DEPARTMENT OF TRANSPORTATION

National Highway Traffic Safety Administration

49 CFR Part 571

[Docket No. NHTSA-2012-0038]

RIN 2127-AK18

Federal Motor Vehicle Safety Standards; Accelerator Control Systems

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

ACTION: Proposed rule; withdrawal.

SUMMARY: This action withdraws the notice of proposed rulemaking (NPRM) published in the Federal Register on April 16, 2012, proposing amendments to Federal Motor Vehicle Safety Standard FMVSS No. 124, *Accelerator Control Systems*. The NPRM proposed to make two amendments to the standard: add a new brake-throttle override (BTO) requirement to address unintended acceleration situations and amend the return-to-idle requirements to include electronic throttle control (ETC) systems. After further analysis of the comments received and other considerations, the agency has decided to withdraw the rulemaking proposal because: the widespread adoption of the BTO system makes FMVSS changes unnecessary and a broader understanding of safe design of vehicle electronic control systems is needed to make an informed decision on regulating return-to-idle on ETC systems.

DATES: The NPRM published in the Federal Register on April 16, 2012, at 77 FR 22638, is withdrawn as of [**INSERT DATE OF PUBLICATION IN THE FEDERAL REGISTER**].

ADDRESSES: Comments on the NPRM are available in Docket No. NHTSA-2012-0038 at http://www.regulations.gov.

FOR FURTHER INFORMATION CONTACT: Michael Pyne, Office of Crash Avoidance Standards, by telephone at 202-366-4171, and by fax at 202-493-2990 or David Jasinski, Office of the Chief Counsel, by telephone at 202-366-2992, and by fax at 202-366-3820. You may send mail to these officials at the National Highway Traffic Safety Administration, 1200 New Jersey Avenue, S.E., Washington, D.C. 20590.

SUPPLEMENTARY INFORMATION:

I. Background

Acceleration control is one of the fundamental aspects of the driving task and is critical for the safe operation of a motor vehicle. Traditionally, a driver uses a pedal to control the amount of engine torque provided to accelerate the vehicle and maintain a desired speed, as well as to reduce or remove torque to slow the vehicle. Loss of acceleration control, which includes "unintended acceleration" (UA), can have serious safety consequences. Based on NHTSA's previous review and analysis of vehicle owner-provided narratives in the Vehicle Owner's Questionnaire (VOQ) database,[1] some UA incidents appear to have involved stuck or trapped accelerator pedals, and a portion of those incidents resulted in crashes. UA events can arise from driver error or vehicle problems, such as accelerator pedal interference that prevents the pedal from being fully released. Another possible failure is separation of throttle-control components,

[1] https://www.safercar.gov/

which was more of a risk when mechanical linkages were commonly used; however, the agency was not able to identify that type of failure with certainty from the limited technical information available in the VOQs.

FMVSS No. 124 was created to address loss of control of vehicle acceleration by establishing requirements for return of a vehicle's throttle to the idle position when the driver removes the actuating force from the accelerator control ("normal operation") or in the event of a severance or disconnection in the accelerator control system ("failsafe operation").[2] The wording of the requirements in FMVSS No. 124 focuses on maintaining accelerator control via return springs acting directly or remotely through linkages on the throttle plate of gasoline-powered vehicles and on the fuel control rack in the case of diesel-powered vehicles.

II. Summary of the Notice of Proposed Rulemaking

On April 16, 2012, the agency published an NPRM to amend FMVSS No. 124, *Accelerator Control Systems* (ACS).[3] The NPRM proposed to make two fundamental changes to the standard: (1) add a new brake-throttle override (BTO) requirement to address unintended acceleration situations, and (2) amend the return-to-idle requirements and test procedures to apply explicitly to electronic throttle control (ETC) systems. The latter proposed change involved extensive enhancement of the test procedures for gasoline and diesel engines and included new procedures for electric and hybrid vehicle propulsion systems. The first part of the NPRM, requiring a BTO system, would apply to vehicles that have a gross vehicle weight rating of 10,000 pounds (4,536 kilograms) or less and that are equipped with ETC systems. The second part, updating the throttle control disconnection test procedures, also called return-to-idle

[2] See 49 CFR 571.124.
[3] 77 FR 22638.

functions, would apply to all passenger cars, multipurpose passenger vehicles, trucks, and buses, regardless of gross vehicle weight rating.

