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July 15, 2016

Honorable Mark R. Rosekind, Administrator
National Highway Traffic Safety Administration (NHTSA)
1200 New Jersey Avenue SE
Washington, DC 20590-0001

Dear Administrator Rosekind:

The tragic deaths of Anton Yelchin and Joshua Brown due to faulty electronics must be placed squarely at NHTSA's feet. In its zeal to advance vehicle electronics, NHTSA has forgotten it is a regulatory agency to ensure vehicle safety, not a promotional agency to foster the development of vehicle technology. It is an inherent conflict of interest for any agency to both promote and regulate technology. The classic example is the Atomic Energy Commission which was split into the Nuclear Regulatory Commission and the Energy Research and Development Administration by the Energy Reorganization Act of 1974.[1]

NHTSA's deference to industry initiatives in lieu of safety standards represents an abdication of its regulatory responsibilities that is *unprecedented* in the history of the agency. NHTSA was established by Congress in 1966, after extensive study, which led lawmakers to conclude that, "The promotion of motor vehicle safety through voluntary standards has largely failed. The unconditional imposition of mandatory standards at the earliest practicable date is the only course commensurate with the highway death and injury toll.[2]" When asked about this radical departure from the regulatory process enacted by Congress fifty years ago, Transportation Secretary Foxx said he "wants to ease some of the regulatory restraints to make it easier for the technology to develop."[3]

Yelchin's death is due to NHTSA creating a huge loophole in 1999 in FMVSS 102 governing transmission shift mechanisms. Brown's death is due to NHTSA's failure to issue a FMVSS for self-driving controls and allowing Tesla to beta test an autopilot system using consumer as test drivers on public roads, something that has never before been done in NHTSA's history.

[1] P. L. 93-438, Oct. 11, 1974.
[2] Committee Report on S. 3005, The Traffic Safety Act of 1966, June 23, 1966, at 274. (Emphasis added.)
[3] POLITICO, Pro Transportation Report, Friday January 15, 2016.

Electronic Shifters Resulted From NHTSA Creating Loophole in FMVSS 102

FMVSS "Standard No. 102's purpose is to reduce deaths and injuries resulting from misshifting. Since 1968, the standard has ensured against misshifting by specifying the sequence in which gears for automatic transmission must be selected. . . [T]he gear selection is required to be in the park, reverse, neutral, drive, and low (PRNDL) sequence. . . . Moreover, with the neutral position required to be between reverse and drive, this further ensures that no mistakes in selection will be made. The neutral position provides a buffer zone between forward and reverse."[4] This statement was made in response to a BMW petition.

Prior to BMW's petition, all electronic and mechanical gear selectors were shifted in the standard PRNDL sequence. With this serial shifting style, neutral acts as a fail-safe or a buffer between reverse and drive. The most common type of misshifting is accidentally shifting a vehicle into drive or reverse when movement of the vehicle is not intended. Because of the standardized gear shift pattern, this type of misshifting becomes far less likely. Indeed, today's consumer is hard-wired to the tactile shift of PRNDL. Changing PRNDL could only lead to human error as NHTSA observed: "However, if shift levers were allowed to be significantly different as in some of the designs BMW has outlined, it is possible that a significant amount of misshifting would occur."[5]

On November 19, 1997, BMW petitioned NHTSA to amend FMVSS 102 to allow the development of unconventional shift mechanisms which may be shifted in a non-serial manner. According to NHTSA, "These shift mechanisms could include joysticks, push buttons, voice activation, rotary switches, and touch screens." [6] BMW claimed that the current standard only applied to vehicles that use levers to switch gears. Therefore, shift mechanisms such as joysticks or push buttons would not apply to Standard 102. BMW also claimed NHTSA only mentioned lever actuated transmissions to "avoid outlawing" future designs.

On June 4, 1998, NHTSA issued a request for comments regarding BMW's petition to amend FMVSS 102. The agency also asked five additional questions as stated below. [7]

1. *Should Standard No. 102 be amended to permit transmission shift mechanisms which allow changing gears in a non-serial manner, e.g., keypads, touch screens, push buttons, voice activation, etc.?*
2. *Should the standard specify maximum speeds at which the transmission can be shifted, (except when switching between drive and lower forward gears) presuming that additional safety concerns exist that could be resolved by preventing shifting while a vehicle is in motion?*

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[4] 63 FR 30449 at 30450 (June 4, 1998).
[5] Id at 30451.
[6] Id at 30450.
[7] Id at 30452.

