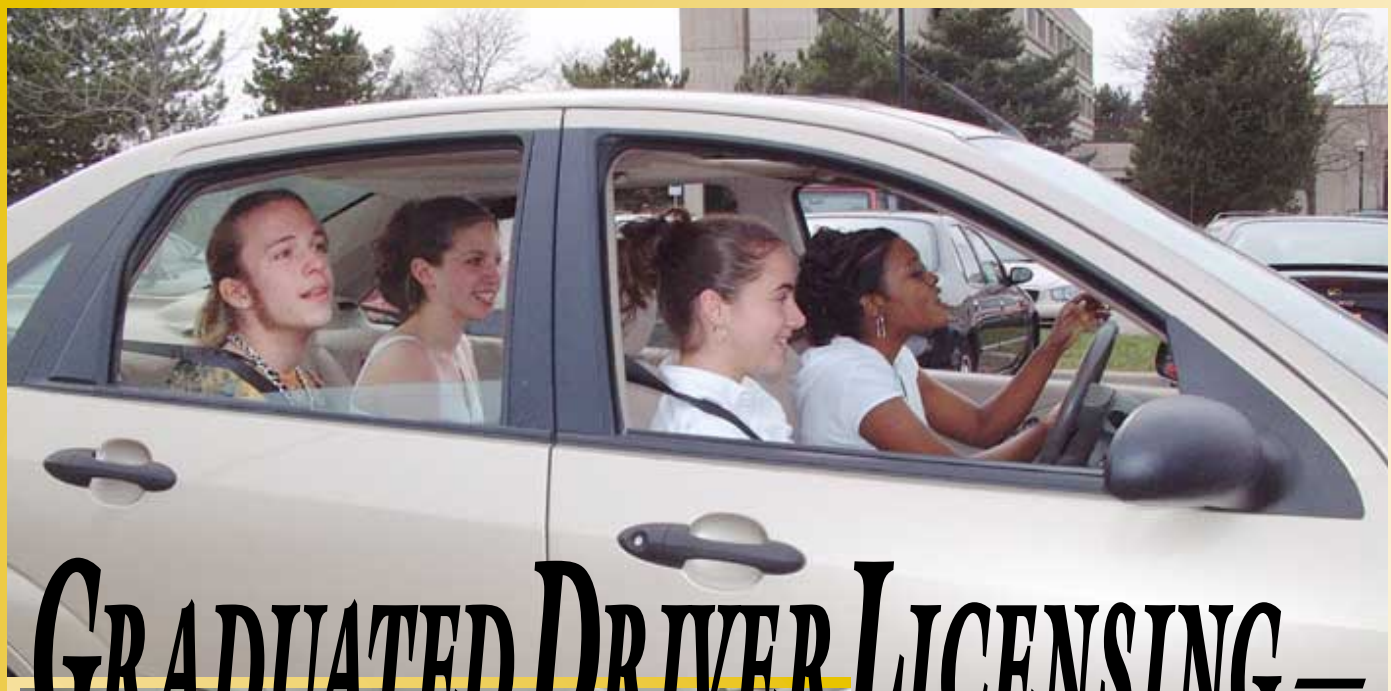
UMTRI

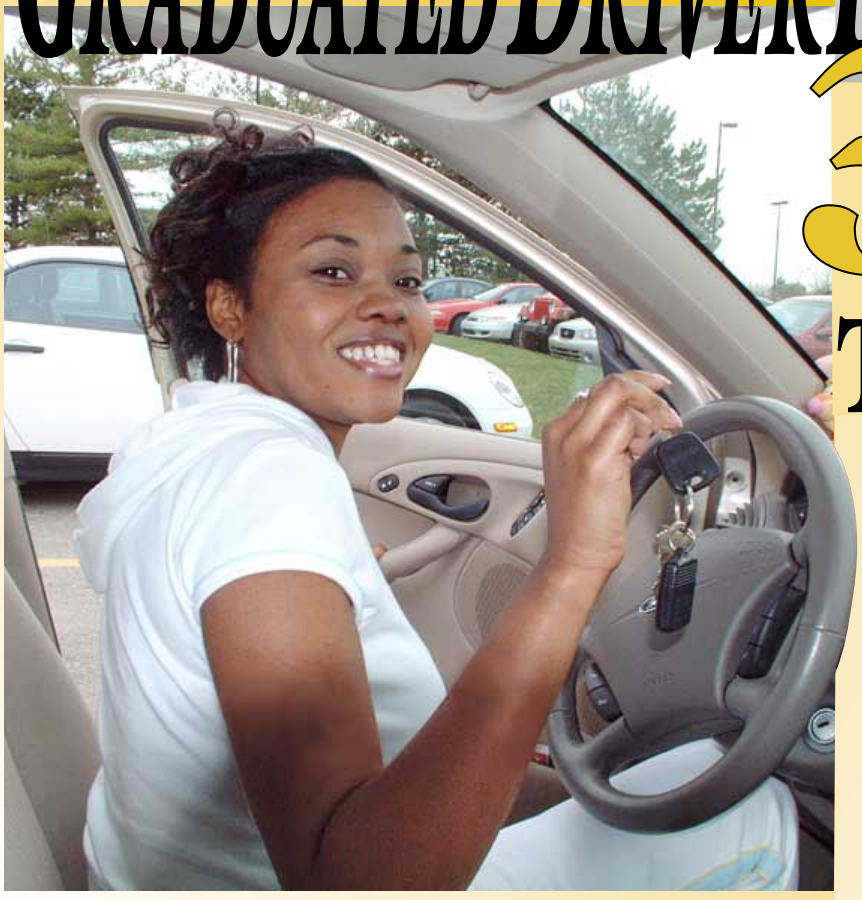
Research Review

• University Of Michigan Transportation Research Institute • October–December 2002 • Volume 33, Number 4 •



Graduated Driver Licensing – 3 Steps To Saving Teens' Lives

on page 1



Inside:

Unsafe Driver Actions 7
Worldwide Traffic Safety..10
Hot off the Press 12
Transportation Tidbits 14

UMTRI

RESEARCH REVIEW

• UNIVERSITY OF MICHIGAN TRANSPORTATION RESEARCH INSTITUTE • OCTOBER–DECEMBER 2002 • VOLUME 33, NUMBER 4 •

ISSN 0739 7100

Writer and Editor: Monica Milla
Designer and Cover Photographer: Shekinah Errington
Printer: UM Printing Services

The UMTRI Research Review is published four times a year by the Research Information and Publications Center of the University of Michigan Transportation Research Institute, 2901 Baxter Road, Ann Arbor, Michigan 48109-2150 (http://www.umtri.umich.edu). The subscription price is $35 a year, payable by all subscribers except those who are staff members of a State of Michigan agency or an organization sponsoring research at the Institute. See the subscription form on the inside back cover. For change of address or deletion, please enclose your address label.