As background, the proposed return-to-idle requirements in the 2012 NPRM were a follow-up to a previous rulemaking involving an NPRM published in 2002[4] but later withdrawn in 2004.[5] The 2002 NPRM was withdrawn because the agency concluded further research was needed on the proposed return-to-idle test procedures. Part of the intent of the 2012 NPRM was to revisit the effort to amend the return-to-idle requirements and to address issues raised in the 2002 NPRM.

The 2012 NPRM proposed vehicle requirements and test procedures to minimize the risk that loss of vehicle control will be caused by either: (1) accelerator control system (ACS) disconnections; or (2) accelerator pedal sticking and entrapment. For both of these safety risks, which could affect vehicles with mechanical as well as electronic throttle controls, the purpose was to ensure that stopping a vehicle is possible without extraordinary driver actions, that is, that releasing the accelerator pedal and stopping the vehicle with a normal brake application would be a sufficient driver response. For measuring return-to-idle in the event of a disconnection, the NPRM proposed an enhanced set of idle state criteria using powertrain factors such as fuel flow or electric power input to indicate the idle state, where each added criterion is analogous to throttle position (or fuel rack position in the case of diesels.) Additionally, the NPRM proposed a new and different type of measurement of vehicle drive propulsion based on the "creep speed," which is defined as the speed of the vehicle with the transmission in gear and the accelerator pedal fully released. As a further amendment of FMVSS No. 124, the NPRM incorporated a new BTO requirement, which included both an equipment requirement to ensure vehicles would

[4] 67 FR 48117
[5] 69 FR 65126

be outfitted with the necessary hardware and/or software and a performance requirement to ensure BTO system intervention in the event an accelerator pedal failed to release while the brake pedal was applied.

III. Summary of Comments

NHTSA received 37 comments regarding the 2012 NPRM.[6] These comments were submitted by 34 entities including three trade associations (Alliance of Automobile Manufacturers (Alliance), Global Automakers, and the Engine Manufacturers Association (EMA)); seven vehicle and equipment manufacturers (Delphi, Ford, General Motors (GM), Mitsubishi, Navistar, Nissan, and TRW); two safety advocacy groups (Advocates for Highway and Auto Safety, and Safety Research & Strategies, Inc.); one academic (Prof. McCann of the University of Oklahoma); and 21 individuals. Commenters from industry strongly opposed the return-to-idle and fail-safe requirements for ETC systems, and many commenters expressed concerns about BTO requirements.

Regarding the proposed BTO requirements, several comments from industry suggested certain conditions of the BTO test procedure need to be clarified: (1) target vehicle speed, (2) accelerator pedal position, (3) gear or range selector position, (4) brake pedal application, (5) total number of tests, and (6) stopping distance requirements per FMVSS Nos. 105 and 135. Industry groups and individual manufacturers generally supported the intent of the rulemaking and agreed the standard should be updated to better address failure modes associated with ETC systems. Commenters from industry and from the general public described a variety of situations wherein two-pedal driving maneuvers are intentional and desirable, and expressed concern that BTO would interfere with these techniques. Numerous individual commenters

[6] Comments are available in Docket No. NHTSA-2012-0038 at http://www.regulations.gov.

requested an exemption from BTO requirements for manual-transmission vehicles, submitting that BTO would interfere with "heel-and-toe" shifting and that the clutch provides a viable failsafe in these vehicles. A few individuals opposed BTO requirements in general, dismissing the technology as unnecessary or as an inappropriate response to the problem of UA, which they said could be caused by electronic malfunctions or other issues not addressed by BTO. Some commenters maintained that UA can be counteracted by sufficient force on the brake pedal without BTO intervention. Commenters also had various specific concerns about test procedures and compliance criteria proposed in the NPRM. For example, vehicle manufacturers requested clarification of the proposed BTO braking-distance requirements, in particular, how the proposed FMVSS No. 124 requirements would relate to and be compatible with existing FMVSS No. 105 and 135 braking requirements.

Regarding NHTSA's proposal to amend the return-to-idle requirements for driver-operated ACS, some commenters disagreed with the idle state indicant options proposed for compliance verification. Delphi disagreed the engine should be required to fully return to idle following an ETC disconnection because that would lead to customer complaints. Instead, Delphi suggested the rule permit ETC systems to limit the maximum engine torque to approximately 50 percent of maximum, thus allowing the vehicle to be easily brought to a stop while avoiding a potentially startling loss of engine power. One individual commenter disagreed with the proposed rule's exclusion of a "disconnection or severance inside of an electronic module" from the failsafe return-to-idle requirement in S5.2.1 of the proposal, but the commenter did not provide supporting information or discuss an alternative approach.

