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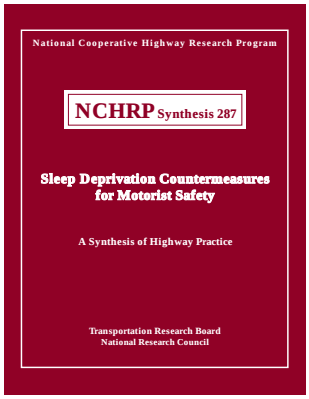
Sleep Deprivation Countermeasures for Motorist Safety

A report prepared under NCHRP Project 20-5, "Synthesis of Information Related to Highway Problems." The report was prepared by Jane C. Stutts, Ph.D., under the guidance of the Topic Panel (see box). The study was programmed and the report reviewed by the Project 20-5 Committee and was sponsored by the American Association of State Highway and Transportation Officials in cooperation with the Federal Highway Administration.



Sleep is a basic biological need, and sleepiness the inevitable consequence of the failure to satisfy that need. Studies have linked sleepiness to decrements in vigilance, reaction time, memory, psychomotor coordination, information processing, and decision making — all of which are critical to safe driving. Although a well-established risk factor for commercial vehicle crashes, sleep deprivation has only recently been recognized as a significant contributer to crashes involving the general motoring public.

As part of the preparation of this report, a survey questionnaire was distributed to all 50 states, the District of Columbia, Puerto Rico, and 13 Canadian provincial transportation agencies. Responses were received from 37 states and 7 provinces. An abbreviated version of the questionnaire was also sent to members of the National Association of Governors' Highway Safety Representatives. Twenty-three states and the District of Columbia responded to this version of the questionnaire. The results of the surveys and a literature review are presented in this synthesis report.

The report concludes that although adequate sleep is the only 100 percent effective "countermeasure" for sleepiness, there are other countermeasures to help make driving safer. Several of the key countermeasures include:

- Education of high-risk populations, the general driving public, and other key groups, such as law enforcement personnel.
- New technologies to detect and warn drowsy drivers.
- Roadway countermeasures such as continuous shoulder rumble strips and other roadway treatments.
- Increased use of rest areas.
- Regulatory and judicial action.

Other opportunities to develop countermeasures are detailed in the report. The following descriptions provide additional information on the findings highlighted above.

• *Driver Countermeasures — Public Education and Awareness:*

Public education and awareness countermeasures are primarily directed at preventing drowsy driving. There are three steps necessary in the development of effective educational/awareness countermeasures: identification of the target audience, identification of themes or messages, and identification of approaches for conveying the messages. In other words, effective countermeasures require careful attention to who, what, and how.

• *New Technologies for Preventing Drowsy Driving Crashes:*

Although technology cannot reduce or eliminate fatigue it can be used to prevent fatigue- or sleep-related crashes by monitoring or detecting drowsy driving, alerting or warning drowsy drivers, and by helping drowsy drivers maintain alertness. Of great concern is the

potential misuse of the technologies; they cannot act as a substitute for the functional capability of the driver.

- *Roadway Countermeasures to Prevent Drowsy Driving Crashes:*

The most successfully employed countermeasure used for reducing single-vehicle, high-speed run-off-road events is the continuous shoulder rumble strip (CSRS). The report presents what is known about the current use and effectiveness of CSRSs and other roadway-oriented countermeasures (including centerline rumble strips) for preventing drowsy driving crashes and summarizes current U.S. and Canadian practice.

- *Environmental Countermeasures — Safe Stopping Areas:*

The primary environmental measure for preventing drowsy driving crashes is the provision of safe stopping locations along roadways. Although rest areas can serve many functions, their primary purpose is to increase motorist safety by providing convenient, secure facilities with ample parking.

- *Regulatory and Judicial Countermeasures:*

A wide array of regulatory and judicial measures to reduce drowsy driving is applicable to commercial drivers. Three areas that have applicability for the general motoring public are reporting of drowsy driving crashes (understanding that fatigue plays a role in accidents), legal sanctions against drowsy drivers (creating a mindset that drowsy driving is risky and unacceptable), and driver licensing.

This report also includes examples of good state practices from New York, California, and Washington. For all the details, a copy of the report can be obtained using the form below.