CONFERENCES & EVENTS

Roads Innovation 2003
March 20, Paris, France
http://www.piarc.org/cnf/innov-e.htm

Transportation's Role in Successful Communities
March 23–26, Fort Lauderdale, Florida
http://www.ite.org/Conference/info.htm

Safety of New Technology in Transport
March 31–April 4, Leeds, England
http://www.its.leeds.ac.uk/short/schedule.html#sntt

4th Annual Forum on Public Health and Transportation Safety
April 1–2, Houston, Texas
http://www.hsrc.unc.edu/forum.htm

Intertraffic Latin America 2003
April 2–4, Mexico City, Mexico
http://www.mexico.intertraffic.com/

CIREN Quarterly Meeting
April 3, Washington, D.C.
http://www-nrd.nhtsa.dot.gov/departments/nrd50/ciren/CIREN.html

9th Application of Transportation Planning Methods Conference
April 6–10, Baton Rouge, Louisiana
http://www.ltrc.lsu.edu/TRBConference/

Traffex 2003/Smart Moving International Congress
April 7–10, Birmingham, England
http://www. http://www.traffex.com/

N. American Intermodal Transportation Summit
April 8–9, Denver, Colorado
http://www.du.edu/transportation/summit

International Truck and Bus Safety Symposium
April 16–18, Orlando, Florida
http://catss.ucf.edu/Pages/News.htm

Heavy Truck Rollover and Collision Avoidance
April 22–23, Baltimore, Maryland
http://www.sae.org/contedu/tt_rollover.htm

Injury Scaling: Uses and Techniques
April 27–28, Arlington, Virginia
http://www.carcrash.org/injuryscaling.html

8th Annual Michigan Traffic Safety Summit
April 29–30, Grand Rapids, Michigan
http://www.michigan.gov/msp/0,1607,7-123-1593_3504-60134--,00.html

14th Annual Transportation Research Conference
April 29–30, St. Paul, Minnesota
http://www.cts.umn.edu/events/rescon/

SAE Automotive Dynamics & Stability Conference
May 7–9, Detroit, Michigan
http://www.sae.org/calendar/ads/

Intertraffic Eurasia 2003
May 13–15, Istanbul, Turkey
http://ww.eurasia.intertraffic.com

21st ARRB and 11th REAAA Conference
May 18–23, Cairns, Australia
http://arrb.com.au/conf21/21about.htm

ESV 2003: Enhanced Safety of Vehicles
May 19–22, Nagoya, Japan
http://www.esv2003.com/

ITS Annual Meeting
May 19–22, Minneapolis, Minnesota
http://www.itsa.org/annualmeeting.html

Canadian Multidisciplinary Road Safety Conference
June 8–11, Banff, Alberta, Canada
http://www.cyberus.ca/~carsp/cmrsc.htm

RR

UMTRI / SHEKINAH ERRINGTON

Graduated Driver Licensing—Three Steps to Saving Teens' Lives

Young beginning drivers experience higher crash risk per mile driven than any other age group. The introduction of graduated driver licensing (GDL), or the three-part licensing process to full driving privileges, has gone a long way to reduce teen deaths and injuries in car crashes. Many states have implemented GDL programs, and data showing their impact are becoming available.

Teens and Driving Risk

In the U.S., each year more than 8,000 people die in motor vehicle crashes in which the driver is between the ages of 15 and 20. These young drivers comprise about 7 percent of the total driving population, but account for nearly 15 percent of all driver fatalities. National research shows that crash rates, per mile driven, are higher for drivers ages 16 to 19 than for all other age groups, and the crash risk of 16- to 17-year-old drivers is almost three times as high as for 18- to 19-year-old drivers.

Young drinking drivers are twice as likely as drivers over age 21 to be involved in a fatal crash. Almost three-quarters of people ages 16 to 20 who died in passenger vehicle crashes were ***not*** wearing safety belts, and almost one quarter of youth who died in speed-related crashes were not wearing safety belts.

continued...

The National Highway Transportation Safety Administration states that teens experience high crash rates due to driving inexperience and lack of adequate driving skills, driving during nighttime high risk hours, risk-taking behavior, poor driving judgment and decision-making, and drinking and driving. Researchers also believe that young drivers' inexperience and risk taking have contributed to the high incidence of crashes. The inexperience of young drivers makes it difficult for them to recognize and respond to hazards, resulting in unsafe driving practices, while their immaturity leads to risky driving behavior such as speeding, tailgating, and not wearing seat belts. Driving is a complex psychomotor skill best acquired with considerable practice, starting in low-risk situations to gain essential experience.

GDL and Risk Reduction

So what's the answer? Increasingly, GDL. It lets young drivers phase into full driving privileges as they develop their driving skills. This usually occurs in three stages: a supervised learner's period, an intermediate license that limits unsupervised driving in high-risk situations, and then a full license. Young drivers are required to demonstrate responsible driving behavior in each stage of licensing before advancing to the next stage. Specifics vary from state to province to country, but can include some level of adult supervision, limited or restricted nighttime driving, and limits on transporting young passengers.

The National Committee on Uniform Traffic Laws and Ordinances has developed a model GDL program using recommendations from the Insurance Institute for Highway Safety, National Highway Traffic Safety Administration, and other national organizations. It calls for a minimum of six months in the learner's stage, and limits on late-night unsupervised driving and transporting teenage passengers in the intermediate stage. Certification that a learner's permit holder has driven a minimum number of supervised hours is also important. Some state programs meet or exceed these core requirements, while others incorporate some aspects of them. States may augment their GDL systems with additional features including driver education innovations, an extended learning period, and requirements for a clean driving record to move on to the next level.