Many manufacturers and industry groups opposed the proposal to measure return-to-idle in the event of a disconnection by measuring the creep speed of the vehicle. The Alliance, GM,

Navistar, and Nissan all opposed the lack of a tolerance in the return-to-idle requirement for normal operation, which states the vehicle must return within one second to an idle state that is "less than or equal to" the baseline state after release of the accelerator pedal. Each requested a reasonable baseline definition and tolerance to allow for intentional overshooting/undershooting of any given idle state indicant. Nissan suggested the return-to-idle requirement for normal operation be deleted entirely, or, if that was not acceptable, a 50 percent tolerance should be provided to accommodate intended vehicle behaviors. For example, some vehicles are designed to return to an idle state above the baseline to improve emissions performance or to prevent stalling. Navistar stated it assumed manufacturers will be allowed to define a reasonable baseline definition and tolerance accounting for variation in the selected idle state indicant, and it requested clarification this was the proposed rule's intent.

Addressing another technical concern, the Alliance stated that a one-second reaction time was too short of a time interval for idle indicants such as calculated axle torque, which measures response at the vehicle's drive wheels and which thus responds more slowly than fast-reacting indicants such as the throttle position that measures engine power input. The Alliance provided this comment in the context of its recommendation to add calculated axle torque and calculated engine load to the list of optional idle indicants the rule would allow.

In the NPRM, NHTSA requested comment on the appropriateness of each of the proposed, optional compliance criteria (throttle position, fuel delivery rate, air intake rate, electric power delivery, and creep speed/coastdown performance). Several commenters stated that the proposed options were overly restrictive. GM stated modern engine control algorithms cause the value of each proposed indicant to vary even when a vehicle is operating at a steady idle. In fact, GM stated it is essential the proposed indicants vary to maintain a steady idle as

other factors like ambient temperature, engine temperature, and accessory load change. The Alliance, EMA, Ford, GM, and Navistar suggested calculated axle torque should be included as an acceptable idle indicant because it is reliable, easily measured, and represents the ultimate output of the powertrain. In contrast, other indicants (throttle position, fuel delivery rate, etc.) are inputs to the engine whose effect on drive torque can vary depending on other factors. They further stated axle torque is a consistent and reliable idle indicant for any vehicle regardless of powertrain type or design because it represents the net result of all the vehicle inputs affecting the response at the drive wheels.

The Alliance, Ford, and GM also recommended calculated engine load be added as an acceptable idle indicant. Navistar recommended a broad definition of idle state indicant (rather than a prescriptive list), as such a definition would remain current as new technologies develop.

The Alliance and Ford disagreed with the "irrevocable selection" requirement,[7] and Ford pointed out it is inconsistent with rulemaking procedures requiring the agency to focus on vehicle minimum performance rather than the manufacturer's design choice to meet that performance. They commented that, as a result of NHTSA's approach in the NPRM, a system that is compliant with one particular idle indicant could be deemed non-compliant as a result of a manufacturer's prior, irrevocable choice of a different indicant. The Alliance and Ford recommended the irrevocable selection requirement be deleted or specified to apply only to a specific vehicle/propulsion system in combination with model years and not indefinitely to an entire model line. Similarly, the Alliance suggested manufacturers be allowed to choose one option for each test, which, in the above example, would enable manufacturers to select the creep

[7] Irrevocable selection in this case means that the manufacturer must select only one of the available idle state indicants for certification of a vehicle, and the manufacturer may not change the selection for that vehicle later on.

speed/coastdown option for S5.2, while Ford recommended that creep speed/coastdown specifically be included as a compliance option for S5.1.

IV. Rationale for Withdrawal

First, with respect to the proposed BTO requirement to address UA situations, NHTSA has received information from manufacturers showing that, as of model year 2018, all light vehicles for sale in the U.S. market have been voluntarily equipped with a BTO system. The information suggests these BTO systems are designed to address the intended safety function by ensuring input to the brake pedal in a vehicle acts on the throttle control system to override simultaneous input to the accelerator pedal. In fact, NHTSA noted in the 2012 NPRM nearly all manufacturers had already equipped their model year 2012 light vehicles with a BTO system, indicating the great majority of new U.S. vehicles have had that safety feature for several model years prior to 2018. NHTSA does not anticipate any manufacturers removing BTO systems from any vehicles in the future. Therefore, NHTSA does not find that there is presently a safety need for a BTO requirement in FMVSS No. 124.

