchorage system as the “LATCH” system, an abbreviation of the phrase “Lower Anchors and Tethers for Children.” The term was developed by a group of manufacturers and retailers for use in educating consumers on the availability and use of the anchorage system and for marketing purposes.

<sup>131</sup> Some boosters can also be secured to the seat with LATCH so that it stays in place when in use and not in use.

<sup>132</sup> For the NHTSA recommendations discussed here, see <https://www.nhtsa.gov/equipment/cars-seats-and-booster-seats> (last accessed Apr. 7, 2022).

<sup>133</sup> See <https://www.healthychildren.org/English/safety-prevention/on-the-go/Pages/Car-Safety-Seats-Product-Listing.aspx>.

<sup>134</sup> About 16.6 percent of children 4 to 7 years old were prematurely transitioned to seat belts in the “2019 National Survey of the Use of Booster Seats” (DOT HS 813 033).

<sup>135</sup> For anthropomorphic test devices, this would include the 50th percentile male, 5th percentile female, and the 6-year-old and 10-year-old child dummies.

LATCH-installed CRSs would lead to false warnings or driver confusion about the belt status of any rear occupants, because NHTSA recommends buckling unused seat belts that are within reach of children to prevent seat belt entanglement and/or strangulation.<sup>136</sup> This includes, for forward- or rear-facing CRSs installed with LATCH, buckling the unused belt behind the CRS. (Fastening the unused seat belt behind the CRS when installing a CRS with LATCH should not be mistaken for installing a CRS with both the seat belt and LATCH; a CRS installed with LATCH is not also installed with the seat belt unless it is approved by both the car seat and vehicle manufacturers.) If users follow NHTSA's recommendation and buckle the belt behind the CRS, the positive-only system would simply consider those belts to be fastened, and the negative- and full-status systems would not register a false warning. If the belt is not buckled as NHTSA recommends, with a positive-only system, the driver would simply see that there were no buckled belts, so there would be no false warnings. For the negative-only and full-status systems (which utilize occupant detection), the system could register the child in the CRS as an occupant depending on the weight of the child and CRS. We are aware of at least one vehicle manufacturer that uses occupant detection for its rear seat belt warnings and it recommends fastening the unused seat belt if the CRS is installed with LATCH to avoid such a false warning. (In the owner's manual section of this preamble we seek comment on including such guidance in the owner's manual, which includes information provided by the vehicle manufacturer to the consumer, whether in digital or printed form.) Again, if the belt is not buckled as NHTSA recommends, the driver would need to take these facts into account when comparing the number of rear seat occupants against how many or which rear seat belts are reported to be in use by the warning system. Second, we are not proposing to require a warning for CRSs improperly attached to the LATCH because the focus of this rulemaking is on providing a seat belt warning, not on providing warnings for improperly installed LATCH child seats. Third, this approach is consistent with ECE R16 and Euro NCAP, neither of which have provisions for addressing LATCH-installed child restraints. Finally,

requiring LATCH sensors would add extra complexity and cost.

We also do not believe a booster seat would present any special challenges to a seat belt warning system. If an (un)belted child is in a booster seat, the system would register the belt as not (un)fastened and (if equipped with occupant detection) that the seat was occupied. This would not necessitate the system to specifically detect the booster seat because the performance criteria are weight-based. In addition, we would not expect an occupant detection system to provide a false warning for an unoccupied booster seat because the proposed seat occupancy criteria (roughly equivalent to a 6-year-old) is heavier than an unoccupied booster seat.

We are also not proposing to require more sophisticated features to test how well the system avoids false positives—*e.g.*, the ability of the system to distinguish packages or pets from occupants or a child seat mode. A detection system that can differentiate between cargo and occupants would require additional sensor technology in comparison to a weight-based sensor and would be more costly. This issue can be mitigated by moving the cargo to the floor or trunk of the vehicle or by buckling the unused belt and would not be an issue for the positive-only compliance option. Tesla's "child seat mode" allows the driver to acknowledge the warning triggered by a CRS installed with LATCH for that trip. With respect to Tesla's comment regarding a child seat mode, neither ECE R16 nor Euro NCAP contemplate this and we are not aware of other manufacturers that have employed this feature. Given that a child seat mode feature could be used to circumvent the warning (*i.e.*, a belt use warning could be prevented or dismissed by use of the child seat mode), and the limited information NHTSA has on it, we have tentatively decided not to permit this feature.

We seek comment on all these issues.

#### d. Minimum Duration

The ANPRM also sought comment on the minimum duration of the warning. NHTSA's front seat belt warning research suggests that longer-duration warnings are more effective, but also more annoying.<sup>137</sup> The current driver's seat belt visual warning in FMVSS No. 208 is required to last at least 60 seconds under the second compliance option in FMVSS No. 208, S7.3(a)(2). Both R16 and Euro NCAP specify a 60-second visual warning (which may end

sooner if the belt is fastened or the seat becomes unoccupied).

#### Comments

Many commenters recommended harmonizing with R16 and adopting 60 seconds.<sup>138</sup>

A few commenters advocated a longer warning. Two commenters recommended the warning should last until all occupants are buckled. One commenter said that systems with long single-cycle durations and those that cycle audible/visual reminders throughout the entirety of the drive are more effective than systems that cycle for a limited number of times.<sup>139</sup>

Another commenter said that the visual warning duration should be based on evidence of effectiveness while maintaining a balance with annoyance.

#### Agency Response

NHTSA is proposing that the warning last for at least 60 seconds. We believe that 60 seconds is sufficient to capture the driver's attention, and that a longer warning would have the potential to become distracting or a nuisance.<sup>140</sup> This would be a shorter warning than we are proposing for the front outboard seats (see Section XI.C). There are a couple of reasons for our tentative decision that a shorter warning is warranted for the rear seats. First, we are not proposing to require occupant detection for the rear seat belt warning system; the positive-only compliance option would require that the driver be informed of which rear seat belts are fastened. This type of "warning" functions more to provide information to the driver, rather than a true warning (because it will be providing information to the driver even if all rear occupants have fastened their seat belts), so we tentatively think that it is not necessary to require that this be particularly long-lasting. Second, and related, even for the compliance options that would entail occupant detection, the complexities of occupant detection in the rear seats and the possibilities for false positives provide another reason for not requiring an extremely long-lasting warning. Manufacturers would be free to provide a longer warning if they wished. The proposed compliance

<sup>138</sup> Global suggested not adopting the Euro NCAP duration requirement (90 seconds) because the warning must balance effectiveness and consumer acceptance, but NHTSA understands the Euro NCAP minimum duration to be 60 seconds.

<sup>139</sup> NSC cited an IIHS study finding that an indefinite reminder and a 100 second constant reminder increased seat belt use by 30–34 percent over an intermittent reminder.

<sup>140</sup> We are also proposing that these visual displays should not be overridden by other visual warnings for the required duration.

<sup>136</sup> <https://www.nhtsa.gov/road-safety/child-safety>.

<sup>137</sup> DOT 2009 Belt Warning Study, *supra* n. 36.

options requiring occupant detection would not require a warning for occupants with fastened belts.

This is consistent with ECE R16 and Euro NCAP and with systems currently deployed in the United States. Our preliminary analysis found that, of the 15 manufacturers that provide vehicle models with a rear seat belt warning system in the United States, 8 appear to provide systems with initial visual warnings that are active for at least 60 seconds. An additional three manufacturers appear to provide visual warnings until the seat belt is fastened.

## 2. Audio-Visual Change-of-Status Warning

The ANPRM sought comment on requiring a change-of-status warning for when a fastened seat belt is unfastened, including an audio-visual change-of-status warning. We also sought comment with respect to potential requirements for an audible warning, including the duration of the warning and whether NHTSA should specify additional warning characteristics (such as sound level).

R16 specifies an audio-visual change-of-status warning for the rear seats. If a fastened rear belt becomes unfastened when the vehicle is in “normal operation,”<sup>141</sup> R16 specifies an audio-visual warning (second level) when certain distance, time and/or speed threshold(s) (at the choice of the manufacturer) are exceeded.<sup>142</sup> The additional thresholds are distance traveled (not to exceed 500 meters), vehicle speed (not to exceed 25 km/h, and/or travel time (not to exceed 60 sec). This warning must last for at least 30 seconds unless the unfastened belt becomes fastened, the seat associated with the unfastened belt is no longer occupied, or the vehicle is no longer in normal operation.<sup>143</sup> This warning may not be canceled by the driver.

Euro NCAP also requires (in order to earn bonus points) an audio-visual change-of-status warning at vehicle speeds of 25 km/h and above.<sup>144</sup> If the change-of-status occurs below 25 km/h and no doors are opened, the signal may be delayed until the vehicle has been in forward motion for 500 meters or has reached a forward speed of 25 km/h.<sup>145</sup> A warning is not required if the system has occupant detection as long as all doors remain closed and the number of

buckled positions remains the same, in order to minimize the number of false positives (e.g., children remaining in the vehicle but swapping seats in the rear while at a traffic light).<sup>146</sup> The warning duration differs for the visual and audible warnings. With respect to the visual warning, if the system does not have occupant detection, the warning must last until the seat belt is fastened or 60 seconds have elapsed.<sup>147</sup> If the system does have occupant detection, the signal must remain on until the belt is fastened. The audible warning must last until the belt is fastened,<sup>148</sup> 30 seconds have elapsed,<sup>149</sup> or the vehicle speed falls below 10 km/h.<sup>150</sup>

## Comments

Many commenters specifically supported requiring an audio-visual change-of-status warning. One commenter cited a survey of adult passengers who do not routinely use a seat belt in the rear in which 62% of respondents said they would be more likely to use a seat belt if there was an audible warning compared with only 50% who said the same about a visual warning.

With respect to the triggers for the warning, two commenters stated that a change-of-status warning should activate regardless of the speed.

Several comments also discussed the duration of an audible alert. Several commenters recommended harmonizing with the 30 seconds required by R16. Other commenters argued for a longer audible warning, including: 60 seconds, 90 seconds, and until all occupants are buckled. One comment noted that audio-visual warnings that continue to cycle throughout the drive are more effective than limited-duration warnings. Another commenter recommended consistency with existing FMVSS No. 208 audible warning systems for front occupants. Commenters stated that the duration should be based on evidence of effectiveness while maintaining a balance with annoyance. A commenter stated that, while information about the effect of an audio-visual rear seat belt warning on rear seat belt use is sparse, research on front seat belt warning systems suggests that an audio-visual

warning lasting longer than 8 seconds would be expected to motivate an unbelted rear occupant to refasten the seat belt.

With respect to other warning characteristics, three commenters recommended that the audible warning be heard throughout the vehicle. A commenter suggested following R16’s requirement that the warning “consist of a continuous or an intermittent (pauses shall not exceed 1 second) sound signal or of continuous vocal information.”<sup>151</sup> Two commenters said that specifying additional audible warning characteristics would be burdensome and unnecessary. A commenter said that there should be a balance of the sound level so that consumers would accept and react positively to the warning, and suggested it be the same as that for the driver. Another commenter recommended that the audible warning specification be based on evidence of effectiveness and suggested that maintaining consistency with other seat belt warning signals would be desirable. A commenter recommended consistency with existing FMVSS No. 208 audible warning systems for front occupants. And yet another commenter recommended a warning that is enhanced but does not rattle the driver.

## Agency Response

The agency proposes to require an audio-visual warning when a rear seat belt is unbuckled during a trip. We propose that when the vehicle’s ignition switch is in the “on” or “start” position, the vehicle’s transmission selector is in a forward or reverse gear, and a rear seat belt in use changes to not being in use, the vehicle must activate a continuous or flashing visual warning consisting of icons<sup>152</sup> or text visible to the driver, as well as a continuous or intermittent audible signal for a period of not less than 30 seconds, beginning when a seat belt in use changes to not being in use. The warnings could cut off sooner if the belt is refastened before the minimum time limit has been reached. Comments from vehicle manufacturers were largely in support of harmonizing with the ECE R16 requirements, and the proposed requirements are comparable to the change-of-status warnings on vehicles currently equipped with rear seat belt warnings. For example, Volvo vehicles provide an audio-visual warning lasting until the belt is refastened.

We believe this warning will be an effective way to reduce the risk of injury

<sup>141</sup> Defined as forward motion at a speed greater than 10 km/h. § 2.47.

<sup>142</sup> Section 8.4.4.5.

<sup>143</sup> These summaries simplify the requirements somewhat. They will be discussed in greater detail later in the preamble where relevant.

<sup>144</sup> Section 3.4.1.5.

<sup>145</sup> Section 3.4.1.5.

<sup>146</sup> Section 3.4.1.5.

<sup>147</sup> Section 3.4.3.1.1.

<sup>148</sup> Section 3.4.1.6.

<sup>149</sup> Section 3.4.3.2.

<sup>150</sup> Section 3.4.1.6. The audio signal must resume when the speed goes above 25 km/h and no doors have been opened and the seat belt(s) remain unbuckled. In addition, the audible signal may instead meet the requirements for the front seating positions, if the vehicle is equipped with occupant detection.

<sup>151</sup> Section 8.4.2.2.1.

<sup>152</sup> In the proposed regulatory text, we use the term “symbol” instead of “icon” in order to be consistent with the current usage in FMVSS Nos. 101 and 208.

to rear seat occupants by alerting the driver when a passenger unbuckles during a trip. NHTSA's 2015 consumer survey found that a change-of-status warning is effective in getting passengers to refasten their seat belt.<sup>153</sup> This may be an especially beneficial feature for drivers transporting children in the back seat. Such a warning may reduce the risk of injury to children by alerting the driver that a child has unbuckled his or her seat belt, providing the driver an opportunity to direct the child to re-buckle the belt. Fifty-five percent of the drivers surveyed by NHTSA who transport children in the rear seat and who said their children do not always use seat belts, have had the experience of their child unbuckling during a trip.<sup>154</sup>

The proposed requirements follow ECE R16 and Euro NCAP in that both of those protocols include an audio-visual rear belt change-of-status warning with specified trigger criteria.<sup>155</sup> We tentatively agree with a commenter that a duration longer than 8 seconds is warranted because it will be more effective and believe that a 30-second minimum duration appropriately balances effectiveness and acceptance. We note that this is shorter than the duration we are proposing for the change-of-status warning for the front outboard seats (until the belt is re-fastened—see Section XI.C.2) because we tentatively believe that a longer warning for the rear seats is more likely to lead to driver distraction, especially with children in the rear seats.

The proposal differs from R16 and Euro NCAP in a few ways:

- *Triggers.* The warning would be required as long as the ignition is on and the transmission selector is in the drive or reverse position, with no additional thresholds or triggers, such as the vehicle having to reach a forward speed of 25 km/h. We tentatively believe this departure from R16 and Euro NCAP is justified. Seat belts provide a safety benefit even at lower speeds, and regardless of the direction of motion. We also believe a warning would be beneficial even if the vehicle is not moving. A driver may want to know if any rear seat occupants—especially children—have been

unbuckled while the vehicle is temporarily stopped (*e.g.*, at a traffic light) or slowed (*e.g.*, in a parking lot), because the vehicle could soon be resuming travel. In addition, providing a warning when the vehicle is stationary would allow the driver to attend to the unbuckled passengers before having to focus attention on the driving task. We similarly believe that a warning would be useful before the vehicle has reached any distance or trip time threshold. We do not adopt the Euro NCAP allowance for not requiring a change-of-status warning when all doors remain closed and the number of buckled positions remains the same because this would require a delay in the activation of the change-of-status warning; also, these types of events are likely limited and require very little time so exposure to the warning would be very limited. We do, however, adopt the Euro NCAP requirement that if a change-of-status occurs and a door is open, the system should consider that as the start of a new trip. This would allow for passengers to exit the vehicle when the driver does not shift into the park gear without activating the change-of-status warning for the full duration requirement.

- *Duration.* The proposed 30-second duration harmonizes with ECE R16 (though it is shorter than the 60-second duration for the visual signal specified in Euro NCAP, but consistent with the 30-second duration for the audible signal). We propose that the audible signal may be “intermittent” (*i.e.*, not continuous), which mirrors the longstanding requirements for the driver's seat belt warning. ECE R16<sup>156</sup> and Euro NCAP<sup>157</sup> do not count periods in which the warning stops for longer than 3 seconds as part of the overall duration, and we have tentatively decided to propose a similar requirement for the rear audible change-of-status warning. (In contrast, we are specifying additional signal characteristics for the front seat belt change-of-status warning because we are proposing to require a longer duration for that warning. This is discussed in Section XI.C.2)

- *Audible warning characteristics.* ECE R16 specifies that for intermittent audible warnings, the pauses shall not exceed 1 second, and that gaps longer than 3 seconds would not count toward the required 30 second duration. Euro NCAP specifies that there must be no gaps greater than 10 seconds, and that gaps longer than 3 seconds would also not count toward their required

duration. We have tentatively decided to propose a requirement that specifies that periods of time when the audible warning is not active for longer than 3 seconds would not count toward the required 30 second duration. Given the very limited duration of the rear seat change-of-status audible warning for the rear seats we believe this is a sufficient constraint for achieving an adequate warning. We have not further specified audible warning characteristics, such as volume or tone, in order to provide manufacturers design flexibility. The standard has required an audible driver's seat belt warning with no additional audible warning requirements since the early 1970s, so we believe manufacturers are familiar with designing and implementing optimal audible seat belt warnings. As mentioned above, we are specifying additional signal characteristics for the front seat belt change-of-status warning because we are proposing to require an indefinite duration for that warning, which requires more thought about the warning characteristics to mitigate the use of ineffective audible warnings (See Section XI.C.2).

We seek comment on all aspects of the proposed change-of-status warning. Are there situations when the warning at a low speed would result in an unnecessary or unwanted warning, and how frequently would such situations occur? Are any of the deviations from R16 and/or Euro NCAP unwarranted, and what is the basis for such a conclusion? We acknowledge that the proposed requirements may still trigger the change-of-status warning for a short period of time until a door is opened when a passenger exits the vehicle and the vehicle is not in the park gear; however, we believe exposure to a very limited warning in these scenarios is necessary in order to capture other change-of-status events that occur when a vehicle is stopped but not in the park gear. We seek comment on how vehicle manufacturers are currently handling (*e.g.*, what type of warning if any is provided) rear seat change-of-status events that occur when the vehicle is stopped, but not in the park gear, or at low speeds (*e.g.*, what type of warning, if any, is provided when passengers exit the vehicle without the vehicle being in the park gear)? As will be discussed later, we are proposing that the change-of-status warning for the front outboard seats be active until the seat belt that triggered the warning is refastened, so we seek comment on whether the proposed limited duration change-of-status warning for the rear seats should

<sup>153</sup> Paul Schroeder & Melanie Wilbur. 2015. Survey of Principal Drivers of Vehicles with a Rear Seat Belt Reminder System. Washington, DC: National Highway Traffic Safety Administration, [Found in the docket for this ANPRM.]

<sup>154</sup> *Id.* at 10. This percentage is based on a fairly small number (15) of drivers who reported that their children do not always use seat belts.

<sup>155</sup> Features of the change-of-status warning that are common with the start of trip warning—for example, the telltale characteristics—are discussed later in the preamble.

<sup>156</sup> Section 8.4.2.4.1.

<sup>157</sup> Section 3.4.3.2.3.



also be required to last indefinitely until the rear seat belt is refastened.

### 3. Telltale Location

A seat belt warning can function by alerting the driver that a rear seat belt is unbuckled, leaving it to the driver to request the rear passenger to buckle up. However, many other strategies are possible. For example, in addition to warning the driver, the front seat passenger could also be warned on the premise that, if the driver was occupied by other matters, the front seat passenger could direct the rear seat passengers to buckle up. Another strategy could be to warn the rear passenger(s) directly that their belt is unbuckled. Finally, in addition to warning the rear passenger(s), the driver and/or the front passenger could be warned. Some research suggests that having the warning visible to the unbelted occupant may increase effectiveness.<sup>158</sup>

ECE R16 requires that the visual warning be visible to the driver when they are facing forward,<sup>159</sup> and Euro NCAP similarly requires that the visual signal be clearly visible to the driver without the need for the head to be moved from the normal driving position.<sup>160</sup>

### Comments

Most commenters recommended that the signal be visible to the driver, while one suggested the signal be visible to the rear seat passengers to avoid relying on the driver to enforce belt use, especially as rear-seat occupancy increases due to the increased use of for-hire vehicles (and, possibly at some time in the future, autonomous vehicles).

Another commenter stated that it is impractical to provide a warning to rear passengers on buses due to wiring costs, customization, and FMVSS No. 222 requirements for head impact performance (for school buses).

### Agency Response

We agree with the majority of commenters and propose that the warning signal be visible to the driver. Although some research may suggest that having the warning visible to the unbelted occupant may increase effectiveness, we tentatively believe that the increased cost, complexity, and re-design such a requirement would entail would not be justified. However, manufacturers would have the flexibility to place the visual warning where it would be seen by some or all rear seat occupants. In Section XII.C we discuss the implications of the telltale location as it relates to automated vehicles.

### 4. Telltale Characteristics

The ANPRM sought comment on whether we should propose requirements for telltale characteristics such as color and required text.

For the current driver's seat belt warning, FMVSS No. 208 requires a continuous or flashing warning light displaying (at the choice of the manufacturer) either the telltale specified in FMVSS No. 101 (see Figure 2) or the words "Fasten Seat Belts" or "Fasten Belts."<sup>161</sup> The telltale must be visible to the driver<sup>162</sup> in both daytime and nighttime.<sup>163</sup> There are no color or illumination requirements for the telltale.<sup>164</sup> The seat belt telltale may share a common space with other telltales except several specific telltales identified in FMVSS No. 101.<sup>165</sup> Telltales in the same common space, however, may not be displayed simultaneously.<sup>166</sup> The seat belt telltale must displace any other symbol or message in that common space while the underlying condition for the telltale's activation exists.<sup>167</sup> Supplementary symbols or words may be used in conjunction with the required telltale or words.<sup>168</sup>

**Figure 2—Seat Belt Telltale From FMVSS No. 101**

**Figure 2 – Seat Belt Telltale from FMVSS No. 101**



The rear reminder requirements in ECE R16 mirror the FMVSS driver's warning requirements in several respects: the telltale may be flashing or steady;<sup>169</sup> it must be recognizable in the daylight and at nighttime and distinguishable from other alerts;<sup>170</sup> and there are no color requirements.<sup>171</sup> However, R16 differs from the FMVSS requirements in that there is no required

telltale symbol.<sup>172</sup> R16 also appears to require a visual warning that depicts all the rear seating positions.<sup>173</sup>

Euro NCAP specifies that as soon as the audible part of the seat belt reminder signal starts, the visual signal needs to flash and be synchronized with the audible part.<sup>174</sup>

### Comments

Several commenters favored standardized warnings. Two commenters stated that standardized telltales would help drivers recognize the icons when driving different/multiple vehicles (rentals, etc.).

In contrast, other commenters urged NHTSA to provide manufacturers with

<sup>158</sup> DOT 2007 Acceptability Study, *supra* n.78.

<sup>159</sup> Section 8.4.2.1.1.

<sup>160</sup> Section 3.4.1.1.

<sup>161</sup> FMVSS No. 208 S7.3(a) and FMVSS No. 101, table 2.

<sup>162</sup> FMVSS No. 208 S7.3; FMVSS No. 101 S5.1.2.

<sup>163</sup> FMVSS No. 101, S5.3.3(a).

<sup>164</sup> See Table 2.

<sup>165</sup> S5.5.2. These are: air bag malfunction, low tire pressure, electronic stability control malfunction, passenger air bag off, high beam, turn signal, and

any brake system malfunction required by table 1 to be red.

<sup>166</sup> See FMVSS No. 101 S4 ("Common space" is "an area on which more than one telltale, indicator, identifier, or other message may be displayed, but not simultaneously").

<sup>167</sup> FMVSS No. 101, S5.5.5.

<sup>168</sup> FMVSS No. 101, S5.2.3.

<sup>169</sup> Section 8.4.2.1.2.

<sup>170</sup> Section 8.4.2.1.1.

<sup>171</sup> Section 8.4.4.3.

<sup>172</sup> Section 8.4.4.3. A common telltale may be used for both the front and rear seat belt reminders. Section 8.4.4.4. The front reminder is required to utilize the symbol specified in Regulation 121, which is the same symbol specified in FMVSS No. 101 and depicted in Figure 2.

<sup>173</sup> Section 8.4.4.2 ("The visual warning shall indicate at least all rear seating positions to allow the driver to identify, while facing forward as seated on the driver seat, any seating position in which the safety-belt is unfastened.")

<sup>174</sup> Section 3.4.1.1.

flexibility and not require a specific telltale. Two commenters specifically suggested harmonizing with ECE R16, in addition to the many commenters who generally urged harmonization with R16. A commenter requested flexibility to choose the indication method for each seating position, such as a telltale or a graphic or rendering of the vehicle seating positions in a more advanced display screen.<sup>175</sup> Another commenter urged NHTSA to defer regulatory action on the establishment of a specific symbol and simply require that any telltale provided be communicated in the owner's manual because additional research is needed to determine which approaches may be most effective in communicating reminder status for a particular row or specific designated seating position, and emphasized its belief that NHTSA should not mandate specific indicators or display characteristics in order to provide OEMs with flexibility. Two commenters similarly suggested allowing the telltales for the rear seat belt reminder to differ (*e.g.*, different colors, symbols) from those currently used for the front.

On the other hand, some commenters did not oppose requiring use of the current driver's seat belt telltale. A commenter said that a typical approach for rear seat belt warnings is to include a separate area on the instrument panel for separate telltale(s) for the rear seating position. These telltales could be specific to the actual seating position to inform the driver of the actual position that is buckled or unbuckled.

A commenter said that the rear seat warning system should be coordinated with the driver warning, and that an ideal approach would be to provide a pictogram of the vehicle that has icons showing the seat belt status for each seating position. The commenter suggested this dashboard image could be combined with the door-ajar image, and it could even be enhanced to indicate whether a door's child safety lock feature is engaged. Similarly, a commenter stated that the warning should convey the location of each unbuckled occupant (negative-only system for which occupant detection would be necessary).

<sup>175</sup> Honda's comment seems ambiguous. It urges harmonization with R16, which does not require a specific telltale, but also states that the existing seat belt telltale in FMVSS No. 101 is a universally-recognized warning that can be used to provide a consistent link to additional seat belt information, and advocates using the FMVSS No. 101 telltale as a "baseline warning" to ensure that an active safety belt warning continues to be provided if an additional seat belt warning visual display needs to give priority to a more important safety warning.

#### Agency Response

We are proposing that the visual warning be continuous or flashing and consist of icons or text and indicate how many or which rear seat belts are in use or not in use depending on the type of warning system. If icons are used to indicate how many or which rear belts are in use, we propose that icon(s) must be green; if icons are used to indicate to the driver how many or which belts are not in use, we propose that the icon(s) be red. If text is used to indicate to the driver how many or which rear seat belts are in use or not in use, we propose that the text contain the words "rear belt(s) in use" or "rear belt(s) not in use." We also propose to amend table 2 in FMVSS No. 101, Controls and displays, to clarify that the "Seat Belt Unfastened Telltale" depicted there does not apply to the rear seat belt reminder. We also propose to amend table 1 in FMVSS No. 101 by adding in a row for the proposed rear seat belt warning. We agree with the merits of standardized warnings, but also seek to provide manufacturers flexibility to address their vehicle designs.

The requirement that the visual warning be continuous or flashing mirrors the current driver's seat belt visual warning requirement and is also consistent with R16. However, we propose to depart from the current driver's warning and from R16 and standardize the color of the icons and text for the warnings to increase the likelihood that consumers would notice, recognize, and respond to the warnings. We believe that standardized colors and text will facilitate the interpretation of the signal. We are departing from the current driver's warning requirements and following R16 by not requiring specific icons because we believe the choice of icons would largely depend on whether the system displayed the number of seat belts in use or which seat belts are in use; this NPRM provides manufacturers flexibility in choosing which icons to use.

Another difference between the proposal and R16 is that R16 requires that the visual warning "indicate at least all rear seating positions." We understand this to mean that the visual warning must depict all the rear seating positions. For instance, on some vehicles, Peugeot employs a visual warning that uses a schematic of the whole vehicle to indicate seat belt non-use or change-of-status for each seating position.<sup>176</sup> Another manufacturer, Cupra, uses a visual warning, on some

<sup>176</sup> [https://public.servicebox.peugeot.com/APddb/modeles/3008/eGuide\\_ed02-16/pdfs/9999\\_9999\\_091\\_en-GB.pdf](https://public.servicebox.peugeot.com/APddb/modeles/3008/eGuide_ed02-16/pdfs/9999_9999_091_en-GB.pdf), pg. 144.

of its European vehicles, which depicts the status of all the seat belts in the rear seats without using a schematic of the whole vehicle.<sup>177</sup>

In order to give manufacturers design flexibility, we do not propose to require that the warning depict all rear seating positions. Our proposed requirements would allow the visual warning to consist of text or icons indicating how many or which rear seats are fastened or unfastened. For example, the warning text might consist of "Middle and Right rear seat belts fastened." Another visual warning option would be the seat belt icon with an adjacent numeral indicating the number of rear seat belts fastened. Accordingly, the proposal would allow, but not require, use of a pictogram as recommended by Safe Ride News. We are not requiring this because we believe it would be difficult to implement on vehicles such as passenger vans with many rear seats. (We also note that R16, which requires the visual warning to indicate all rear seats, does not apply to vehicles that transport more than eight passengers.) We acknowledge that vehicles with a larger number of rear seats, such as passenger vans/buses, may encounter visual signal complexities; however, we are not dictating specific types of signals in the proposed requirements in order to ensure manufacturers have adequate flexibility to address these types of issues. We think these vehicles, in particular, would benefit from the option to indicate how many rear seats are fastened.

We seek comment on all of these issues, including the type of visual warnings that rear seat belt reminder systems employ currently or may employ in the future. We also seek comment on whether we should consider further aligning with R16 by requiring the visual warning to indicate all rear seating positions, which features of a visual warning would be appropriate for buses, and whether any further amendments to FMVSS No. 101 are necessary (*e.g.*, the common space requirements in S5.5).

#### 5. Belt Use Criteria

The ANPRM sought comment on whether NHTSA should retain, for a rear seat belt warning, the criteria used for the current driver's seat belt warning to determine if the occupant is belted. The current driver's belt warning requirements specify that a belt is "not in use" when, at the option of the

<sup>177</sup> [https://www.cupraofficial.com/content/dam/public/cupra-website/owners/cupra-car-model-manuals/brochures/CUPRA\\_FORMENTOR\\_06\\_21\\_EN.pdf](https://www.cupraofficial.com/content/dam/public/cupra-website/owners/cupra-car-model-manuals/brochures/CUPRA_FORMENTOR_06_21_EN.pdf), pg. 17.

manufacturer, either the seat belt latch mechanism is not fastened or the belt is not extended at least 10.16 centimeters (cm) (4 inches (in)) from its stowed position.<sup>178</sup>

ECE R16 defines an “unfastened” belt to mean “either the safety-belt buckle of any occupant is not engaged or the length of the pulled out webbing is less than the length of the webbing which is needed to buckle an un-occupied seat in the rear most seating position.”<sup>179</sup> Euro NCAP does not specify a webbing spool-out criteria, and only refers to the status of the belt buckle.

#### Comments

Three commenters supported using the existing FMVSS No. 208 criteria.