Results from U.S. Programs

In a recent study, UMTRI researchers Jean Shope and Lisa Molnar examined and evaluated the results

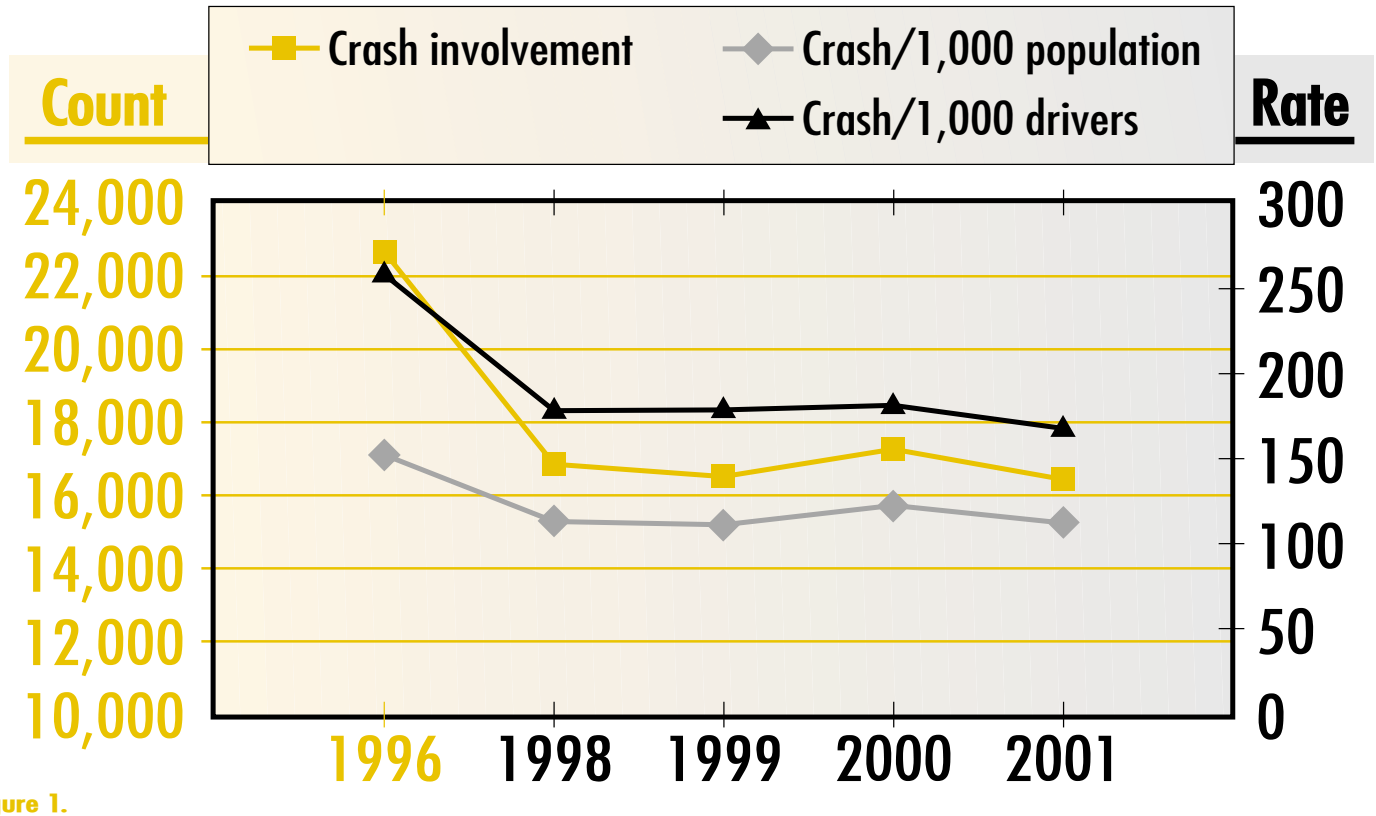


Figure 1.
Overall crash involvement, crashes per 1,000 population, and crashes per 1,000 drivers for 16-year-old drivers in Michigan. Michigan's GDL program began in 1997, with reduced crash involvement in 1998 and beyond. 1996 shows pre-GDL figures.

from early GDL programs in the U.S. They reviewed reports from programs, launched from 1996 through 1999, in six states. Shope says, "Graduated driver licensing is an exciting development with a large impact on traffic safety. As a result of GDL, there has been a notable decrease in crash rates for 16-year-olds. Even though each state measures its results differently, the overall outcomes are encouraging."

The six states reported crash reductions among teen drivers following GDL implementation. This positive effect was observed across different geographical regions, and with different GDL programs—fewer teens are experiencing crashes and becoming injured. Even after adjusting for changes in the population of licensed drivers, reductions were still generally found. For example, the risk of a 16-year-old driver being involved in a fatal or injury crash in Michigan and Florida was reduced 11 percent and 24 percent, respectively. The overall risk of a 16-year-old driver being involved in any crash was reduced 25 percent in Michigan and 27 percent in North Carolina. Reductions of crash risk during restricted night hours were particularly impressive.

In another study, Shope and Molnar evaluated the first four years of Michigan's GDL program, comparing crash rates of 16-year-old drivers in 1996 (before GDL) with crash rates from 1998 to 2001. They examined overall crashes, as well as several subtypes of crashes (casualty, night, late evening, and passenger). Significant reductions in crash risk following GDL were found and generally maintained for all crash categories examined. Night crashes showed the greatest reduction. *(See Figure 1 for details.)*

Results from New Zealand and Canada

Other states and countries have seen similar trends. New Zealand has had a national GDL program since August, 1987, and was the first location anywhere in the world to adopt GDL. Dorothy Begg, a senior research fellow in the Injury Prevention Research Unit at the University of Otago, New Zealand, says, "There has been a very significant reduction in traffic crash injury among young people since the GDL system was introduced, and there is good evidence that the driving restrictions of the GDL have contributed significantly to this reduction, in particular the night-time curfew, and also the restriction on carrying young passengers."

In 1985, New Zealand's traffic crash fatality rate for drivers age 15 to 24 was nearly 48 per 100,000 population. In 1999, twelve years after GDL was implemented, the rate was cut in half to 24.2. After the implementation of GDL, crash-related serious injury among 15- to 19-year-olds decreased by 23 percent, while crashes for drivers over age 25 were down by 16 percent. This means at least a 7 percent decrease is attributable to GDL.

