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July 30, 2024

Sophie Shulman
Deputy Administrator
National Highway Traffic Safety Administration
1200 New Jersey Avenue, SE
Washington, DC 20590

Agency Information Collection Activities; Notice and Request for Comment
Motorcycle Crash Avoidance Technology Review; Docket No. NHTSA-2024-0024

Dear Deputy Administrator Schulman:

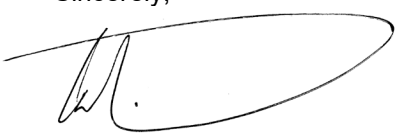
The Insurance Institute for Highway Safety (IIHS) welcomes the opportunity to comment on the National Highway Traffic Safety Administration's (NHTSA's) plan to survey motorcyclists about advanced crash avoidance technologies on motorcycles, which include antilock braking systems (ABS). NHTSA stated that one of the purposes of this survey is to "identify possible unintended consequences of mandating the technology." While IIHS welcomes any addition to the current state of knowledge in motorcyclist safety, we strongly discourage NHTSA from delaying possible rulemaking on motorcycle ABS by waiting for these survey results. We encourage NHTSA to grant our second petition to mandate ABS on new motorcycles (appended to this comment) and begin the rulemaking process without delay.

With about two thirds of new motorcycle models sold in the U.S. having ABS as standard equipment, and with many countries throughout the world already having mandated this technology, it is unclear what NHTSA would learn about unintended consequences of a motorcycle ABS mandate by conducting a survey of riders. Nevertheless, public comment is a fundamental component of the rulemaking process that would allow known issues to be identified. Furthermore, public comment allows any individual or organization to provide feedback, not just those who happen to get selected (and consent) to participate in a survey.

Motorcyclist fatalities have reached a record high for each of the three most recent years of NHTSA's fatal crash data, so it is imperative that efforts to reduce this burden on riders begin immediately. The life-saving benefits of motorcycle ABS, as well as the benefits for nonfatal crashes, as outlined in the appended petition, are indisputable. While there are other crash avoidance technologies relevant to motorcycles, we must remember that it is possible to update a motorcycle ABS mandate to include these if/when evidence of their effectiveness in reducing motorcyclist fatalities becomes sufficiently strong.

In summary, IIHS strongly encourages NHTSA to begin rulemaking to mandate ABS on new motorcycles without delay. An ABS mandate would serve as an important building block of a Safe System for motorcycling—an approach the U.S. Department of Transportation has adopted broadly in its National Roadway Safety Strategy. This is also an opportunity for the United States to catch up with the many other countries that have already mandated this life-saving technology.

Sincerely,



Eric Teoh
Director of Statistical Services
Insurance Institute for Highway Safety

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November 9, 2023

The Honorable Ann Carlson
Acting Administrator
National Highway Traffic Safety Administration
1200 New Jersey Avenue, SE
Washington, DC 20590

Petition for rulemaking: Upgrade Federal Motor Vehicle Safety Standard No. 122, Motorcycle Brake Systems (49 CFR 571.122), to require antilock braking systems (ABS) for new on-road motorcycles

Dear Acting Administrator Carlson:

The Insurance Institute for Highway Safety and Highway Loss Data Institute (IIHS–HLDI) first petitioned the National Highway Traffic Safety Administration (NHTSA) to require ABS on all new on-road motorcycles in 2013 (Moore & Teoh, 2013). In the 10 years since then, evidence of ABS effectiveness has continued to accumulate, and it has become far more common among new motorcycles in the United States. Despite this, NHTSA has taken no action to require this life-saving technology. Therefore, IIHS–HLDI hereby petition NHTSA to upgrade Federal Motor Vehicle Safety Standard No. 122, Motorcycle Brake Systems (49 CFR 571.122), to require ABS on all new on-road motorcycles sold in the United States.

Evidence of ABS effectiveness

The latest study by IIHS (Teoh, 2022) includes a much broader sample of motorcycles compared with our previous research (Teoh, 2011, 2013)—65 motorcycle models vs. 13—and shows that motorcycles with optional ABS have fatal crash rates 22% lower than those same motorcycles without ABS. Further, it shows that ABS is associated with lower fatal crash rates for all types of on-road motorcycles investigated. The latest research by HLDI (Basch et al., 2015; Highway Loss Data Institute, 2014, 2016) shows that motorcycle ABS is associated with 21%–24% lower collision claim frequencies and, importantly, that the ABS effect did not vary when controlling for riders' associated automobile claim frequencies. This finding refutes the notion that observed ABS benefits are simply due to safer riders being more likely to purchase the ABS option.

