

NATIONAL TRANSPORTATION SAFETY BOARD
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(Information subject to editing)

Safety Study
Reducing Speeding-Related Crashes Involving Passenger Vehicles
NTSB/SS-17/01

This is a synopsis from the NTSB's Safety Study and does not include the Board's rationale for the conclusions and safety recommendations. NTSB staff is currently making final revisions to the report from which the attached conclusions and safety recommendations have been extracted. The final report and pertinent safety recommendation letters will be distributed to recommendation recipients as soon as possible. The attached information is subject to further review and editing.

EXECUTIVE SUMMARY

Speeding – exceeding a speed limit or driving too fast for conditions – is one of the most common factors in motor vehicle crashes in the United States. In this safety study, the National Transportation Safety Board (NTSB) examines causes of and trends in speeding-related passenger vehicle crashes and countermeasures to prevent these crashes.

Why the NTSB Did This Study

From 2005 through 2014, crashes in which a law enforcement officer indicated a vehicle's speed was a factor resulted in 112,580 fatalities, representing 31% of all traffic fatalities. Speeding or speed has been cited as a safety issue, or a causal or contributing factor in 49 major NTSB highway accident investigations since 1967. Although recent speeding-related NTSB investigations have primarily involved large trucks and buses, most speeding-related crashes involve speeding passenger vehicles. In 2014, passenger vehicles constituted 77% of speeding vehicles involved in fatal crashes, and 78% of all speeding-related fatalities involved a speeding passenger vehicle. This study leverages prior NTSB investigations, together with other research, to address the national safety issue of speeding among passenger vehicle drivers.

In this study, the NTSB used a combination of quantitative and qualitative methods to summarize the risks of speeding, describe the scope of the problem, and promote the use of proven and emerging speeding countermeasures. This included a literature survey; analyses of speeding-related crash data; and interviews with national, state, and local traffic safety stakeholders. The stakeholders were representatives from transportation and highway safety agencies, law enforcement agencies, automobile manufacturers, research institutions, advocacy groups, equipment vendors, personal auto insurance providers, and professional associations.

This study assessed speeding among passenger vehicle drivers in a broad sense, as a factor that contributes to crashes and injury severity. Several, of many, potential solutions to the issue of speeding-related crashes are discussed. The solutions do not address every cause of

speeding or type of speeding-related crash, but they are intended to be widely applicable to a significant portion of these crashes.

What the NTSB Found

Speed – and therefore speeding – increases crash risk in two ways: (1) it increases the likelihood of being involved in a crash, and (2) it increases the severity of injuries sustained by all road users in a crash.

The relationship between speed and crash involvement is complex, and it is affected by factors such as road type, driver age, alcohol impairment, and roadway characteristics like curvature, grade, width, and adjacent land use. In contrast, the relationship between speed and injury severity is consistent and direct. Higher vehicle speeds lead to larger changes in velocity in a crash, and these velocity changes are closely linked to injury severity. This relationship is especially critical for pedestrians involved in a motor vehicle crash, due to their lack of protection.

Typically, speed limits are set by statute, but adjustments to statutory speed limits are generally based on the observed operating speeds for each road segment—specifically, the 85th percentile speed of free-flowing traffic. Raising speed limits to match the 85th percentile speed can result in unintended consequences. It may lead to higher operating speeds, and thus a higher 85th percentile speed. In general, there is not strong evidence that the 85th percentile speed within a given traffic flow equates to the speed with the lowest crash involvement rate for all road types. Alternative approaches and expert systems for setting speed limits are available, which incorporate factors such as crash history and the presence of vulnerable road users such as pedestrians.

Speed limits must be enforced to be effective, and data-driven, high-visibility enforcement is an efficient way to use law enforcement resources. The success of data-driven speed enforcement programs depends on the ability to measure and communicate their effectiveness. However, law enforcement reporting of speeding-related crashes is inconsistent, which leads to underreporting of speeding-related crashes. This underreporting leads stakeholders and the public to underestimate the overall scope of speeding as a traffic safety issue nationally and hinders the effective implementation of data-driven speed enforcement programs locally.