A commenter suggested harmonizing with ECE R16, regardless of the type of system, in order to provide flexibility for vehicles that may have different characteristics with respect to rear row seating positions; for example, for rear seats that can be removed from a vehicle, providing an option whereby belt spooling can be used as an alternative to buckle latching may reduce challenges associated with any electrical connections that might be otherwise needed to provide functionality.

Other commenters suggested using different belt use criteria considering the wide range of possible occupants, devices (e.g., car seats), and objects in rear seats, but did not offer possible solutions. One commenter stated that any seat belt use criteria should take into account whether a bypass system for CRS installation would be employed to prevent false warnings caused by using the lower anchors. Another commenter stated that the prolific use of LATCH seats and integrated child seats on buses will necessitate an alternate means of seat belt use detection.

#### Agency Response

The current FMVSS No. 208 belt use criteria for the driver’s seat belt warning requirements have been in place since 1974 and allow for the use of a belt latch or spool-out sensor. While these criteria would be effective for determining belt use for the initial seat belt warning, we believe the use of a spool-out sensor would not allow for an objective or reliable criterion for the proposed change-of-status warning. There may be instances where the webbing may not readily spool back in when the seat belt is unbuckled (e.g., due to the use of shoulder belt routing features or the use

of a belt positioning booster seat), and thus would not reliably trigger the change-of-status warning. Therefore, we are proposing amending the belt use criteria in FMVSS No. 208, for the seat belt warning requirements, to rely on the use of a belt latch sensor, and not provide requirements that would accommodate the use of a spool-out sensor. We believe this is consistent with Euro NCAP. We invite comment on this tentative decision to not accommodate the use of spool-out sensors for the belt use criterion and request any data on the prevalence of the use of spool-out sensors in the fleet.

Concerns about false alarms triggered by LATCH use for the installation of child restraints are already addressed by the simple approach, in line with NHTSA’s recommendations, that parents and caregivers fasten and lock the unused seat belts for the seat where the child restraint is being installed. This is an already existing agency recommendation to prevent seat belt entanglement and would prevent false warnings related to LATCH use.

#### 6. Electrical Connections

In the ANPRM, we explained that a rear seat belt warning system might require an electrical connection between the seat and the vehicle to relay the information gathered by a belt latch or webbing spool-out sensor to the rest of the warning system. A rear-belt warning system may therefore, as several commenters to the RFC noted,<sup>180</sup> present potential wiring complexities, particularly in vehicles with removable, folding, rotating, or stowable seats. These types of seats might present an issue for a rear seat belt warning system because the electrical connection might not be automatically reestablished for these seats when the seat is reinstalled. There could be instances with manual connection seats where the driver either forgets to make the connection or makes an improper connection. Even for seats where the connections are automatically established when the seat is reinstalled, the automatic connectors might malfunction. If the electrical connection is not reestablished, the warning system could malfunction or provide inaccurate information. Removable seats are mainly found in the second row of minivans.<sup>181</sup> Foldable, rotating or

otherwise stowable seats (e.g., Stow-n-Go, Flip and Fold) are prominent in the third row of minivans or large SUVs. Foldable or stowable seats in the second row are not as prominent in minivans.

Neither Euro NCAP nor ECE R16 have any requirements that address the potential for improper electrical connections for such seats. The ECE regulations provide that the rear seat belt warning requirements would not apply to folding rear seats or to seats fitted with an s-type belt (including a harness belt) until September 2022.<sup>182</sup> Euro NCAP does not exclude folding seats and includes all seating positions including optional and removable seats, but does not require the monitoring of the buckle status for rear seat belt secondary buckles that require a tool to unlock.

#### Comments

Three commenters stated that removable, suspension and folding seats are complex and raise reliability and technological readiness concerns and should be exempted from the warning requirements until it would be practicable. Two of these commenters said that if a seat belt warning were required for such seats, significant lead time or a phase-in (e.g., until the vehicle platform was updated) would be necessary.

Commenters stated that a rule should include some or all of these seat types. A commenter stated that, although these seats may present challenges for rear seat belt warning systems, NHTSA has provided no evidence that, in cases other than removable seats, the challenges would be insurmountable, or quantified the portion of the target population represented by occupants of these types of seats, which likely includes many children. Another commenter stated that removable seats would not need to be exempted from the requirements (as they currently are from ECE R16) if specific types of electrical connections or technology (e.g., wired buckle switch, wireless buckle switch, belt extension) were not required.

Commenters said that electrical connections for removable, rotating, flipping and folding seats should not require any action on the part of the consumer because vehicles with these seats frequently transport children, and believed that NHTSA should also consider requiring wireless connections and a warning for an improper connection.

Commenters were against any prescriptive design requirements related to the connection between the vehicle

<sup>178</sup> S7.3(c). These are the definitions for manual belts. For automatic belts, see *infra* Section XII.A.

<sup>179</sup> Section 2.46.

<sup>180</sup> See Docket No. NHTSA–2010–0061 (comments of IEE S.A., Alliance of Automobile Manufacturers, Association of Global Automakers, and Automotive Safety Council).

<sup>181</sup> We consider readily removable seats to be seats designed to be easily removed and replaced by means installed by the manufacturer for that purpose (see FMVSS No. 208 S4.1.4.2.2.), and do not require any special tools for their removal.

<sup>182</sup> See Sections 8.4.1.3 and 15.4.2.

and any removeable, folding, rotating, or stowable seats, and in favor of a robust set of compliance options to facilitate new technology (although one commenter also said that any additional time it would take NHTSA to develop such options would not be justified by the limited benefits and relatively small number of affected vehicles). A commenter said that NHTSA should instead include a reliability requirement (*e.g.*, lifetime warranty).

Two commenters expressed concerns with wiring complexities associated with buses. One of these commenters specifically noted track-mounted seats, which can be repositioned by the end user, which are also subject to improper connections and for which wireless communication technology is not currently available.

#### Agency Response

We have tentatively decided not to exempt any of these seat types from the proposed requirements. We are not exempting suspension and/or folding seats; the electrical connections should not be disturbed because these seats are not readily removable, and they would potentially just require additional wiring to accommodate the folding or stowing process. We are also not exempting removable seats because we tentatively believe that concerns with improper electrical connections will be addressed by the proposed warning requirement discussed below. Applying the requirements to these seats also harmonizes with ECE R16 (which will soon fully phase in the rear belt requirements for these seats) and Euro NCAP. We do not consider a phase-in necessary for suspension and/or folding seats because we believe the solution for these seats is simple. For removable seats a phase-in is unnecessary because readily attachable electrical connections appear feasible. We do not believe buses would be subject to these requirements, given our definition of readily removable seats.

We have tentatively decided not to propose any requirements with respect to the electrical connections for folding, rotating, or stowable seats. Because these seats are not readily removable, the electrical connections should not be disturbed and could be accommodated with additional wiring. We are, however, proposing two requirements related to the electrical connections for readily removable seats.

First, we are proposing that readily removable seats must either automatically connect the electrical connections when the seat is put in place (*i.e.*, not require the vehicle user to take any additional action to

reconnect the electrical connections other than re-installing the seat) or, if a manual connection is required (*i.e.*, the user must reconnect the electrical system), the connectors must be readily-accessible.<sup>183</sup> By readily-accessible connectors we mean connectors that are easy for an ordinary consumer to see and access. A system utilizing a wireless connection could be classified as either automatic or manual, depending on whether the user needs to take any additional actions to establish the wireless connection. We agree with the commenters who recommended no prescriptive requirements in order to ensure OEMs have flexibility in system design. We think the proposal balances flexibility and the need to ensure that a proper connection is made.

Second, we are proposing that vehicles utilizing the negative-only compliance option provide a visual warning to the driver if a proper electrical connection has not been established for a readily removable seat. We are concerned that consumers could reinstall removable seats (with either automatic or manual connections) without making a proper electrical connection. There could be instances for manual connection seats where the driver either forgets to make the connection or makes an improper connection. Even for seats where the connections are automatically established when the seat is reinstalled, the automatic connectors might malfunction (*e.g.*, debris, broken connector) and a proper connection may not be made. If the electrical connection is not reestablished, the warning system could malfunction or provide inaccurate information. We are only proposing to require the warning for negative-only systems because a faulty connection would result in the system not triggering any warning of an unbelted rear seat occupant. Moreover, the driver would otherwise have no reason to suspect that the system was malfunctioning, and so might mistake the lack of a warning as an indication that the rear seat occupant was belted.

These potentially serious problems are not present in full-status or positive-only warning systems. First, it is our expectation that a faulty connection for a full-status system would affect both the occupant detection and belt status. However, if for some reason this is not the case and the occupant detection of a full-status system is working properly,

but the seat belt buckle sensor is not connected properly, then no visual warning should activate without input from the buckle sensor and the driver should easily recognize the system is not working properly. If for this same scenario, the system interprets a lack of input from the seat belt sensor as an unbuckled seat belt when the driver verifies or requests the rear seat occupant to buckle their seat belt and the occupant is already buckled, then the driver would again be aware the system is not working properly. If the occupant detection sensors are not connected properly, the driver would be aware of the number of rear seat occupants being transported, and would thus be aware that the system is not operating correctly when there is not a warning for each occupant. Similarly, if there were not a good connection in a vehicle with a positive-only system, an unbelted rear seat occupant would not register as belted, which would be accurate; a belted passenger would also not register as belted, but since the passenger would be belted, there would be no adverse consequences from the system error if a crash were to occur.

We believe that both of these requirements would mainly affect minivans, which make up a small percentage of the fleet.<sup>184</sup> We believe it might be possible to utilize the rear seat belt visual warning signal, with slight modifications (*e.g.*, a different color). The agency seeks comments on this proposal, particularly on the safety need for such warnings, costs, and feasibility of the proposed warning. We also seek comment on whether this telltale should be added to table 2 of FMVSS No. 101, Controls and displays.

None of the regulations or statutes administered by NHTSA require manufacturers to provide a lifetime warranty. However, if a vehicle or item of equipment is determined (by the manufacturer or NHTSA) to have a safety-related defect or fails to meet an applicable FMVSS, the Safety Act requires the manufacturer to notify the owner of the defect or noncompliance and (if the vehicle or item is not more than 15 years old) remedy the vehicle or item without charge to the vehicle owner.

#### 7. Owner's Manual Instructions

The ANPRM sought comment on requiring the owner's manual to provide

<sup>183</sup> As we note in Section X.C.7 below, we also propose that the owner's manual (which includes information provided by the vehicle manufacturer to the consumer, whether in digital or printed form) include instructions on how to make any manual electric connections for readily removable seats.

<sup>184</sup> We estimate that minivans make up 3.6% of vehicles produced based on MY 2015 WardsAuto production data. The number of minivans that would potentially be affected by this proposed requirement is less than 3.6%, because some minivans only have foldable/stowable rear seats, not removable seats.

information on the warning system's features, including the location, format, and meaning of the visual warnings. Because the owner's manual readership may be relatively low,<sup>185</sup> we also sought comment on whether this information should be displayed in the vehicle instead of (or in addition to) the owner's manual.

#### Comments

None of the commenters opposed such a requirement. Several commenters supported including such information in the owner's manual. Some commenters requested flexibility in describing the functionality of the system. One commenter suggested that the owner's manual could include information on the seating positions where a rear-seat reminder is provided, a description of the visual and audible warning(s), an indication of whether the system incorporates driver monitoring (including any limitations), instructions for deactivating or cancelling any warning(s), any limitations related to CRS, and information related to the connection of removable, folding, rotating, or stowable seats.

A commenter believed that information should also be displayed in-vehicle, especially for one-time vehicle users (renters, friends, family), and especially with respect to electrical connections for removable/stowable seats. Another commenter believed that more research on the best way to communicate this to owners is needed.

A commenter stated that information on how a rear seat belt reminder affects CRS installation should be provided, including whether the system is able to detect a CRS (and avoid false warnings).

#### Agency Response

We propose that the owner's manual (which includes information provided by the vehicle manufacturer to the consumer, whether in digital or printed form) describe the warning system's features, including the location, format, and meaning of the visual warnings. We also propose that the owner's manual include instructions on how to make any manual electrical connections for readily removable seats. This will provide manufacturers flexibility for how they describe the functionality of the system. These proposed additions to the owner's manual requirements in FMVSS No. 208 would require a

<sup>185</sup> The National Child Restraint Use Special Study found that only 13 percent of drivers reported reading the vehicle owner's manual. Nathan K. Greenwell. 2015. DOT HS 812 142. Washington, DC: U.S. Department of Transportation, National Highway Traffic Safety Administration, p. 10.

revision to the approved collection of information OMB No. 2127-0541. Later in this proposed rule, we seek comment on this revision.

With regard to including system functionality information in the vehicle itself, these types of vehicle features are not normally explained visually in the vehicle, other than information on air bags which pose safety risks. This level of detail is best described in the owner's manual.

We are aware of at least one manufacturer that provides information in the owner's manual on how their rear belt warning system with occupant detection functions when a CRS is installed with LATCH and guidance on how to avoid activating the warning (for example, it informs the consumer that fastening the seat belt prior to installing a CRS with LATCH will avoid activating the warning system for that seat).<sup>186</sup> We seek comment on whether we should require including such information in the owner's manual (which includes information provided by the vehicle manufacturer to the consumer, whether in digital or printed form).

#### 8. Interaction With Other Vehicle Warnings

The ANPRM also solicited comment on whether a rear seat belt warning could conflict with other in-vehicle warnings, and how this might be addressed.

#### Comments

A few commenters believed that the rear belt reminder could conflict with other warnings. One commenter believed that there are conflicts and that the rear seat belt warnings should be given priority over other warnings. Two commenters recommended that NHTSA provide flexibility for rear-seat reminder system alerts (or aspects of the alert) to be temporarily suppressed or paused where it is necessary to alert or redirect the driver's attention to higher-priority warnings—for example, related to the operation of the vehicle or a potential safety risk within the external roadway environment, such as an alert provided by an advanced driver assistance system (ADAS), crash avoidance system or automated driving system (ADS) request to intervene. Another commenter recommended that the existing FMVSS No. 101 Seat Belt Unfastened Telltale be utilized as a persistent "baseline" warning when there is an active seat belt warning for any occupant, even in the event that the display of detailed

<sup>186</sup> As noted earlier, NHTSA recommends buckling unused seat belts that are within reach of children to prevent seat belt entanglement and/or strangulation.

seat belt information is prevented by a higher priority warning.

Other commenters did not believe there would be conflicts with other warnings, and one manufacturer did not believe there would be a conflict if the audible warning is accompanied by a visual warning.

#### Agency Response

NHTSA is proposing that the rear seat belt reminder telltale must not be overridden by other visual warnings for the required duration. This is consistent with the current requirements in FMVSS No. 101 for the driver's seat belt warning which specify, among other things, that the seat belt telltale must displace any other symbol or message in that common space while the underlying condition for the telltale's activation exists.<sup>187</sup> We do not believe that the seat belt warning requirements will interfere with other warnings for safety systems since they have dedicated warning signals. This should give manufacturers the flexibility to determine the best way to implement their warnings. For instance, warnings for a potential safety risk can be more aggressive than those for the seat belts. With regard to available space, the visual signal might be displayed as a telltale light on the instrument panel or on the vehicle's information display screen. Manufacturers will also have to determine whether the driver and rear passenger seat belt visual warning will be treated the same.

#### D. Alternative Warning Signals

The ANPRM sought comment on requiring or specifying as a compliance option a rear seat belt warning that differs from the type of audio-visual warning that is currently required for the driver's seat belt. Alternatives to a visual warning on vehicle start-up could include an audible signal, either electronic or mechanical, or a haptic warning (e.g., steering wheel or seat vibration). Similarly, an audible or visual warning of a change in the status of rear seat belts could be either electronic or mechanical and could include a haptic signal. We also sought comment on alternative solutions that would alert the driver when a rear seat passenger buckles and/or unbuckles (e.g., mirrors to see whether belts are buckled, or the sound of the latch plate clicking into the buckle).

#### Comments

Many commenters recommended requiring the traditional audio-visual

<sup>187</sup> FMVSS No. 101, S5.5.5. See discussion *supra*, Section X.C.4, Telltale characteristics.

warnings currently used for the front seats. One commenter stated that warning specifications should be based on effectiveness and that audio-visual warnings would likely be highly effective given occupants' familiarity with them; it did not believe that a less-sophisticated warning, such as a specialized system of mirrors, would be sufficient to inform the driver about the status of the rear seat belts. Two commenters noted the potential for confusion/distraction if an alternative warning were used. A commenter stated that the "click" of the belt buckle, while certainly evidence of a buckled seat belt, can easily be missed by the driver and other occupants, as it could be masked not only by the drivers' own belt clicking, but also by ambient noise in the vehicle, and that, given the research supporting the effectiveness of an audio-visual signal, an alternative warning system would not be acceptable. Two commenters said that an alternate warning is not necessary because ECE R16's requirements are adequate.

A commenter said that, in addition to requiring an audio-visual warning, the proposed rule should require a notification on the instrument cluster if a seat belt is unbuckled that must be acknowledged by the driver before any other use of the instrument panel is permitted.

A commenter stated that rear seat belt warnings are not practicable for buses, but if they were used, an audible alarm similar to that required for emergency exits would be necessary to provide an effective notice to the driver. The commenter believed that the interior mirror on buses designed to permit the driver to view the passengers, while not as effective in determining proper seat belt use as an electronic monitoring system, has been effective in aiding the driver to observe passengers that were obviously not properly belted. The commenter did not support the use of haptic signals on buses. A public commenter suggested use of cameras.

#### Agency Response

We agree with the commenters who believe that an alternative warning is not necessary and that an audio-visual warning would be appropriate.<sup>188</sup> Cameras would be unnecessary and would add cost. The agency believes that mirrors alone would not be as effective as an audio-visual warning and may pose risks, as drivers would have to study the view to determine belt status, assuming they could clearly see

the belts. In addition, as explained above, the proposed rule would not apply to school buses.

We are specifying minimum performance requirements in order to balance the effectiveness and acceptability of these systems. Manufacturers can go beyond our requirements, such as by providing a warning on the instrument panel that must be acknowledged by the driver before any other use of the instrument panel is permitted.

#### *E. Resistance to Intentional and Inadvertent Defeat and Deactivation*

The ANPRM sought comment on whether NHTSA should propose requirements to address circumvention. We pointed to agency research on the development of a seat belt misuse detection system that identified a number of ways in which a rear seat belt warning system might be intentionally defeated, as well as potential countermeasures.<sup>189</sup> For example, a warning system could be defeated if:

- The belt is buckled before the occupant sits in the seat. This could be addressed by requiring a sequential logic system. A sequential logic system would require that the belt be buckled after the seat has been occupied in order for the system to recognize the seat belt as being buckled.
- An occupant buckles the seat belt behind themselves. This could be addressed by utilizing both seat belt latch and spool-out sensors and deactivating the warning only if the webbing were spooled out more than a predetermined length. However, even these sensors could be defeated by pulling out additional webbing and clipping it off to prevent retraction.
- The seat belt and/or occupant detection sensors utilized by the rear warning system in vehicles with removable rear seats are intentionally disconnected.

We also noted some ways in which the warning could be inadvertently circumvented (for example, when the driver uses a remote engine starter so that the initial warning activates before the driver is in the vehicle).

We also sought comment on whether a feature allowing single-trip manual deactivation would diminish the likelihood of circumvention. The ECE regulations allow the rear seat belt warning system to incorporate a short-term and/or a long-term deactivation feature for the audible change-of-status

warning.<sup>190</sup> Under those regulations, a short-term deactivation may only be effectuated by specific controls that are not integrated in the safety-belt buckle, and only when the vehicle is stationary.<sup>191</sup> When the ignition or master control switch is deactivated for more than 30 minutes and activated again, a short-term deactivated safety-belt reminder must reactivate. A long-term deactivation may only be effectuated by a sequence of operations that are detailed only in the manufacturer's technical manual or which require tools that are not provided with the vehicle. It must not be possible to provide either short- or long-term deactivation of the visual warning. Under Euro NCAP, the system may allow the driver to acknowledge the signal and switch it off for that unique event, except for change-of-status events; a new trigger of the warning should not be prevented.<sup>192</sup> We therefore understand there to be two distinct but related concepts in the ECE regulations and Euro NCAP: acknowledgement and deactivation. The former allows the driver to turn off the signal once it is activated, while the latter prevents the signal from activating altogether. In addition, FMVSS No. 101 provides that telltales for several functions (such as high beams), but not including the driver's seat belt warning, must not be cancelable while the underlying condition for their activation exists.<sup>193</sup>

#### Comments

Several commenters supported addressing intentional and/or inadvertent defeat. A commenter stated that, given the relatively small proportion of hard-core nonusers, the proportion of the potential target population seeking to intentionally defeat the systems is relatively small. Nonetheless, the commenter stated that, if mitigation strategies can be built into the systems, such an advance would likely help address at least some portion of "hard-core nonusers" as well as those exhibiting inadvertent misuse. Commenters believed that the cost of the potential countermeasures would be minimal, and they should be required to the extent feasible. A commenter stated that the rear warning system should include appropriate requirements for inadvertent defeat, but not intentional defeat. Another commenter supported investigating the possibility of eliminating the "false comply"

<sup>188</sup> With respect to Blue Bird's argument regarding the practicability of a rear warning for buses, see Section X.B, Applicability.

<sup>189</sup> Mazzae, E.N., Baldwin, G.H.S., & Andrella, A.T. (2018, October), Performance assessment of prototype seat belt misuse detection system (Report No. DOT HS 812 593). Washington, DC: National Highway Traffic Safety Administration.

<sup>190</sup> Section 8.4.5.

<sup>191</sup> Section 8.4.5.1.

<sup>192</sup> Section 3.4.3.1.2.

<sup>193</sup> S5.5.6(b).

condition of buckling behind the back or extracting and “pinning” the belt without buckling. One potential option is to replicate current systems used to identify seat belt use for front seated occupants, as occupant detection systems can also assist with identifying misuse. They also commented that sensor technology that identifies belt pullout, occupant location, and buckle switches can add redundancy and reduce the risk of intentional and inadvertent defeat.

Other commenters disagreed with hardening the system against circumvention because it would be burdensome and unnecessary (minimal benefits). One commenter noted the relatively small proportion of drivers who circumvent the seat belt warning.

With respect to deactivation, three commenters supported following R16, and IEE supported following R16 and/or Euro NCAP. Three other commenters opposed allowing deactivation because it would drastically weaken system effectiveness.

We also received comments on the interaction with a remote engine starter and the warning. A commenter believed that adopting the requirements of R16 should help address this issue, as warnings must be provided when the ignition switch (or master control switch) is activated (*i.e.*, capable of being driven). The commenter also believed that the current driver’s warning requirements (where the warning is provided beginning when the vehicle ignition switch is moved to the “on” or the “start” position) address this issue. Another commenter recommended that NHTSA specify the start of the drive as the moment when the ignition is activated in the mode where the vehicle is capable of being driven. A commenter stated that this potential issue can easily be avoided with occupant detection, because the warning cycle would only be triggered based on the actual presence of occupants.

#### Agency Response

We have tentatively decided not to propose any system-hardening features. In drafting this proposal, the agency focused on extending the rear seat belt warning technologies currently in a relatively small proportion of vehicles to the rest of the fleet. These existing systems generally do not provide mechanisms to limit circumvention. We decided not to include requirements to address circumvention for a variety of reasons. Most importantly, doing so would increase cost and complexity. For example, since we are not proposing to require occupant detection technology,

we are not proposing a sequential logic system. We also believe that because the proposed warnings are minimally intrusive—a relatively short-duration visual warning on start-up, and an additional short audio-visual warning for a seat belt that is subsequently unbuckled—attempts to defeat the system will be rare.

We have also tentatively decided not to allow acknowledgement or deactivation of the required warning signals. While some commenters suggested adopting the R16 requirements, they did not offer further information on the need or use of these options, except for one commenter that noted it would diminish the safety value of the system. Therefore, we believe that proposing to allow an acknowledgment, short-term deactivation, and/or long-term deactivation option would have a net negative impact on the effectiveness of the proposed warning system (the driver would not get the full benefit of the warning). As discussed earlier in this proposed rule, we believe that the proposed warnings are minimally intrusive and have relatively short durations (visual-only at start-up and audio-visual for a change-of-status), and the positive-only compliance option would mitigate warnings for unoccupied seats. In addition, we believe that allowing the driver to turn off the change-of-status warning would not meet the need for safety. Since we cannot justify allowing such options from a safety perspective (allowing it would negatively impact the effectiveness of the systems) or consumer acceptance perspective (warning signals are unobtrusive and vehicle manufacturers could opt for the positive-only option), we have tentatively decided not to allow either a deactivation or acknowledgment option. For this reason, we also propose amending FMVSS No. 101 S5.5.6(b) by adding the seat belt telltale to the list of telltales that may not be cancellable while the underlying condition for the telltale exists. This would apply to both the front and rear seat belt warnings. This would mean that the seat belt warning telltale would not be allowed to be acknowledged (*i.e.*, cancelled) until the minimum warning duration had been reached.

We seek comment on vehicle manufacturers’ desire to provide such options, and, if they currently offer such options, how they have implemented them. We also seek comment on whether allowing such options would affect manufacturers’ choice of compliance option (*e.g.*, if we allowed acknowledging or deactivating the warning signals, would they be more

inclined to choose the negative-only or full-status compliance options?). We also seek comment on our proposed revision of FMVSS No. 101.

In vehicles with a remote engine starter, the driver would potentially not be present to witness the initial warning signals if they are designed to meet our minimum requirements. This could potentially be addressed by programming the system to require input from the door sensors or occupant sensors to verify that the driver is in the vehicle, or by requiring the signals to initiate when the transmission is moved out of the park mode. We have chosen not to propose a strategy for this scenario, but request comments on practicable solutions to this problem that could be implemented in the final rule and the potential cost impacts. New technologies or solutions may be available that may address these scenarios without limiting the design flexibility of manufacturers or significantly increasing the cost.

#### F. Consumer Acceptance

In the ANPRM we explained that in order for the proposed rear seat belt warning to have a lasting impact on seat belt use, it must balance effectiveness and acceptability. For a seat belt warning system to induce an unbelted occupant to buckle up, the warning must be noticeable enough to attract the occupant’s attention, or, for a warning directed at the driver, the driver’s attention. However, if the warning is overly intrusive, consumers may not accept the technology.<sup>194</sup> Therefore, the warning must be noticeable enough to prompt occupants to buckle their seat belts, but not so intrusive that the public does not accept the warning system, or that an occupant will circumvent or disable it. Consumer acceptance of any eventual seat belt warning requirements is an important consideration, given the potential safety benefits of rear seat belt warnings, the history of seat belt warning technologies, and the fact that consumers have not yet had widespread exposure to rear seat belt warnings. NHTSA is especially aware of this concern, given the agency’s experience with public and Congressional backlash in the 1970s over the ignition interlock and continuous warning buzzer regulations.

We also noted research by NHTSA and others suggesting that consumers would accept the new technology. The 2004 Transportation Research Board Report observed that “the data available to date provide strongly converging

<sup>194</sup> DOT 2009 Seat Belt Study at 2; Transportation Research Board Study at 8.

evidence in support of both the potential effectiveness and consumer acceptance of many new seat belt use technologies[.]”<sup>195</sup> As part of the research for the report, NHTSA conducted focus-group interviews with part-time and hard-core nonusers. The report noted that “many part-time users interviewed by NHTSA—the primary target group for the technology—were receptive to the new systems. Nearly two-thirds rated the reminders “acceptable,” and approximately 80 percent thought that they would be “effective.”<sup>196</sup> The ANPRM also pointed to a telephone survey of drivers of vehicles with and without a rear seat belt warning system that NHTSA conducted in 2015.<sup>197</sup> The rear warning systems in those vehicles had characteristics that were similar to the proposed requirements: a visual warning on start-up and an audio-visual change-of-status warning. The survey found, among other things, that 81% of drivers of vehicles with a rear seat belt warning were “very satisfied” with the system; less than 2% were dissatisfied. Among drivers of vehicles without a rear seat belt warning, attitudes towards rear seat belt warnings were generally positive as well: a majority (55%) indicated that it was important to them that their next vehicle be equipped with a rear seat belt warning system.

#### Comments

Several commenters believed that consumers would accept rear seat belt warnings. Commenters said that NHTSA’s research shows that a large proportion of the consumer population will accept rear seat belt warnings and it noted that at the time of the interlock issue in the 1970s, seat belt use rates were much lower than today, and a larger proportion of the population were hard-core nonusers. A commenter stated that its survey of 2,000 drivers showed that 70 percent favored a law requiring seat belt reminders that continuously chime until the seat belt is buckled, including rear seat passengers.<sup>198</sup> Another commenter noted a 2012 IIHS survey showing that most motorists supported enhanced belt reminders that were “more persistent and intense” than

<sup>195</sup> Transportation Research Board Study at 75–76.

<sup>196</sup> *Id.* at pg. 10.

<sup>197</sup> Paul Schroeder & Melanie Wilbur, *Survey of Principal Drivers of Vehicles with a Rear Seat Belt Reminder System*. Washington, DC: National Highway Traffic Safety Administration (2015). The vehicles with seat belt warning systems were Volvos and certain Cadillac and Chevrolet models.

<sup>198</sup> Citing [www.norc.org/Research/Projects/Pages/underutilized-strategies-in-traffic-safety-results-of-a-nationally-representative-survey.aspx](http://www.norc.org/Research/Projects/Pages/underutilized-strategies-in-traffic-safety-results-of-a-nationally-representative-survey.aspx) (last accessed Oct. 25, 2021).

what most automakers offered at the time.<sup>199</sup> The commenter also noted the results of NHTSA’s 2015 survey. Another commenter said that IIHS has found that the majority of drivers in the U.S. who transport passengers would accept a rear seat belt reminder system.<sup>200</sup> This study found that parents believed an audible alert to be especially useful in alerting the driver to a child unbuckling in the back seat during a trip. A commenter suggested that consumers would accept R16-conforming systems.

One commenter said that further studies are necessary because there is insufficient data on consumer acceptance.

#### Agency Response

NHTSA has tentatively concluded that the proposed warning system would be acceptable to consumers in light of the specific characteristics of the proposed warning signals, real-world experience with seat belt reminder systems, and research and consumer surveys by NHTSA and others.

We believe that the proposed requirements are specified so that the potential for consumer disapproval is minimized. Our intent was to specify minimum warning requirements that would result in an effective yet acceptable warning. With respect to the warning on start-up, we propose requiring only a visual warning, and not a more intrusive audible alert. The 60-second duration is comparable to the visual rear seat belt warnings provided by currently deployed systems. For example, the visual rear seat belt warning in some MY2022 vehicles lasts for at least 60 seconds.<sup>201</sup> The change-of-status warning would involve an audio-visual alert lasting at least 30 seconds. While most vehicle models currently available in the U.S. with rear seat belt warning systems have a change-of-status warning that meets this 30-second minimum duration, we are aware of two available models that exceed this duration for the rear change-of-status warning. False positives would also be minimized

<sup>199</sup> Citing Highway Loss Data Inst., Ins. Inst. for Highway Safety, *Unbelted: Adults Admit They Often Skip Belts in Rear Seat*, 52 Status Rep. 1, 3 (Aug. 3, 2017), available at [www.iihs.org/api/datastore/document/status-report/pdf/52/5](http://www.iihs.org/api/datastore/document/status-report/pdf/52/5) (last accessed Oct. 25, 2021).

<sup>200</sup> Citing David G. Kidd & Anne T. McCartt (2014) *Drivers’ Attitudes Toward Front or Rear Child Passenger Belt Use and Seat Belt Reminders at These Seating Positions*, *Traffic Injury Prevention*, 15:3, 278–286, DOI: 10.1080/15389588.2013.810333.