3. *Should there be a requirement that the brake pedal be depressed, or any other action, to achieve a failsafe condition to occur in order to initiate a change in gears?*
4. *If non-serial shift mechanisms were allowed, how should the display requirements be altered to accommodate them?*
5. *Although BMW did not raise any issues regarding transmission braking effect, the agency would like to get comments on this requirement. Should the requirement be less specific by allowing other means of slowing down the vehicle when the transmission is shifted into a lower forward gear?*

In response to NHTSA's request, Advocates for Highway and Auto Safety opposed the BMW petition stating "we do not support amendment of the current standard to provide open-ended opportunities for technological innovations. . . . Safety should not easily be forfeited for technology that essentially is driven by marketing appeal and desires for competitive advantage."[8]

On November 15, 1999, NHTSA withdrew its rulemaking on whether or not to amend its safety standard for transmission shift lever sequence. NHTSA found an amendment was unnecessary because: "BMW asked for and got an interpretation dated September 25, 1998 that said its contemplated shift lever sequence would not violate the existing requirements."[9] Although the rulemaking was withdrawn, NHTSA claimed to be willing to amend the standard if "standardized gear shift sequence proved to be a needless impediment to new technology."[10] As to safety, NHTSA said it would study the matter after greenlighting BMW.

In addition, we have said that the design BMW intends to implement is not precluded by the standard. However, we are concerned that nonserial shift methods may not be as effective in preventing misshifting as those which are shifted serially. While Standard No. 102 only has a sequence requirement for shift levers, the result of the standard has been that all automatic transmission shift mechanisms are shifted serially in a PRNDL pattern. We believe that this standardization has been an important factor in the prevention of misshifting.

We are concerned that, as new designs for automatic transmissions that do not use a shift lever come into the market, there is nothing in Standard No. 102 to prevent misshifting in those vehicles. Since the public will be unfamiliar with those new designs, they would seem to be more at risk for misshifting. To address these concerns, NHTSA is studying what can be done to prevent misshifting on vehicles whose automatic transmission does not use a shift lever.[11]

In the original request for comments, NHTSA claimed that non-serial methods of shifting could increase the possibility of misshifting, especially in cases when the driver

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[8] Advocates for Highway and Auto Safety (August 12, 1998.)
[9] 64 FR 61810 at 61812 (November 15, 1999).
[10] Id at 61811.
[11] Id at 61813.

changes gears without looking at the gear selector or display. Even though NHTSA knew modern electronic shifters could have a negative impact on misshifting, it decided not to amend the standard, not even to require a failsafe Park lock such as was used in the recall of Yelchin's Jeep Grand Cherokee. By not amending the standard, NHTSA created a loophole leaving the manufacturer to decide whether to include safety mechanisms or not in electronic shifters or non-lever shifting systems to prevent misshifting and rollaways. This decision not to amend Safety Standard 102 is what has allowed FCA US to implement electronic shifters in their vehicles without the necessary safety features to prevent accidents like the one that took Anton Yelchin's life.

Failure to Issue FMVSS for Self-Driving Allowed Tesla to Beta-Test Technology

NHTSA has failed to issue any specific Federal Motor Vehicle Safety Standards (FMVSS) covering automated vehicle driver assist technology. Instead NHTSA has issued only vague Guidelines for development of Autonomous Vehicles. NHTSA has issued new NCAP test procedures on Automatic Emergency Braking (AEB) which will not be implemented before 2018 with year 2019 models.[12] These procedures are not mandatory and are limited to a few simple tests, not the wide variety of conditions that occur in the real world. Unike the crash tests in NCAP, there is no underlying Safety Standard to provide a minimum safety floor which auto companies can use to show how much safer their cars are than required by law. The lack of Safety Standards created a huge regulatory loophole through which Tesla drove its beta "Autopilot" system with tragic results. If there had been a Safety Standard, Autopilot wouldn't have gotten off the ground.

Joshua Brown's death and the recent crashes in Pennsylvania and Montana shed light on the limitations of semi-autonomous vehicles and the costs of promoting advanced driving technology without regulations and enforced standards. Brown's Tesla Model S was equipped with three types of sensors, which are forward-looking camera and radar and 360-degree ultrasonic sensors.[13] However, the system Tesla installed on the car failed to protect the driver. Problem areas include the blind spot of sensors and accident scenarios that are not programmed in the system. Mobileye, a partner of Tesla's Autopilot technology commented on Brown's crash that current collision avoidance technology is meant for rear-end collisions and the detection for Lateral Turn Across Path (LTAP) will not be included in their system until 2018.[14] Tesla also commented that the probable reason that AEB was not activated was due to either a misinterpretation of the side of the truck as an overhead sign or its indistinguishable color from the background.[15] Given that Brown was an experienced driver with his Tesla Model S according to his online profile, he was still unable to react to the

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[12] Volpe Center, USDOT. 2016. Review of FMVSS for Automated Vehicles: Preliminary Report (DOT-VNTSC-OSTR-16-03)
USDOT. 2015. CIB System Performance Evaluation for the NCAP

[13] https://www.teslamotors.com/support/model-s-specifications

[14] http://electrek.co/2016/07/01/tesla-autopilot-mobileye-fatal-crash-comment/

[15] Ibid.

accident.[16] Only professional drivers on test tracks and laboratories should test drive vehicles with safety critical prototype systems, not Guinea pig consumer drivers.