Recent research in Europe has also found benefits. Rizzi et al. (2015) estimated ABS to be associated with a 24%–34% reduction in injury crashes across three countries and a 34%–42% reduction in fatal crashes, using head-on crashes as a comparison group. An in-depth study from Germany estimated that ABS could prevent 26% of motorcycle crashes (Lich et al., 2015). Another in-depth study (Rizzi, Strandroth, et al., 2016) found that fatal sliding crashes were far less common among motorcycles equipped with ABS. Yet another study (Rizzi, Kullgren, et al., 2016) showed that motorcycle ABS reduced the number of emergency care visits as well as both the risk and severity of impairing injuries in crashes.

The evidence of ABS effectiveness outlined above is in addition to what was already known back in 2013. By 2013, ABS was known to improve test-track braking performance among both novice and experienced riders (Vavryn & Winkelbauer, 2004), and in a variety of situations (Gail et al., 2009; Green, 2006). A NHTSA study (Green, 2006) noted that novice riders can be expected to achieve high levels of braking performance when using ABS-equipped motorcycles. In-depth studies estimated that anywhere from 17% to 50% of motorcycle crashes could have been prevented had those vehicles been equipped with ABS (Gwehenberger et al., 2006; Rizzi et al., 2009; Roll et al., 2009). The latest studies at the time comparing crash rates for motorcycles with and without ABS indicated a 31% reduction in fatal crash rates (Teoh,

2013) and a 20% benefit (or 31% with combined control braking systems) for collision claim frequency (Highway Loss Data Institute, 2013) for motorcycles with ABS. The ABS benefit for collision claims was even stronger during the first month of the insurance policy (Highway Loss Data Institute, 2012). Even back in 2013, the evidence of ABS effectiveness was solid, and coupling that with the latest evidence, it is now indisputable that ABS improves motorcycle safety.

Proliferation of ABS among motorcycles in the United States

The proportion of new motorcycle models that have ABS as standard equipment has steadily increased, from about 1% in 2003 to 20% in 2013 and now to 59% in 2023 (Insurance Institute for Highway Safety, 2023a). While this is certainly an improvement, it still leaves a 30%–40% gap in terms of new motorcycle models that do not have ABS. Moreover, only 20% of motorcycles registered in the U.S. in 2023 have standard ABS (Teoh, 2023a), as clearly not everyone owns a new motorcycle. NHTSA has the unique ability to close this gap and accelerate the penetration of ABS into the motorcycle fleet.

The rapid increase in equipping ABS on new motorcycles likely can be attributed to two factors: increased acceptance by consumers, and production practices driven by the many countries throughout the world that have required ABS on new motorcycles. Both factors would reduce the difficulty of requiring motorcycle ABS here in the United States. NHTSA should follow the lead set by all European Union member states, the United Kingdom, Brazil, Japan, Taiwan, Australia, New Zealand, and India in requiring this life-saving technology.

Off switch/warning and other considerations to explore in the rulemaking process

We are aware that ABS can negatively affect motorcycle handling in loose-surface conditions, so it is reasonable to allow (or require) an off switch for ABS for use in such conditions. It would also be reasonable to require the display of a readily-visible warning light indicating when the system is disabled (or malfunctioning), which could help remind riders to re-enable ABS when entering a paved roadway, or serve as a quick check that ABS is indeed off when riding in loose-surface conditions. There may be other important considerations that can be identified from public comments and addressed during the rulemaking process.

Mandatory ABS as one part of riding in a safe system

While ABS obviously doesn't prevent every crash or death, it is clearly a powerful tool for improving motorcycle safety. In 2021, the latest year of data currently available, motorcyclist crash deaths reached an all-time high of 6,084 (Insurance Institute for Highway Safety, 2023b), so it is imperative that this trend be reversed quickly. The most effective way would involve the Safe System approach, which recognizes that humans make mistakes and are vulnerable, and that safety is maximized by redundancy. The U.S. Department of Transportation adopted Safe System thinking as part of its National Roadway Safety Strategy. As recently outlined by IIHS (Teoh, 2023b), ABS on all new on-road motorcycles would be an important component of a Safe System for motorcycling. This would leave fewer crashes and deaths for other countermeasures to address, meaning more riders arriving safely at their destinations.

In summary, IIHS–HLDI request NHTSA begin rulemaking to require motorcycle ABS, without further delay, as a key step in improving safety for motorcyclists on our nation's roads.

Sincerely,

Eric R. Teoh
Director of Statistical Services, IIHS

Matthew J. Moore
Senior Vice President, HLDI

References

Basch, N., Moore, M., & Hellinga, L. A. (2015). *Evaluation of motorcycle antilock braking systems*. International Technical Conference on the Enhanced Safety of Vehicles, Gothenburg, Sweden.

Gail, J., Funke, J., Seiniger, P., & Westerkamp, U. (2009). *Anti lock braking and vehicle stability control for motorcycles – Why or why not?* International Technical Conference on the Enhanced Safety of Vehicles, Stuttgart, Germany.