<sup>201</sup> We identified three manufacturers that produce vehicles with visual warnings that last for at least 60 seconds. One manufacturer provides vehicles where the visual warning stays active until the belt is fastened.

because the positive-only compliance option only necessitates a buckle sensor, not occupant detection, which is more prone to false positives.

Recent field experience also suggests that consumers would accept the proposed requirements. As noted earlier, an increasing number of vehicles sold in the United States have rear seat belt warning systems; based on 2022 Purchasing with Safety in Mind: What to Look For When Buying a Vehicle information, 46.9% of the total vehicle projected sales are equipped with rear SBWS.<sup>202</sup> Moreover, in connection with the 2010 RFC, GM commented that it has not received any complaints about its rear seat belt warning system in either the United States or Europe,<sup>203</sup> and Volvo indicated that it had found a high level of acceptance for its system.<sup>204</sup> In addition to this, many OEMs have implemented enhanced seat belt warnings for the front outboard seats over the past two decades. Consumers’ acceptance of these warnings also suggests that they would accept warnings for the rear seats.

Finally, in addition to the research noted in the ANPRM we note the studies cited by the commenters that support our tentative conclusion that consumers would accept the proposed warnings. In 2012, IIHS conducted a national telephone survey of drivers and passengers about seat belt use. Using this survey data, it proceeded to conduct several studies.

One study, cited by the commenters, was on the attitudes towards seat belt use and in-vehicle technologies for encouraging seat belt use.<sup>205</sup> All respondents were asked questions regarding their belt use habits and perceptions of different types of seat belt interlocks. Part-time belt users and nonusers were additionally questioned about different types of reminders and reminder strategies. The survey found that enhanced reminders are more acceptable than seat belt interlocks and are viewed as having the potential to be as effective as interlocks if sufficiently persistent. A larger proportion of part-time belt users and nonusers said they would be more likely to buckle up in response to auditory and haptic reminders than visual reminders. More

<sup>202</sup> In the ANPRM it was 13% based on MY2019 vehicle data.

<sup>203</sup> See Docket No. NHTSA–2010–0061 (GM comment).

<sup>204</sup> See Docket No. NHTSA–2010–0061 (Volvo comment).

<sup>205</sup> Kidd, McCartt, & Oesch. *Attitudes Towards Seat Belt Use and In-Vehicle Technologies for Encouraging Belt Use*. Insurance Institute for Highway Safety. January 2013. The study oversampled part-time belt users and nonusers.



than two-thirds of part-time belt users and at least one-third of nonusers said they would be more likely to buckle up in response to seat belt reminders that become more intense or continue indefinitely; these reminders would be acceptable to about half of part-time belt users and around one-fifth of nonusers.

Another study cited by the commenters used the same survey that also collected information about drivers' attitudes towards passenger belt use and belt reminders for front passengers and children in back seats.<sup>206</sup> This study used the 477 respondents (of the 1,218 total surveyed) that were drivers who transport a front-seat passenger at least once a week and 254 were drivers who transport an 8- to 15-year-old child in the back seat. The respondents were asked about their attitudes toward seat belt use by their front passengers or rear child passengers and preferences for different passenger belt reminder features. The study found that nearly every driver who transports children in the back seat would encourage their belt use, regardless of the driver's belt use habits. Most drivers who transport front passengers wanted passenger seat belt reminders to encourage passengers to buckle up. As far as signal characteristics, the study found that front and rear passenger reminder signals that last indefinitely would be acceptable to most drivers who transport these passengers, and that an audible alert may be especially useful to alert drivers to children unbuckling in the rear seat during a trip.

We therefore tentatively conclude that consumers would accept the proposed warnings. NHTSA recognizes that there is some proportion of the public that may not desire a rear seat belt warning system.<sup>207</sup> However, based on extensive research by NHTSA and others, we agree with commenters that consumers are more accepting of seat belt warnings now than in the 1970s.<sup>208</sup> We are also mindful of Congress's repeal of the duration limitation on the audible warning for the driver's seat belt, as well as its directive to NHTSA to initiate a rulemaking for rear seat belt use

<sup>206</sup> Kidd, D.G. and McCartt, A.T. 2013. Drivers' attitudes toward front or rear child passenger belt use and seat belt reminders at these seating positions. Insurance Institute for Highway Safety, January 2013.

<sup>207</sup> For example, in NHTSA 2015 phone survey, for drivers of vehicles without a rear seat belt warning, 23% found their vehicle's seat belt warning (*i.e.*, for the front outboard passenger seats) annoying, and 16% would not need or want a seat belt warning system in their vehicle.

<sup>208</sup> See also, *e.g.*, Highway Loss Data Inst., Ins. Inst. for Highway Safety, *Unbelted: Adults Admit They Often Skip Belts in Rear Seat*, 52 Status Rep. 1, 3 (Aug. 3, 2017) (indicating that most rear belt nonusers are not hard-core nonusers).

systems. We believe this likewise suggests that the public would be amenable to appropriately specified warnings. NHTSA welcomes public comment on this issue.

### G. Technological and Economic Feasibility

The ANPRM sought comment on the technological and economic feasibility of rear seat belt warning systems.

#### Comments

Several commenters stated that rear warnings are technically feasible. Four commenters stated that rear warning requirements in foreign markets show that such systems are technically feasible and available. Two commenters also noted that rear reminders are already available in a number of makes and models in the United States, with a commenter noting that Volvo has been offering such a system in the United States since 2009.

A commenter said that because technological complexity and cost will depend on the specifics of the particular system, NHTSA should provide OEMs flexibility by establishing baseline performance requirements with compliance options that would allow for more advanced system characteristics.

Another commenter stated that buses present challenges for a rear seat belt warning system with respect to the number of passengers and harshness of the interior environment. The commenter also said that it would be difficult integrating a passenger seat system with rear seat belt warnings that are the same as the OEM driver and copilot warning system, so that the warnings may not match. The commenter said that there are seat belt warning systems being developed that utilize wireless technology and such a system would be less complex than a wired electrical connection system. The limitation of a wireless system is the battery life, and more system features such as individual passenger alerts would reduce battery life further. However, a battery-operated wireless system would be much simpler for large vehicles with many passengers, as it would reduce the need for complex wiring systems. Another commenter believed that larger vehicles with many rear designated seating positions could present technical challenges, including the ability of a system to differentiate between objects that might be placed on seats and actual passengers of various weights and sizes.

#### Agency Response

NHTSA has tentatively concluded that the proposed requirements are technologically and economically practicable.<sup>209</sup> Based on 2022 Purchasing with Safety in Mind: What to Look For When Buying a Vehicle information, 46.9% of the total U.S. vehicle projected sales are equipped with rear seat belt warning systems. For vehicles that do not already incorporate a rear seat belt warning system, the positive-only compliance option would require seat belt sensors, wiring, and display adjustments. All of this technology is readily available. The seat belt latch sensors that would be needed for all three systems are already used by many manufacturers to comply with the existing driver seat belt requirements. Occupant detection might present technological challenges but would not be necessary for a positive-only warning system. As we explain in more detail in Section XIV, Overview of Costs and Benefits, we estimate that the minimum cost to comply with the rear seat belt warning requirements (the positive-only system) would be \$167.8 million. This is based on a per-vehicle cost of \$19.59 for 53.1% of 16M affected new vehicles. As explained later, our preliminary regulatory impact analysis indicates that the proposed requirements are cost-beneficial across a range of discount rates and reasonable effectiveness estimates.

As we noted in the ANPRM, implementing a visual warning may require physical redesign of the instrument panel. Such redesign would have to take into account visibility, interaction with existing signals and displays, available space on the instrument panel, and effectiveness, as well as other factors. In some instances, a visual signal might be displayed as a telltale on the instrument panel or on the vehicle's information display screen. Manufacturers would also have to determine whether driver and rear passenger seat belt warning visual signals would be treated the same.

We also recognize that vehicles with many rear designated seating positions may present some challenges, but we have tentatively concluded that they should be subject to the proposed requirements (with the exception of school buses) because those vehicles would be at least as likely, if not more likely, to have rear occupants. In addition, multiple rear seats may increase the difficulty of the driver in ascertaining rear seat belt use, so a warning could prove especially useful

<sup>209</sup> See also Section XIV, Overview of Benefits and Costs.

in these vehicles. We also recognize the intent of the MAP-21 requirements in improving protection for rear occupants, and given the proven benefits of seat belts, believe the warning should be broadly applied. Our main motivation for including small buses is to capture large capacity passenger vans; these vehicles might utilize the option of a warning that indicates the number of seat belts fastened. However, we do seek comment on whether it would be appropriate to exclude additional vehicle types.

Overall, we believe that the proposed compliance options would provide manufacturers with the flexibility to innovate and develop new technologies, while also ensuring a minimum level of safety. We seek comments on the practicability of the proposed compliance options.

### **XI. Warning Requirements for Front Outboard Seats**

We propose several changes and enhancements to the seat belt warning requirements for the front outboard seats. There are three main changes we are proposing.

First, we are proposing a requirement for an audio-visual warning on vehicle start-up for the front outboard passenger seat. Currently, the standard requires a short duration (4–60 seconds, depending on the compliance option) audio-visual seat belt warning on vehicle start-up for the driver's seat belt for most vehicles with a GVWR under 10,000 lb (excluding medium-sized buses), but not for any other front seats. The vast majority of the vehicles being sold today (approximately 96.6% of the fleet, according to information submitted by vehicle manufacturers to NHTSA for NCAP in MY 2022) already provide a seat belt warning for the front outboard passenger seat. We propose to require a seat belt warning for this seat to ensure that all vehicles have this important safety feature.

Second, we propose to close the current gap for a driver's seat belt warning in medium-sized buses. We are unaware of any such buses that do not already provide a driver's seat belt warning; requiring this would ensure that they continue to have a driver seat belt warning in the future.

Third, we propose several changes to the current requirements for the audio-visual warning signal that currently apply to the driver's seat that would also apply to the front outboard passenger seat. The most notable of these is that we propose to require that the audio-visual warning on vehicle start-up last until the belts at any occupied front outboard seats are

fastened, and a change-of-status warning for any front outboard seat that would also last until the seat belt is refastened (unless a front door is open).

These proposals are explained in more detail below.

#### *A. Seat Belt Warning for Front Outboard Passenger Seat*

This document proposes to require an audio-visual seat belt warning for any front outboard passenger seat.<sup>210</sup> FMVSS No. 208 currently requires an audio-visual seat belt warning for the driver's seat in passenger cars and trucks, buses, and MPVs with a GVWR of 4,536 kg (10,000 lb) or less, except for buses with a GVWR greater than 3,855 kg (8,500 lb) and less than or equal to 4,536 kg (10,000 lb). NHTSA's regulations currently do not require seat belt warnings for any seating position other than the driver's seat.<sup>211</sup> Although the ANPRM did not discuss extending the seat belt warning requirements to any front passenger seats, two commenters recommended that NHTSA amend FMVSS No. 208 to require a seat belt warning for all front seats, and another commenter recommended adopting the ECE R16 requirements for front outboard seating positions. ECE R16 requires an audio-visual seat belt warning for the front outboard passenger seat.<sup>212</sup>

We believe there is good reason to do so, as the reasons for ensuring the driver is buckled apply equally to front outboard passenger. About 10.4% of right-front passengers do not always fasten the belt<sup>213</sup> and unbelted occupants are overrepresented in fatal crashes. The lack of a seat belt warning requirement for the front outboard passenger seat dates to the 1970s, when seat belt use rates were much lower and seat belt warnings were not as acceptable to consumers as they are today. Further, almost all (96.6%) vehicles offered for sale in the U.S. that participate in the NCAP information request are already equipped with a seat belt warning at this position, so requiring such a warning would ensure that all vehicles be equipped with a seat belt warning at this position.

<sup>210</sup> In Section XIII.C we discuss the potential for more than one front outboard passenger seat in ADS-equipped vehicles.

<sup>211</sup> See, e.g., Interpretation Letter from NHTSA to R. Lucki, July 24, 1985 ("Thus, the intent was to require a warning system for only the driver's position.").

<sup>212</sup> Section 8.4.1.1.

<sup>213</sup> National Center for Statistics and Analysis. (2021, February). *Seat belt use in 2020—Overall results (Traffic Safety Facts Research Note, Report No. DOT HS 813 072)*. National Highway Traffic Safety Administration.

We are proposing an audio-visual warning on vehicle start-up because research by NHTSA and others suggests that seat belt warnings that use an audio-visual signal are more effective than visual warnings alone. In addition, the potential technological, consumer acceptance, and cost issues associated with requiring an audible warning for a rear seat belt warning do not apply to an audible warning for the front outboard passenger seat because, although the audible warning would entail use of occupant detection technology, most vehicles are already equipped with both an audible seat belt warning and occupant detection for the front outboard passenger seat. This proposal would not require that the audible warning be specific to either the driver or front outboard passenger seat; therefore, manufacturers could utilize the same audible warning for both seats as is done with some of the existing front belt warning systems.

The proposed front outboard passenger seat requirements would apply to all the vehicles to which the proposed rear belt warning requirements would apply: all front outboard designated seating positions in passenger cars, and all front outboard designated seating positions certified to a compliance option requiring seat belts in trucks, MPVs, and buses with a GVWR of 4,536 kg (10,000 lb) or less.<sup>214</sup> We have tentatively decided not to extend the seat belt warning requirements to front center seats because our preliminary regulatory impact analysis found that a system for the front center seat without occupant detection would provide limited benefit due to the low occupancy of the front center seat and the limited number of vehicles in the fleet with a front center seat. See Section XIII, Regulatory Alternatives, and the PRIA for a more detailed analysis.

#### **Occupant Detection**

Because we are proposing an audio-visual warning, we are also proposing to require that any front outboard passenger seat be equipped with an occupant detection system; an audio-visual warning is typically only appropriate for occupied seats because having an audible warning activate for an unoccupied seat could be a nuisance

<sup>214</sup> There are some compliance options for certain trucks and MPVs that permit passive protection in lieu of seat belts at the front outboard seating positions. See S4.2.3 (compliance options for trucks and MPVs weighing between 8,500–10,000 lb); S4.2.6 & S4.2.1.1 (compliance options for walk-in van-type trucks and vehicles designed to be sold exclusively to the U.S. Postal Service 8,500 lb and less).

for the occupants and might desensitize them to the warning or lead them to circumvent the system. Requiring occupant detection is consistent with Euro NCAP, which requires occupant detection for the front passenger seat belt warning. In the United States, occupant detection is already widely deployed in the front outboard passenger seat, either as part of an advanced air bag system, or as part of a voluntary seat belt warning system.<sup>215</sup> Based on compliance and consumer information data submitted to NHTSA by vehicle manufacturers, NHTSA is not aware of any vehicles to which the proposed requirements would apply that are not already equipped with occupant detection for this seating position. This demonstrates that the technology is feasible and that an occupant detection requirement would not result in any additional costs.<sup>216</sup> It would also ensure that vehicles produced in the future would be equipped with the technology.

We propose that the warning system consider this seating position “occupied” when an occupant who weighs at least 46.7 kg (103 lb) and is at least 139.7 cm (55 in) tall is seated in the seat. These values are the weight and height criteria currently specified in FMVSS No. 208 (S29.1(f)) for a person who is used as an alternative for the 5th percentile adult female test dummy for compliance testing of advanced air bag systems utilizing static suppression. These criteria are consistent with the agency’s recommendation on not transporting children in the front seat, as well as Euro NCAP and the ECE R16 test procedures. As described below, in connection with the proposed test procedures (Section XII.B, Test Procedures), the agency would use

<sup>215</sup> Occupant detection is utilized by the advanced air bags to properly classify the occupant in the seat (e.g., child, adult, small-statured adult) so that the advanced frontal air bag systems can determine if and with what level of power the front air bag will inflate. We also believe that occupant detection is voluntarily used in the front passenger seat to avoid having an audible seat belt warning activate for an unoccupied seat.

<sup>216</sup> Occupant detection systems are less challenging for the front outboard passenger seat than for the rear seats because the front outboard passenger seat is not typically subject to as many of the potential complications to occupant detection (such as large occupants spanning multiple seating positions). There may be infrequent situations where occupant detection sensors may incorrectly register the presence of an occupant when the seat is unoccupied (e.g., mistaking cargo for an occupant). However, if cargo placed on the seat causes a false occupant detection reading and inadvertent activation of the front passenger seat belt warning signal, the driver can readily discern it is a false reading and can easily either place the cargo on the floor or fasten the seat belt to disable the signal.

either a person or test dummy meeting these criteria.

#### *B. Driver’s Seat Belt Warning for Medium-Sized Buses*

FMVSS No. 208 currently does not require buses with a GVWR greater than 3,855 kg (8,500 lb) and less than or equal to 4,536 kg (10,000 lb), or with a GVWR less than or equal to 3,855 kg (8,500 lb) and an unloaded weight greater than 2,495 kg (5,500 lb), to be equipped with a driver seat belt warning. We are proposing to amend FMVSS No. 208 to close this loophole.

We are unaware of any such buses that do not already have a driver seat belt warning that meets or surpasses the warning specified in FMVSS No. 208. Accordingly, we believe this requirement would have minimal, if any, costs or benefits. Requiring a driver seat belt warning for these buses would ensure that they continue to have a driver seat belt warning in the future. We invite comments on this proposal and these assumptions.

#### *C. Amendments to the Current Warning Signal Requirements*

The current driver’s seat belt warning requirements provide manufacturers with two compliance options.<sup>217</sup> The first option requires that if the key is in the “on” or “start” position and the seat belt is not in use, the vehicle must provide a visual warning for at least 60 seconds, and an audible warning that lasts 4 to 8 seconds. Under the second option, when the key is turned to the “on” or “start” position, the vehicle must provide a visual warning for 4 to 8 seconds (regardless of whether the driver seat belt is fastened) and an audible warning lasting 4 to 8 seconds if the driver seat belt is not in use.

We propose to modify these requirements in three main ways. First, we propose a single compliance option that requires a start-of-trip audio-visual warning that lasts until the seat belt at any occupied front outboard seat is fastened. Second, we propose to require an audio-visual change-of-status warning if a buckled belt at either of these seating positions is unfastened in the middle of a trip. Third, we propose some additional requirements for the audible warning related to increasing the duration (for example, specifying a minimum 0.20 duty cycle for the audible warning); however, we generally do not propose requirements beyond what is currently in the standard related to other aspects of the warning. These proposals are explained in more detail below.

<sup>217</sup> S7.3.

#### 1. Increasing the Duration of the Audio-Visual Warning on Vehicle Start-Up

The current eight-second limitation on the duration of the audible warning was based on a statutory restriction, enacted in 1974, that limited the length of the audible warning. MAP–21 repealed this limitation. In light of MAP–21’s repeal of the 8-second limitation, the ANPRM sought comment on removing the corresponding limitation in FMVSS No. 208.

#### Comments

Several commenters supported removing this restriction. One commenter said that removing it would provide manufacturers with greater regulatory certainty in deploying enhanced seat belt reminders, although, the commenter stated, there needs to be an upper bound on the duration of the required warning to ensure an objective and repeatable test for the purposes of vehicle certification. The commenter recommended maintaining the current 4- to 8-second warning thresholds defined in table 4 of the FMVSS No. 208 laboratory test procedures.<sup>218</sup> Another commenter encouraged NHTSA to allow enhanced seat belt reminder systems as a compliance option, possibly in lieu of the currently required 4 to 8 second alarm. A commenter recommended increasing the minimum duration for the audible warning to at least 90 seconds because the current audible signal duration upper limit is ineffective for increasing seat belt use (and cited studies to support this recommendation). Related to this, a commenter stated that a survey of 2,000 drivers it commissioned showed that 70 percent favored a law requiring seat belt reminders that continuously chime until the seat belt is buckled, including rear seat passengers,<sup>219</sup> and a commenter noted a 2012 IIHS survey showing that most motorists supported enhanced belt reminders that were “more persistent and intense” than what most automakers offered at the time.<sup>220</sup>

On the other hand, a commenter recommended that NHTSA incorporate

<sup>218</sup> The laboratory procedures are not part the regulatory text. Published separately by NHTSA’s Office of Vehicle Safety Compliance, they are intended to provide laboratories contracted by NHTSA with additional guidelines for obtaining compliance test data.

<sup>219</sup> Citing [www.norc.org/Research/Projects/Pages/underutilized-strategies-in-traffic-safety-results-of-a-nationally-representative-survey.aspx](http://www.norc.org/Research/Projects/Pages/underutilized-strategies-in-traffic-safety-results-of-a-nationally-representative-survey.aspx) (last accessed Oct. 25, 2021).

<sup>220</sup> Citing Highway Loss Data Inst., Ins. Inst. for Highway Safety, *Unbelted: Adults Admit They Often Skip Belts in Rear Seat*, 52 STATUS REP. 1, 3 (Aug. 3, 2017), available at [www.iihs.org/api/datastore/document/status-report/pdf/52/5](http://www.iihs.org/api/datastore/document/status-report/pdf/52/5) (last accessed Oct. 25, 2021).

the Euro NCAP enhanced seat belt reminder requirements in the U.S. NCAP program if the agency wants to encourage enhanced seat belt reminders that provide driver warnings beyond 8-seconds.

A commenter recommended that the front and rear requirements be consistent with respect to the required duration of the audible warning.

#### Agency Response

NHTSA has tentatively decided to increase the required duration for the audio-visual warning provided on vehicle start-up to occupants of the front outboard seats. The extremely short duration currently required for the driver's seat belt warning—which originated in the early 1970s—is outdated.<sup>221</sup> It was premised on the since-repealed eight-second statutory limitation on the audible warning duration, then-existing low seat belt use rates, and consumer resistance to enhanced warnings, and the related lack of such warnings in most vehicles.

<sup>221</sup> What is now the second compliance option (S7.3(a)(2)) was added to the standard in 1974, and what is now the first compliance option (S7.3(a)(1)) was added to the standard in 1991. See 39 FR 42692 (Dec. 6, 1974); 56 FR 3222 (Jan. 29, 1991). The second (and original) compliance option requires an “advisory” visual warning that is required to activate regardless of whether the seat belt is buckled; the purpose for this, as NHTSA explained in 1974, was so the “reminder would remain effective even if the belt were disabled to silence the audible warning.” 39 FR 42692. (A later rulemaking preamble also suggested that this would serve to remind other occupants to buckle their belts. 56 FR 3222.) The 4- to 8-second duration was selected “because an irritating light can be easily ignored or disabled, a visual signal can effectively serve only a reminder function, and as such, it should be as simple as possible. The NHTSA concludes that a 4- to 8-second reminder is best calculated to accomplish the advisory function.” 39 FR 42692. The first compliance option was added in response to a petition for rulemaking from General Motors to allow manufacturers to use a safety belt warning system meeting the requirements for automatic safety belt warning systems as an alternative to the warning system that was specified for manual belt systems.

These circumstances no longer hold. There are several respects in which the current requirements are therefore not relevant to today's market.

First, the existing requirements are significantly exceeded by the warnings provided in current vehicles. Although NHTSA did not previously have the authority to require a seat belt warning with an audible signal lasting more than 8 seconds, starting in at least the early 2000s, manufacturers voluntarily began providing enhanced audio-visual warnings exceeding the FMVSS No. 208-minimum durations.<sup>222</sup> In order to get a better sense of the warning durations in currently sold vehicles, NHTSA analyzed data on the seat belt warning durations for MY 2022 vehicle models provided to the agency by vehicle manufacturers for NCAP; this data covers most vehicles offered for sale in the U.S. for MY 2022 with a GVWR of 4,536 kg (10,000 lbs.) or less.<sup>223</sup> In total, we received seat belt duration information on over 500 different vehicle models.<sup>224</sup> For each vehicle model, we looked at the warning durations for the visual and audible warnings for the driver and front outboard passengers seat belts, as well as the reported projected sales for that model as a proportion of the total projected sales for all of the vehicle

<sup>222</sup> See Section III, Regulatory and Legislative History. Similarly, an advisory warning for other seating positions is not necessary because if the proposal is adopted the front outboard passenger seat and the rear seats would have warnings specifically for those seats.

<sup>223</sup> See *supra* note 38.

<sup>224</sup> Specifically, we received information on driver visual warning duration for 599 models for; driver audible warning duration for 599 models; front outboard passenger visual warning duration for 564 models; and front outboard passenger audible warning duration for 558 models. The number of models differs because some models for which a vehicle manufacturer submitted information did not include complete information on the front outboard seat belt warnings and some vehicles are not equipped with a front passenger seat belt warning system.

models for which data was provided to NHTSA. We then tabulated this data to determine how warning durations were distributed across the new vehicle fleet. Specifically, we divided the range of warning durations provided—ranging from six seconds to indefinitely long—into intervals. For each interval, we summed up the projected vehicle sales of all the vehicle models providing a warning with a duration falling within that interval and divided that sum by the total projected sales of all vehicle models. In general, we found that roughly half of new light vehicles provide a visual warning that lasts until the belt is fastened and an audible warning that lasts at least two minutes (120 sec). In the discussion later, we discuss this data in more detail. We also looked at the warning durations provided in new vehicles tabulated by vehicle model instead of projected sales. The results are generally the same, although there are some differences compared to the vehicle sales analysis presented here. These data and results are presented in appendix A.

With respect to the driver visual warning, the majority of new vehicles—over 60% as a percentage of total projected sales volume—have a warning that lasts until the belt is fastened (Figure 3). The remainder of the fleet is about equally divided between a 5-minute (300 second) visual warning and a visual warning lasting at least 1.5 minutes, but less than 2 minutes (90–119 seconds).<sup>225</sup> Less than 2% of the fleet has a warning lasting less than 1.5 minutes (90 sec). The results for the front outboard passenger visual warning are essentially the same as for the driver seat belt visual warning. See Figure 4.

<sup>225</sup> The 300–329 second interval consists of vehicles from just one manufacturer, all of which have a 300-second reminder. The 90–119 second interval includes a variety of different-make vehicle models with different reminder durations.

Figure 3 – Driver visual (sales)

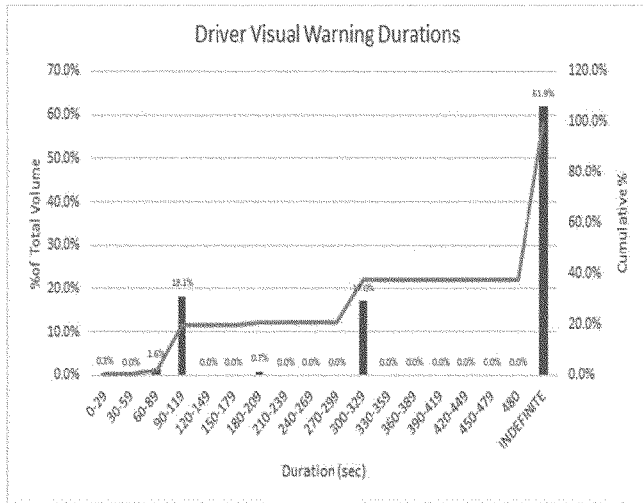
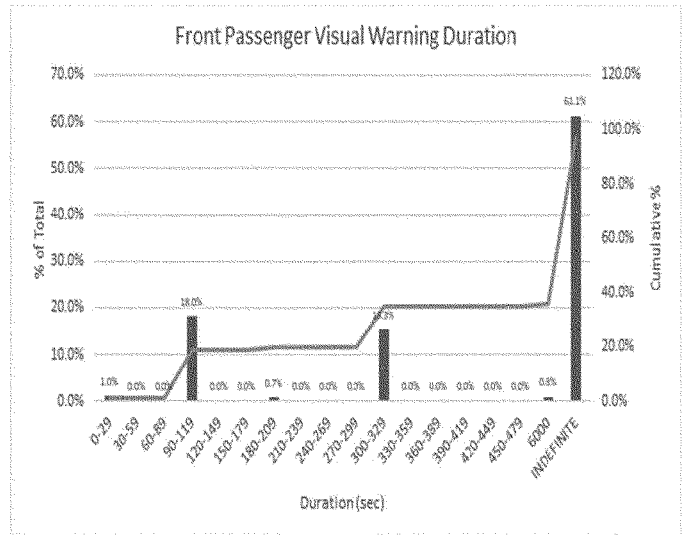


Figure 4 – Passenger Visual (sales)



With respect to the driver audible warning, all of the vehicles for which NHTSA had data have an audible warning lasting longer than the regulatory minimum of 4 seconds. A small number of vehicles (about 1% as a share of total projected sales volume) have an audible warning that last six or eight seconds.<sup>226</sup> See Figure 5. Thus, a very small proportion of the current

vehicle fleet provide the very low-duration audible warning currently required by FMVSS No. 208.

Instead, almost all new vehicles provide a driver audible warning that significantly exceeds the current minimum. Overall, about 99% of vehicles (by share of total projected sales volume) provide an audible warning that lasts at least 30 seconds,

and about 92% of vehicles provide an audible warning that lasts at least 1.5 min (90+ sec). See Figure 6. About half of the fleet (47%) provide an audible warning that lasts two minutes or more (120+ s). Of the vehicles that provide an audible warning with a finite length, the sales-weighted mean is 2.9 minutes (174 seconds) and the median is 1.7 minutes (100 seconds).

Figure 5 – Driver Audible warning (% projected sales)

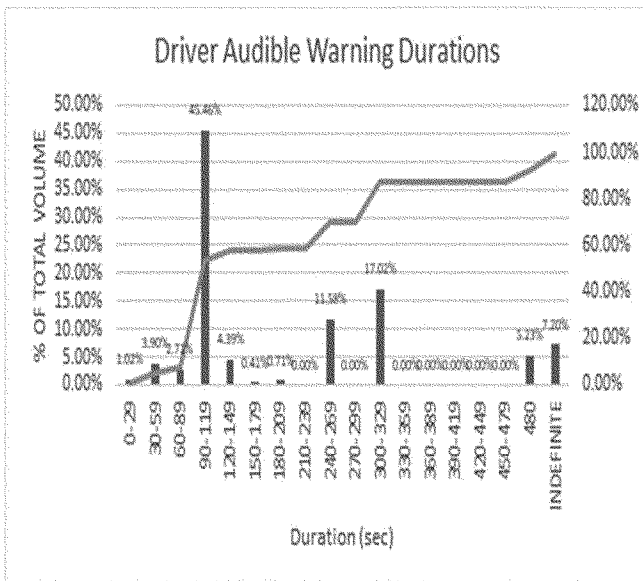
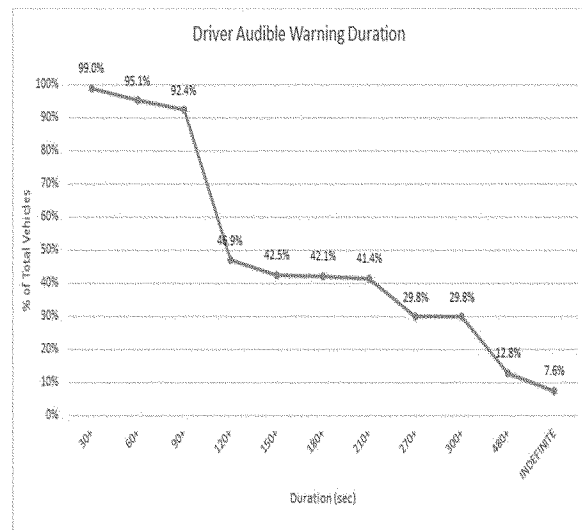


Figure 6 – Driver Audible warning, cumulative minimum duration (% projected sales)



<sup>226</sup> For the driver audible warning, the 0–29 second interval consists of a number of different

vehicle makes, all of which provide either a six or eight-second warning.