After GDL was instituted in New Zealand, the following showed a substantial reduction:

- Rate of reported crashes for 15- to 19-year-old car drivers (1981–1991)
- Ratio of reported crashes for 15- to 19-year-old drivers compared with crashes for drivers over 25
- Rate of hospital admissions as a result of car crashes for 15- to 19-year-old car drivers (1983–1990)

LICENCE ART COURTESY OF DOROTHY BEGG / UNIVERSITY OF OTAGO, NEW ZEALAND

- Ratio of 15- to 19-year-old drivers admitted to hospital compared to drivers over 25

A study by Begg, Jonathan Alsop, Shaun Stephenson, and John Langley showed that some of the reduction in young driver crashes can be attributed to GDL restrictions. The nighttime curfew in particular had a significant impact, with 34 percent fewer nighttime crashes for those with a restricted license, and 23 percent fewer for those with a full GDL, compared with those licensed pre-GDL.

Elsewhere, a report from the Traffic Injury Research Foundation showed that the GDL program in Nova Scotia, Canada, has been associated with a significant reduction in crashes and casualties. Among 16-year-old drivers, all collisions decreased by

continued...

24 percent during the first full year of the program, and by 37 percent over the first three years of the program. Comparable decreases also occurred in injury and fatal crashes. Improvements were also observed for all novice drivers (Nova Scotia requires the GDL program for all novice drivers, not just young ones), with a 19 percent drop in the collision rate.

Parents' and Teens' Views on GDL

GDL has been shown to improve young drivers' safety on the roads, but how do teens and their parents *feel* about the program? Parents, on the whole, are extremely positive about GDL, according to a study by Patricia Waller, Michelle Olk, and Shope. In Michigan, parents reported spending about 75 hours supervising their kids' driving (25 more than required by law). They had many positive opinions about the program, citing not only improved driving and safety, but also a welcome opportunity to be involved in their children's driving and to spend more time with them. Illustrative responses include "I felt more involved in my son's education, and he takes it more seriously," "It has made my daughter an excellent driver," and "Nine older siblings did not go through this program, and I feel this extra practice time is helpful and at times essential." Negative comments about GDL focused mainly on the lack of adequate information about the program when it was first introduced. (Since that time, much more information is available on GDL, both through state and national organizations, to first-time drivers and their parents/guardians.)

Begg, Langley, Anthony Reeder, and David Chalmers investigated the attitudes and experiences of young people going through the GDL system in New Zealand. The participants were born between 1972 and 1973 and were regularly followed up since birth. They were 15 years old at the time GDL system was introduced in New Zealand in 1987. Overall, 79 percent agreed or strongly agreed with GDL at age 15, and 70 percent felt the same at age 18 after going through the program. The drivers were most affected by the

nighttime curfew (34 percent) and the passenger restriction (44 percent). Only 32 percent said they had *not* broken any of the conditions of the GDL. Of those who did break GDL conditions, 88 percent said they broke the passenger restriction at least once, and 55 percent said they broke the curfew restriction at least once.

Recent research has demonstrated that simple motivational strategies can persuade parents to adopt driving agreements and impose greater restrictions on early teen driving. Bruce Simons-Morton and Jessica Hartos state that while GDL provides a framework for licensing young drivers, "a framework is needed to guide parental management. Parent-teen driving agreements or contracts are a potentially important tool for framing and promoting parental management practices regarding teen driving. Driving agreements…have been employed successfully in a wide range of contexts."

How It All Began

While the proliferation of GDL programs across the country seems to have happened fairly suddenly—almost every state now has some form of program—the process to this level of implementation actually took several decades. In fact, the research upon which the idea of graduated driver licensing is based took place in the early 1970s at the University of North Carolina Highway Safety Research Center (UNC HSRC). One of these studies linked enhanced origin and destination (O&D) data to crash data from the same time and area, and another linked data on passengers derived from supplemental data collected on state crash report forms. The results from these studies showed that young drivers were overrepresented in nighttime crashes and in crashes with a young person in the passenger seat. Patricia Waller, who served as the director of UMTRI from 1989 to 1999, conducted these early studies at UNC HSRC. Shope says, "Pat realized the need to evaluate GDL programs. She was instrumental in getting legislation passed in Michigan, and made countless trips to the state capitol. She was key in obtaining NHTSA funding to start the evaluation of Michigan's program, and led the GDL research at UMTRI before she retired."

In the 1970s and 1980s, Waller gave many presentations proposing GDL to state and national meetings of driver educators, and says the response was "almost unanimously positive and often enthusiastic." In 1976, Waller was invited to testify before a Blue Ribbon Panel of the Toronto legislature about the proposal for a GDL system. They asked many questions, raising concerns about the younger age at which the driver would start. The vote fell one short of endorsing and recommending a GDL system.

Working with the legislature in North Carolina, Waller discovered the main concern there was also about the lower initial age. However, the legislature did vote to lower the age of obtaining a driver's permit from 15-and-a-half to 15. (The lower age of obtaining a permit lengthens the time for practice before full licensure.)

In 1984, Waller was invited to New Zealand to discuss various proposals for modifying their driver licensing system, including GDL. In August, 1987, New Zealand launched the first GDL program in the world. Prior to GDL in New Zealand, a 15-year-old could be fully licensed simply by passing a standard driving test (on-road plus a few oral questions). Post GDL, 15- to 24-year-old new drivers start with a learner license obtained by passing written, oral, and vision tests. The learner phase lasts six months and requires supervision by a licensed driver. Next, the driver gets a restricted license by passing a practical driving test. Unless supervised, the restricted license allows no driving from 10 p.m. to 5 a.m. and no passengers under 20 years of age. A BAC of 0.03 or less applied to learner and restricted-license drivers. After 18 months of the restricted license, the driver graduates to a full license.

Since 1987, several changes have been made to the New Zealand GDL program. In 1992 the 0.03 BAC limit was applied to all drivers under 20 years of age, regardless of license status. In 1999 several further changes were made. For example, the GDL program was extended to all new drivers (not only those ages 15 to 24), a new full license driving test based on driving skill and hazard perception was introduced between the restricted and full license stages, and a much stronger penalty regimen of demerit points and fines was adopted for breaches of the GDL conditions.