Green, D. (2006). A comparison of stopping distance performance for motorcycles equipped with ABS, CBS, and conventional hydraulic brake systems. International Motorcycle Safety Conference, Long Beach, CA.

Gwehenberger, J., Schwaben, I., Sporner, A., & Kubitzki, J. (2006). Schwerstunf€alle mit motorr€adern—analyse der unfallstruktur und der wirksamkeit von ABS. *VKU Verkehrsunfall und Fahrzeugtechnik*(1).

Highway Loss Data Institute. (2012). Motorcycle ABS and time to claim. *Bulletin*, *29*(4), 1–8.

Highway Loss Data Institute. (2013). Evaluation of motorcycle antilock braking systems (ABS) and ABS in conjunction with combined control braking systems (CCBS). *Bulletin*, *30*(10), 1–36.

Highway Loss Data Institute. (2014). Evaluation of motorcycle antilock braking systems. *Bulletin*, *31*(11), 1–15.

Highway Loss Data Institute. (2016). Evaluation of motorcycle antilock braking systems — An update. *Bulletin*, *33*(24), 1–14.

Insurance Institute for Highway Safety. (2023a). Analysis of motorcycle information data maintained by the Highway Loss Data Institute.

Insurance Institute for Highway Safety. (2023b). *Fatality facts 2021: Motorcycles and ATVs*. Retrieved 10/05/2023, from https://www.iihs.org/topics/fatality-statistics/detail/motorcycles-and-atvs

Lich, T., Block, W., Prashanth, S., & Heiler, B. (2015). Motorcycle stability control - The next generation of motorcycle safety and riding dynamics. *SAE International Journal of Engines*, *9*(1), 491–498. https://doi.org/10.4271/2015-32-0834

Moore, M. J., & Teoh, E. R. (2013). IIHS–HLDI petition to National Highway Traffic Safety Administration to require antilock braking systems on all new motorcycles manufactured for on-highway use. In. Docket No. NHTSA-2009-0108.

Rizzi, M., Kullgren, A., & Tingvall, C. (2016). The combined benefits of motorcycle antilock braking systems (ABS) in preventing crashes and reducing crash severity. *Traffic Injury Prevention*, *17*(3), 297–303. https://doi.org/10.1080/15389588.2015.1061660

Rizzi, M., Strandroth, J., Holst, J., & Tingvall, C. (2016). Does the improved stability offered by motorcycle antilock brakes (ABS) make sliding crashes less common? In-depth analysis of fatal crashes involving motorcycles fitted with ABS. *Traffic Injury Prevention*, *17*(6), 625–632. https://doi.org/10.1080/15389588.2015.1134794

Rizzi, M., Strandroth, J., Kullgren, A., Tingvall, C., & Fildes, B. (2015). Effectiveness of motorcycle antilock braking systems (ABS) in reducing crashes, the first cross-national study. *Traffic Injury Prevention*, *16*(2), 177–183. https://doi.org/10.1080/15389588.2014.927575

Rizzi, M., Strandroth, J., & Tingvall, C. (2009). The effectiveness of antilock brake systems on motorcycles in reducing real-life crashes and injuries. *Traffic Injury Prevention*, *10*(5), 479–487. https://doi.org/10.1080/15389580903149292

Roll, G., Hoffmann, O., & Konig, J. (2009). *Effectiveness evaluation of antilock brake systems (ABS) for motorcycles in real-world accident scenarios*. 21st International Technical Conference on the Enhanced Safety of Vehicles, Washington, DC.

Teoh, E. R. (2011). Effectiveness of antilock braking systems in reducing motorcycle fatal crash rates. *Traffic Injury Prevention*, *12*(2), 169–173. https://doi.org/10.1080/15389588.2010.541308

Teoh, E. R. (2013). Effects of antilock braking systems on motorcycle fatal crash rates: An update. Insurance Institute for Highway Safety.

Teoh, E. R. (2022). Motorcycle antilock braking systems and fatal crash rates: Updated results. *Traffic Injury Prevention*, *23*(4), 203–207. https://doi.org/10.1080/15389588.2022.2047957

Teoh, E. R. (2023a). *Motorcycles registered in the United States, 2002–2023*. Insurance Institute for Highway Safety.

Teoh, E. R. (2023b). *Simple steps could reduce motorcyclist deaths — If only we'd take them*. Insurance Institute for Highway Safety. https://www.iihs.org/news/detail/simple-steps-could-reduce-motorcyclist-deaths--if-only-wed-take-them

Vavryn, K., & Winkelbauer, M. (2004). *Braking performance of experienced and novice riders — Results of a field study*. International Conference on Transport and Traffic Psychology, Nottingham, UK.