Turning to the specific durations provided for the driver audible seat belt warning, about half of new vehicles (45.5% as a share of total projected sales volume) provide a warning that lasts 90–to–119 s (1.5 s – 1.98 s).<sup>227</sup> See Figure 5. The longest-duration audible warnings, provided by two vehicle

manufacturers, last until the belt has been buckled (accounting for about 8% of new vehicles sold). The longest limited-duration audible warnings, lasting 5 and 8 minutes (300 and 480 seconds) are provided by two manufacturers (about 22% of new vehicles).<sup>228</sup> The other duration that is

used in a non-trivial share of new vehicles is from 4 min – 4.5 min (240 s – 269 s) (about 12% of new vehicles).<sup>229</sup> The corresponding analysis for the front outboard passenger seat belt warning is very similar.<sup>230</sup> See Figure 7 and Figure 8.

Figure 7 - Passenger Audible (sales)

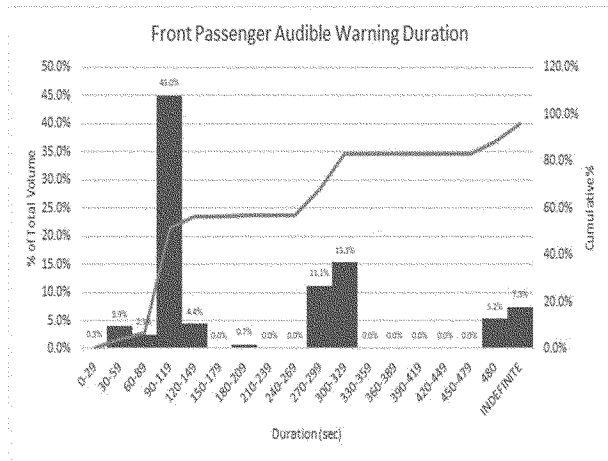
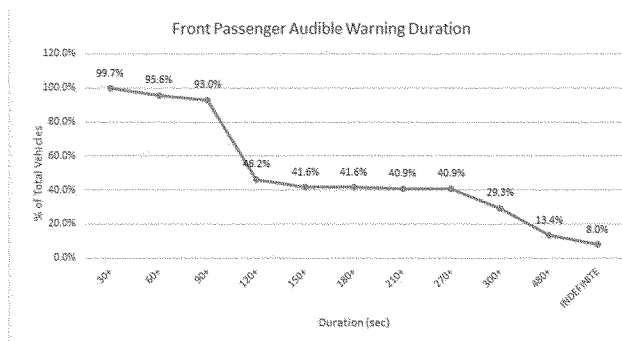


Figure 8 – Passenger Audible warning, cumulative minimum duration (% projected sales)



Second, we tentatively agree with IIHS that the current audible signal duration upper limit of eight seconds is ineffective for increasing seat belt use. From the vehicle survey data presented here, it is clearly not a factor affecting vehicle design. As discussed earlier in this preamble, front seat belt use rates have plateaued in recent years so that about 10% of front-row occupants do not always use a seat belt. Coupled with this, we note that approximately 83–89% of nonusers are part-time nonusers who would be open to using a belt.<sup>231</sup> Although research may not yet have firmly established which exact system specifications are optimal,<sup>232</sup> research by NHTSA and others suggests that audio-visual warnings are more effective than visual warnings alone and that longer duration warnings are more effective than shorter duration warnings.<sup>233</sup> NHTSA’s earlier research

estimated that an enhanced reminder, on average, increased seat belt use three to four percentage points compared to the basic reminder currently required by FMVSS No. 208. IIHS in its comment cited recent research it had conducted that evaluated the effectiveness of three different driver’s seat belt reminders. All of the reminders had a visual warning that persisted until the seat belt was fastened but had audible reminders of varying duration. The research found that, compared to a short intermittent audible reminder (specifically, three intermittent 7-second audible reminders), an audible reminder with an indefinite duration increased seat belt use by 34%, and an audible reminder with a 100-second duration increased seat belt use by 30%. However, we note that more than 90% of MY 2022 vehicles already have audible warnings of at least 90 seconds, but only about

8% have an indefinite reminder. For more information on these effectiveness estimates, see Section XIV, Costs and Benefits.

Third, we tentatively believe that contemporary consumers would accept a longer warning. As we discussed earlier in this preamble, in the early 1970s, NHTSA faced consumer backlash when it required long-lasting seat belt warnings. However, consumer behavior and attitudes have changed since then—seat belt use is more widespread, and opposition to using a seat belt is much less prevalent than it was in the 1970s. This is evidenced by MAP–21’s repeal of the eight-second audible seat belt warning limitation, and by the fact that almost all light vehicles sold in the U.S. now feature relatively long duration visual and audible warnings for the front outboard seats. Research by NHTSA and others suggests that

<sup>227</sup> 90, 96, 100, and 108 seconds are the most used durations in that range, but there are other durations too. 100 seconds is the most used.

<sup>228</sup> The only warning duration provided in the 300–329 sec interval is 300 sec.

<sup>229</sup> Specifically, these are all on vehicles from one manufacturer, which provide an audible warning lasting 261 s.

<sup>230</sup> The sale-weighted mean for the front passenger audible warning is 176.57 and the median is 96.

<sup>231</sup> It also might be the case that so-called “hard-core” nonusers, who comprise about 11–17% of nonusers, would use the belt if the reminder were sufficiently annoying, although, for the purposes of our effectiveness (and benefits) analysis, we conservatively assume that the increase in belt use would be due entirely to part-time nonusers.

<sup>232</sup> DOT 2009 Belt Warning Study, p. 1 (“Although improvements in seat belt use rates appear to result from ESBRs, there is not yet good evidence concerning what works best and why a given system may influence occupant behavior.”)

<sup>233</sup> See, e.g., DOT 2009 Belt warning Study, pp. 8, 46–49. See also David G. Kidd & Jeremiah Singer, The effects of persistent audible seat belt reminders and a speed-limiting interlock on the seat belt use of drivers who do not always use a seat belt. Insurance Institute for Highway Safety (2019) (“Persistent enhanced reminders with longer-lasting or more frequent auditory chimes have been found to be more effective for increasing seat belt use.”) (citing NHTSA research).

consumers would potentially accept an appreciably longer duration warning. As we noted above in connection with the rear seat belt warning (Section X.F, Consumer Acceptance), NHTSA's research suggests that part-time belt users are receptive to seat belt warning technologies, including front seat belt warnings. Furthermore, more recent research by others suggests support for more persistent reminders. IIHS's research has found that, while public acceptance of intense reminders was a concern, seat belt reminders that become more intense or continue indefinitely would be acceptable to about half of part-time belt users and around one-fifth of nonusers.<sup>234</sup> Another IIHS study found that, while its data was subject to some limitations, "most drivers who transport front passengers wanted . . . reminders that last indefinitely until the front passenger buckles up," "suggest[ing] that stronger front passenger reminders, such as those meeting Euro NCAP's design requirements, may be acceptable to most drivers who transport front passengers."<sup>235</sup> We also note the studies cited by NSC and CAS suggesting strong support for more persistent—and even indefinitely long—reminders. At the same time, we do acknowledge that while enhanced warnings are potentially more effective, they are also more intrusive.<sup>236</sup> They therefore present potential consumer acceptance challenges that may reduce their effectiveness.<sup>237</sup> NHTSA's earlier

<sup>234</sup> Kidd, McCartt, & Oesch. Attitudes Towards Seat Belt Use and In-Vehicle Technologies for Encouraging Belt Use. Insurance Institute for Highway Safety. January 2013, pp. 1–3. The study over-sampled part-time belt users and nonusers. *But see* p. 3 ("Requiring all vehicles to have more intense enhanced reminders is a promising way to increase belt use among part-time belt users, but public acceptance still is a concern because the characteristics that make reminders more effective also are the characteristics that make them more annoying. It is not clear how intense a reminder needs to be to increase belt use among the remaining part-time belt users and non-users and what trade-off in annoyance is acceptable.") (citation omitted).

<sup>235</sup> Kidd, D.G. and McCartt, A.T. 2013. Drivers' attitudes toward front or rear child passenger belt use and seat belt reminders at these seating positions. Insurance Institute for Highway Safety, January 2013. *But see id.* at p. 13 ("Long-lasting, auditory front passenger reminders might not be acceptable to these drivers, so it is important to find ways to reduce the potential annoyance of front passenger reminders without compromising their effectiveness.").

<sup>236</sup> DOT 2009 Belt Warning Study, *supra* n.36, p. 39 (drivers); p. 45 (passengers).

<sup>237</sup> *See, e.g.*, DOT 2009 Seat Belt Study at 54, 58 (while research to date on front seat systems suggests that features such as a longer-lasting flashing visual warning might be more effective than a basic system, some warnings that may be more effective could also be more annoying to occupants).

research suggests that it may be challenging to design a warning system with effective yet acceptable characteristics,<sup>238</sup> and that no clear consensus exists about which warning system features are most acceptable.<sup>239</sup> It also noted that while it appears that a majority of the general public accepts seat belt reminders, the data on public acceptance is somewhat limited and anecdotal, and that resistance by a minority of the public could limit overall public acceptability.<sup>240</sup> However, based on the best data available to us, we tentatively believe that consumers would accept an audio-visual front seat belt reminder with a significantly longer duration than the standard currently requires, including an indefinite duration.

Fourth, the technology necessary to implement such an enhanced warning is already standard equipment on almost all light vehicles. An enhanced warning that activates for an unoccupied seat could be a nuisance that either desensitizes the occupants to the warning, or leads them to circumvent or defeat the warning. Enhanced warnings therefore generally need to work in conjunction with an occupant detection system. This makes light vehicle front outboard seats well-suited for enhanced warnings, because almost all front outboard seats are already equipped with occupant classifications systems in order to comply with the advanced air bag requirements. Seat belt warnings for the front outboard seats are therefore capable of being activated only when an unbelted occupant is present, which greatly diminishes the risk of false warnings. Accordingly, increasing the reminder duration would entail minimal costs.

Finally, a longer-duration is consistent with seat belt warning durations required or encouraged in other markets and ratings programs. ECE R16 requires that for the front seats there be a 30 second visual warning when the front seat belts are not fastened and the ignition is activated. It also requires an audio-visual warning that must activate for at least 30 seconds if the seat belt remains unfastened and specific onset criteria are met (*e.g.*, distance traveled, speed, etc.). To prevent unnecessary signals, both ECE R16 and Euro NCAP require that the system be capable of detecting whether

<sup>238</sup> *See* DOT 2009 Seat Belt Study at 60.

<sup>239</sup> DOT 2009 Belt Warning Study, p. 8; Schroeder & Wilbur, *supra*, p. 33.

<sup>240</sup> N. Lerner et al. 2007. Acceptability and Potential Effectiveness of Enhanced Seat Belt Reminder System Features. DOT HS 810 848. Washington, DC: National Highway Traffic Safety Administration, p. 41–42

the front passenger seat is occupied. The Euro NCAP assessment protocol requires a visual signal that remains active until the seat belt is fastened, and a two-stage audible signal; the initial audible signal must not exceed 30 seconds and the final audible signal must be at least 90 seconds. Similar to Euro NCAP, under the IIHS seat belt reminder system ratings protocol, the primary audible reminder signal for the front outboard seats must be at least 90 seconds in total duration in order to obtain an "acceptable" or "good" rating. Although ECE R16 does not require an indefinite reminder, such a reminder would comply with that standard, as they do not contain a maximum length.

We are therefore proposing to increase the minimum duration of the audio-visual warning for the front outboard seat belts on vehicle start-up. In developing this proposal, we considered a range of alternative warning durations. At the upper end of the range is an indefinite reminder—a reminder that remains activated until the occupant fastens the seat belt. Short of this are reminders that have relatively long durations, but do not last indefinitely. Because there is a large range of durations that could be selected, in order to help structure the proposal (and aid comment) we considered the following "buckets" of reminder durations, based on the front audible warning durations provided in MY 2022 light vehicles offered for sale in the U.S. as well as the durations specified in ECE R16, Euro NCAP, and the IIHS ratings protocol:

- Less than thirty seconds (less than required in Europe and provided in only about 1% of new vehicles offered for sale in the U.S. in MY 2022);
- 30 seconds up to but not including 90 seconds (1.5 minutes) (consistent with ECE R16, and provided in about 8% of MY 2022 vehicles in the U.S.);
- 90 seconds (1.5 minutes) up to but not including 2 minutes (consistent with Euro NCAP, and provided in about 46% of MY 2022 vehicles in the U.S.);
- 2 minutes (120 sec) up to (and including) 5 minutes (300 seconds) (the approximate mid-range of the audible warning durations provided in MY 2022 vehicles in the U.S.);
- Greater than 5 minutes (300 sec) but not indefinite (which includes the longest limited-duration audible warning, 8 minutes (480 sec) (provided in about 8% of new vehicles in the U.S.); and
- Indefinite duration (currently adopted by two vehicle manufacturers, accounting for about 8% of new vehicles in the U.S.).

We have tentatively decided to propose requiring an audio-visual reminder that lasts until the belts are fastened at any occupied front outboard seating position, in light of the increase in roadway fatalities and the lack of improvement of front seat belt use rates. We also tentatively believe this is supported by the favorable ratio of part-time to hard-core seat belt nonusers, surveys indicating a significant level of acceptance for enhanced seat belt warnings, and the fact that a non-trivial share of currently sold vehicles have an indefinite-duration reminder. These vehicles incorporating the indefinite warning support the practicability of the proposal. Additionally, the small percentage of market penetration provides the greatest opportunity for potential benefit (see section XIII). We also believe that other warning signal characteristics—such as duty cycle, frequency, volume, or timbre—can be adjusted to balance effectiveness and consumer acceptance; manufacturers would have the flexibility to adjust these or other aspects of the warning, within certain limits, as discussed further below. We do not agree with Global that an upper bound on the warning duration is necessary for objectivity. The warning simply would be required to remain active as long as the belt were unfastened at an occupied seat; NHTSA's compliance test would necessarily have to stop at some point, but NHTSA could make the test time as long as it wanted and manufacturers would have to certify that the warning would be indefinite.

NHTSA seeks comment on this proposal. If opposed to an indefinite warning, what data support limiting its duration? If NHTSA were to instead require an enhanced but limited-duration warning, how long should the warning be? We also seek comment from manufacturers (and others) about the basis for the warning durations provided in current vehicles, particularly the warnings that exceed the Euro NCAP duration (90 sec); for example, the basis for the 5-minute warning, or the 8-minute warning, or the indefinite warning. We also seek comment on the effectiveness and consumer acceptance of the proposed and alternative durations. One reason a shorter duration could be more effective is that some seat belt nonusers might be more likely to habitually circumvent an indefinite-duration warning as opposed to a limited-duration warning. However, such an assumption presupposes there is some limited duration for which a nonuser would be less likely to circumvent. What would such a

duration be, and would it have a reduced effectiveness over a longer or indefinite limit such that the benefit from reduced circumvention was offset by a lower effectiveness? We also seek any additional data on effectiveness or acceptance, or any relevant studies that NHTSA has not identified in the preamble or the PRIA.

We also seek comment on whether the required durations for the visual and audible components of the warning should be identical or different (for example, requiring an indefinitely long visual warning and an audible warning that is of a relatively long, but limited, duration)? Similarly, should the warning durations for the driver and passenger differ or be identical? We also recognize that duration is not the only warning signal characteristic that might increase effectiveness (and affect acceptance); we seek comment on whether NHTSA should set minimum performance requirements for other aspects of the warning (e.g., volume of audible warning and frequency of visual flashing warning and intermittent audible warning) in lieu of or in addition to an increase in the warning duration, and the empirical support for such a choice. We discuss proposed limits and seek comment on certain parameters related to the audible warning below.

## 2. Requiring an Audio-Visual Change-of-Status Warning

NHTSA also proposes to require an audio-visual warning whenever the driver or front outboard passenger seat belt is unfastened during a trip. Although the driver may be aware that the front outboard passenger seat belt has been unfastened, we believe a change-of-status warning may encourage or remind front outboard passengers to refasten their seat belt. We propose an audio-visual warning consisting of a continuous or flashing visual warning of icons or text visible to the driver and any front outboard passenger and a continuous or intermittent audible signal lasting until the seat belt is refastened. The warning would be required to activate when the vehicle's ignition switch is in the "on" or "start" position, the vehicle's transmission selector is in a forward or reverse gear, and the driver and or front outboard passenger seat belt status changes from in use to not in use. However, similar to the Euro NCAP protocol requirements, if the change-of-status occurs and a front door on the same side of the vehicle as the belt triggering the warning is open, the system can consider that the start of a new trip. The proposed indefinite duration is longer

than the minimum 30-second duration proposed for the rear seat belt change-of-status warning. We tentatively believe a longer duration for the front seat belt warning is justified because it does not pose the same potential for driver distraction as it does for the rear seat belt warning. Additionally, if the change-of-status is finite, this would essentially provide a method of circumventing the indefinite startup warning, *i.e.*, an occupant could be buckled at startup, but then unbuckle during the trip and only receive a fixed duration warning.

ECE R16 essentially requires the same change-of-status warning requirements for the front and rear seats (the duration is generally about 30 seconds unless the belt is fastened sooner), so the reader is referred to the discussion of the change-of-status warning in connection with the rear seat belt warning proposal (Section X.C.2). Euro NCAP specifies that the change-of-status warning must essentially meet the requirements of the initial warning, but those requirements are different for the front and rear seats. Again, for the front seats, Euro NCAP specifies that for the initial warning a visual signal shall remain active until the seat belt is fastened, and specifies a two-stage audible signal; the initial audible signal must not exceed 30 seconds and the final audible signal must be at least 90 seconds.

We seek comment on the proposed change-of-status warning. What types of change-of-status warnings are vehicle manufacturers currently using for the front and rear seats (e.g., audio-visual, duration, etc.)? NHTSA is also considering, as it is for the start-of-trip warning, a limited-duration change-of-status warning. Would a limited-duration change-of-status warning be preferable? And should it be identical to the start-of-trip warning, or is there a reason to require different warnings (with respect to any warning signal characteristic, but especially duration)? How are vehicle manufacturers currently handling change-of-status events that occur when the vehicle is stopped or at low vehicle speeds, without a door being opened? Similarly, how are change-of-status events handled when passengers exit the vehicle without the vehicle being in the park gear?

## 3. Audible Warning Characteristics

If the proposed indefinite audible warning were adopted, manufacturers would almost certainly design audible warnings that were not continuous but instead cycled, in order to avoid the excessive annoyance of a fully continuous, long-lasting audible



warning and to fine-tune annoyance and effectiveness. In light of this, NHTSA believes that it is necessary to more fully specify the audible warning characteristics than was necessary for a brief audible warning to ensure that the warnings have at least a minimum level of persistence.

We therefore propose to define a set of terms objectively describing the audible warning: *warning cycle*, *chime frequency*, and *duty cycle*:

- A warning cycle for an intermittent audible warning consists of period(s) when the warning is active at the chime frequency or continuously, and inactive period(s). A warning cycle begins with an active period and is 30 seconds in duration.

- Chime frequency means the repetition rate for an intermittent audible warning when the warning is active.

- Duty cycle means the total amount of time an intermittent audible warning is active during a warning cycle at the chime frequency or continuously, divided by the total warning cycle duration (30 seconds).

When an audible warning is emitting sound, it may do so continuously or intermittently. We believe if the chime frequency of the warning is too low, the warning may become less effective. In a 2009 agency study that focused on analyzing characteristics of optimal reminder systems, we found that, among the reminder systems analyzed, the one with the highest belt use rate had the longest average single-cycle duration and the highest maximum sound frequency.<sup>241</sup> However, the agency wishes to provide ample design latitude with respect to the chime frequency. In a 2007 agency-funded study on enhanced seat belt reminder features, the “slow chime” warning evaluated had a 0.83 Hz frequency.<sup>242</sup> We are proposing a minimum frequency of 0.5 Hz. The warning will be considered active when the audible warning is emitting a continuous sound or a sound at a 0.5 Hz frequency or higher. We seek comment on the proposed specification for minimum chime frequency.

Another important characteristic for an indefinite warning is the duty cycle. The duty cycle is the ratio of the total time when the audible warning is active divided by the total warning cycle time. A 1.0 or 100-percent duty cycle for a 30-

second warning cycle means that the warning is active throughout the entire 30 seconds. In order for the duty cycle specification to be meaningful, the warning cycle time must be specified. We are proposing that the warning cycle be fixed at 30 seconds. Therefore, because we are proposing that the audio-visual warning continue until an unfastened seat belt at an occupied seat is buckled, the audible warning will be composed of a continuous series of 30-second warning cycles that continues until the belt is buckled.

We have tentatively decided to require a minimum duty cycle of 0.20 or 20 percent (*i.e.*, 6 seconds for each 30-second warning cycle). We have tentatively selected this because we are aware of research data that suggests that a 20 percent duty cycle is effective but are not aware of data that a lower duty cycle would be sufficiently effective. In 2012, IIHS published a study examining the effects of duty cycle and duration on seat belt reminder effectiveness and annoyance.<sup>243</sup> The study examined four duty cycle conditions: 100, 50, and 20 percent, and a basic reminder (as ratios 1.0, 0.5 and 0.2). The warning cycles were consecutive 30 intervals. In the 100 percent duty cycle condition, the flashing icon and 1 Hz frequency chime were present for the entire 30-second reminder cycle. In the 50 percent duty cycle condition, the flashing icon and 1 Hz frequency chime were present for the first 15 seconds of the reminder cycle, and a continuously illuminated icon was present for the final 15 seconds. In the 20 percent duty cycle condition, the flashing icon and 1 Hz frequency chime were present for the first 6 seconds of the reminder cycle followed by a continuously illuminated icon for the remaining 24 seconds. In the basic reminder system condition, the flashing icon and chime were present for the first 6 seconds of the first reminder cycle only, and then icon was continuously illuminated for the remainder of the warning. In terms of effectiveness, the 20 percent duty cycle reminder was rated no less effective than the 100 percent duty cycle reminder.

The chime frequency and duty cycle can also be adjusted to optimize the warning. As chime frequencies and/or duty cycle increase, effectiveness generally (though not necessarily) increases, and annoyance generally increases. Given the proposed indefinite warning duration for the front seats, vehicle manufacturers would almost

certainly design warnings with duty cycles of less than 100 percent in order to address consumer acceptance issues. For instance, the 2012 IIHS study found that a decrease in the duty cycle could reduce annoyance while not appreciably reducing effectiveness. The enhanced reminders, however, were not equally annoying. Forty percent of participants in the 1.0 duty cycle reminder condition and 40 percent of participants in the 0.5 duty cycle reminder condition agreed or strongly agreed that the reminder distracted them while they were driving. However, only 25 percent of participants in the 0.2 duty cycle reminder condition indicated the reminder distracted them. Manufacturers can also balance the duty cycle against the chime frequency.

These proposed specifications differ somewhat from Euro NCAP and ECE R16. Rather than directly specifying a duty cycle, Euro NCAP specifies that for the front seats the audible signal must not have gaps greater than 10 seconds, and that gaps longer than 3 seconds would not count toward the warning’s total duration. ECE R16 also does not count warning gaps longer than 3 seconds toward the required minimum warning duration requirement. We are not specifying a limit on the maximum duration of audible gaps for the purposes of determining the warning’s total duration since we are not proposing a minimum warning duration requirement. The 10 second limit Euro NCAP specifies, in addition to its specification of a 3 second gap limit toward the calculation of the warning’s total duration, would not be sufficient to ensure a 0.20 duty cycle warning (that is supported by the IIHS research). For instance, a system with a warning cycle that is 11 seconds long and a 10 second gap would result in a duty cycle of 0.09 which would likely not be as effective as a system meeting our proposed requirements.

We seek comment on our proposed method of specifying the audible warning duty cycle and the limits proposed.

#### 4. Visual Warning Characteristics

We are retaining the existing requirements with respect to some aspects of the visual warning and modifying them in other respects.

We are retaining the current requirements that the warning be continuous or intermittent (flashing) and must display either the identifying symbol or the words (“Fasten Belts” or “Fasten Seat belts”) specified in table 2 of FMVSS No. 101. We have tentatively decided not to specify minimum requirements for the duty cycle or flash

<sup>241</sup> Mark Freedman et al., *Effectiveness and Acceptance of Enhanced Seat Belt Reminder Systems: Characteristics of Optimal Reminder Systems Final Report*. DOT HS 811 097.

<sup>242</sup> DOT HS 810 848; Lerner, N; Singer, L; Huey, R; Jenness, J; “Acceptability and Potential Effectiveness of Enhanced Seat Belt Reminders System Features,” (2007)

<sup>243</sup> Kidd, D.G. (2012). Response of part-time belt users to enhanced seat belt reminder systems of different duty cycles and duration. *Transportation Research Part F*, 15, 525–534.

rates analogous to what we are proposing for the audible warning; we tentatively believe that manufacturers will design the visual warning features in conjunction with and in a way that complements the audible warning characteristics. We have decided to retain the requirement for the symbols or text specified in FMVSS No. 101 because these visual warnings have been in place for decades and we believe that consumers are accustomed to them. Removing the requirement may have unintended negative effects if drivers and front passengers are not accustomed to new visual warnings or do not find the new visual warnings as effective. This means that if a manufacturer chose to use a pictogram format for the rear seat belt warning, it could include the front seat belts in this pictogram, but it would also have to provide the warnings specified in FMVSS No. 101, table 2. We believe manufacturers are already doing this. We seek comment on all of these tentative decisions.

We are also proposing requirements with respect to telltale visibility. We propose requiring that if there is a driver's designated seating position, the visual warning for the driver's seat belt must be visible from the driver's seat and the visual warning for the front outboard passenger seat belt must be visible from the driver's seat and the front outboard passenger seat. (For the case where there is not a driver's designated seating position (which is the case with an ADS-equipped vehicle without any manual driving controls), see Section XII.C.). We are proposing to require that the visual warning be visible to both the driver and any front outboard passenger because NHTSA's study on front seat belt warning systems suggests that visual warnings for front outboard passenger seat belts are more effective when they are visible to the passenger as well as the driver.<sup>244</sup> Euro NCAP similarly recommends that the visual warning be visible to the front passenger.<sup>245</sup> We believe it would be practicable for manufacturers to comply with this requirement; for example, the warning could be located in the center console display (which might be a salient place to present visual displays, both because of its location and because it may allow larger size icons or text).<sup>246</sup> Some manufacturers already provide a passenger seat belt warning in close proximity to the passenger air bag status indicator, which is visible to both the driver and front passenger.

We have tentatively decided not to specify more detailed criteria for the location or visibility of the telltale as, for example, are provided in S19.2.2 for the passenger air bag telltale. A visual warning for the driver's seat belt has been required since the early 1970s and we are not aware of any issues with the visibility of that telltale, so we tentatively believe this is unnecessary.

#### 5. Other Warning Signal Features and Criteria

We have tentatively decided not to specify requirements or criteria for other aspects of the front outboard seat belt warnings.

*Warning activation criteria.* Global and Honda commented that NHTSA should consider updates to the driver seat belt reminder requirements to include additional trigger thresholds beyond the vehicle ignition switch being moved to the "on" or "start" position. The commenters believed advances in vehicle sensor technology enable warnings to be provided for a range of conditions, such as when the vehicle speed reaches a certain limit, or when the transmission is moved from the park position. One commenter suggested that the front and rear warning requirements be consistent in this respect.

Euro NCAP and ECE R16 specify additional trigger requirements above and beyond the ignition being engaged and a seat belt not fastened for some aspects of the front seat belt warnings. Euro NCAP specifies trigger criteria related to factors such as speed, distance traveled, and time elapsed for the change-of-status warning, the audible warning at the start of a trip, and the final (loud and clear) warning. ECE R16 specifies, for both the start of trip warning and the change-of-status warning, additional activation criteria for the second-level warning related to vehicle speed, distance traveled, and time elapsed.

We have tentatively decided not to specify trigger criteria other than the criteria proposed above. The reasons for doing so mirror the reasons given in the analogous discussions in the rear seat belt warning discussion. See Section X.C.1.b (start-of-trip warning) and Section X.C.2 (change-of-status warning).

*Warning duration criteria.* Euro NCAP and ECE R16 also specify additional duration criteria other than a minimum time and the seat belt becoming fastened. Euro NCAP specifies, for the audible warning duration (for both the start-of-trip and change-of-status warnings) criteria related to vehicle speed, door/belt status, running time,

and distance traveled.<sup>247</sup> ECE R16 specifies, for the second-level audio-visual warning duration for the front seat belts an additional criterion related to vehicle speed.<sup>248</sup> We have tentatively decided not to include more complex criteria. The reasons for this mirror the reasons given for the rear seat belt change-of-status warning duration in Section X.C.2.

*Warning circumvention, acknowledgment and deactivation.* We have tentatively decided not to propose features to harden the system against circumvention (such as a sequential logic system which would evaluate whether the belt was fastened prior to an occupant sitting in the seat or sensors that can determine seat belts fastened behind an occupant's back) because such features would increase the cost and complexity of the systems. Neither ECE R16 nor Euro NCAP require such features.

We have also tentatively decided not to allow features which would permit the driver to acknowledge the warning and cancel it prior to the required duration or to deactivate the warning for an entire trip or for a specified time period (thus preventing it from activating in the first place). ECE R16 allows both short-term and long-term deactivation of the audible warning (with a variety of restrictions, such as that it be more difficult to effectuate a short-term deactivation than to buckle the belt). Euro NCAP does not provide any specifications for deactivation or acknowledgement of the warnings for the front seats; it only allows acknowledgement of warnings for rear seats, except for change-of-status warnings. We seek comment on this. Should a final rule incorporate either or both of these features? Would this unacceptably impact the effectiveness of the warning and essentially negate its indefinite duration? Or could it facilitate acceptance and thus either not impact effectiveness or even have a positive impact on effectiveness, to the extent it might make it less likely that the occupant habitually completely circumvents the system? Or should cancellation or deactivation be allowed for the passenger seat belt audible warning but not the driver seat belt warning, in order to mitigate the potential for false positives (due to cargo on the seat that the occupant detection system classifies as a person, etc.)? We note that, since we are not proposing hardening requirements, the proposal would not preclude designs that do not

<sup>244</sup> See DOT 2009 Seat Belt Study at 67–68.

<sup>245</sup> Section 3.7.5.5.

<sup>246</sup> DOT 2009 Seat Belt Study at 67–68.

<sup>247</sup> Section 3.4.1.6.

<sup>248</sup> Section 8.4.2.4.3 (warning can cease if vehicle is not moving forward at least 10 km/h).

activate a passenger seat belt warning if the seat belt is fastened and no one is in the seat. Thus, such nuisance warnings due to cargo could be prevented by buckling the seat belt or simply placing the cargo somewhere else.

Should the final rule allow for permanent or short-term deactivation of front seat audible warnings when the vehicle is traveling below a certain speed? This might allow for situations such as someone needing to drive to a mailbox on a road located on private property or perhaps driving in a parking lot. Below what speed could such a deactivation be implemented without potential loss of benefits? Would such an allowance cause confusion and be counterproductive to the goal of the proposal?

## XII. Other Issues

### A. Automatic Belts

This proposal applies to automatic belts. Automatic belts are belts that secure without any action by the occupant. The agency is not aware of any currently produced vehicles that would be affected by the proposed requirements that have automatic belts. We propose that a seating position with an automatic belt would have to meet the same seat belt warning requirements that apply to manual belts. We are not including provisions in the proposed test procedures specific to automatic seat belt systems because we believe the seat belt use definitions provide sufficient guidance. We seek comments on this issue.