As for the return-to-idle requirements for ETC systems, NHTSA has decided that proposing an extensive upgrade of FMVSS No. 124 in a way that provides meaningful protection from a variety of possible ETC system failures is not currently feasible. Modern ETC systems have become highly complex, software-driven systems that are fully integrated with electronic powertrain controls and other on-board computerized electronics, making it impractical to address the throttle control function independently of other electronic control functions and systems in a vehicle. To effectively complete a rulemaking on ETC, it is apparent from

comments and other information that NHTSA should take an approach that considers the overall functional safety of vehicle electronic powertrain control systems.

As vehicle powertrain controls and other vehicle systems have grown more complex over the years, the automotive industry has formed working groups to address functional safety. One of the most prominent efforts in this area is the creation of a voluntary standard, ISO 26262, that provides a risk-based approach for the safe design of vehicle electronic systems. ISO 26262 evaluates functional safety of a system starting with initial system development and extending over the lifecycle. Using ISO 26262, the risk of hazardous outcomes is managed over the vehicle's lifecycle to address concerns related to electronic and electrical failures.

Although NHTSA recently completed research on potential causes of electronic throttle control system failures using functional safety analyses, and this research puts the agency in a better position to consider alternative ways to ensure the safety, security, and reliability of these systems, the field of functional safety and security of vehicle electronic systems is changing rapidly. While there are functional safety guidelines or recommended practices that exist, they are heavily focused on the vehicle design process, and it would be difficult for NHTSA to derive performance requirements based on those documents.

In addition, one specific unresolved issue from the NPRM is that some commenters reported idle state measurements that vary beyond the proposed 50-percent tolerance because different idle control strategies are needed based on driving conditions, environmental conditions, and other factors. All of the test procedures in the NPRM rely on a tolerance in order to limit overall powertrain output to a level that is reasonably close to the level that exists at idle. An idle state tolerance much higher than 50 percent may allow a significant and possibly uncontrollable amount of drive torque which would, to some extent, defeat the safety purpose of the standard.

While this specific issue may be resolvable in time, it currently is an additional obstacle to moving forward with the proposed test procedures.

Furthermore, although comments on the NPRM did not focus on the question of scope of failure modes addressed by FMVSS No. 124, upgrading and possibly expanding the types of failures covered by FMVSS No. 124 still could raise scope concerns. Presently, the sole failure mode addressed in FMVSS No. 124 is disconnection or severance within the ACS. The proposed rule included, for example, a powertrain output test procedure based on the measurement of vehicle creep speed in the event of a failure caused by disconnection or severance. However, it is unknown whether inadvertent physical disconnection of electrical ACS components, which might occur because of wear, vibration, heat-cycling, etc., is the failure mode of greatest concern or even an appreciable safety risk. NHTSA currently does not have information such as test data, VOQs, defect reports, service campaigns, or manufacturer data indicating that the risk of disconnections is a proven safety problem for systems comprised of electrical components rather than mechanical ones. Consequently, the relevance of an ETC safety standard that focuses on disconnections as the only failure mode is highly questionable. Unless other types of failure modes could be added to FMVSS No. 124 without expanding the scope of the standard, the return-to-idle requirements of an upgraded standard would not necessarily address the potential safety risks.

V. Conclusion

Based on its evaluation of the available information, NHTSA has concluded a BTO requirement is not necessary at this time and that there are substantial challenges associated with developing objective tests both for the operation of BTO and for return-to-idle requirements for

ETC systems, and these obstacles make a rulemaking not feasible at this time. Accordingly, the agency withdraws the proposed amendment of the safety standard for ACS. NHTSA will continue to monitor the safety performance of throttle control systems in motor vehicles and may consider rulemaking or other appropriate action in the future if it is necessary for vehicle safety.

The NPRM contained in docket number NHTSA-2012-0038, as published in the Federal Register on April 16, 2012, at 77 FR 22638, is withdrawn.

Issued in Washington, DC under authority delegated in 49 CFR 1.95 and 501.5.

Heidi Renate King,

Deputy Administrator.

Billing Code: 4910-59-P

[FR Doc. 2019-09820 Filed: 5/13/2019 8:45 am; Publication Date: 5/14/2019]