Since then, many jurisdictions have adopted similar programs. The Insurance Institute for Highway Safety's Highway Loss Data Institute provides detailed information about all GDL laws in the United States and Canada at **http://www.hwysafety.org/safety_facts/state_laws/grad_license.htm**.

In Michigan, an interest in addressing crashes by young drivers was precipitated by a particularly terrible crash in the 1990s that killed several young people and happened to take place near the home of legislator Dan Gustafson. Waller and her colleagues met with him and outlined their ideal GDL program, which included a nighttime driving restriction, a one-passenger restriction, and parent/adult supervision of at least 50 hours of driving (10 of which must be at night). The legislation was sponsored, amended to remove the passenger

continued…

UMTRI / SHEKINAH ERRINGTON

restriction (and include a few small changes), and passed into law. The program was implemented in April, 1997.

Shope says, "Michigan was one of the first states to implement GDL, and the first to require both certification of 50 hours of parent-supervised driving and a two-phase driver education program."

Where GDL Is Going

To build on the current laws and further reduce teen driving deaths, the National Transportation Safety Board encourages states to implement stronger nighttime and passenger restrictions, and the Insurance Institute for Highway Safety has recommended a blueprint GDL program.

Shope and Molnar conclude that the impact of these studies and others to come will guide future GDL research, practice, and policy. Shope also feels future research is necessary to determine if these crash reductions are maintained and if other jurisdictions continue receiving similar results. Shope says, "The reductions in crash risk are great, but we have to work to make sure they stay low. If GDL is not enforced and parents are not highly involved, the perception of its importance will decrease, as will its effectiveness. Reducing teen drivers' crash risk is essential, and GDL is certainly a step in the right direction." RR

UMTRI Researchers Determine Which Driver Actions Attribute to the Majority of Crashes

In the last decade, the number of trucks registered in the U.S. with gross vehicle weights above 10,000 pounds has increased 25 percent, and the number of miles traveled by these large trucks has increased 41 percent. In 2000, 5,211 people were killed and about 140,000 were injured in crashes involving trucks[1]. Ninety-eight percent of these fatalities and injuries occurred to occupants in passenger cars. A team of UMTRI researchers decided to find out why and how to mitigate this number.

A literature review suggested that car drivers are poor judges of truck speed, maneuverability, braking, and acceleration. Many car drivers assume trucks are operated in the same way as cars, and do not seem to recognize the risks associated with driving near trucks.

Information on unsafe driving actions is available in crash data files, but contains uncertainty that is inherent in police judgments and unsworn witness and crash survivor statements. For example, the physical evidence on which police officers base their opinions may be conflicting or ambiguous, and crash survivors and witnesses may not clearly remember the events leading up to the crash. In addition, straightforward tabulations and associated statistical techniques are inadequate.

Understanding Unsafe Driving

These problems were addressed in a recent UMTRI study, sponsored by the AAA Foundation for Traffic Safety, to better understand the actions of drivers preceding fatal car-truck crashes. Researchers Lidia P. Kostyniuk, Frederick M. Streff, and Jennifer Zakrajsek used crash data[2] to examine

continued...

AMERICAN AUTOMOBILE ASSOCIATION / KATHERINE ZIMMERMAN

At right: **Lidia Kostyniuk, research scientist in UMTRI's Social and Behavioral Analysis Division, attends the AAA release of the study at the National Press Club in Washington, D.C.**

[1] A "truck" is defined as having a gross vehicle weight of over 10,000 pounds and a body type of single unit straight truck, tractor-trailer(s), unknown with trailer(s), or combinations of these.

[2] The researchers examined crash data, using the Bayesian approach, the Fatality Analysis Reporting System (FARS), and UMTRI's Center for National Truck Statistics file, Trucks Involved in Fatal Accidents (TIFA). The samples contained 35,244 fatal car-car crashes and 10,732 fatal car-truck crashes for the period 1995–1998.

unsafe driver actions and identify which ones were more likely in car-truck crashes than in car-car crashes. They also discovered behavioral patterns associated with these actions and suggested educational interventions.

The crash data used in the study classified 94 driver factors or conditions (unsafe driving actions or driver conditions) that preceded a crash. Up to four unsafe actions could be recorded for each driver in each crash. Of all the driver factors in fatal car-truck crashes, 75 percent were linked to car drivers and 25 percent were linked to truck drivers—that suggests car drivers are three times more likely to commit unsafe actions in fatal car-truck crashes. Additionally, about 80 percent of car drivers in fatal crashes had at least one unsafe driving act or condition recorded, compared with only 27 percent of truck drivers.

Yet, the majority of crashes were related to a few unsafe driving actions. In fact, just five driver factors contributed to 65 percent of the dangerous actions by car drivers in both fatal car-truck and fatal car-car crashes:

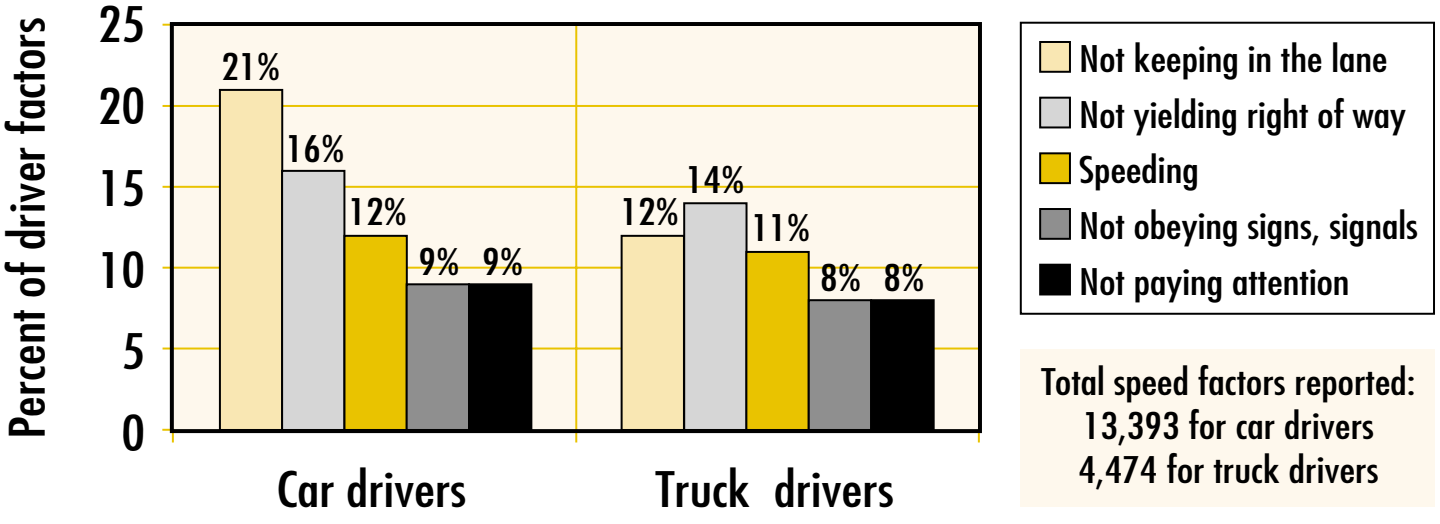
- Failing to keep in the lane or running off the road (21 percent)
- Failing to yield the right of way (16 percent)
- Driving too fast for conditions or above the speed limit (12 percent)
- Failing to obey signs and signals (9 percent)
- Not paying attention (9 percent)