### B. Test Procedures

This NPRM includes procedures for how the agency would test the front outboard passenger and rear seat belt warning systems for compliance with the proposed requirements.

We note that ECE R16 (in Annex 18) sets out some limited test procedures. With respect to the front passenger belt warning, it sets out procedures for testing the warning when the seat belt is unbuckled at the onset of a trip and procedures for testing the change-of-status warning. For the rear seat belt warning system, it has procedures for testing the change-of-status warning. In Europe and other countries around the world, compliance with safety standards is based on type approval. Type approval is the confirmation that production samples of a design will meet specified performance standards. For type approval, manufacturers submit product specifications to governmental authorities, which then require third party approval testing,

certification, and a production conformity assessment by an independent body. Test procedures in FMVSS, on the other hand, are more extensive and detailed, because an FMVSS must be objective, so that manufacturers can self-certify that their vehicles are in compliance.

The proposed test procedures in this NPRM specify that NHTSA could test any system under any combination of seat occupancy or seat belt use status. The test procedures also specify how the agency would test a seat belt warning system with a designated seating position that is occupied.

In order to test a seat belt warning system with a front seating position that is occupied, the agency would use either any anthropomorphic test device specified in part 572 or a person meeting or exceeding the proposed weight and height criteria (at least 46.7 kg and 139.7 cm, respectively, corresponding to the 5th percentile adult female test dummy specified in part 572). The human beings or test dummies used would be seated, the seat belt use and ignition conditions would be applied, and the required signals must operate (that is, either activate or not activate) accordingly. For example, if the agency placed the appropriate test dummies in both front outboard seating positions and fastened both outboard seat belts so that the seat belts were in use, the front seat belt warning system would not be permitted to activate the audible or visual signals under the current first compliance option and could only activate the visual signal under the current second compliance option.<sup>249</sup> The test could be conducted with the seat and adjustable belt anchorages in any position.

For rear warning systems that utilize occupant detection (either negative-only or full-status systems), the agency would use either a person or any anthropomorphic test device specified in part 572 that meets the proposed weight and height criteria (at least 21 kg and 114 cm, respectively).<sup>250</sup> The agency would perform the test with the seat in any position, the seat back in the manufacturer's nominal design riding

<sup>249</sup> The first option requires that if the key is in the "on" or "start" position and the seat belt is not in use, the vehicle must provide a visual warning for at least 60 seconds, and an audible warning that lasts 4 to 8 seconds. Under the second option, when the key is turned to the "on" or "start" position, the vehicle must provide a visual warning for 4 to 8 seconds (regardless of whether the driver seat belt is fastened) and an audible warning lasting 4 to 8 seconds if the driver seat belt is not in use.

<sup>250</sup> For anthropomorphic test devices, this would include the 50th percentile male, 5th percentile female, and the 6-year-old and 10-year-old child dummies.

position, and any adjustable anchorages in any position.

We seek comment on all aspects of the test procedures. We also seek comment on whether the R16 Annex 18 test procedures affect how the requirements in R16 should be interpreted, and whether any deviations between the proposed test procedures and the Annex 18 test procedures are undesirable. We also seek comment on whether the proposed procedures are sufficiently detailed and objective.

### C. Considerations for Automated Driving Systems

The ANPRM did not address considerations related to automated driving systems (ADSs).

#### Comments

A commenter recommended avoiding any additional references to the "driver" in FMVSS No. 208 to avoid introducing further barriers to the deployment of automated driving systems.

#### Agency Response

NHTSA is actively addressing how the FMVSS might be revised to take vehicles with different types of ADSs into account. On March 30, 2022, NHTSA published a final rule updating the occupant protection standards (200-series FMVSS) to account for ADS-equipped vehicles, particularly those without driving controls.<sup>251</sup> The final rule amended the 200-series FMVSS to account for future vehicles that do not have the traditional manual controls associated with a human driver because they are equipped with ADSs.

One aspect of this NPRM is a requirement specifically tailored to an ADS-equipped vehicle without a driver DSP. For the amendment to the driver's seat belt warning, we are proposing that the front passenger warning apply to "any" front outboard passenger. The addition of the term "any" makes it clear that, in some vehicles, there may be more than one front outboard passenger seating position. This would be the situation of an ADS-equipped vehicle that has no manually operated driving controls. The agency views this as a means for maintaining the same level of occupant protection in ADS-equipped vehicles that exists in conventional vehicles, *i.e.*, both will be required to have seat belt warnings in both outboard seating positions. We note that in a dual mode vehicle,<sup>252</sup> the

<sup>251</sup> 87 FR 18560 (Mar. 30, 2022).

<sup>252</sup> An [ADS-Equipped] Dual-Mode Vehicle is defined as "[a] type of ADS-equipped vehicle designed for both driverless operation and operation by a conventional driver for complete trips." SAE J3016\_201806 Taxonomy and

left front seat is still by definition a driver's seat, regardless of the operational status of the vehicle, so a provision to just have a warning for the driver and right outboard passenger would be sufficient to assure that all front seat occupants receive a warning.

We are also proposing that if there are multiple front outboard passenger seats in an ADS-equipped vehicle without manual driving controls, then both front outboard seat belt warnings and change-of-status warnings must be visible to both front outboard passengers. The rationale for this is as follows. Although an ADS-equipped vehicle without manually operated controls by definition does not have a driver, it is reasonable to assume that one of the front outboard passengers may be performing the management role for the duration of a trip, such as might be the case of a parent in a vehicle with children under their care. In such a situation, the manager of the trip may be seated in either front outboard seat. Thus, to be most beneficial, the visual warning must be seen by an occupant choosing to sit in either front outboard seat. Additionally, if the agency restricted the warning visibility to just the right outboard passenger and not "any" outboard passenger, in an ADS-equipped vehicle with no driving controls and a lone vehicle occupant in the left front seat, that occupant would not receive a seat belt use warning.

The 2022 ADS final rule also addressed situations where an ADS-equipped vehicle without manual driving controls has one or no outboard seats in the front row (e.g., an ADS-equipped vehicle with only two seats in the front row, one or both of which would be classified as inboard passenger seating positions under 571.3) and requires seat belt warnings for certain inboard seats in such vehicles. We are proposing that these front inboard passenger seats have the same seat belt warnings as front outboard seats.

The agency acknowledges that the proposal does not address the influence of ADS-equipped vehicles on the visibility of the rear seat belt warning. As proposed, the rear seat belt warning is only required to be visible from the driver's seat. As previously discussed, there may be no driver's DSP in an ADS-equipped vehicle. Thus, no vehicle occupant will be required to see the rear seat belt warning. NHTSA acknowledges the inadequacy of this situation and we believe there are many potential solutions. For example, it

could be required that for a vehicle without manually operated driving controls, any front seat occupant receive the rear seat belt warning. Another approach would be to require that in such vehicles, all seating positions be apprised of the seat belt use in all other DSPs in the vehicle. The agency has determined that it is not prepared to propose a solution for the visibility of rear seat belt warnings for ADS-equipped vehicles and that it is beyond the scope of this proposed rule. As we stated in the March 30, 2022 final rule, the agency plans future agency work related to telltales and indicators for ADS-equipped vehicles.

### XIII. Regulatory Alternatives

NHTSA has considered alternatives to the proposal. In the preceding sections of this document, we have discussed various alternatives for different aspects of the proposed requirements. In this section we address five major alternatives that we considered: ECE R16 and Euro NCAP; occupant detection and enhanced warning signals for the rear seat belt warning; non-regulatory alternatives; requiring a warning for the front center seat; and requiring an audio-visual seat belt warning for the front outboard seating positions with a duration not less than 90 seconds. For three of these alternatives (rear-seat occupant detection, front center seat, and 90-second front warning), we also quantified the costs and benefits (see Section XIV).

#### A. ECE R16 and Euro NCAP

The ANPRM sought comment on the extent to which any requirements should be based upon or differ from other regulatory requirements (such as ECE requirements) or consumer information programs such as Euro NCAP.<sup>253</sup> As discussed in more detail in the regulatory analyses section below, Executive Order 13609 provides that International regulatory cooperation can reduce, eliminate, or prevent unnecessary differences in regulatory requirements. Similarly, § 24211 of the Infrastructure, Investment, and Jobs Act<sup>254</sup> instructs DOT to harmonize the FMVSS with global regulations to the maximum extent practicable (for example, to the extent that harmonization would be consistent with the Safety Act).

<sup>253</sup> The discussion in this preamble focuses on Euro NCAP and R16. NCAP programs in other regions are largely similar to Euro NCAP or R16, so our analysis of these requirements will adequately cover the requirements of the NCAP programs in other regions.

<sup>254</sup> H.R. 3684 (117th Congress) (2021).

#### Comments<sup>255</sup>

Several commenters recommended harmonizing with R16.<sup>256</sup> Two commenters stated that almost all automakers have already developed systems to conform to the R16 requirements, and that disharmonization would increase costs without any benefits. Two commenters said that harmonization would accelerate introduction of seat belt reminders. A commenter said that R16 represents a "sweet spot" between safety benefits, consumer acceptance, harmonization, and compliance costs. The commenter also said that the benefits from harmonization can be substantial, such as flexibility to innovate, cost minimization, and efficiency of global research, development, and production processes; a non-harmonized approach could also necessitate system redesign for the United States market.

Some commenters recommended harmonizing with NCAP programs in other regions, such as Euro NCAP. For example, a commenter supported harmonization with Euro NCAP; another supported harmonization with Euro NCAP (or, if not that, then with R16), and a third commenter suggested using other NCAP programs as a model when empirical data is lacking. A commenter recommended harmonization with Euro NCAP and IIHS's assessment protocol.

A few commenters, while acknowledging that harmonization is generally desirable, commented that the proposed rule should not harmonize at the expense of safety/effectiveness. Commenters said that the requirements should be evidence-based.

#### Agency Response

In developing this proposal, our intent was to harmonize with ECE R16 and Euro NCAP as much as possible but deviate where we believed it was justified with respect to the Safety Act criteria (need for safety, objectivity, practicability). The tentative reasons for following or deviating in any of these respects are explained in detail in the relevant section of the preamble. In general, we believe that although the proposal deviates from R16 in some

<sup>255</sup> The ANPRM sought comment on this in the context of various aspects of the rear seat belt warning, and this is what the comments likely concerned, but the discussion in the agency response below also includes the front seats.

<sup>256</sup> Some comments specifically identified version R16-07. As noted earlier, the ECE has subsequently revised that regulation. The current version is Revision 10. We assume commenters favoring harmonization intended that we harmonize with the most current version of R16.

ways, the two are not incompatible, so that it is possible to design a rear reminder system that complies with the proposed requirements and is compatible with R16.

On December 2021, IIHS released its Seat Belt Reminder System Test and Rating protocol.<sup>257</sup> It sets out general requirements for the seat belt reminder visual and audible signals for front outboard and rear seating positions. It does not put much emphasis on the visual warning for front-outboard seating positions other than specifying that a visual signal needs to be displayed in the instrument panel, overhead panel, or center console, indicating an unfastened belt. On the other hand, for the audible warning there are requirements for when it must begin if the seat belt is unfastened at ignition and for change-of-status, and when it can cease (when the seat belt is unfastened, vehicle is no longer in motion, or seat is no longer occupied). It also has sound pressure level and frequency requirements for the audible warning.

For the rear seats, it specifies that the visual signal must activate within 10 seconds of the ignition being turned on, that the signal must indicate whether the seat belt at each rear seating position is fastened or unfastened, and that it must last at least 60 seconds. It does not require a visual signal if the seat belts at all occupied rear seats are fastened or if no rear occupants are present. It allows the visual signal to be cancelled by the driver. For a seat belt change-of-status in the rear seats when the vehicle is in motion, it requires an audible and visual signal that lasts at least 30 seconds. It further specifies that the audible and visual signal can stop when seat belts at the occupied rear seats are fastened, the vehicle is no longer in motion, or the seats are no longer occupied.

For the front seats, under the IIHS ratings protocol, the primary audible reminder signal for the front outboard seats must be at least 90 seconds in total duration in order to obtain an “acceptable” or “good” rating.

Unlike Euro NCAP the IIHS rating system provides ratings instead of points (poor, marginal, acceptable, good). For instance, if the front-passenger seat has an audible signal that lasts less than 8 seconds it would be given a “Poor” rating. For a “Good” rating” both the driver and front-passenger belt reminder must have an

audible signal that lasts at least 90 seconds and meet the rest of the belt reminder system requirements (essentially meet the requirements for an “Acceptable” rating) and meet the requirements set forth for the rear seat belt reminder system. Accordingly, a vehicle cannot receive a “Good” rating without having a rear seat belt reminder system, and a rear seat belt reminder system is not required for all the other ratings. It does not specify occupancy criteria. We do not believe our requirements impede meeting the requirements of the IIHS protocol.

#### *B. Occupant Detection and Enhanced Warning Signals for the Rear Seat Belt Warning*

Rear seat warning systems that employ occupant detection have potential advantages over systems without it. With occupant detection, a warning system can provide more informative warnings. The system can determine whether any seats are occupied by an unbelted occupant, as opposed to simply notifying the driver which belts, if any, are fastened. Such systems are also better able to provide enhanced warnings. Enhanced warnings refer (for the purposes of this document) to warnings that are relatively longer-lasting or have an audible component. Having an audible or longer-duration visual warning activate for an unoccupied seat could be a nuisance for the driver and might either desensitize the occupants to the warning signal or lead them to circumvent or defeat the system. Enhanced warnings therefore generally need to work in conjunction with an occupant detection system.

In the ANPRM we observed, however, that occupant detection for the rear seats may present technical or cost challenges. Rear seats are used in ways that can complicate occupant detection. Rear seats may frequently be used to transport cargo such as groceries, pets, and other heavy objects that could be mistaken for an occupant. In addition, rear seats may be less well-defined than front seats, which could impede accurate detection. For example, it may be technically challenging for an occupant detection system to recognize a large occupant spanning multiple seating positions as a single occupant rather than two occupants. This could lead to false warnings, which can lead occupants to disregard or attempt to circumvent the system. Occupant detection would also be more expensive. While approximately 46.9% of MY 2022 projected vehicle sales in the United States have rear seat belt warning systems, only about 7% are equipped with occupant detection.

Occupant detection is optional but not required by both ECE R16 and Euro NCAP. Accordingly, neither Euro NCAP nor ECE R16 require an audible warning on vehicle start-up for the rear seats. Euro NCAP specifies that, if there is no occupant detection, only a 60-second visual signal is needed for the rear warning in order to earn bonus points, and R16 requires a 60-second visual signal. For systems with occupant detection in all rear seats, Euro NCAP specifies that the visual signal does not need to indicate the number of seat belts in use or not in use, but the signal must remain as long as the seat belts remain unfastened on any of the occupied rear seats. Neither R16 nor Euro NCAP require a visual signal if the system can determine there are no occupants in the rear.

The ANPRM sought comment on whether NHTSA should propose rear seat belt warning system requirements that would necessitate occupant detection or enhanced warning signals.

#### Comments

Many commenters recommended requiring occupant detection in the rear seats. Other commenters argued that occupant detection would reduce false signals, and some argued that occupant detection was feasible and already available in numerous vehicle models. A commenter stated that NHTSA had provided no literature review of available systems and their capabilities, and that NCAP programs throughout the world had concluded that these systems are feasible and important to advancing safety. Two commenters said that some of the technological challenges NHTSA identified in the ANPRM have already been addressed in systems developed for the right front passenger seat. A commenter also noted that various NCAP programs award points for occupant detection. Another commenter said that the residual technical challenges appear to be mostly associated with accommodating certain child restraint systems. The commenter believed that occupant detection with the option of temporary driver override for the duration of an individual trip is a reasonable approach that balances notification with recognition that seats may be occupied by objects other than unrestrained human occupants. Commenters also said that occupant detection systems are cost-efficient, with a number of systems costing less than \$10.

On the other hand, several commenters opposed requiring occupant detection. Commenters suggested harmonizing with ECE R16, which does not require occupant

<sup>257</sup> <https://www.iihs.org/media/f15e5be9-ac62-4ea6-a88d-7511105bfff5/H3hGKQ/Ratings/Protocols/current/Seat%20Belt%20Reminder%20Test%20Protocol.pdf>.

detection. Some commenters brought up the technological and use challenges. For example, a commenter stated that it is difficult to distinguish actual rear occupants from other rear objects because consumers tend to use rear seats in a wider variety of conditions (e.g., child restraints, pets, groceries, and various types of cargo); its experience shows that occupant detection in rear seats leads to false alarms and reduced consumer acceptance. Several commenters raised concerns about cost. One commenter believed that the cost of such systems would not justify any additional benefits. Another commenter believed that there were insufficient data available to demonstrate that occupant detection would actually increase system effectiveness because without occupant detection the driver knows how many occupants are in the vehicle. On the other hand, a commenter said that costs are not prohibitive; the commenter also stated that rear seat occupant detection systems are available that can take into consideration the specific challenges of the rear seat compared to a front seat, including robust sensors to help avoid false positive warnings. At the same time, commenters requested that any requirements not prohibit innovation and provide manufacturers with flexibility. One commenter opposed requiring occupant detection on buses because such systems would be complicated (e.g., the number of seats and seating configurations, challenges with LATCH). It also stated that it is unaware of any occupant detection systems currently available for buses, so all rear passenger seats currently in use will require significant development efforts.

As noted earlier,<sup>258</sup> several commenters favored requiring an audio-visual warning at the start of the trip. A commenter also supported requiring the most effective warnings.

On the other hand, commenters argued against requiring enhanced warnings. A commenter recommended requiring only a visual warning on start-up to avoid false alarms and consumer acceptance issues because occupant detection is currently not affordable. Another commenter also stated that consumer acceptance of enhanced warning systems in the United States is not well understood. Commenters recommended following R16 with respect to enhanced warnings, because it strikes an appropriate balance of benefits, acceptance, harmonization,

and costs. Two commenters suggested that NHTSA instead consider updating NCAP to include enhanced warnings. A commenter said that the reminder system should use existing audio/visual warning patterns because the driving public likely would be able to understand those more easily.

#### Agency Response

We have tentatively decided not to require occupant detection in the rear seats because we tentatively believe that occupant detection continues to present technical challenges. While it can reduce false warnings for unoccupied seats it can also result in false warnings, due to the limitations of the sensors and different use scenarios in the rear seats. We acknowledge that most of the components necessary to meet the proposed minimum performance requirements for a system with occupant detection are readily available, and that a small portion of the total U.S. vehicle projected sales, based on the MY2022 NCAP data, are equipped with rear SBWS with occupant detection. However, these potential issues surrounding the implementation of occupant detection could reduce the effectiveness and/or acceptance of these systems and thus we tentatively decided against requiring occupant detection.

Occupant detection would be cost-beneficial only if rear seat belt use increased substantially more than we estimate that it would for a warning system without occupant detection. Our teardown analysis indicates that occupant detection components cost \$39.75 per vehicle, which, added to the \$19.59 per vehicle cost of the buckle sensor, results in a combined warning system cost of \$59.33 per vehicle (2020 \$). We estimate that the total new fleet cost of a rear seat belt warning system with occupant detection would be about \$758 million (2020 \$). As explained in more detail in Section XIV, Overview of Costs and Benefits, and in the PRIA, in order for benefits and costs to be equal for this regulatory option, seat belt use for rear seat occupants 11 years and older would need to increase by approximately 9.4 percent when discounted at 3 percent and 11.6 percent when discounted at seven percent. A 9 to 12 percent increase in seat belt use is about 2 to 3 times greater than that estimated for the proposed SBWS requirement. While we would expect some possible increase in seat belt use from that specific functionality, it is doubtful that it would double or triple the increase in seat belt use estimated for SBWS without occupant detection. Therefore, we do not expect

this regulatory alternative to be cost-effective or net beneficial.

This tentative decision is based on current information on factors such as the needed increase in seat belt use for this regulatory alternative to have positive net benefits. This proposal does not preclude manufacturers from choosing to use occupant detection and includes compliance options that involve the use of occupant detection. This harmonizes with R16 and Euro NCAP. Vehicle manufacturers may in the future implement rear seat occupant detection technology for other functions (such as advanced occupant restraint functions or warnings for unattended children in the rear seating positions after the vehicle motor is turned off), which would relieve some of the cost burden and facilitate the integration of occupant detection technology for rear seat belt warning systems. Because we are not requiring occupant detection, we are therefore also not requiring enhanced warnings (such as an audible warning on vehicle start-up) for the rear seat belt reminder. The proposal, however, gives manufacturers the flexibility to innovate and optimize warning signal characteristics, including providing enhanced warnings. We seek comment on these issues.

#### C. Non-Regulatory Alternatives

The ANPRM sought comment on whether NHTSA should consider non-regulatory approaches. It identified two potential non-regulatory approaches: awarding NCAP bonus points and voluntary guidelines.

#### Comments

Some commenters supported including rear seat belt reminders in NCAP in addition to, but not in lieu of, a regulatory requirement in order to accelerate adoption of advanced systems. Two commenters also believed that inclusion in NCAP could encourage adoption. One commenter was opposed to voluntary guidelines. The commenter said that inclusion of occupant detection in NCAP would be the most appropriate way to incentivize such systems and familiarize industry with their implementation.

#### Agency Response

In light of the MAP-21 mandate and our tentative conclusion that the proposed requirements would meet the section 30111 criteria, we have decided to issue this proposal, and not pursue non-regulatory alternatives. However, we would like to note that on March 9, 2022, NHTSA published an RFC notice announcing its current and future plans

<sup>258</sup> See Section X.C.1.a, Visual Warning at Start of Trip with Three Compliance Options.

for updating NCAP.<sup>259</sup> The RFC notice included a section on seat belt interlocks that requested comment on whether NCAP should consider credit for enhanced seat belt reminder systems and whether NCAP should include a seat belt interlock assessment and, if so, what it would consist of (e.g., interlock types, what seats would be covered, etc.). The notice requested data on both topics. Our preliminary review of the comments about whether NCAP should consider credit for enhanced seat belt reminders found that the majority of commenters were in support of such an initiative. A commenter stated that, rather than considering credit for enhanced seat belt reminders, NHTSA should regulate more persistent reminders as allowed under MAP-21.

#### D. Requiring a Warning System for the Front Center Seat

The agency also considered requiring a seat belt warning system for the front center seating position but is not proposing doing so for a few reasons.

First, there is low occupancy for the front center seat. According to 2013 FARS and GES data, only 0.4 percent of the occupants of passenger cars and light trucks with a GVWR of 10,000 lb or less involved in fatal or injury-only crashes were seated in the front center seating position. This is due to the rarity of front center seats in the modern vehicle fleet, not because this position is safer. More specifically, 62 occupants of these vehicles seated in the front center seat were killed. Of those fatalities, 79 percent (49 occupants) were unrestrained. In addition, there were 8,000 occupants of these vehicles that were injured while seated in the front center seat. Of those front center seat occupants injured, approximately 8.2 percent (656 occupants) were unrestrained.<sup>260</sup>

Next, a system for the front center seat without occupant detection would likely not be effective. Without occupant detection, a belt reminder system for the front center seat would be limited to providing a positive-only visual signal (for the reasons discussed regarding the front and rear seats and occupant detection). We believe that such a signal would not be likely to result in meaningful safety benefits for the front center seat. Because it would be only a visible and not an audible warning, it would likely not provide the occupant in the front center seat much

incentive to fasten the seat belt or provide the driver an additional incentive to request the front center passenger to fasten the seat belt.

Finally, a system with occupant detection would not be cost-effective or net-beneficial. When discounted at three and seven percent, the cost per ELS is approximately \$88.9 million and \$110.0 million, respectively and the net benefits are negative for this regulatory alternative. Because the cost per ELS is higher than the comprehensive cost of a fatality and the net benefits are negative, this regulatory alternative is not cost-effective or net-beneficial.

#### E. Requiring a 90 Second Duration Seat Belt Warning System for the Front Outboard Seating Positions

As explained earlier (see Section XI.C.1), NHTSA considered a range of alternative warning durations for the front outboard seat belt warning. NHTSA quantified the costs and benefits for one of these alternate durations (90 seconds). NHTSA selected the 90 second duration length as an alternative because this is the most common audible warning duration for the front outboard seats, based on our NCAP data. About 92.4 percent of the new vehicle fleet is already equipped with an audible seat belt warning with a duration of 90 seconds or greater. Therefore, a requirement for a minimum of 90 second duration audible warning would only affect 7.6 percent of the new vehicle fleet. The benefit and cost analysis was conducted in a similar manner as that for the indefinite duration seat belt warning described in Section XIV. Our analysis found that a requirement for a 90-second audible warning would save 7 equivalent lives with no change in the estimated cost. These benefits are significantly lower than those for the proposed warning that remains on until the seat belt is buckled.

We seek comment on these issues.

### XIV. Overview of Benefits and Costs

In this section, we briefly present our estimates of the benefits and costs of the proposed rear and front seat belt warning requirements, as well as three of the major regulatory alternatives we considered. For a more detailed discussion, please refer to the Preliminary Regulatory Impact Analysis (PRIA) in the docket for this rulemaking. NHTSA seeks comment on its methodology, data sources, and estimates.

#### A. Proposed Requirements

NHTSA quantified the benefits and costs of the proposed requirements. In

this section we present a summary of these estimates for the rear seat belt warning system, front outboard seat belt warning system, and then the combined costs and benefits for both proposals.

#### 1. Rear Seat Belt Warning System

The ANPRM sought comment on the potential effectiveness, benefits, and costs of a rear seat belt warning.

#### Comments

NHTSA received several comments on the potential target population. For example, a commenter said that approximately 900 second row unrestrained occupants are killed and another 19,000 are injured each year, and a portion of this target population would likely have injuries mitigated or eliminated through the use of rear seat belt warning systems. Another commenter brought up the increasing number of rear seat passengers,<sup>261</sup> including the rise of rideshare vehicles.<sup>262</sup> Two<sup>263</sup> commenters<sup>264</sup> also stated that studies have found rear seat passengers in rideshare or taxis (for hire vehicles) are less likely to buckle up than those in privately owned (not for hire) vehicles, and one of the commenters noted that children usually sit in the back row, and they may unfasten their seat belt out of boredom during a trip. A commenter also said that restraint non-use exceeds the national average (47%) in the population of occupants starting at age 8–12, and the unrestrained percentage for younger occupants is 36% for 4–7 year olds and 22% for occupants less than 4 years old.

Several commenters noted a relative lack of data regarding the effectiveness of rear seat belt warnings. A commenter stated that the first vehicles with an advanced rear seat belt reminder system

<sup>261</sup> Citing Li, R., Pickrell, T.M. (2019, February). Occupant restraint use in 2017: Results from the NOPUS controlled intersection study (Report No. DOT HS 812 594). Washington, DC: National Highway Traffic Safety Administration, at: <https://crashstats.nhtsa.dot.gov/Api/Public/ViewPublication/812594.pdf>.

<sup>262</sup> Citing Aarian Marshall, A Third of Americans Use Ride-Hail. Uber and Lyft Need More, Wired, Jan. 8, 2019, <https://www.wired.com/story/uber-lyft-ride-hail-stats-pew-research/> (last accessed Nov. 26, 2019).

<sup>263</sup> Citing Jessica Jermakian & Rebecca Weast, Passenger use of and attitudes toward rear seat belts. J. Safety Research 66, p. 113–119, Feb. 2018, <https://doi.org/10.1016/j.jsr.2017.12.006> (last accessed Nov. 26, 2019); Kenneth Nemire, Seat belt use by adult rear seat passengers in private passenger, taxi, and rideshare vehicles, Proceedings of the Human Factors and Ergonomics Society Annual Meeting, Oct. 20, 2017, <https://doi.org/10.1177/1541931213601896> (last accessed Nov. 26, 2019).

<sup>264</sup> Citing Rear Seat Belt Use: Little Change in Four Years, Much More To Do, GHSA, (Nov., 2019), <https://www.ghsa.org/resources/RearBeltReport19>.

<sup>259</sup> 87 FR 13452 (Mar. 9, 2022).

<sup>260</sup> See Traffic Safety Facts 2013, NHTSA, DOT HS 812 139 (2015), Tables 87–88. Only light truck occupant injuries are reported. The number of passenger car occupants injured was not reported because it was less than 500.

only entered the Japanese and EU markets in recent years, and there are not yet any field data available on effectiveness.

However, a few commenters did provide rough effectiveness estimates. One commenter estimated that it was likely similar to front seat effectiveness (3–4%). Two other commenters pointed to a 2012 SAE paper that compared the effect of various visual and audible warnings on rear belt use based on a series of experiments.<sup>265</sup> One of the commenters said that its research has found that seat belt warning systems with persistent audible tones lasting at least 90 seconds increase the seat belt use of drivers who do not routinely use a seat belt by 34%. The commenter also referenced a Volvo survey of Volvo owners in Sweden and Italy in 2005 showing that a rear belt warning system had an effectiveness of approximately 50%.

Several commenters commented generally that a rear belt reminder would be effective while not providing specific effectiveness estimates. A commenter agreed with NHTSA that the proportion of occupants who actively seek to avoid restraint use is small compared to the proportion of part-time nonusers who would likely be amenable to warnings. Another commenter similarly stated that many consumers do not prioritize rear belt use but rather consider it unnecessary (for short trips in particular), forget to buckle up, or perceive no deterrent threat from traffic enforcement, and enforcement of seat belt laws is more challenging for the back seat due to more difficult visibility. A commenter said that there is extensive evidence of the effectiveness of front seat belt reminders and there is no reason to believe that rear seat belt reminder effectiveness would significantly differ. Commenters noted the NHTSA research on seat belt warnings discussed in Section V, showing a generally positive increase in use rates. Commenters referred to an IIHS survey showing that, of 1,172 respondents who had ridden in the back seat during the preceding six months, 75% said they would be more likely to wear the rear seat belt if someone in the car reminded them, 62% would if there was an audible belt reminder, and 50% would if there was a visual belt reminder.<sup>266</sup>

<sup>265</sup> M. Akamatsu, H. Hashimoto and S. Shimaoka, “Assessment Method of Effectiveness of Passenger Seat Belt Warning,” in SAE International 2012–01–0050, 2012. This study is discussed in the PRIA (Section 2.3).

<sup>266</sup> Citing Highway Loss Data Inst., Ins. Inst. for Highway Safety, Unbelted: Adults Admit They Often Skip Belts in Rear Seat, 52 Status Rep. 1, 3

With respect to costs, a commenter said that seat belt reminder systems require a relatively small investment, and low-cost 2-D or digital cameras (which are cheaper than seat sensors) could be used to detect a rear seat passenger. Two commenters said that the cost will decrease further if rear seat belt reminder systems are required in all vehicles. A commenter said that for passenger cars already equipped with rear seat buckle monitoring (13% in US for MY 2019; almost 100% of new vehicle models in the EU market, legally required in EU for new types from September 2019 onwards), the additional costs for the occupant detection technology to cover the second row seating positions are in the low two-digit range. The commenter also stated that among vehicles available in the EU with advanced rear seat SBR systems, a couple are vehicle models that belong to the high-volume, cost-sensitive vehicle segments (small/compact cars), showing that the additional costs for the rear seat occupant detection are not prohibitive. The commenter said that the occupant detection sensors for a seat belt warning system are available at lower costs than occupant classification (e.g., for front air bags) sensors.