Automated speed enforcement (ASE) is also widely acknowledged as an effective countermeasure to reduce speeding-related crashes, fatalities, and injuries. However, only 14 states and the District of Columbia use it. Many states have laws that prohibit or place operational restrictions on ASE, and federal guidelines for ASE are outdated and not well known among ASE program administrators. Point-to-point enforcement, which is based on the average speed of a vehicle between two points, can be used on roadway segments many miles long. This type of ASE has had recent success in other countries, but it is not currently used in the United States.

Vehicle technologies can also be effective at reducing speeding. Intelligent speed adaptation (ISA) uses an onboard global positioning system or road sign-detecting camera to determine the speed limit; it then warns drivers when they exceed the speed limit, or prevents drivers from exceeding the speed limit by electronically limiting the speed of the vehicle. Although passenger vehicle manufacturers are increasingly equipping their vehicles with technologies relevant to speeding, these technologies often are not standard features and require the purchase of certain option packages. New car safety rating systems are one effective way to incentivize the manufacture and purchase of passenger vehicles with advanced safety systems such as ISA.

Finally, the current level of emphasis on speeding as a national traffic safety issue is lower than warranted. Current federal-aid programs do not ensure that states fund speed management activities at a level commensurate with the national impact of speeding on fatalities and injuries. Also, unlike other traffic safety issues with a similar impact (such as alcohol-impaired driving) there are no nationwide programs to increase public awareness of the risks of speeding. Although the US Department of Transportation (DOT) has established a multi-agency team to coordinate speeding-related work throughout the DOT, this team's work plan does not include means to ensure that the planned actions are completed in a timely manner.

FINDINGS

1. Speed increases the likelihood of serious and fatal crash involvement, although the exact relationship is complex due to many factors.
2. Speed increases the injury severity of a crash.
3. Drivers report understanding that speeding is a threat to safety but acknowledge it is a common driving behavior in the United States.
4. The *Manual on Uniform Traffic Control Devices* guidance for setting speed limits in speed zones is based on the 85th percentile speed, but there is not strong evidence that, within a given traffic flow, the 85th percentile speed equates to the speed with the lowest crash involvement rate on all road types.
5. Unintended consequences of the reliance on using the 85th percentile speed for changing speed limits in speed zones include higher operating speeds and new, higher 85th percentile speeds in the speed zones, and an increase in operating speeds outside the speed zones.
6. Expert systems such as USLIMITS2 can improve the setting of speed limits by allowing traffic engineers to systematically incorporate crash statistics and other factors in addition to the 85th percentile speed, and to validate their engineering studies.
7. The safe system approach to setting speed limits in urban areas is an improvement over conventional approaches because it considers the vulnerability of all road users.

8. Speeding-related performance measures are needed to determine the effectiveness of data-driven, high-visibility enforcement programs and to communicate the value of these programs to law enforcement officers and the public.
9. The involvement of speeding passenger vehicles in fatal crashes is underestimated.
10. The lack of consistent law enforcement reporting of speeding-related crashes hinders the effective implementation of data-driven speed enforcement programs.
11. Automated speed enforcement is an effective countermeasure to reduce speeding-related crashes, fatalities, and injuries.
12. The lack of state-level automated speed enforcement (ASE) enabling legislation, and restrictions on the use of ASE in states where legislation exists, have led to underuse of this effective speeding countermeasure.
13. Federal guidelines for automated speed enforcement (ASE) programs do not reflect the latest technologies and operating practices and are not very effective because their existence is not well known among the ASE program administrators.
14. Point-to-point speed enforcement has been shown to be an effective speeding countermeasure internationally, but it is not currently used in the United States.
15. Intelligent speed adaptation is an effective vehicle technology to reduce speeding.
16. New car safety ratings are effective in incentivizing consumers to purchase passenger vehicles with advanced safety systems.
17. Traffic safety campaigns that include highly publicized, increased enforcement can be an effective speeding countermeasure, but their inconsistent and infrequent use by states hinders their effectiveness.
18. The current level of emphasis on speeding as a national traffic safety issue is lower than warranted and insufficient to achieve the goal of zero traffic fatalities in the United States.
19. Current federal-aid programs do not require or incentivize states to fund speed management activities at a level commensurate with the national impact of speeding on fatalities and injuries.
20. The US Department of Transportation (DOT) Speed Management Program Plan identifies important actions to reduce speeding-related fatalities, but the DOT has not tracked or ensured the timely implementation of these actions.