These statistics suggest that motorists drive the same way around trucks as they do around cars, and a reduction in the general crash risk will also reduce the number of car-truck crashes.

These same five unsafe driving acts were also the most common factors for truck drivers, accounting for 51 percent of all unsafe actions by truck drivers. Moreover, the study found that four driver factors were more likely in fatal car-truck crashes than in fatal car-car crashes—improper following, improper lane change,

Below: **Of the 94 possible driving factors recorded in the data, just five were associated with 65 percent of the crashes. Car and truck drivers had similar distributions of each of the five main factors, except failing to keep the lane, which was associated with car drivers almost twice as often—21 percent versus 12 percent for truck drivers. Of *all* unsafe driving actions (in addition to the five recorded in fatal car-truck crashes that are shown here), 75 percent were linked to car drivers and 25 percent were linked to truck drivers.**

Five most frequent driver factors in fatal car-truck crashes



Total speed factors reported:
13,393 for car drivers
4,474 for truck drivers

Tips for Driving Near Trucks

- Never change lanes abruptly around a truck.
- Slow down to let trucks have right of way.
- Drive at a safe speed, appropriate to the conditions and posted speed limit.
- Use turn signals when changing lanes.
- Do not drive alongside or immediately behind a truck.
- Never cut in front of a truck, especially if doing so will require the truck to brake.

obscured vision, and drowsiness/being asleep—though these are recorded for relatively few crashes. The consequence of each of these four actions or conditions is more severe in car-truck crashes than in car-car crashes, and should be the focus of education.

The good news is, because truck drivers commit fewer unsafe driving actions, that car drivers are largely in control of their own safety when driving near large trucks. Car drivers who are aware of the characteristics of large trucks and drive accordingly are likely to be safer driving near them than are drivers who are unaware.

Improving Driving Safety

Based on the research findings, the UMTRI investigators determined strategies that could be used to teach motorists about the risks associated with the major unsafe driving actions. They recommend using various instructional methods—from passive education to active participation—to match whether the desired change is in knowledge, behavior, or attitude. Among other things, they suggest creating an interactive world wide web site that not only educates drivers about the dangers of driving near trucks, but allows them to test their knowledge.

Driver factor	Likelihood of being in a fatal car-truck versus car-car crash
Improper following	2.5
Vision obscured by rain/snow/fog/sand/dust	2.0
Drowsiness/fatigue or sleeping	1.7
Improper or erratic lane change	1.5

Another type of training to engage the user is a personal computer-based driving simulation, demonstration, or game that shows the interaction between cars and large trucks.

In response to the study findings and recommendations, the AAA Foundation for Traffic Safety launched a nationwide campaign to educate drivers about ways to reduce car-truck crashes. Part of the campaign involves a Share with Care program that offers practical advice to car and truck drivers on ways to avoid truck-car crashes. The safety education campaign is proliferated through AAA's 80 clubs and more than 1,100 offices, to reach about 45 million AAA members as well as the general public. AAA will provide the safety information through publications and through driver education and improvement programs.

The findings of this study are consistent with findings of a similar study that also included nonfatal accidents (Stuster, 1999)[3].

The study is available in its entirety at http://www.aaafoundation.org/pdf/CarTruck.pdf. RR

[3] Stuster, J. 1999. The Unsafe Driving Acts of Motorists in the Vicinity of Large Trucks. Final Report. Santa Barbara, California: Anacapa Services, Inc.

COLLABORATIONS

At left: **Four driving factors are more likely in car-truck crashes than in car-car crashes. The highest likelihood is for following improperly, which is two and a half times more likely to be recorded in a fatal car-truck crash than in a *fatal* car-car crash.**

Improving Worldwide Traffic Safety

WHO and FIA Join Efforts for Road Safety

WORLD HEALTH ORGANIZATION

In 2000, over 1.2 million people were killed in road-traffic incidents, which are the world's ninth leading cause of death, and the figure is expected to nearly double by 2020. To address this growing concern, leaders from around the world met in London in February 2003 in a joint effort to improve road safety and reduce road-traffic-related deaths. Attendees included Gro Harlem Brundtland, director general of the World Health Organization (WHO), Max Mosley, president of the Federation Internationale de l'Automobile (FIA), several government ministers, and experts in road safety from around the world. In addition to the staggering death rates, injuries due to road-traffic crashes are a major drain on health and health-care-system resources. Data show that in some countries, 1 of every 10 hospital beds is occupied by a victim of a road-traffic crash. Dr. Brundtland says, "We must multiply our efforts to prevent people from falling victim to road-traffic collisions."

"Road safety is an issue of immense human proportions. It is also an issue of equity. Road safety very much affects poor people," says James D. Wolfensohn, president of the World Bank. Indeed, developing countries have only 40 percent of all motor vehicles and 86 percent of all traffic fatalities. In addition, the greatest increase in traffic fatalities each year takes place in developing countries. The majority of the victims of these incidents are people who will never be able to afford a car: pedestrians, cyclists, and users of public transportation. UMTRI visiting research scientist Kåre Rumar reports that the most overrepresented crash type in developing countries is pedestrian collisions in the dark, and that the risk of a fatality is three to seven times greater than during the daytime. Worldwide, about 200,000 pedestrians are killed in night traffic each year, and over 90 percent of these fatalities occur in developing countries.