#### Agency Response

Based on FARS and NASS–CDS data from 2011 to 2015, on average 1,002 unrestrained rear seat occupants were killed in crashes and 7,820 were injured.<sup>267</sup> After adjusting these to account for future decreases in fatalities and injuries projected to occur in the absence of the proposed requirements due to the introduction of other mandatory safety technologies (e.g., electronic stability control), there were, on average, 475 fatalities and 7,036 injuries to unrestrained rear seat occupants each year. This is the overall target population—the annual deaths and injuries that the proposed requirements are aimed at reducing.

We estimated the benefits we expect to result from the proposed rear seat belt warning requirements. The benefits are the fatalities and injuries that we estimate would be prevented by the proposed requirements. The benefits depend, principally, on the effectiveness of seat belts in preventing deaths and injuries and the expected increase in seat belt use due to the proposed rear seat belt warning system requirements. Seat belt effectiveness for

(Aug. 3, 2017), available at <https://www.iihs.org/api/datastore/document/status-report/pdf/52/5> (last accessed Nov. 26, 2019).

<sup>267</sup> See PRIA, Appendix D.

rear seat occupants is 55 percent for passenger cars and 74 percent for light trucks and vans.<sup>268</sup>

NHTSA believes that the proposed minimum required warning signal characteristics would be effective at informing the driver of the use status of the rear seat belts and facilitating the driver to request that a rear passenger fasten an unfastened belt. A seat belt warning system can increase rear seat belt use in two ways: it can remind an occupant to fasten their belt, and it can inform the driver that a passenger is unbuckled, so that the driver can request the occupant to fasten their belt.<sup>269</sup> Without a rear seat belt warning, the driver must turn around to ascertain whether a rear seat occupant is using a seat belt (or ask the occupant); in some vehicles, belt use may not be evident to the driver, even if he or she turned around, due to line-of-sight limitations. As noted above, in NHTSA’s 2015 survey, 65% of drivers of vehicles equipped with rear seat belt reminders reported that the rear seat belt reminder made it easier to encourage the rear seat passengers to buckle up.<sup>270</sup> Also, as noted earlier, part-time users—the predominant nonuser group—are amenable to seat belt warnings. In addition, children, who might be particularly compliant to driver requests, are proportionally much more likely to be rear seat passengers than are adults.<sup>271</sup>

We believe that any of the three compliance options would be effective at doing this. While some provide more information than others, and some would require the driver to fill in some informational gaps, even the most basic system (positive-only) would inform the driver about which belts are fastened; the driver would readily be able to determine whether there were any unbelted occupants. We also believe that the 60-second visual warning would be effective. NHTSA could have proposed a more intrusive warning signal, such as an audible warning and/or a longer-duration visual warning. However, because such warnings necessitate occupant detection and we have tentatively decided not to require occupant detection, we have also tentatively decided not to propose more aggressive warnings.

NHTSA estimated the effectiveness of the proposed rear seat belt warnings. Available research regarding seat belt use indicates that seat belt warning

<sup>268</sup> See PRIA, Table 29.

<sup>269</sup> Motoyuki Akamatsu et al., Assessment Method of Effectiveness of Passenger Seat Belt Reminder. 2012–01–0050, SAE International (2012).

<sup>270</sup> Survey of Principal Drivers of Vehicles with a Rear Seat Belt Reminder System at 47.



systems are effective at increasing seat belt use; however, estimates of the amount of increased belt usage that can be attributed to warning systems vary. In arriving at our estimates of increased seat belt usage, we examined research conducted by NHTSA and others, as well as information submitted in response to the request for comments. For rear seat passengers eleven years old and older, we used a “low” estimate of 3.4 percentage points, and a “high” estimate of 5.1 percentage points.<sup>272</sup> For rear seat passengers from six to eleven

years old, we used a low estimate of 0.27 percentage points and a high estimate of 0.41 percentage points.<sup>273</sup> (The estimated increases for younger passengers are much lower because they already have high rates of seat belt use). For simplicity, we refer to these scenarios as “Low” and “High,” or “3%” and “5%.”  
Based on these belt and warning system effectiveness estimates, we estimate that the proposed rear seat belt warning requirements would prevent 22 fatalities and 75 injuries annually under the “Low” scenario. Under the “High”

scenario, we estimate that 34 fatalities and 112 injuries would be prevented annually.<sup>274</sup> See table 9. Another way to measure benefits is by calculating equivalent lives saved. Equivalent lives saved are the number of prevented fatalities added to the number of prevented injuries, with the prevented injuries expressed in terms of fatalities (that is, with an injury expressed as a fraction of a fatality, so that the more serious the injury, the higher the fraction). The estimated equivalent lives saved are presented in table 10.

TABLE 9—ESTIMATED ANNUAL BENEFITS—LIVES SAVED AND INJURIES PREVENTED FOR POSITIVE-ONLY SBWS (REAR SEATS), WITH ESTIMATED 3 & 5 PERCENTAGE POINT INCREASE IN BELT USE

Injury level	3% (low)	5% (high)
MAIS 1 <sup>275</sup> .....	23.2	34.3
MAIS 2 .....	40.2	60.3
MAIS 3 .....	5.6	8.4
MAIS 4 .....	5.5	8.2
MAIS 5 .....	0.2	0.3
Total Injuries .....	74.7	111.5
Fatal .....	22.3	33.6

TABLE 10—ESTIMATED ANNUAL BENEFITS—EQUIVALENT LIVES SAVED—POSITIVE-ONLY SBWS (REAR SEATS) <sup>276</sup>

Belt use increase	3% Discount rate	7% Discount rate
3% increase .....	21.9	17.7
5% increase .....	32.9	26.7

We also estimated the costs of the proposed requirements. To comply with the minimum proposed requirements (the positive-only compliance option), the system would need to have seat belt buckle sensors (to determine if the belt is fastened) and wiring and wire conduits to provide information on the belt buckle status from the rear seats to the computer processor controlling the warning system. Based on the results of

NHTSA’s teardown analysis, we estimate a cost of \$6.28 per seat. Given an average of 3.12 rear seats per vehicle, this yields a final cost of \$19.59 per vehicle. Based on this, the cost to the fleet to comply with the proposed minimum requirements (the positive-only system) is \$167.8 million (M).  
Based on the forgoing, we performed benefit-cost and cost-effectiveness analyses. A benefit-cost analysis

calculates net benefits, which is the difference between the benefits flowing from injury and fatality reductions and the cost of the rule. Our net benefit estimates are presented in table 11. The cost-effectiveness analysis derives the cost per equivalent life saved, which is equal to the total cost of the rule divided by the total fatal equivalents that it prevents. These estimates are presented in table 12.

TABLE 11—NET BENEFITS—POSITIVE-ONLY SBWS (REAR SEATS) <sup>277</sup>  
[2020 Dollars, in millions]

Seat position and belt use increase	3% Discount rate	7% Discount rate
3% increase .....	\$95.6	\$46.2
5% increase .....	228.3	153.9

<sup>272</sup> See PRIA, Table 33.

<sup>273</sup> See PRIA, Table 33.

<sup>274</sup> See PRIA, Table 47.

<sup>275</sup> The Abbreviated Injury Scale (AIS) is a classification system for assessing impact injury severity developed and published by the

Association for the Advancement of Automotive Medicine and is used for coding single injuries, assessing multiple injuries, or for assessing cumulative effects of more than one injury. MAIS represents the maximum injury severity of an occupant at an AIS level, *i.e.*, the highest single AIS

for a person with one or more injuries. MAIS 1 & 2 injuries are considered minor injuries and MAIS 3–5 are considered serious injuries.

<sup>276</sup> See PRIA, Table 72.

<sup>277</sup> See PRIA, Table 79.

TABLE 12—COST-EFFECTIVENESS ANALYSIS (COST PER EQUIVALENT LIFE SAVED)—PROPOSED POSITIVE-ONLY SYSTEM<sup>278</sup>

[2020 Dollars, in millions]

Seat position and belt use increase	ELS	Cost	Cost/ELS
<b>3% Discount Rate</b>			
3% increase .....	21.9	\$166.4	\$7.6
5% increase .....	32.9	166.4	5.0
<b>7% Discount Rate</b>			
3% increase .....	17.7	\$166.4	\$9.4
5% increase .....	26.7	166.4	6.2

2. Front Seat Belt Warning System

Based on FARS and NASS–GES data from 2011 to 2015, on average 7,503 unrestrained drivers and 1,453 unrestrained front outboard passengers of passenger cars and light trucks were killed annually in traffic crashes. Additionally, 53,113 unrestrained drivers and 10,324 unrestrained front outboard passengers were, on average, injured annually. After adjusting these to account for future decreases in fatalities and injuries projected to occur in the absence of the proposed requirements due to the introduction of other mandatory safety technologies (e.g., electronic stability control), there were, on average, 6,733 fatalities and 47,952 injuries to unrestrained front seat occupants each year. This is the overall target population—the annual deaths and injuries that the proposed requirements are aimed at reducing.

According to the NOPUS, 90.6% of the drivers used the seat belt in 2021, which is slightly higher when compared to passengers in the right-front seating position with an observed belt use rate of 89.4%.<sup>279</sup> In order to estimate the percentage of drivers and front passengers who do not always use a seat belt, we used the results from a 2004 analysis using data from the Household Expenditure Panel Survey (MEPS–HC)<sup>280</sup> that found that among persons 16–64 years of age, 87.7 percent reported always or nearly always using seat belts when driving or riding in a car. Another 6.9 percent reported sometimes using seat belts, while 5.4 percent reported seldom or never using

seat belts when driving or riding in a car. These results are summarized in table 13. This means, when an observation is made about the percentage of drivers who use the seat belts, the observed belt use rate is higher than 87.7% since the other groups would contribute to the observed belt use rate although they are not always using the seat belts. NHTSA recognizes that driving habits may or may not have changed since 2002 as seat belt use rates have increased and as new generations of drivers and passengers are on the road. NHTSA considered, but tentatively decided not to use, the results of more recent studies, such as the (2016) Motor Vehicle Occupant Safety Survey<sup>281</sup> to estimate the percentage of drivers and front passengers who do not always use a seat belt. While the 2016 MVOSS is more recent, we decided to use the 2004 study because we tentatively concluded that the data provided by the 2004 study best suited the needs of our analysis. Given that most data on seat belt use is self-reported, the 2004 study has a high sample size (approximately 25,000)<sup>282</sup> and provides robust categorizations of seat belt use that fits the needs of our analysis. Furthermore, when comparing this data to the findings of the 2016 MVOSS, we did not find evidence that these trends have significantly changed over time.<sup>283</sup> NHTSA seeks comment on instead using the results of more recent studies, such as the 2016 MVOSS, or other data sources commenters are able to identify.

<sup>281</sup> Spado, D., Schaad, A., & Block, A. (2019, December). *2016 motor vehicle occupant safety survey; Volume 2: Seat belt report* (Report No. DOT HS 812 727). National Highway Traffic Safety Administration.

<sup>282</sup> Compared to the 2016 MVOSS, which had, depending on the question, sample sizes of approximately 5,000 to 10,000.

<sup>283</sup> For example, the 2016 MVOSS found that about 6% of drivers reported using their belt sometimes (most of the time or some of the time. See pg. 7 (Fig. 5) in the MVOSS.

TABLE 13—SEAT BELT USE CHARACTERISTICS

Belt user and related items	Rate (%)
A reported “sometimes using seat belts” .....	6.9
A reported “seldom or never using seat belts when driving or riding in a car” .....	5.4
Percentage of drivers who always use seat belts, calculated .....	87.7
Total .....	100.0

As we did for the rear seats, NHTSA estimated the effectiveness and benefits associated with requiring a seat belt warning system that remains activated until the seat belts are buckled for the driver and front outboard passenger seats. In developing this estimate, NHTSA used the results of a study conducted by the Insurance Institute for Highway Safety (IIHS) by Kidd et al. (2019)<sup>284</sup> In the Kidd et al. (2019) study, part-time belt users (who had a recent seat belt citation and reported not always using a seat belt) drove two vehicles for a certain period of time, a Chevrolet with three intermittent 7-second audible warnings followed by either a BMW with a 100-second audible warning (n=17) or a Subaru with an audible warning that continues until the seat belt is buckled (n=16). (All of the vehicles provided a visual warning that lasted until the seat belt was buckled.) Kidd et al. found that, relative to the intermittent reminder (i.e., 7-second audible reminder), the BMW warning with the 100-second audible reminder increased seat belt use by 30% and the Subaru warning with

<sup>284</sup> “The effects of persistent audible seat belt reminders and a speed-limiting interlock on the seat belt use of drivers who do not always use a seat belt,” April 2019, David G. Kidd Insurance Institute for Highway Safety, Jeremiah Singer Westat, Inc.

<sup>278</sup> See PRIA, Table 73.

<sup>279</sup> National Center for Statistics and Analysis. (2021, December). Seat belt use in 2021—Overall results (Traffic Safety Facts Research Note. Report No. DOT HS 813 241). National Highway Traffic Safety Administration.

<sup>280</sup> May Chu, “Statistical brief #62: Characteristics of Persons Who Seldom or Never Wear Seat Belts 2002.” [https://meps.ahrq.gov/data\\_files/publications/st62/stat62.pdf](https://meps.ahrq.gov/data_files/publications/st62/stat62.pdf).

the indefinite audible warning increased belt use by 34%.<sup>285</sup>

NHTSA estimates, based on the NOPUS, Chu, and IIHS studies, that a requirement for an indefinite duration audible seat belt warning would increase the overall observed seat belt use rate by 2.8 percentage points for the driver and 2.4 percentage points for the front outboard passenger from current observed seat belt use levels.

NHTSA also reviewed manufacturer data for model year 2020 vehicles to determine market penetration of indefinite duration seat belt warning systems in the front outboard seats and that of a 90-second or greater duration

warning and obtained the estimates in table 14.

TABLE 14—MARKET PENETRATION OF DIFFERENT DURATION SEAT BELT AUDIBLE WARNING SYSTEMS

SBWS system	Percentage of sales
<90 second warning .....	7.6
90 second and 90+ but not indefinite .....	85.2
Enhanced—Warning until seat belt is buckled .....	7.2

For front seat occupants, seat belts reduce the risk of fatality by 44% (for passenger cars) and 73% (for light

trucks and vans).<sup>286</sup> Seat belts reduce the risk of moderate to greater severity injuries by up to 50%.<sup>287</sup>

Based on the estimated seat belt warning system effectiveness in increasing seat belt use, the market penetration of different duration seat belt audible warning systems, and the effectiveness of seat belts in mitigating fatalities and injuries, NHTSA estimates that requiring an audio-visual seat belt warning that remains activated until the seat belt is buckled (indefinite duration) would prevent 65 driver fatalities, 11 front outboard passenger fatalities, and a total of 211 injuries annually, as shown in table 15. This results in 92 equivalent lives saved (Table 16).

TABLE 15—ESTIMATED ANNUAL BENEFITS—LIVES SAVED AND INJURIES PREVENTED—INDEFINITE SBWS (FRONT OUTBOARD SEATS)

Injury level	Driver	Front passenger	Total
MAIS 1 .....	20.7	3.7	24.4
MAIS 2 .....	120.0	20.5	140.5
MAIS 3 .....	21.6	3.9	25.5
MAIS 4 .....	17.4	3.1	20.5
MAIS 5 .....	0.5	0.1	0.6
Total Injuries .....	180.2	31.2	211.4
Fatal .....	65.9	11.4	77.3

The estimated annual benefits in terms of equivalent lives saved is shown in Table 17.

TABLE 16—ESTIMATED ANNUAL BENEFITS—EQUIVALENT LIVES SAVED—INDEFINITE SBWS [Front Outboard Seats]

	Undiscounted	3% Discount rate	7% Discount rate
Driver .....	78.7	65.2	52.8
Front Passenger .....	13.6	11.3	9.2
Total .....	92.3	76.5	62.0

We also estimated the costs of the proposed requirements. Since all driver seats are required to have at least the basic warning system, the incremental cost of enhanced seat belt warning for the driver seat is zero. We assume there would be some labor costs associated with software updates needed to extend the warning. However, as this is a simple programming change, this cost would be amortized over each vehicle's

production and is therefore considered de minimis. Though there are no requirements for a seat belt warning system for the front outboard passenger seat, NHTSA estimates that 96 percent of vehicles have seat belt warning systems on the front outboard passenger seat. NHTSA estimated the cost of equipping a seat belt warning system in the front outboard passenger seat to be \$2.13 per seat. Therefore, the cost of

equipping the remaining 4 percent of the 16 million new vehicle fleet is \$1.36 million (= 16 million × 4 percent × \$2.13).

Based on the foregoing, we performed benefit-cost and cost-effectiveness analyses. The estimated net benefits are presented in table 17 and the cost-effectiveness estimates are presented in Table 18.

<sup>285</sup> There were several limitations in this study, the main one being that the number of study participants was small, and, consequently, there was limited statistical power when comparing the

change in rate of belt use between the different vehicle technology conditions. The study further discusses this and other limitations, such as how

the demographics of the study sample differs from part-time belt users nationwide.

<sup>286</sup> See PRIA, Table 30.

<sup>287</sup> See PRIA, Table 30.

TABLE 17—ANNUAL MONETIZED BENEFITS, COSTS AND NET BENEFITS—INDEFINITE SBWS (FRONT OUTBOARD SEATS)  
[2020 dollars, in millions]

	Driver			Front passenger			Driver and Front Passenger		
	Undiscounted	3%	7%	Undiscounted	3%	7%	%	%	%
Passenger Car Benefits .....	\$422.5	\$353.0	\$288.0	\$79.9	\$66.7	\$54.4	\$502.4	\$419.7	\$342.4
Light Truck & Van Benefits .....	520.4	427.6	344.8	83.4	68.5	55.2	603.8	496.1	400
Total Benefits .....	942.9	780.5	632.8	163.3	135.2	109.7	1,106.2	915.8	742.5
Total Costs .....	0	0	0	1.36	1.36	1.36	1.36	1.36	1.36
Net Benefits .....	942.9	780.5	632.8	161.9	133.9	108.3	1,104.8	914.4	741.1

TABLE 18—COST-EFFECTIVENESS ANALYSIS (COST PER EQUIVALENT LIFE SAVED)—INDEFINITE SBWS (FRONT OUTBOARD SEATS)  
[2020 dollars, in millions]

Discount rate	ELS	Cost	Cost/ELS
3% .....	76.5	\$1.36	\$0.018
7% .....	62.0	1.36	0.022

3. Overall Benefits and Costs of Proposal  
In Table 19, we combine the benefits and costs for the proposed rear and front

seat belt warning requirements. We estimate positive net benefits under all

discount rates and effectiveness estimates.

TABLE 19—NET BENEFITS FROM THE PROPOSAL (SBWS FOR REAR SEATING POSITIONS AND INDEFINITE SBWS FOR FRONT OUTBOARD SEATING POSITIONS)  
[2020 dollars, in millions]

	3% Discount rate	7% Discount rate
Front Outboard Seats .....	\$914.4	\$741.1
Rear Seats (3% increase in rear seat belt use) .....	95.6	46.2
Rear Seats (5% increase in rear seat belt use) .....	228.3	153.9
Total Net Benefits (3% increase in rear belt use) .....	1,010.0	787.4
Total Net Benefits (5% increase in rear belt use) .....	1,142.7	895.0

In Table 20, we combine the equivalent lives saved and cost for the proposed rear and front seat belt

warning requirements to determine the cost per equivalent life saved.

TABLE 20—COST PER EQUIVALENT LIVES SAVED FROM THE PROPOSAL (SBWS FOR REAR SEATING POSITIONS AND INDEFINITE SBWS FOR FRONT OUTBOARD SEATING POSITIONS)  
[2020 dollars, in millions]

Category	%	3% Discount rate			7% Discount rate		
		Equivalent lives saved	Cost	Cost per equivalent lives saved	Equivalent lives saved	Cost	Cost per equivalent lives saved
Rear Seat Occupants .....	3	21.9	\$166.4	\$7.61	17.7	\$166.4	\$9.38
	5	32.9		5.05	26.7		6.23
Front Seat Occupants .....	3	76.5	1.4	0.018	62.0	1.4	0.022
	5	109.4	167.8	1.53	88.7	167.8	1.89
Total .....	3	98.4		1.71	79.7		2.11
	5						

*B. Regulatory Alternatives*

In the preceding sections of this document, we discussed various alternatives for different aspects of the proposed requirements. In Section XIII, Regulatory Alternatives, we identified five major alternatives that we

considered. We quantified the costs and benefits of three of these alternatives (rear-seat occupant detection, a 90-second front outboard seat belt warning, and front center seat belt warning). Below, we briefly summarize our results. For a more detailed discussion,

the reader is referred to the Preliminary Regulatory Impact Analysis in the docket for this rulemaking.

1. Occupant Detection in Rear Seats

For the rear seat belt reminder, NHTSA is proposing to specify three

different compliance options. One of these (the positive-only system) would not necessitate occupant detection, while the other two (the negative-only and full-status) would necessitate occupant detection. NHTSA estimated the costs and benefits of requiring a system with occupant detection.

NHTSA’s teardown analysis indicates that occupant detection components cost \$39.75 per vehicle, which, added to the \$19.59 per vehicle cost of the buckle sensor, results in a combined warning system cost of \$59.33 per vehicle (2020 \$). NHTSA estimates that about 47 percent of new vehicles have a SBWS for the rear seating positions and 7 percent of new vehicles have occupant detection in rear seats. If NHTSA selected the regulatory alternative where occupant detection is required, this would result in a total cost of \$757.7M. This cost estimate is based on the assumption that 53 percent of new vehicles would need to install a seat belt sensor in the rear seats and 93 percent would need to also install occupant detection in the rear seats to comply with the regulatory requirement.

Because there is uncertainty in how much more effective a SBWS with occupant detection would be in increasing seat belt use compared to the already estimated increase in seat belt

use with the proposed SBWS without occupant detection, NHTSA did not conduct a cost-effectiveness and net benefits analysis. Instead, NHTSA estimated the minimum increase in seat belt use for this regulatory alternative that would result in overall benefits equal to the overall costs (zero net benefits). The agency estimated that seat belt use for rear seat occupants 11 years and older would need to increase by approximately 9.4 percent when discounted at 3 percent and 11.6 percent when discounted at 7 percent for this regulatory alternative to result in zero net benefits. Therefore, increase in seat belt use from this regulatory alternative would need to be greater than 9.4 percent at 3 percent discount rate and greater than 11.6 percent at 7 percent discount rate for positive net benefits. A 9 to 12 percent increase in seat belt use is about 2 to 3 times greater than that estimated for the proposed SBWS requirement. The SBWS considered under this regulatory alternative are capable of letting the driver know, for occupied rear seats, either which occupants are not using their seat belts or how many of the rear seat occupants are not using their seat belts. While we would expect some possible increase in seat belt use from

that specific functionality, it is doubtful that it would double or triple the increase in seat belt use estimated for SBWS without occupant detection. Therefore, we do not expect this regulatory alternative to be cost-effective or net beneficial.

2. 90-Second Front Outboard Seat Belt Warning

NHTSA also estimated the costs and benefits if it were to require a 90-second audio-visual warning for the front outboard seats instead of the proposed requirement for a warning that lasts until the belt and any occupied seat is buckled. NHTSA estimated the benefits in a similar manner as that for the proposed seat belt warning for front seat occupants where the warning remains on until the seat belt is buckled. One difference is that, for the 90-second duration alternative, we assumed that the drivers and passengers who identify as never using a seat belt would likely not use the seat belt with a 90-second duration warning. Another difference is that this alternative only affects 7.6 percent of the vehicle fleet with front seat occupant seat belt warning with duration less than 90 seconds.

The benefits of this alternative are presented in Table 21.

TABLE 21—INJURIES PREVENTED, LIVES SAVED, AND EQUIVALENT LIVES SAVED IN FRONT OUTBOARD SEATS BY A 90-SECOND DURATION SBWS

Injury level	Injuries and fatalities prevented		Equivalent lives saved	
	Driver	Front passenger	Driver	Front passenger
MAIS 1 .....	1.84	0.22	0.01	0.00
MAIS 2 .....	9.85	1.18	0.46	0.05
MAIS 3 .....	1.77	0.22	0.19	0.02
MAIS 4 .....	1.43	0.18	0.38	0.05
MAIS 5 .....	0.04	0.00	0.02	0.00
Fatal .....	5.29	0.65	5.29	0.65
Total .....	.....	.....	6.34	0.77

About 7 equivalent lives are saved by this alternative, which is significantly lower than the 86 equivalent lives saved by a warning that remains on until the seat belt is buckled. The cost of this

alternative is the same as that for the proposed warning. The only cost is that for the 4 percent of vehicles without a seat belt warning system in the front outboard passenger seat (cost = \$1.36

million). The annual monetized benefits, costs, and net benefits of this alternative are shown in Table 22.

TABLE 22—ANNUAL MONETIZED BENEFITS, COSTS AND NET BENEFITS FOR A 90-SECOND DURATION SBWS IN FRONT OUTBOARD SEATS<sup>288</sup>  
[2020 dollars, in millions]

Vehicle type	Driver			Front passenger			Driver and front passenger		
	Undiscounted	3%	7%	Undiscounted	3%	7%	Undiscounted	3%	7%
PC .....	\$35.3	\$29.5	\$25.4	\$4.7	\$3.9	\$3.2	\$40.0	\$33.4	\$27.2
LTV .....	40.7	33.4	26.9	4.6	3.8	3.1	45.2	37.2	30.0
Total Benefits .....	75.9	62.9	51.0	9.3	7.7	6.2	85.2	70.6	57.2

TABLE 22—ANNUAL MONETIZED BENEFITS, COSTS AND NET BENEFITS FOR A 90-SECOND DURATION SBWS IN FRONT OUTBOARD SEATS<sup>288</sup>—Continued  
[2020 dollars, in millions]

Vehicle type	Driver			Front passenger			Driver and front passenger		
	Undiscounted	3%	7%	Undiscounted	3%	7%	Undiscounted	3%	7%
Costs .....	0	0	0	1.36	1.36	1.36	1.36	1.36	1.36
Net Benefits .....	75.9	62.9	51.0	7.9	6.3	4.9	83.8	69.2	55.9

While this regulatory alternative is cost effective, the benefits are significantly lower than that of the proposed warning.

3. Seat Belt Warning for Front Center Seat

The agency also considered requiring a seat belt warning system for the front center seating position. To estimate incremental benefits, NHTSA used the

2011–2015 FARS data, the adjustment factors to account for safety impacts of new required safety technologies, and the injury-to-fatality ratios by injury severity to establish the target population addressed by this regulatory alternative (Table 23).

TABLE 23—ANNUAL ADJUSTED FATALITIES AND NON-FATAL INJURIES TO FRONT CENTER SEAT PASSENGERS

Vehicle type	Injury severity	Restrained	Unrestrained	Total
PC .....	MAIS 1 .....	11	15	26
	MAIS 2 .....	5	7	11
	MAIS 3 .....	1	2	3
	MAIS 4 .....	1	1	2
	MAIS 5 .....	0	0	0
	Total Injuries (MAIS 1–5) .....	18	25	43
	Fatal .....	2	3	6
LTV .....	MAIS 1 .....	23	112	135
	MAIS 2 .....	8	38	46
	MAIS 3 .....	0	0	0
	MAIS 4 .....	0	2	2
	MAIS 5 .....	0	0	0
	Total Injuries (MAIS 1–5) .....	31	152	183
	Fatal .....	5	23	28

Due to a lack of data, NHTSA is unable to establish the seat belt use rate for front center passengers under the baseline. Also, due to this limitation, the agency cannot estimate the increase

in seat belt use rates under this regulatory alternative. Since front center seat passengers are most similar to right front seat passengers, NHTSA used the effectiveness rates calculated for

indefinite duration seat belt warning system for the front outboard passenger seat to estimate incremental benefits as shown in Table 24.

TABLE 24—INCREMENTAL BENEFITS FOR INDEFINITE DURATION SBWS IN FRONT CENTER SEATING POSITION

Injury severity	Observed injuries	Calculated effectiveness of indefinite duration SBWS for front outboard passenger seats (%)	Incremental benefits
<b>Passenger Cars</b>			
MAIS 1 .....	26	0.03	0.0078
MAIS 2 .....	11	0.41	0.0466
MAIS 3 .....	3	0.41	0.0129
MAIS 4 .....	2	0.41	0.0093
MAIS 5 .....	0	0.41	0.0002
Fatal .....	6	0.43	0.0241
<b>LTVs</b>			
MAIS 1 .....	135	0.03	0.0405

<sup>288</sup> See PRIA, Table 92.

TABLE 24—INCREMENTAL BENEFITS FOR INDEFINITE DURATION SBWS IN FRONT CENTER SEATING POSITION—Continued

Injury severity	Observed injuries	Calculated effectiveness of indefinite duration SBWS for front outboard passenger seats (%)	Incremental benefits
MAIS 2 .....	46	0.41	0.1878
MAIS 3 .....	0	0.41	0.0012
MAIS 4 .....	2	0.41	0.0088
MAIS 5 .....	0	0.41	0.0006
Fatal .....	28	0.43	0.1203

The cost for front center passenger seats would include the cost for a buckle sensor and occupant detection. Therefore, the cost per vehicle for this regulatory alternative is \$14.86 in 2020 dollars. This cost estimate reflects a cost of \$2.13 to add a buckle sensor and the

cost to add occupant detection for \$12.73. In assessing the number of vehicles that would be impacted by this regulatory alternative, we consider that the front center seat is not a common feature in new light vehicles. Based on our engineering judgement, we expect

that 800,000 vehicles or five percent of the new vehicle fleet include a center seating position. Table 25 presents the total cost to meet the requirements under this regulatory alternative for an indefinite duration SBWS for front center passenger seats.

TABLE 25—TOTAL COST OF INDEFINITE DURATION SBWS FOR FRONT CENTER PASSENGER SEATS

Number of vehicles impacted	Per vehicle cost	Total cost
800,000 .....	\$14.86	\$11,888,000

Table 26 presents the of the cost-effectiveness analysis and Table 27 presents the benefit-cost analysis for this regulatory alternative. When discounted at three and seven percent,

the cost per ELS is approximately \$88.9 million and \$110.0 million, respectively and the net benefits are negative for this regulatory alternative. Because the cost per ELS is higher than the

comprehensive cost of a fatality and the net benefits are negative, this regulatory alternative is not cost-effective.

TABLE 26—COST-EFFECTIVENESS ANALYSIS FOR SBWS FRONT CENTER SEAT PASSENGERS  
[Millions]

Category	Discounted at 3%			Discounted at 7%		
	Equivalent lives saved	Cost	Cost per equivalent lives saved	Equivalent lives saved	Cost	Cost per equivalent lives saved
Front Center Seat .....	0.1337	\$11.89	\$88.91	0.1081	\$11.89	\$110.00

TABLE 27—BENEFIT-COST ANALYSIS FOR SBWS FRONT CENTER SEAT PASSENGERS  
[Millions]

Category	Discounted at 3%			Discounted at 7%		
	Monetized benefits	Cost	Net benefits	Monetized benefits	Cost	Net benefits
Front Center Seat .....	\$1.60	\$11.89	-\$10.29	\$1.29	\$11.89	-\$10.59

**XV. Proposed Effective Date**

We received one comment responding to the ANPRM on the effective date. The commenter said that adequate lead-time and phase-ins should be provided. With respect to eliminating the eight-second limitation for the front seat requirements, the commenter stated that R16 and the corresponding FMVSS

requirements are safety neutral, so compliance with either of these requirements should be permitted for a sufficient period of time to permit the orderly phase-out of current models with long product refresh cycle durations.