While issuing regulations and standards for new self-driving and driver assist technologies is challenging and will take time, the ultimate payoff is in lives saved. Until Safety Standards are issued, NHTSA must take steps to prohibit beta testing of safety-critical self-driving systems in vehicles mass-marketed to consumers for use on public roads. Tesla continues to emphasize that its Autopilot system is currently in public beta phase which Elon Musk explains in his Tweet that being beta means the system has "less than 1 billion miles of real world driving".[17] All other major automobile companies test the safety-critical systems in vehicles on their own facilities with their own professional drivers before selling them to the public. GM, for example, has proving grounds in Yuma, Arizona and Milford, Michigan as well as in other countries for their engineers to test their new cars under various conditions.[18]

Tesla is a posterchild for the need for Safety Standards as term "Autopilot" is truly confusing to consumers and creates a misperception of the system's ability. Consumers believe it is capable of driving the vehicle when it is not. Even Tesla's claim that the vehicle meets all applicable Safety Standards conveys a sense of safety that doesn't exist because there are no standards that apply to Autopilot.

Elon Musk himself concluded that "a lot of people don't understand what it is and how you turn it on."[19] In fact, semi-autonomous vehicles may require more caution than fully autonomous ones due to the dilemma between machine limitations on real-world driving and human nature when being idle. It is not realistic to keep the driver highly concentrated and be ready to take over the vehicle at all times when the system seems to be doing all the driving. Volvo, for example, has required drivers' hands on the steering wheel in order to activate its Pilot Assist system.[20] Most importantly, most semi-autonomous systems on the market are mostly level 2 automation, which is only for driver assistance. It is important that both the car makers and consumers perceive the systems correctly. In other words, thinking or trying

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[16] https://www.youtube.com/user/NexuJosh

[17] Elon Musk also mentioned in another comment that "Use of word "beta" is explicitly so that drivers don't get comfortable. It is not beta software in the standard sense." See:
https://twitter.com/elonmusk/status/752190828798353408
https://twitter.com/elonmusk/status/752192639403896833
For public beta phase mentioned in recent statement, see:
https://www.teslamotors.com/blog/tragic-loss

[18] http://media.gm.com/media/us/en/gm/news.detail.html/content/Pages/news/us/en/2009/Jul/0722_NewProvingGround.html
http://www.detroitnews.com/story/business/autos/general-motors/2015/07/24/gm-opens-active-safety-test-area-milford/30639061/

[19] http://www.wsj.com/articles/tesla-has-no-plans-to-disable-autopilot-feature-in-its-cars-1468340310

[20] http://support.volvocars.com/uk/cars/Pages/owners-manual.aspx?mc=v526&my=2016&sw=15w46&article=1135994a8975c470c0a80151244bf156

to make the system sound or work like a level 3 system when it is not capable of is absolutely irresponsible.

Conclusion

NHTSA's rulemaking process has withstood the test of time and been used in over 4,000 thousand decision-making proceedings published in the Federal Register, including many involving highly technical issues. [21] Under The National Traffic and Motor Vehicle Safety Act, rules issued must be objective and framed in terms of performance, not vehicle design. And the safety rules must set *minimums*, allowing manufacturers ample flexibility to develop and propose greater safety innovations. Further, in reviewing this law, a 1972 decision by the Sixth Circuit Court of Appeals made it clear that federal vehicle safety standards are intended to force innovation.[22]

Congress intended that compliance with the federal rules would both regulate and stimulate new technologies. Today's NHTSA has abandoned the regulatory side for the stimulation side at the expense of safety. By issuing interpretative rules as it did on electronic shifters for BMW and not issuing Safety Standards as it did on self-driving vehicles, NHTSA created safety loopholes that inevitably led to the deaths of Joshua Brown and Anton Yelchin. More consumers will die needlessly in crashes unless NHTSA returns to its congressionally mandated role of safety regulator.

Sincerely,

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Executive Director

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[21] 1 Auto. Design Liability § 3:8, NHTSA FMVSS and CFR actions and citations (3d ed. 2015).
[22] *Chrysler Corp. v. Department of Transp.*, 472 F.2d 659, 671 (1972).