Mosley says, "Poor road safety causes one of the greatest inequities in the world today. More than a million people—the vast majority in the poorest countries of the world—are being killed each year, often because unsuitable vehicles are being driven on unsuitable roads by poorly trained drivers," Conference participants reviewed proven strategies for reducing road-traffic injuries. "The main obstacles for improving road safety are ignorance about the magnitude of the problem and its preventability" says Dr Etienne Krug, director of WHO's Department of Injuries and Violence Prevention. "If policy makers were fully aware of the gains to be achieved by implementing policies on issues such as drunk driving, speeding, motorcycle helmets, and visibility, many lives could be saved."

MICROSOFT CORPORATION / MICROSOFT OFFICE DESIGN GALLERY LIVE

UMTRI's Involvement in Worldwide Traffic Safety

Many UMTRI research studies incorporate worldwide data. For example:

- Headlighting studies compare U.S. and European standards.
- Collaborative studies to develop a world-harmonized, side-impact crash dummy.

MICROSOFT CORPORATION / MICROSOFT OFFICE DESIGN GALLERY LIVE

- Various UMTRI researchers serve on international standards organizations and help develop those policies, including SAE recommended practice J2364 ("the 15-second rule").
- The Office for the Study of Automotive Transportation's Delphi market-research studies detail the differences in North American, European, and Asian manufacturers and suppliers.

In addition, the results of many UMTRI studies are relevant for worldwide use in automotive design or further research—for example, various telematics and ergonomics research results, world-class manufacturing best-practice recommendations, and truck braking, load, and roll data. In another recent study, Rumar examined future headlighting development in developed versus developing countries. Specifically, the study investigated what direction future automobile lighting should take, based on a worldwide perspective that takes developing countries into consideration. The report provides a list of countermeasures and further research to be undertaken to address this problem.

World Health Day 2004—"Safe Roads"

WHO has dedicated World Health Day 2004 to "Safe Roads," creating an opportunity to draw the general public's attention to the growing but preventable problem of road-traffic injuries.

The objectives of the Safe Roads World Health Day are to:

- Draw global attention to the growing but preventable human and economic costs of road-traffic injuries
- Advocate for increased and sustained action in policy, programs, funding, and research
- Place road-traffic-injury prevention high on the agenda of governments, international organizations, development agencies, nongovernmental organizations, and the private sector
- Launch the World Report on Road Traffic Injury Prevention
- Build partnerships and collaboration for road traffic injury prevention.

Events will be organized around the world by governments, organizations, and other groups.

World Report on Road-Traffic Injury Prevention

World Health Day 2004 will also see the launch of the joint WHO/World Bank World Report on Road Traffic Injury Prevention, which will provide facts on the global magnitude of the problem and point out directions for road-traffic-injury prevention.

It is the first major, authoritative report produced and issued by the World Health Organization. The World Report on Road Traffic Injury Prevention will be issued jointly by the World Health Organization and the World Bank. The report emphasizes that road-traffic injuries are a major but neglected public health problem, requiring concerted efforts for effective and sustainable prevention. The report is structured into five chapters devoted to fundamental concepts of world traffic safety; the global burden, intensity and impacts of road-traffic injuries; key determinants of the situation; intervention strategies; and conclusions and recommendations for improvement. RR

MICROSOFT CORPORATION / MICROSOFT OFFICE DESIGN GALLERY LIVE

Hot Off The Press

Conference Papers

Ervin, R.; Winkler, C.; Karamihas, S. 2002. "A centrifuge concept for measuring the rollover threshold of light-duty vehicles." Michigan University, Ann Arbor, Transportation Research Institute, Engineering Research Division. 10 p. *Accident Reconstruction.* Warrendale, Pa., Society of Automotive Engineers, 2002, pp. 337–346. Report No. SAE 2002-01-1603. UMTRI-95627 A01.

Flannagan, M.J.; Sivak, M.; Simpson, J. K. 2001. " The relative importance of pictorial and nonpictorial distance cues for driver vision." Michigan University, Ann Arbor, Transportation Research Institute, Human Factors Division. 5 p. *First International Driving Symposium on Human Factors in Driver Assessment, Training and Vehicle Design. 1st. Proceedings.* Aspen, Colo., 2001, pp. 214–218. Sponsored by Ichikoh Industries, Kanagawa (Japan) UMTRI-95904 A42.

Kantowitz, B.H. 2001. "Using microworlds to design intelligent interfaces that minimize driver distraction." Michigan University, Ann Arbor, Transportation Research Institute. 16 p. *First International Driving Symposium on Human Factors in Driver Assessment, Training and Vehicle Design. 1st. Proceedings.* Aspen, Colo., 2001, pp. 42–57. UMTRI-95904 A09.

Sivak, M.; Flannagan, M.J.; Schoettle, B. 2001. "Driver assessment and training in the 1980s and the 1990s: an analysis of the most-cited publications." Michigan University, Ann Arbor, Transportation Research Institute, Human Factors Division. 5 p. *First International Driving Symposium on Human Factors in Driver Assessment, Training and Vehicle Design. 1st. Proceedings.* Aspen, Colo., 2001, pp. 21–25. UMTRI-95904 A05.

Journal Articles

Elliott, M.R.; Raghunathan, T.E.; Shope, J.T. 2002. "The effect of duration and delay of licensure on risk of crash: a Bayesian analysis of repeated time-to-event measures." Pennsylvania University, Philadelphia, Department of Biostatistics and Epidemiology/ Pennsylvania University, Philadelphia, School of Medicine/ Michigan University, Ann Arbor, Transportation Research Institute, Social and Behavioral Analysis Division/ Michigan University, Ann Arbor, School of Public Health/ Michigan University, Ann Arbor, Institute for Social Research. 12 p. *Journal of the American Statistical Association, Applications and Case Studies,* Vol. 97, No. 458 (June 2002) pp. 420–431. UMTRI-95873.

Fancher, P.; Bareket, Z.; Ervin, R. 2001. "Human-centered design of an acc-with-braking and forward-crash warning system." Michigan University, Ann Arbor, Transportation Research Institute, Engineering Research Division. 21 p. *Vehicle System Dynamics,* Vol. 36, No. 2–3, (Sep 2001), pp. 203–223. UMTRI-95825.