In order to accelerate the fleet penetration of the proposed seat belt

warning requirements and to achieve the associated benefits as quickly as reasonably possible, NHTSA proposes an effective date of the first September 1 that is one year after the publication of the final rule for the front seat belt warning system requirements and the first September 1 that is two years after the publication of the final rule for the

rear seat belt warning system requirements, with optional early compliance permitted. For example, if the final rule were published on October 1, 2022, the effective date would be September 1, 2024, for the front seat belt warning system requirements and September 1, 2025, for the rear seat belt warning system requirements.

Consistent with 49 CFR 571.8(b), multi-stage manufacturers and alterers would have an additional year to comply.

To equip vehicles with one of the proposed rear seat belt warning systems, a manufacturer could utilize existing vehicle components such as door sensors, audible signals, and the center console display. Integrating a rear seat belt warning system in vehicles would require equipping the rear seats with certain components most vehicles do not already have, such as the appropriate seat belt use sensing technology (seat belt latch sensors, which are readily available).

Manufacturers would also have to redesign the hardware and software as necessary to incorporate the required signals, incorporate new visual signals in the instrument panel (if the visual signal is located there) and validate the performance of these components and systems. These endeavors take time, which we estimate to be two years.

On the other hand, almost all vehicles (96%) already have a front outboard passenger seat belt warning system. The majority of vehicle manufacturers would simply have to make software adjustments necessary to ensure it meets the proposed requirements. Occupant detection technology is readily available and the majority of the front outboard passenger seats already have a seat belt warning or occupant sensing technology needed to meet the proposed requirements. We acknowledge that a small portion of vehicles (4%) that do not have a front outboard passenger seat belt warning system will require hardware and software adjustments, but this is not a new technology and we believe manufacturers can focus their resources accordingly to meet the front seat belt warning system requirements earlier than the rear seat belt warning system requirements.

Overall, the proposed seat belt warning requirements should not require much interior redesign, nor should they require the use of much new technology. When the FMVSS No. 208 driver seat belt warning was first required in 1971, less than a year of lead time was given for vehicles that chose a compliance option that required the warning.<sup>289</sup> We believe that the

proposed effective dates will provide manufacturers with sufficient time to integrate the proposed rear and front passenger seat belt warnings (if one is not already in place).

At the same time, we appreciate the challenges multi-stage manufacturers and alterers may face as a result of these new rear seat belt warning requirements in terms of obtaining and implementing the necessary hardware. We note, however, that most of the components necessary to meet the proposed minimum performance requirements for the proposed seat belt warnings are readily available from original equipment manufacturers and we do not foresee any major delays in obtaining them. In order to provide flexibility to these small businesses, and in accordance with 49 CFR 571.8(b), multi-stage manufacturers and alterers would have an extra year of lead time.

We seek comment on these issues. If a commenter believes one year does not provide sufficient lead time for the front seat warning, NHTSA seeks comment on the types of vehicles for which additional lead time is requested and the basis for such a request. Alternatively, if a commenter believes the compliance period is too long in light of the safety considerations addressed in this NPRM, NHTSA seeks comment on an alternative compliance period.

## **XVI. Regulatory Analyses**

*Executive Order 12866, Executive Order 14094, Executive Order 13563, and DOT Regulatory Policies and Procedures*

We have considered the potential impact of this proposed rule under Executive Order 12866, Executive Order 14094, Executive Order 13563, DOT Order 2100.6A and the Department of Transportation's regulatory policies and procedures.<sup>290</sup> The Office of Management and Budget has determined that this proposed rule is a significant regulatory action and was reviewed under section 3(f)(1) of E.O. 12866, as amended by E.O. 14094. Pursuant to E.O. 12866 and the Department's policies, we have identified the problem this proposed rule addresses, assessed the benefits and costs, and considered alternatives. These analyses have been summarized in Section VI, Safety Need and Section XIV, Overview of Benefits and Costs and are discussed in more detail in the docketed preliminary regulatory impact analysis.

<sup>290</sup> 49 CFR part 5, subpart B; Department of Transportation Order 2100.6A, Rulemaking and Guidance Procedures, June 7, 2021.

## *Promoting International Regulatory Cooperation*

The policy statement in section 1 of Executive Order 13609 provides that the regulatory approaches taken by foreign governments may differ from those taken by the United States to address similar issues, and that in some cases the differences between them might not be necessary and might impair the ability of American businesses to export and compete internationally. It further recognizes that in meeting shared challenges involving health, safety, and other issues, international regulatory cooperation can identify approaches that are at least as protective as those that are or would be adopted in the absence of such cooperation and can reduce, eliminate, or prevent unnecessary differences in regulatory requirements.

In addition, section 24211 of the Infrastructure, Investment, and Jobs Act, Global Harmonization, provides that DOT "shall cooperate, to the maximum extent practicable, with foreign governments, nongovernmental stakeholder groups, the motor vehicle industry, and consumer groups with respect to global harmonization of vehicle regulations as a means for improving motor vehicle safety."<sup>291</sup>

In developing this proposal, our intent was to harmonize with ECE R16 and Euro NCAP as much as possible, but deviate where we believed it was justified with respect to the Safety Act criteria (need for safety, objectivity, practicability). The tentative reasons for following or deviating in any of these respects are explained in detail in the relevant section of the preamble. In general, we believe that although the proposal deviates from R16 in some ways, the two are not incompatible, so that it is possible to design a rear reminder system that complies with the proposed requirements and is compatible with R16. Further, almost all international NCAP programs, including those in Europe, Japan, China, Korea, Latin America, Southeast Asia, and Australia and New Zealand award points to vehicles that are equipped with seat belt warning systems for passenger seating positions. Thus, the proposed requirements are consistent with these international programs and complement those international efforts to increase seat belt use by all vehicle occupants.

## *Regulatory Flexibility Act*

Pursuant to the Regulatory Flexibility Act (5 U.S.C. 601 *et seq.*, as amended by

<sup>291</sup> H.R. 3684 (117th Congress) (2021).

<sup>289</sup> 36 FR 4600 (Mar. 10, 1971).



the Small Business Regulatory Enforcement Fairness Act (SBREFA) of 1996), whenever an agency is required to publish an NPRM or final rule, it must prepare and make available for public comment a regulatory flexibility analysis (RFA) that describes the effect of the rule on small entities (*i.e.*, small businesses, small organizations, and small governmental jurisdictions). The Small Business Administration's regulations at 13 CFR part 121 define a small business, in part, as a business entity "which operates primarily within the United States." (13 CFR 121.105(a)). No regulatory flexibility analysis is required if the head of an agency certifies that the rule will not have a significant economic impact on a substantial number of small entities. SBREFA amended the Regulatory Flexibility Act to require Federal agencies to provide a statement of the factual basis for certifying that a rule will not have a significant economic impact on a substantial number of small entities.

NHTSA has considered the effects of this proposed rule under the Regulatory Flexibility Act. According to 13 CFR 121.201, the Small Business Administration's size standards regulations used to define small business concerns, manufacturers of the vehicles covered by this final rule would fall under North American Industry Classification System (NAICS) No. 336211, *Automobile Manufacturing*, which has a size standard of 1,000 employees or fewer.

NHTSA estimates that there are three small light vehicle manufacturers in the U.S. We estimate that there are several hundred second-stage or final-stage manufacturers and alterers that could be impacted by a final rule. The agency has analyzed the economic impact on these entities. For the reasons discussed below and in the PRIA, we tentatively conclude that if made final, this proposed rule would not have a significant economic impact on a substantial number of small entities.

The proposed rule would directly affect motor vehicle manufacturers. However, we believe that the proposed rule would not have a significant economic impact on these entities. Small manufacturers are already certifying their vehicle's compliance, for the driver position, with FMVSS No. 208's seat belt warning system requirements. The means they use to certify to the current requirements would be similar to or the same as those they would use to certify to the proposed rear seat belt warning requirements.

Further, the proposed compliance test is a relatively simple test, involving a test technician positioning a person or test dummy in a seat and checking if the requisite signals activate. Checking to see if visual and audible warnings activate for the driver seat belt warning system has been a part of FMVSS No. 208 compliance testing for many years, and manufacturers are knowledgeable about conducting such tests.

Small manufacturers have options available to certify compliance, none of which will result in a significant economic impact on these entities. The manufacturers can and do obtain seating systems from seat suppliers and install the seats on the body following the instructions of the seat supplier. Seat and seat belt suppliers are large entities with resources available to assist small manufacturers in incorporating the seat belt warning systems, if manufacturers need technical assistance (which we do not think they will need, given the simplicity of the systems, particularly those rear systems that do not involve occupant detection). We do not believe that current manufacturing practices would have to change significantly as a result of a final rule.

In addition, we also believe that the proposed rulemaking would not have a significant impact on small and limited-line vehicle manufacturers because the market for the vehicles produced by these entities is highly inelastic. Purchasers of these vehicles are attracted by the desire to have an unusual vehicle. Further, all light vehicles would have to comply with the proposed requirements. Since the price of complying with the proposed rule would likely be passed on to the final consumer, the price of competitor's models would increase by similar amounts. Further, we do not believe that raising the price of a vehicle to include the cost of a rear seat belt warning system would have much, if any, effect on vehicle sales.

There are a significant number (several hundred) of second-stage or final-stage manufacturers and alterers that would be impacted by a final rule. These manufacturers buy incomplete vehicles to finish as complete vehicles or modify previously-certified vehicles. Many of these latter vehicles are van conversions; there are a variety of vehicles affected.

To produce a vehicle, a final-stage manufacturer can either stay within the incomplete vehicle document (IVD) furnished by the incomplete vehicle manufacturer (which are typically large vehicle manufacturers, such as GM or Ford), or the final-stage manufacturer can work with incomplete vehicle

manufacturers to enable the final-stage manufacturer to certify to the new requirements.<sup>292</sup> The final-stage manufacturer can also certify to the standard using due care based on an assessment of the information available to the manufacturer.

While there are a substantial number of multi-stage manufacturers that could be impacted by the proposed rule, we believe that the impact on them would not be significant. We note that these manufacturers are already certifying their vehicles to FMVSS No. 208's seat belt warning system requirements that apply to the driver seating position. They are already familiar with the equipment and manufacturing processes involved to certify their vehicles to seat belt warning system requirements. Further, we anticipate that final-stage manufacturers will base their vehicles on incomplete vehicles that already have the SBRS installed rather than install the systems themselves.

For final-stage manufacturers working with incomplete vehicles that do not have rear seats or SBRSs already installed, we tentatively believe that completing vehicles to meet the proposed requirements would be practicable. The manufacturers can obtain seats and seat belt systems (with seat belt warning system) from suppliers. NHTSA recognizes that the suppliers might be supplying larger vehicle manufacturers during the development and lead time period, and do not have the capabilities to handle all of the smaller manufacturers, including final-stage manufacturers. The rulemaking proposal accounts for this limitation by proposing to allow final-stage manufacturers an additional year to comply with the proposed requirements, to provide flexibility to these small entities and reduce the economic impact of the proposed rule on them. (See also 49 CFR 571.8(b).)

For an alterer (a person who alters by addition, substitution or removal of components [other than readily attachable components] a certified vehicle before the first purchase of the vehicle other than for resale), the impacts of the proposed rule would not be significant. The proposed rule would allow alterers an additional year to comply with the proposed requirements. If an alterer is removing

<sup>292</sup> For a discussion of NHTSA's certification regulations for final stage manufacturers, see 71 FR 28168, May 15, 2006, Docket No. NHTSA-2006-24664, Response to petitions for reconsideration of a final rule implementing regulations pertaining to multi-stage vehicles and to altered vehicles. The Background section of that document provides concepts and terminology relating to the certification of multi-stage vehicles.

rear seats, the person making the alteration would simply have to be careful not to affect the compliance of the seat belt warning system for the remaining seats. (See 49 CFR 571.8(b).)

An alterer that is adding rear seats could obtain seating systems with seat belt warning systems from seat suppliers and install the seats on the body following the instructions of the seat supplier. Changes may have to be made to the instrument panel area to add the requisite visual signal, but the proposed rule provides flexibility to manufacturers in providing the visual signal.

#### *Executive Order 13132 (Federalism)*

NHTSA has examined this proposed rule pursuant to Executive Order 13132 (64 FR 43255; Aug. 10, 1999) and concluded that no additional consultation with States, local governments, or their representatives is mandated beyond the rulemaking process. The agency has concluded that the proposed rule does not have sufficient federalism implications to warrant consultation with State and local officials or the preparation of a federalism summary impact statement. The proposed rule does not have “substantial direct effects on the States, on the relationship between the national government and the States, or on the distribution of power and responsibilities among the various levels of government.”

NHTSA rules can have preemptive effect in two ways. First, the National Traffic and Motor Vehicle Safety Act contains an express preemption provision: When a motor vehicle safety standard is in effect under this chapter, a State or a political subdivision of a State may prescribe or continue in effect a standard applicable to the same aspect of performance of a motor vehicle or motor vehicle equipment only if the standard is identical to the standard prescribed under this chapter. 49 U.S.C. 30103(b)(1). It is this statutory command by Congress that preempts any non-identical State legislative and administrative law address the same aspect of performance.

The express preemption provision described above is subject to a savings clause under which “[c]ompliance with a motor vehicle safety standard prescribed under this chapter does not exempt a person from liability at common law.” 49 U.S.C. 30103(e). Pursuant to this provision, State common law tort causes of action against motor vehicle manufacturers that might otherwise be preempted by the express preemption provision are generally preserved. However, the

Supreme Court has recognized the possibility, in some instances, of implied preemption of State common law tort causes of action by virtue of NHTSA’s rules—even if not expressly preempted.

This second way that NHTSA rules can preempt is dependent upon the existence of an actual conflict between an FMVSS and the higher standard that would effectively be imposed on motor vehicle manufacturers if someone obtained a State common law tort judgment against the manufacturer—notwithstanding the manufacturer’s compliance with the NHTSA standard. Because most NHTSA standards established by an FMVSS are minimum standards, a State common law tort cause of action that seeks to impose a higher standard on motor vehicle manufacturers will generally not be preempted. However, if and when such a conflict does exist—for example, when the standard at issue is both a minimum and a maximum standard—the State common law tort cause of action is impliedly preempted. See *Geier v. American Honda Motor Co.*, 529 U.S. 861 (2000).

Pursuant to Executive Order 13132, NHTSA has considered whether this proposed rule could or should preempt State common law causes of action. The agency’s ability to announce its conclusion regarding the preemptive effect of one of its rules reduces the likelihood that preemption will be an issue in any subsequent tort litigation.

To this end, the agency has examined the nature (*e.g.*, the language and structure of the regulatory text) and objectives of this proposed rule and does not foresee any potential State requirements that might conflict with it. NHTSA does not intend that this proposed rule preempt state tort law that would effectively impose a higher standard on motor vehicle manufacturers than that established by this proposed rule. Establishment of a higher standard by means of State tort law would not conflict with the standards proposed in this NPRM. Without any conflict, there could not be any implied preemption of a State common law tort cause of action.

#### *National Environmental Policy Act*

NHTSA has analyzed this NPRM for the purposes of the National Environmental Policy Act. The agency has determined that implementation of this action would not have a significant impact on the quality of the human environment.

#### *Executive Order 12988 (Civil Justice Reform)*

With respect to the review of the promulgation of a new regulation, section 3(b) of Executive Order 12988, “Civil Justice Reform” (61 FR 4729, February 7, 1996) requires that Executive agencies make every reasonable effort to ensure that the regulation: (1) Clearly specifies the preemptive effect; (2) clearly specifies the effect on existing Federal law or regulation; (3) provides a clear legal standard for affected conduct, while promoting simplification and burden reduction; (4) clearly specifies the retroactive effect, if any; (5) adequately defines key terms; and (6) addresses other important issues affecting clarity and general draftsmanship under any guidelines issued by the Attorney General. This document is consistent with that requirement.

Pursuant to this Order, NHTSA notes as follows. The issue of preemption is discussed above in connection with E.O. 13132. NHTSA notes further that there is no requirement that individuals submit a petition for reconsideration or pursue other administrative proceeding before they may file suit in court.

#### *Paperwork Reduction Act*

Under the procedures established by the Paperwork Reduction Act of 1995 (PRA) (44 U.S.C. 3501, *et. seq.*), Federal agencies must obtain approval from the OMB for each collection of information they conduct, sponsor, or require through regulations. A person is not required to respond to a collection of information by a Federal agency unless the collection displays a valid OMB control number. In this NPRM, NHTSA is proposing new information collection requirements. The OMB has promulgated regulations describing the process through which an agency may request and receive clearance for its information collections. Under OMB’s regulation (at 5 CFR 1320.8(d)), an agency must ask for public comment on the following: (a) whether the proposed collection of information is necessary for the proper performance of the functions of the agency, including whether the information will have practical utility; (b) the accuracy of the agency’s estimate of the burden of the proposed collection of information, including the validity of the methodology and assumptions used; (c) how to enhance the quality, utility, and clarity of the information to be collected; and (d) how to minimize the burden of the collection of information on those who are to respond, including the use of appropriate automated,

electronic, mechanical, or other technological collection techniques or other forms of information technology, e.g. permitting electronic submission of responses. In compliance with these requirements, NHTSA asks for public comments on the Information Collection Request (ICR) described below for a revision to NHTSA's existing clearance titled "Consolidated Vehicle Owner's Manual Requirements for Motor Vehicles and Motor Vehicle Equipment" (OMB Control No. 2127-0541, which is being forwarded to OMB for review and approval.

*Title:* Consolidated Vehicle Owner's Manual Requirements for Motor Vehicles and Motor Vehicle Equipment.  
*OMB Control Number:* 2127-0541.

*Type of Request:* Revision of a previously approved collection.

*Type of Review Requested:* Regular.  
*Requested Expiration Date of Approval:* 3 years from the date of approval.

*Summary of the Collection of Information:*

The National Traffic and Motor Vehicle Safety Act authorizes the Secretary of Transportation (NHTSA by delegation), at 49 U.S.C. 30111, to issue Federal Motor Vehicle Safety Standards (FMVSS) that set performance standards for motor vehicles and items of motor vehicle equipment. Further, the Secretary (NHTSA by delegation) is authorized, at 49 U.S.C. 30117, to require manufacturers to provide information to first purchasers of motor vehicles or items of motor vehicle equipment related to performance and safety in printed materials that are attached to or accompany the motor

vehicle or item of motor vehicle equipment. NHTSA has exercised this authority to require manufacturers to provide certain specified safety information to be readily available to consumers and purchasers of motor vehicles and items of motor vehicle equipment. This information is most often provided in vehicle owners' manuals and the requirements are found in 49 CFR parts 563, 571, and 575. This information collection request only covers requirements or requests to provide information that is not provided verbatim in the regulation or standard. The information requirements or requests are included in: Part 563, "Event data recorders;" FMVSS No. 108, "Lamps, reflective devices, and associated equipment;" FMVSS No. 110, "Tire selection and rims;" FMVSS No. 138, "Tire Pressure Monitoring Systems;" FMVSS No. 202a, "Head restraints;" FMVSS No. 205, "Glazing materials;" FMVSS No. 208, "Occupant crash protection;" FMVSS No. 210, "Seat belt assembly anchorages;" FMVSS No. 213, "Child restraint systems;" FMVSS No. 225, "Child restraint anchorage systems;" FMVSS No. 226, "Ejection mitigation;" FMVSS No. 303, "Fuel System Integrity of Compressed Natural Gas Vehicles;" § 575.103, "Truck-camper loading;" § 575.104, "Uniform tire quality grading standards;" and § 575.105, "Vehicle rollover." NHTSA is seeking approval from OMB for a revision of this currently approved collection.<sup>293</sup>

In this NPRM, we propose requiring that the owner's manual describe the vehicle's seat belt warning system

features, including the location, format, and meaning of the visual warnings. We also propose that the owner's manual include instructions on how to make any manual electrical connections for readily removable seats. The need for the proposed collection is discussed in Section X.C.7. If the proposed requirements are made final, we will ensure we obtain OMB approval for the proposed information collection prior to the effective date of the final rule.

*Description of the likely respondents:* Vehicle manufacturers.

*Estimated Number of Respondents:* 52.

*Estimated Total Annual Burden Hours:* 10,172.

This revision would increase the estimated annual burden hours for FMVSS No. 208 by 1,544 hours to 4,294 hours (1,544 hours + 2,750 hours) and the total estimated annual burden hours to 10,172. The change in burden reflects changes as a result of the rulemaking requiring the development of new information for the owner's manual amortized over the 3 years the information collection is approved for. NHTSA believes all manufacturers already have the engineering staff on hand needed to write the required instructions, if not already available, which they will accomplish in the regular performance of their duties. More details on the ICR and burden calculations are found in the 30-day notice NHTSA published on October 14, 2022 (87 FR 62489).

Table 28 provides a summary of the estimated hour burden and associated labor costs.

TABLE 28—ESTIMATED ANNUAL HOUR BURDEN AND ASSOCIATED LABOR COSTS

Part/section	Brief title	Number of respondents annually	Number of responses annually (i.e., number owner's manuals)	Estimated total annual burden hours	Estimated total annual labor costs at \$50.44/hour
563	Event Data Recorders	22	9,405,000	203	\$10,239
571.108	Lighting—VHAD	34	9,405,000	383	19,319
571.108	Lighting—SABs	22	15,048,000	613	30,920
571.110	Tire Selection and Rims	0	0	0	0
571.138	Tire Pressure Monitoring	22	18,810,000	438	22,093
571.202a	Head Restraints	22	18,810,000	876	44,185
571.205	Glazing	34	19,140	176	8,877
571.208	Crash Protection	22	19,360,000	4,294	216,589
571.210	Belt Anchors	22	18,810,000	438	22,093
571.213	Child Restraints	22	968,000	20	1,009
571.225	Child Restraint Anchorages	22	18,810,000	876	44,185
571.226	Ejection Mitigation	22	18,810,000	1,205	60,755
571.303	CNG Fuel Systems	15	22,000	18.00	908
575.103	Truck-Camper Loading	18	2,542,100	35.00	1,765
575.104	Tire Quality	34	15,243,030	579.00	29,205

<sup>293</sup> For a full description of the currently approved information collection, please see the 60-

day notice NHTSA published on February 22, 2022

(87 FR 9787) and the 30-day notice NHTSA published on October 14, 2022 (87 FR 62489).

TABLE 28—ESTIMATED ANNUAL HOUR BURDEN AND ASSOCIATED LABOR COSTS—Continued

Part/section	Brief title	Number of respondents annually	Number of responses annually (i.e., number owner's manuals)	Estimated total annual burden hours	Estimated total annual labor costs at \$50.44/hour
575.105 .....	Utility Vehicles .....	22	2,970,000	18.00	908
Totals .....	.....	.....	.....	10,172	513,050

There are no proposed recordkeeping requirements associated with this collection of information.

*Estimated total annual costs of the proposed collection of information:* \$8,726,501.

The FMVSS No. 208 seat belt reminder system owner's manual information requirements would require an estimated additional 4 pages to cover the general system information and the information on manual electrical

connections for readily removable rear seats. The only cost associated with publishing this information would be the cost of printing the required text. NHTSA estimates there are 17,600,000 new vehicles each year that include the FMVSS No. 208 occupant crash protection information in the owner's manual. Therefore, the estimated annual cost to manufacturers would be increased by \$755,040 (4 pages × 300 words per page × \$0.00013 per word ×

.25 cost factor × 1.1 production factor × 17,600,000 manuals) bringing the total estimated annual cost to \$8,726,501.

The total annual cost to the respondents for the currently approved collection of information published in vehicles' owner's manuals is summarized in table 29 below. More details on the ICR and cost calculations are found in the 30-day notice NHTSA published on October 14, 2022 (87 FR 62489).

TABLE 29—ESTIMATED ANNUAL COSTS

Part/section	Brief title	Estimated total costs to respondents
563 .....	Event Data Recorders .....	\$30,566
571.108 .....	Lighting—VHAD .....	38,208
571.108 .....	Lighting—SABs .....	244,530
571.110 .....	Tire Selection and Rims .....	0
571.138 .....	Tire Pressure Monitoring Systems .....	244,530
571.202a .....	Head Restraints .....	733,590
571.205 .....	Glazing .....	131
571.208 .....	Occupant Crash Protection .....	4,152,720
571.210 .....	Seat Belt Assembly Anchors .....	244,530
571.213 .....	Child Restraints Systems .....	15,730
571.225 .....	Child Restraints anchorage systems .....	943,800
571.226 .....	Ejection Mitigation .....	1,833,975
571.303 .....	Fuel System Integrity of Compressed Natural Gas Vehicles .....	36
575.103 .....	Truck-Camper Loading .....	39,657
575.104 .....	Uniform Tire Quality Grading Standards .....	193,205
575.105 .....	Vehicle Rollover .....	11,293
Total Costs .....	.....	8,726,501

*Public Comments Invited:* You are asked to comment on any aspects of this information collection, including (a) whether the proposed collection of information is necessary for the proper performance of the functions of the Department, including whether the information will have practical utility; (b) the accuracy of the Department's estimate of the burden of the proposed information collection; (c) ways to enhance the quality, utility and clarity of the information to be collected; and (d) ways to minimize the burden of the collection of information on respondents, including the use of automated collection techniques or other forms of information technology.

Please submit any comments, identified by the docket number in the heading of this document, by the methods described in the **ADDRESSES** section of this document to NHTSA and OMB. Although comments may be submitted during the entire comment period, comments received within 30 days of publication are most useful.

*National Technology Transfer and Advancement Act*

Under the National Technology Transfer and Advancement Act of 1995 (NTTAA) (Pub. L. 104–113), “all Federal agencies and departments shall use technical standards that are developed or adopted by voluntary consensus standards bodies, using such technical

standards as a means to carry out policy objectives or activities determined by the agencies and departments.”

Voluntary consensus standards are technical standards (e.g., materials specifications, test methods, sampling procedures, and business practices) that are developed or adopted by voluntary consensus standards bodies, such as SAE (formerly, the Society of Automotive Engineers). The NTTAA directs this agency to provide Congress, through OMB, explanations when the agency decides not to use available and applicable voluntary consensus standards.

While the agency is not aware of any voluntary standards that exist regarding the seat belt warnings contemplated in

this proposed rule, the agency has examined relevant regulations in other countries, such as the European Union standard ECE R16. As discussed above, although we are not aware of any foreign regulations that require seat belt warnings for the front outboard passenger or rear seat belts or for the driver seat on small buses, we believe that requiring seat belt warnings for these seating positions and for the driver seats on small buses meets a safety need and is practicable.

#### Severability

The issue of severability of FMVSSs is addressed in 49 CFR 571.9. It provides that if any FMVSS or its application to any person or circumstance is held invalid, the remainder of the part and the application of that standard to other persons or circumstances is unaffected. NHTSA seeks comment on the issue of severability.

#### Unfunded Mandates Reform Act

The Unfunded Mandates Reform Act of 1995 (Pub. L. 104–4) (UMRA) requires agencies to prepare a written assessment of the costs, benefits, and other effects of proposed or final rules that include a Federal mandate likely to result in the expenditures by States, local or tribal governments, in the aggregate, or by the private sector, of \$100 million or more (adjusted annually for inflation with base year of 1995) in any one year. Adjusting this amount by the implicit gross domestic product price deflator for 2022 results in \$177 million ( $111.416/75.324 = 1.48$ ). The assessment may be included in conjunction with other assessments, as it is here.

UMRA requires the agency to select the “least costly, most cost-effective or least burdensome alternative that achieves the objectives of the rule.” As discussed above, the agency considered alternatives to the final rule and has concluded that the requirements are the most cost-effective alternatives that achieve the objectives of the rule.

The proposed rule on SBRS is not likely to result in expenditures by State, local or tribal governments of more than \$100 million annually. However, it is estimated to result in the expenditure by automobile manufacturers and/or their suppliers by approximately \$168 million annually. The estimated costs are discussed in Section XIV and the PRIA.

We have tentatively concluded that the requirements we are proposing in this NPRM are the most cost-effective alternatives that achieve the objectives of the rule.

#### Plain Language

Executive Order 12866 and E.O. 13563 require each agency to write all rules in plain language. Application of the principles of plain language includes consideration of the following questions:

- Have we organized the material to suit the public’s needs?
- Are the requirements in the rule clearly stated?
- Does the rule contain technical language or jargon that isn’t clear?
- Would a different format (grouping and order of sections, use of headings, paragraphing) make the rule easier to understand?
- Would more (but shorter) sections be better?
- Could we improve clarity by adding tables, lists, or diagrams?
- What else could we do to make the rule easier to understand?

If you have any responses to these questions, please include them in your comments on this proposal.

#### Regulation Identifier Number (RIN)

The Department of Transportation assigns a regulation identifier number (RIN) to each regulatory action listed in the Unified Agenda of Federal Regulations. The Regulatory Information Service Center publishes the Unified Agenda in April and October of each year. You may use the RIN contained in the heading at the beginning of this document to find this action in the Unified Agenda.

#### Privacy Act

In accordance with 5 U.S.C. 553(c), DOT solicits comments from the public to better inform its rulemaking process. DOT posts these comments, without edit, to [www.regulations.gov](http://www.regulations.gov), as described in the system of records notice, DOT/ALL–14 FDMS, accessible through [www.dot.gov/privacy](http://www.dot.gov/privacy). In order to facilitate comment tracking and response, we encourage commenters to provide their name, or the name of their organization; however, submission of names is completely optional. Anyone is able to search the electronic form of all comments received into any of our dockets by the name of the individual submitting the comment (or signing the comment, if submitted on behalf of an association, business, labor union, etc.). You may review DOT’s complete Privacy Act Statement in the **Federal Register** published on April 11, 2000 (Volume 65, Number 70; Pages 19477–78).

#### XVII. Public Participation

##### *How do I prepare and submit comments?*

Your comments must be written and in English. To ensure that your comments are correctly filed in the Docket, please include the docket number indicated in this document in your comments.

Your comments must not be more than 15 pages long. (49 CFR 553.21). We established this limit to encourage you to write your primary comments in a concise fashion. However, you may attach necessary additional documents to your comments. There is no limit on the length of the attachments.

If you are submitting comments electronically as a PDF (Adobe) file, NHTSA asks that the documents be submitted using the Optical Character Recognition (OCR) process, thus allowing NHTSA to search and copy certain portions of your submissions.

Please note that pursuant to the Data Quality Act, in order for substantive data to be relied upon and used by the agency, it must meet the information quality standards set forth in the OMB and DOT Data Quality Act guidelines. Accordingly, we encourage you to consult the guidelines in preparing your comments. OMB’s guidelines may be accessed at <https://www.transportation.gov/regulations/dot-information-dissemination-quality-guidelines>.

##### *How can I be sure that my comments were received?*

If you wish the Docket to notify you upon its receipt of your comments, enclose a self-addressed, stamped postcard in the envelope containing your comments. Upon receiving your comments, the Docket will return the postcard by mail.

##### *How do I submit confidential business information?*

You should submit a redacted “public version” of your comment (including redacted versions of any additional documents or attachments) to the docket using any of the methods identified under **ADDRESSES**. This “public version” of your comment should contain only the portions for which no claim of confidential treatment is made and from which those portions for which confidential treatment is claimed has been redacted. See below for further instructions on how to do this.

You also need to submit a request for confidential treatment directly to the Office of Chief Counsel. Requests for confidential treatment are governed by 49 CFR part 512. Your request must set

forth the information specified in part 512. This includes the materials for which confidentiality is being requested (as explained in more detail below); supporting information, pursuant to § 512.8; and a certificate, pursuant to § 512.4(b) and part 512, appendix A.