RECOMMENDATIONS

New Recommendations

As a result of this safety study, the National Transportation Safety Board makes the following safety recommendations:

To the US Department of Transportation:

1. Complete the actions called for in your 2014 Speed Management Program Plan, and periodically publish status reports on the progress you have made.

To the National Highway Traffic Safety Administration:

2. Identify speeding-related performance measures to be used by local law enforcement agencies, including—but not limited to—the numbers and locations of speeding-related crashes of different injury severity levels, speeding citations, and warnings, and establish a consistent method for evaluating data-driven, high-visibility enforcement programs to reduce speeding. Disseminate the performance measures and evaluation method to local law enforcement agencies.
3. Identify best practices for communicating with law enforcement officers and the public about the effectiveness of data-driven, high-visibility enforcement programs to reduce speeding, and disseminate the best practices to local law enforcement agencies.
4. Work with the Governors Highway Safety Association, the International Association of Chiefs of Police, and the National Sheriffs' Association to develop and implement a program to increase the adoption of speeding-related *Model Minimum Uniform Crash Criteria Guideline* data elements and improve consistency in law enforcement reporting of speeding-related crashes.
5. Work with the Federal Highway Administration to update the *Speed Enforcement Camera Systems Operational Guidelines* to reflect the latest automated speed enforcement (ASE) technologies and operating practices, and promote the updated guidelines among ASE program administrators.
6. Work with the Federal Highway Administration to assess the effectiveness of point-to-point speed enforcement in the United States and, based on the results of that assessment, update the *Speed Enforcement Camera Systems Operational Guidelines*, as appropriate.

7. Incentivize passenger vehicle manufacturers and consumers to adopt intelligent speed adaptation (ISA) systems by, for example, including ISA in the New Car Assessment Program.
8. Collaborate with other traffic safety stakeholders to develop and implement an ongoing program to increase public awareness of speeding as a national traffic safety issue. The program should include, but not be limited to, initiating an annual enforcement mobilization directed at speeding drivers.
9. Establish a program to incentivize state and local speed management activities.

To the Federal Highway Administration:

10. Revise Section 2B.13 of the *Manual on Uniform Traffic Control Devices* so that the factors currently listed as optional for all engineering studies are required, require that an expert system such as USLIMITS2 be used as a validation tool, and remove the guidance that speed limits in speed zones should be within 5 mph of the 85th percentile speed.
11. Revise Section 2B.13 of the *Manual on Uniform Traffic Control Devices* to, at a minimum, incorporate the safe system approach for urban roads to strengthen protection for vulnerable road users.
12. Work with the National Highway Traffic Safety Administration to update the *Speed Enforcement Camera Systems Operational Guidelines* to reflect the latest automated speed enforcement (ASE) technologies and operating practices, and promote the updated guidelines among ASE program administrators.
13. Work with the National Highway Traffic Safety Administration to assess the effectiveness of point-to-point speed enforcement in the United States and, based on the results of that assessment, update the *Speed Enforcement Camera Systems Operational Guidelines*, as appropriate.

To the seven states prohibiting automated speed enforcement:

14. Amend current laws to authorize state and local agencies to use automated speed enforcement.

To the 28 states without automated speed enforcement laws:

15. Authorize state and local agencies to use automated speed enforcement.

To the 15 states with automated speed enforcement restrictions:

16. Amend current laws to remove operational and location restrictions on the use of automated speed enforcement, except where such restrictions are necessary to align with best practices.

To the Governors Highway Safety Association:

17. Work with the National Highway Traffic Safety Administration, the International Association of Chiefs of Police, and the National Sheriffs' Association to develop and implement a program to increase the adoption of speeding-related *Model Minimum Uniform Crash Criteria Guideline* data elements and improve consistency in law enforcement reporting of speeding-related crashes.

To the International Association of Chiefs of Police:

18. Work with the National Highway Traffic Safety Administration, the Governors Highway Safety Association, and the National Sheriffs' Association to develop and implement a program to increase the adoption of speeding-related *Model Minimum Uniform Crash Criteria Guideline* data elements and improve consistency in law enforcement reporting of speeding-related crashes.

To the National Sheriffs' Association:

19. Work with the National Highway Traffic Safety Administration, the Governors Highway Safety Association, and the International Association of Chiefs of Police to develop and implement a program to increase the adoption of speeding-related *Model Minimum Uniform Crash Criteria Guideline* data elements and improve consistency in law enforcement reporting of speeding-related crashes.