You are required to submit to the Office of Chief Counsel one unredacted “confidential version” of the information for which you are seeking confidential treatment. Pursuant to § 512.6, the words “ENTIRE PAGE CONFIDENTIAL BUSINESS INFORMATION” or “CONFIDENTIAL BUSINESS INFORMATION CONTAINED WITHIN BRACKETS” (as applicable) must appear at the top of each page containing information claimed to be confidential. In the latter situation, where not all information on the page is claimed to be confidential, identify each item of information for which confidentiality is requested within brackets: “[.]”

You are also required to submit to the Office of Chief Counsel one redacted “public version” of the information for which you are seeking confidential treatment. Pursuant to § 512.5(a)(2), the redacted “public version” should include redactions of any information for which you are seeking confidential treatment (*i.e.*, the only information that should be unredacted is information for which you are not seeking confidential treatment).

NHTSA is currently treating electronic submission as an acceptable method for submitting confidential business information to the agency under part 512. Please do not send a hardcopy of a request for confidential treatment to NHTSA’s headquarters. The request should be sent to Dan Rabinovitz in the Office of the Chief Counsel at [Daniel.Rabinovitz@dot.gov](mailto:Daniel.Rabinovitz@dot.gov). You may either submit your request via email or request a secure file transfer link. If you are submitting the request

via email, please also email a courtesy copy of the request to John Piazza at [John.Piazza@dot.gov](mailto:John.Piazza@dot.gov).

*Will the agency consider late comments?*

We will consider all comments received before the close of business on the comment closing date indicated above under **DATES**. To the extent possible, we will also consider comments that the docket receives after that date. If the docket receives a comment too late for us to consider in developing a final rule (assuming that one is issued), we will consider that comment as an informal suggestion for future rulemaking action.

*How can I read the comments submitted by other people?*

You may read the comments received by the docket at the address given above under **ADDRESSES**. The hours of the docket are indicated above in the same location. You may also see the comments on the internet. To read the comments on the internet, go to <https://www.regulations.gov>. Follow the online instructions for accessing the dockets.

Please note that even after the comment closing date, we will continue to file relevant information in the docket as it becomes available. Further, some people may submit late comments. Accordingly, we recommend that you periodically check the Docket for new material. You can arrange with the docket to be notified when others file comments in the docket. See [www.regulations.gov](http://www.regulations.gov) for more information.

#### **Appendix A—Front Outboard Seat Belt Warnings—Additional Data**

In Section XI we looked at the durations of the visual and audible seat belt warnings for the driver and front outboard passenger seats provided on new (MY 2022) vehicles. There we tabulated warning durations by the

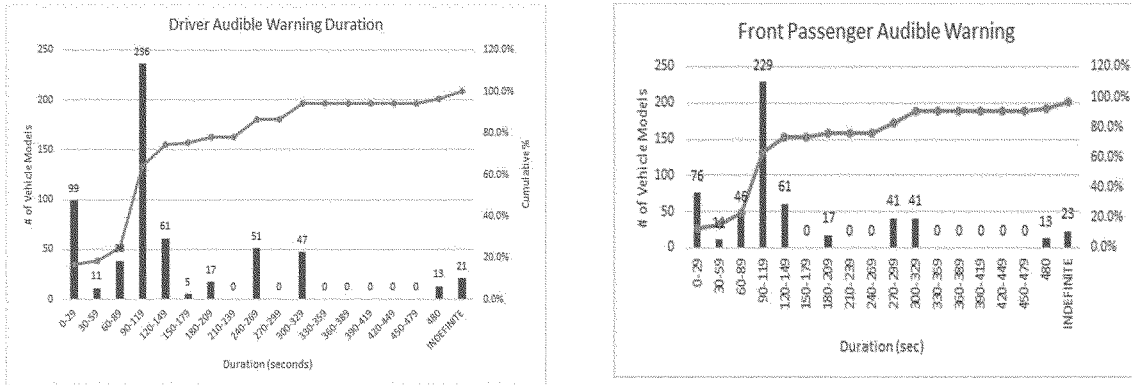
proportion of total projected sales of the vehicle models within each durational range. In this appendix, we provide a brief discussion of, and data for, the warning durations provided in new vehicles tabulated by the number of vehicle models within each durational range. The results are largely the same but do show some differences. The differences could be attributed to lack of projected sales data for some vehicle models, but we provide other potential explanations below.

For example, when tabulated by vehicle model instead of as a share of total projected sales, a larger proportion of vehicles have a very short duration audible seat belt warning. As we saw in the discussion in Section XI, only a very small proportion of new vehicles projected to be sold have a very short-duration audible warning lasting six or eight seconds (about 1% for the driver warning, and .3% for the passenger warning). However, the share of vehicles with such short warnings is substantially higher when tabulated as a proportion of vehicle models (about 17% for the driver warning and 14% for the passenger warning) (see Figure A.1). This could be because these vehicles are not expected to have a high sales volume.

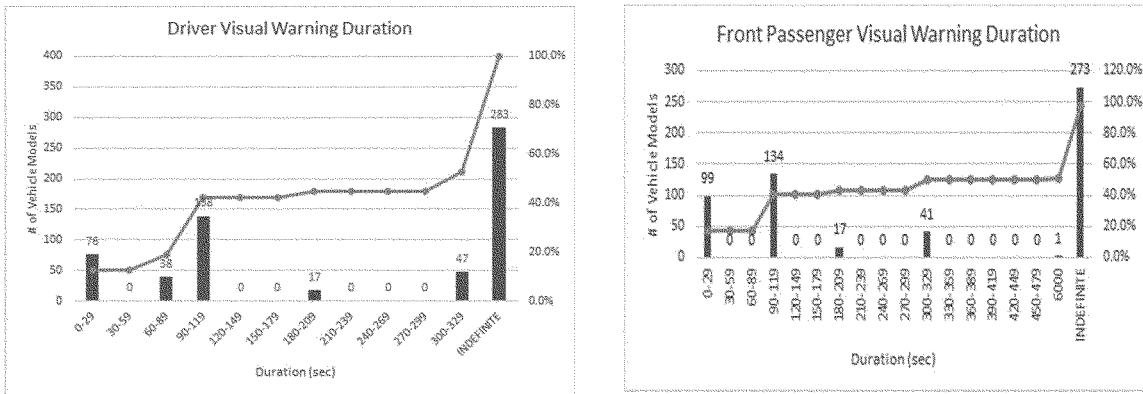
The same situation holds for longer duration audible warnings. A large proportion of the vehicles projected to be sold provide a warning that lasts at least 1.5 min (90 + sec) (92% for the driver warning, 76% for the passenger warning), while the share of vehicles with this warning duration is substantially lower when tabulated as a proportion of vehicle models (about 80% for both the driver and passenger warnings) (see Figure A.1). In this case these vehicle models are likely high sales volume vehicles. Similar differences are also apparent for the visual warning. See Figure A.2.

**BILLING CODE 4910-59-P**

**Fig. A.1 - Audible warning durations (as % of vehicle models offered for sale)**



**Fig. A.2 – Visual warning durations (as % of vehicle models offered for sale)**



We believe the analysis in terms of sales volume is more meaningful, because that reflects the number of vehicles that are actually equipped with—and occupants that are actually exposed to—such warnings. For example, while only a small proportion of vehicles (about 1% by sales volume) have a very short-duration driver audible warning (six or eight seconds), these vehicles account for about 17% of vehicle models for which we had data. That is, very short warnings appear to be provided in a relatively high proportion of small-volume vehicle models. However, the sales volume data better reflects how common these short duration warnings are—relatively not that common in the sense that only a small proportion of new vehicles sold have these very short duration warnings.

**List of Subjects in 49 CFR Part 571**

Imports, Motor vehicle safety, Motor vehicles.

**Proposed Regulatory Text**

For the reasons discussed in the preamble, the National Highway Traffic Safety Administration proposes to amend 49 CFR part 571 as follows:

**PART 571—FEDERAL MOTOR VEHICLE SAFETY STANDARDS**

**Subpart B—Federal Motor Vehicle Safety Standards**

- 1. The authority citation for part 571 continues to read as follows:

**Authority:** 49 U.S.C. 322, 30111, 30115, 30117, and 30166; delegation of authority at 49 CFR 1.95.

- 2. Amend § 571.101 by:

- a. Revising paragraph S5.5.6; and

- b. Revising table 1 and table 2. The revisions read as follows.

**§ 571.101 Standard No. 101; Controls and displays.**

\* \* \* \* \*










S5.5.6(a) Except as provided in S5.5.6(b) and (c), messages displayed in a common space may be cancelable automatically or by the driver.

(b) Telltales for high beams, turn signal, low tire pressure, and passenger air bag off, and telltales for which the color red is required in table 1 to § 571.101 must not be cancelable while the underlying condition for their activation exists.




(c) Telltales for the seat belts must not be cancellable by the driver before the minimum durations are satisfied but may be cancellable automatically as specified in FMVSS No. 208.


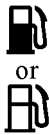



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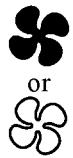


Table 1 to § 571.101 Controls, Telltales, and Indicators With Illumination or Color Requirements <sup>1</sup>

Column 1 ITEM	Column 2 SYMBOL	Column 3 WORDS OR ABBRE- VIATIONS	Column 4 FUNCTION	Column 5 ILLUMIN- ATION	Column 6 COLOR
Highbeam <sup>2</sup>	 3, 5	-----	Telltale	-----	Blue or Green <sup>4</sup>
Turn signals <sup>2</sup>	 3, 6	-----	Control	-----	-----
			Telltale	-----	Green <sup>4</sup>
Hazard warning signal	 3	Hazard	Control	Yes	-----
			-----	Telltale <sup>7</sup>	-----
Position, side marker, end-outline marker, identification, or clearance lamps	 3,8	Marker Lamps or MK Lps <sup>8</sup>	Control	Yes	-----
Windshield wiping system		Wiper or Wipe	Control	Yes	-----
Windshield washing system		Washer or Wash	Control	Yes	-----
Windshield washing and wiping system combined		Washer-Wiper or Wash-Wipe	Control	Yes	-----
Windshield defrosting and defogging system		Defrost, Defog, or Def.	Control	Yes	-----
Rear window defrosting and defogging system		Rear Defrost, Rear Defog, Rear Def., or R-Def.	Control	Yes	-----
Brake system malfunction	-----	Brake	Telltale	-----	Red <sup>4</sup>



Column 1 ITEM	Column 2 SYMBOL	Column 3 WORDS OR ABBRE- VIATIONS	Column 4 FUNCTION	Column 5 ILLUMIN- ATION	Column 6 COLOR
Antilock brake system malfunction for vehicles subject to FMVSS 105 or 135	-----	Antilock, Anti-lock, or ABS <sup>9</sup>	Telltale	-----	Yellow
Malfunction in Variable Brake Proportioning System	-----	Brake Proportioning <sup>9</sup>	Telltale	-----	Yellow
Regenerative brake system malfunction	-----	RBS or ABS/RBS <sup>9</sup>	Telltale	-----	Yellow
Malfunction in antilock system for vehicles other than trailers subject to FMVSS 121	-----	ABS or Antilock <sup>9</sup>	Telltale	-----	Yellow
Antilock brake system trailer fault for vehicles subject to FMVSS 121		Trailer ABS or Trailer Antilock	Telltale	-----	Yellow
Brake pressure (for vehicles subject to FMVSS 105 or 135)	-----	Brake Pressure <sup>9</sup>	Telltale	-----	Red <sup>4</sup>
Low brake fluid condition (for vehicles subject to FMVSS 105 or 135)	-----	Brake Fluid <sup>9</sup>	Telltale	-----	Red <sup>4</sup>
Parking brake applied (for vehicles subject to FMVSS 105 or 135)	-----	Park or Parking Brake <sup>9</sup>	Telltale	-----	Red <sup>4</sup>
Brake lining wear-out condition (for vehicles subject to FMVSS 135)	-----	Brake Wear <sup>9</sup>	Telltale	-----	Red <sup>4</sup>
Electronic Stability Control System Malfunction (for vehicles subject to FMVSS 126) <sup>10, 11</sup>		ESC <sup>12</sup>	Telltale	-----	Yellow
Electronic Stability Control System "OFF" (for vehicles subject to FMVSS 126) <sup>10</sup>		ESC OFF	Control	Yes	-----
			Telltale	-----	Yellow

Column 1 ITEM	Column 2 SYMBOL	Column 3 WORDS OR ABBRE- VIATIONS	Column 4 FUNCTION	Column 5 ILLUMIN- ATION	Column 6 COLOR
Electronic Stability Control System Malfunction (for vehicles subject to FMVSS 136) <sup>11</sup>		ESC	Telltale	-----	Yellow
Fuel Level		Fuel	Telltale	-----	-----
			Indicator	Yes	-----
Engine oil pressure	 <sup>13</sup>	Oil	Telltale	-----	-----
			Indicator	Yes	-----
Engine coolant temperature	 <sup>13</sup>	Temp	Telltale	-----	-----
			Indicator	Yes	-----
Electrical charge		Volts or Charge or Amp	Telltale	-----	-----
			Indicator	Yes	-----
Engine stop	-----	Engine Stop <sup>14</sup>	Control	Yes	-----
Automatic vehicle speed (cruise control)	-----	-----	Control	Yes	-----
Speedometer	-----	MPH, or MPH and km/h <sup>15</sup>	Indicator	Yes	-----

Column 1 ITEM	Column 2 SYMBOL	Column 3 WORDS OR ABBRE- VIATIONS	Column 4 FUNCTION	Column 5 ILLUMIN- ATION	Column 6 COLOR
Heating and Air conditioning system	-----	-----	Control	Yes	-----
Automatic transmission control position <i>(park)</i> <i>(reverse)</i> <i>(neutral)</i> <i>(drive)</i>	-----	<b>P R N D</b> <small>16</small>	Indicator	Yes	-----
Heating and/or air conditioning fan		Fan	Control	Yes	-----
Low Tire Pressure (including malfunction) (See FMVSS 138)	 <small>17</small>	Low Tire <small>17</small>	Telltale	-----	Yellow
Low Tire Pressure (including malfunction that identifies involved tire) (See FMVSS 138)	 <small>17</small>	Low Tire <small>17</small>	Telltale	-----	Yellow
Tire Pressure Monitoring System Malfunction (See FMVSS 138) <sup>18</sup>	-----	TPMS <small>17, 19</small>	Telltale	-----	Yellow
Rear Seat Belt Warning	----- <sup>20</sup>	Rear belt(s) in use or Rear belt(s) not in use	Telltale	-----	Green or Red <sup>21</sup>

**Notes:**

<sup>1</sup> An identifier is shown in this table if it is required for a control for which an illumination requirement exists or if it is used for a telltale for which a color requirement exists. If a line appears in column 2 and column 3, the control, telltale, or indicator is required to be identified, however the form of the identification is the manufacturer's option. Telltales are not considered to have an illumination requirement, because by definition the telltale must light when the condition for its activation exists.

<sup>2</sup> Additional requirements in FMVSS 108.

<sup>3</sup> Framed areas of the symbol may be solid; solid areas may be framed.

<sup>4</sup> Blue may be blue-green. Red may be red-orange.

<sup>5</sup> Symbols employing four lines instead of five may also be used.

<sup>6</sup> The pair of arrows is a single symbol. When the controls or telltales for left and right turn operate independently, however,

the two arrows may be considered separate symbols and be spaced accordingly.

<sup>7</sup> Not required when arrows of turn signal telltales that otherwise operate independently flash simultaneously as hazard warning telltale.

<sup>8</sup> Separate identification is not required if function is combined with master lighting switch.

<sup>9</sup> Refer to FMVSS 105 or FMVSS 135, as appropriate, for additional specific requirements for brake telltale labeling and color. If a single telltale is used to indicate more than one brake system condition, the brake system malfunction identifier must be used.

<sup>10</sup> Requirement effective September 1, 2011.

<sup>11</sup> A manufacturer may use this telltale in flashing mode to indicate ESC operation.

<sup>12</sup> This symbol may also be used to indicate the malfunction of related systems/functions, including traction control, trailer stability assist, corner brake control, and other similar

functions that use throttle and/or individual wheel torque control to operate and share common components with ESC.

<sup>13</sup> Combination of the engine oil pressure symbol and the engine coolant temperature symbol in a single telltale is permitted.

<sup>14</sup> Use when engine control is separate from the key locking system.

<sup>15</sup> If the speedometer is graduated in both miles per hour and in kilometers per hour, the scales must be identified "MPH" and "km/h", respectively, in any combination of upper- and lowercase letters.

<sup>16</sup> The letters 'P', 'R', 'N', and 'D' are considered separate identifiers for the individual gear positions. Their locations within the vehicle, and with respect to each other, are governed by FMVSS 102. The letter 'D' may be replaced by another alphanumeric character or symbol chosen by the manufacturer.

<sup>17</sup> Required only for FMVSS 138 compliant vehicles.

<sup>18</sup> Alternatively, either low tire pressure telltale may be used to indicate a TPMS malfunction. See FMVSS 138.




<sup>19</sup> Required only for vehicles manufactured on or after September 1, 2007.

<sup>20</sup> A symbol may be used at the manufacturer's option as provided in FMVSS No. 208 S7.5.

<sup>21</sup> These are the colors for the symbols if symbols are chosen. If a symbol is used to indicate to the driver how many or which rear seat belts are in use, the color of the illuminated symbol must be green. If symbols are used to indicate to the driver how many or which rear seat belts are not in use the

color of the illuminated symbol must be red. See FMVSS 208 S7.5(c)(1).

**Table 2 to § 571.101 Identifiers for Controls, Telltales and Indicators With No Color or Illumination Requirements**

Column 1 ITEM	Column 2 SYMBOL	Column 3 WORD(S) OR ABBREVIATION
Hand Throttle Control	-	Throttle
Engine Start Control	-	Engine Start <sub>1</sub>
Manual Choke Control	-	Choke
Odometer	-	Kilometers or km, if kilometers are shown. Otherwise, no identifier is required. <sup>2</sup>
Horn		Horn
Master Lighting Switch		Lights
Headlamps and Taillamps Control	-	- <sup>4,5</sup>
Low Brake Air Pressure Telltale (for vehicles subject to FMVSS 121)	-	Brake Air
Front Seat Belt Unfastened Telltale		Fasten Belts or Fasten Seat Belts

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*Notes:*

1. Use when engine control is separate from the key locking system.
  2. Any combination of upper- or lowercase letters may be used.
  3. Framed areas may be filled.
  4. If a line appears in Column 2 and Column 3, the Control, Telltale or Indicator is required to be identified, however the form of the identification is the manufacturer's option.
  5. Separate identification not required if function is combined with Master Lighting Switch.
- 3. Amend § 571.208 by:
    - a. Adding paragraphs S4.1.5.7, S4.1.5.7.1, S4.1.5.8, S4.1.5.8.1, S4.2.8,

S4.2.8.1, S4.2.9, S4.2.9.1, S4.4.3.4, S4.4.3.4.1, S4.4.3.5, S4.4.3.5.1, and S4.5.1.(f)(3);

- b. Revising paragraph S4.5.3.3(b); and
- c. Adding paragraph S7.5.

The revisions and additions read as follows:

**§ 571.208 Standard No. 208; Occupant crash protection.**

\* \* \* \* \*

S4.1.5.7. *Front seat belt warnings for passenger cars manufactured on or after [insert date the first September 1 that is one year after the date of publication of a final rule].*

S4.1.5.7.1 Any front outboard designated seating position and any inboard designated seating position for which a seat belt warning is specified in S4.1.5.6 shall comply with S7.5.

S4.1.5.8. *Rear seat belt warnings for passenger cars manufactured on or after [insert date the first September 1 that is two years after the date of publication of a final rule].*

S4.1.5.8.1. All rear designated seating positions, except in law enforcement vehicles, shall comply with S7.5.

\* \* \* \* \*

S4.2.8 *Front seat belt warnings for trucks and multipurpose passenger*

vehicles manufactured on or after [insert date the first September 1 that is one year after the date of publication of a final rule] with a GVWR of 4,536 kg (10,00 lb) or less.

S4.2.8.1. All front outboard designated seating positions certified to a compliance option requiring a seat belt shall comply with S7.5.

S4.2.9 Rear seat belt warnings for trucks and multipurpose passenger vehicles manufactured on or after [insert date the first September 1 that is two years after the date of publication of a final rule] with a GVWR of 4,536 kg (10,00 lb) or less.

S4.2.9.1. All rear designated seating positions certified to a compliance option requiring a seat belt, except law enforcement vehicles, shall comply with S7.5.

\* \* \* \* \*

S4.4.3.4 Front seat belt warnings for buses manufactured on or after [insert date the first September 1 that is one year after the date of publication of a final rule] with a GVWR of 4,536 kg (10,000 lb) or less.

S4.4.3.4.1 All front outboard designated seating positions shall comply with S7.5.

S4.4.3.5 Rear seat belt warnings for buses manufactured on or after [insert date the first September 1 that is two years after the date of publication of a final rule] with a GVWR of 4,536 kg (10,000 lb) or less.

S4.4.3.5.1 All rear designated seating positions certified to a compliance option requiring a seat belt, except for school buses and law enforcement vehicles, shall comply with S7.5.

\* \* \* \* \*

S4.5.1 Labeling and owner's manual information.

\* \* \* \* \*

(f) \* \* \*

(3) The owner's manual (which includes information provided by the vehicle manufacturer to the consumer, whether in digital or printed form) for any vehicle equipped with a seat belt warning system must include an accurate description of the system features and warning signals, including the location and format of the visual warnings, in an easily understandable format. The description shall include information on when the different features of the warning system will activate and how to interpret the visual warnings. For vehicles with any rear designated seating position that is a readily removable seat (a seat designed to be easily removed and replaced by means installed by the manufacturer for that purpose) equipped with manual electrical connections that are utilized

by the rear seat belt warning system, the owner's manual (which includes information provided by the vehicle manufacturer to the consumer, whether in digital or printed form) must include a description of the purpose of the connection, instructions on how to achieve a proper connection in an easily understandable format, and a description of how not achieving a proper connection may affect the proper functioning of the system.

\* \* \* \* \*

S4.5.3.3 An automatic seat belt furnished pursuant to S4.5.3 shall:

\* \* \* \* \*

(b) Conform to the seat belt warning system requirements of S7.5.

\* \* \* \* \*

S7.5 Seat belt warning systems for front outboard seat belt assemblies in vehicles manufactured on or after [insert date the first September 1 that is one year after the date of publication of a final rule] provided in accordance with the requirements of S4.1.5.7, S4.2.8, S4.4.3.4, and S4.5.3.3, and rear seat belt assemblies in vehicle manufactured on or after [insert date the first September 1 that is two years after the date of publication of a final rule] provided in accordance with the requirements of S4.1.5.8, S4.2.9, S4.4.3.5, and S4.5.3.3.

(a) Definitions for S7.5. (1) A manual seat belt is not in use when the seat belt latch mechanism is not fastened. A seat belt is in use when the seat belt latch mechanism is fastened. An automatic seat belt is not in use when the seat belt latch mechanism is not fastened or, if the automatic belt is non-detachable, the emergency release mechanism is in the released position. If the automatic seat belt is motorized, whether the seat belt is in use is determined when the seat belt webbing is in its locked protective mode at the anchorage point.

(2) A front outboard passenger seating position is occupied when an occupant or dummy that weighs 46.7 kg (103 lb) or greater and is 139.7 cm (55 inches) tall or taller is seated in the seat.

(3) A rear seating position is occupied when an occupant or dummy that weighs 21 kg (46.5 lb) or greater and is 114 cm (45 inches) tall or taller is seated in the seat.

(4) A warning cycle for an intermittent audible warning consists of period(s) when the warning is active at the chime frequency or continuously, and of inactive period(s). A warning cycle begins with an active period and is 30 seconds in duration.

(5) Chime frequency means the repetition rate for an intermittent

audible warning when the warning is active.

(6) Duty cycle means the total amount of time an intermittent audible warning is active during a warning cycle at the chime frequency or continuously, divided by the total warning cycle duration (30 seconds).

(b) Front outboard seat belt warning system. For vehicles subject to this requirement, a driver's designated seating position and any front outboard passenger designating seating position must be equipped with an audio-visual seat belt warning meeting the requirements of S7.5(b)(1) through (5) when tested in accordance with S7.5(d).

(1) Activation and duration—(i) Start of trip warning. An audio-visual warning must activate when the ignition switch is placed in the "on" or "start" position if the seat is occupied and the seat belt is not in use. The audio-visual warning must continue until the seat belt that triggered the warning is in use. The audio-visual warning is otherwise not permitted to activate except to comply with S7.5(b)(1)(ii).

(ii) Change-of-status warning. An audio-visual warning must activate when the ignition switch is in the "on" or "start" position, the vehicle is in forward or reverse drive mode, and the status of the seat belt changes from in use to not in use, unless a front door on the same side of the vehicle as the seat belt triggering the warning is open, in which case a warning is not required and the system may consider this as a new trip with respect to that seat belt and reset the warning system. The audio-visual warning must continue until the seat belt that triggered the warning is in use.

(2) Visual warning. (i) If there is a driver's designated seating position, the visual warning for the driver's seat belt must be visible from the driver's seat and the visual warning for the front outboard passenger seat belt must be visible from the driver's seat and the front outboard passenger seat.

(ii) If there is not a driver's designated seating position, the visual warning for each outboard passenger designated seating position must be visible from each outboard passenger designated seating position.

(iii) The visual warning may be continuous or intermittent and must display the identifying symbol or the words specified in table 2 of FMVSS 101.

(iv) For telltales associated with multiple front outboard seats, the seat with which each telltale is associated must be clearly recognizable to a driver and to any front outboard passenger.

(3) *Audible warning.* The audible warning may be continuous or intermittent. If intermittent, the audible warning when active must be continuous or have a chime frequency of at least 0.5 Hz and a duty cycle of at least 0.2. The same audible warning may be used for all seats.

(4) *Cancellation.* The warning must not be able to be canceled or deactivated.

(5) *Override.* The warning must not be overridden by other warnings.

(c) *Rear passenger seat belt warning system.* For vehicles subject to this requirement, all rear designated seating positions must be equipped with a warning system that conforms to the requirements of S7.5(c)(1) through (6) when tested in accordance with S7.5(d).

(1) *Activation and duration*—(i) *Start of trip warning.* A visual warning must activate when the ignition switch is placed in the “on” or “start” position and last for at least 60 seconds, except for systems certified to S7.5(c)(2)(i)(B) when there are no occupied rear seats with a seat belt that is not in use.

(ii) *Change-of-status warning.* An audio-visual warning must activate when the ignition switch is in the “on” or “start” position, the vehicle is in forward or reverse drive mode, and the status of the seat belt changes from in use to not in use, unless any rear door is open, in which case a change-of-status warning is not required and the system may consider this situation as a new trip with respect to that seat belt and reset the warning system. The audio-visual warning must last for at least 30 seconds or until the seat belt that triggered the warning is in use.

(2) *Visual warning.* (i) The visual warning may be continuous or intermittent and must consist of symbols or text visible from the driver’s seat indicating:

(A) How many or which rear seat belts are in use;

(B) For the occupied rear seats, how many or which rear seat belts are not in use;

(C) For the occupied rear seats, how many or which rear seat belts are in use and how many or which rear seat belts are not in use; or

(D) (For the change-of-status warning only) that a seating position experienced a seat belt change-of-status from in use to not in use.

(ii) The warning must not indicate a seat belt is not in use for an unoccupied seat.

(iii) If symbols are used to indicate to the driver how many or which rear seat belts are in use, the color of the illuminated symbols must be green. If symbols are used to indicate to the

driver how many or which rear seat belts are not in use, the color of the illuminated symbols must be red.

(iv) If text is used to indicate to the driver how many or which rear seat belts are in use or not in use, the text must contain the words “rear belt(s) in use” or “rear belt(s) not in use.”

(v) The visual warning must not be overridden by other visual warnings.

(3) *Audible warning.* The audible warning may be continuous or intermittent. If intermittent, inactive periods longer than 3 seconds will not be counted toward the total duration of the audible warning. The same audible warning may be used for all rear seats, and the same audible warning may be used for the rear as for the front.

(4) *Cancellation.* The warning must not be able to be canceled or deactivated.

(5) *Override.* The warning must not be overridden by other warnings.

(6) *Seat electrical connection requirements.* Any rear designated seating position consisting of a readily removable seat (a seat designed to be easily removed and replaced by means installed by the manufacturer for that purpose) that is equipped with electrical connections utilized by the rear seat belt warning system must either—

(i) Automatically connect the electrical connections when the seat is put in place; or

(ii) If a manual electrical connection is required, the connectors must be readily accessible.

(7) *Electrical connection warning signal.* Vehicles that provide a visual warning according to S7.5(c)(2)(i)(B) and are equipped with any readily removable rear seat(s) (a seat designed to be easily removed and replaced by means installed by the manufacturer for that purpose) must, when the ignition switch is placed in the “on” or “start” position, provide an intermittent visual warning visible from the driver’s seat if a seat has been installed and a proper electrical connection has not been made. The visual warning must remain active until all the rear seat electrical connections are properly made.

(d) *Test procedures*—(1) *In general.* (i) If testing with any designated seating position occupied, use the seating procedures in S7.5(d)(2) for front designated seating positions and the seating procedures in S7.5(d)(3) for rear designated seating positions.

(ii) Place the ignition switch in the “on” or “start” position and verify that the seat belt warnings function as specified in S7.5(b) and S7.5(c), for any combination of seat belt use or seat occupancy at any designated seating position(s).

(2) *Seating procedures for front designated seating positions*—(i) *Anthropomorphic test devices used for testing.* The anthropomorphic test device (test dummy) is any of the anthropomorphic test devices specified in part 572 that meet the criteria specified in S7.5(a)(2).

(ii) *Seating procedure.* (A) With the seat back in the manufacturer’s nominal design riding position, any other seat adjustments in any position, and any adjustable seat belt anchorages in any position, seat the test dummy such that the midsagittal plane of the dummy is vertical and within  $\pm 10$  mm of the seat centerline, with the torso and pelvis in contact with the seat back.

(B) At the option of the manufacturer (irrevocably selected prior to or at the time of certification of the vehicle), instead of using test dummies, a human being (dressed in a cotton T-shirt, full length cotton trousers, and sneakers) may be used whose weight and height (including this clothing) meet the criteria specified in S7.5(a)(2). The person should be seated in order to match, to the extent possible, the final physical position specified in S7.5(d)(2)(ii)(A).

(3) *Seating procedures for rear designated seating positions*—(i) *Anthropomorphic test devices used for testing.* The anthropomorphic test device is any of the anthropomorphic test devices specified in part 572 that meet the criteria specified in S7.5(a)(3).

(ii) *Seating procedure.* (A) With the seat back in the manufacturer’s nominal design riding position, any other seat adjustments in any position, and any adjustable anchorages in any position, seat the test dummy such that the midsagittal plane of the dummy is vertical and within  $\pm 10$  mm of the seat centerline, with the torso and pelvis in contact with the seat back; or

(B) At the option of the manufacturer (irrevocably selected prior to or at the time of certification of the vehicle), instead of using test dummies, a human being (dressed in a cotton T-shirt, full length cotton trousers, and sneakers) may be used whose weight and height (including this clothing) meet the criteria specified in S7.5(a)(3). The person should be seated in order to match, to the extent possible, the final physical position specified in S7.5(d)(3)(ii)(A).

\* \* \* \* \*

Issued under authority delegated in 49 CFR 1.95, 501.4, and 501.5.

**Ann Carlson,**  
Acting Administrator.

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