Shope, J.T. 2002. "Rationale for graduated licensing and the risks it should address: discussion paper." Michigan University, Ann Arbor, Transportation Research Institute, Social and Behavioral Analysis Division. 3 p. *Injury Prevention,* Vol. 8, Supplement II (Sept. 2002), pp. 14–16. UMTRI-62843.

Sivak, M.J. 2002. "Field measurements of direct and rearview-mirror glare from low-beam headlamps." Michigan University, Ann Arbor, Transportation Research Institute. 10 p. *Lighting Research and Technology,* Vol. 34, No. 2, 2002, pp. 101–110. UMTRI-62841.

Technical Reports

2001. *State of Michigan 2000 motor vehicle accident codebook; Michigan 2000.* Michigan University, Ann Arbor, Transportation Research Institute. 103 p. *UMTRI Transportation Data Center Data Set Codebook,* No. 2001-7, October 2001. UMTRI-32767 A27.

Blower, D.; Campbell, K.L. 2002. *Incidence of rear underride in fatal truck crashes: 1997–1998.* Michigan University, Ann Arbor, Transportation Research Institute, Survey and Analysis Division/ Department of Transportation, Washington, D.C./ National Highway Traffic Safety Administration, National Center for Statistics and Analysis, Washington, D.C./ Federal Motor Carrier Safety Administration, Washington, D.C. Published by Ann Arbor, Mich.: University of Michigan, Transportation Research Institute. 26 p. Sponsored by Department of Transportation, Washington, D.C.; Federal Motor Carrier Safety Administration, Washington, D.C. Report No. UMTRI-2001-16/ DTFH61-96-C-0038. UMTRI-95905.

Devonshire, J.M.; Sayer, J.R. 2002. *The effects of infrared-reflective and antireflective glazing on thermal comfort and visual performance: a literature review.* Michigan University, Ann Arbor, Transportation Research Institute, Human Factors Division. Published by Ann Arbor, Mich.: University of Michigan, Transportation Research Institute. 92 p. Sponsored by Michigan University, Ann Arbor, Transportation Research Institute, Industry Affiliation Program for Human Factors in Transportation Safety. Report No. UMTRI-2002-4. UMTRI-95816.

Eby, D.W.; Kostyniuk, L.P.; Molnar, L.J.; Joksch, H.; Vivoda, J M.; Miller, L.L. 2002. *The effects of standard safety belt enforcement on police harassment: year 2 annual report executive summary.* Michigan Department of State, Lansing/ Michigan University, Ann Arbor, Transportation Research Institute, Social and Behavioral Analysis Division. Published by Ann Arbor, Mich.: University of Michigan, Transportation Research Institute. 14 p. Sponsored by Michigan Department of State, Lansing. Report No. UMTRI-2002-13-1. UMTRI-95903.

Hot Off The Press

Eby, D.W.; Kostyniuk, L.P.; Molnar, L.J.; Joksch, H.; Vivoda, J.M.; Miller, L.L. 2002. *The effects of standard safety belt enforcement on police harassment: year 2 annual report.* Michigan University, Ann Arbor, Transportation Research Institute, Social and Behavioral Analysis Division/ Michigan Department of State, Lansing. Published by Ann Arbor, Mich.: University of Michigan, Transportation Research Institute. 142 p. Sponsored by Michigan Department of State, Lansing. Report No. UMTRI-2002-13-2. UMTRI-95901.

Eby, D.W.; Vivoda, J.M. 2002. *Direct observation of safety belt use in Michigan: spring 2002.* Michigan University, Ann Arbor, Transportation Research Institute, Social and Behavioral Analysis Division. 64 p. Sponsored by Michigan State Office of Highway Safety Planning, Lansing. Report No. UMTRI-2002-19. UMTRI-71544 A24.

Green, P. 2001. *Synopsis of driver interface standards and guidelines for telematics as of mid-2001.* Michigan University, Ann Arbor, Transportation Research Institute, Human Factors Division. Published by Ann Arbor, Mich.: University of Michigan, Transportation Research Institute ; Springfield, Va.: National Technical Information Service. 24 p. Sponsored by Visteon Corporation (Europe) Report No. UMTRI-2001-23. UMTRI-95941.

Hardy, W.N.; Schneider, L.W. 2002. *Identification of injury mechanisms resulting in injuries to the upper extremities in frontal crashes; Project D.4: identification of injury mechanisms resulting in injuries to the upper extremities in frontal crashes.* General Motors Corporation, Warren, Mich./ Michigan University, Ann Arbor, Transportation Research Institute, Biosciences Division. Published by Ann Arbor, Mich.: University of Michigan, Transportation Research Institute. 75 p. Sponsored by General Motors Corporation, Warren, Mich. Report No. UMTRI-2002-11. UMTRI-95652.

McGehee, D.; LeBlanc, D J.; Kiefer, R.J.; Salinger, J. 2001. *Human factors in forward collision warning systems: operating characteristics and user interface requirements.* Iowa University, Iowa City, Public Policy Center/ Michigan University, Ann Arbor, Transportation Research Institute, Engineering Research Division/ General Motors Corporation, Warren, Mi./ Veridian Engineering, Buffalo, N.Y./ Society of Automotive Engineers, Warrendale, Pa. Published by Warrendale, Pa.: Society of Automotive Engineers. 35 p. Sponsored by Society of Automotive Engineers, Warrendale, Pa. Report No. J2400. UMTRI-95662.

Rumar, K. 2002. *Night vision enhancement systems: what should they do and what more do we need to know?* Michigan University, Ann Arbor, Transportation Research Institute, Human Factors Division. Published by Ann Arbor, Mich.: University of Michigan, Transportation Research Institute ; Springfield, Va. : National Technical Information Service. 52 p. Sponsored by Michigan University, Ann Arbor, Transportation Research Institute, Industry Affiliation Program for Human Factors in Transportation Safety. Report No. UMTRI-2002-12. UMTRI-95648.

Sivak, M.; Flannagan, M.J.; Schoettle, B.; Nakata, Y. 2002. *Performance of the first generation of HID headlamps in the U.S.* Michigan University, Ann Arbor, Transportation Research Institute, Human Factors Division/ Michigan University, Ann Arbor, Transportation Research Institute, Biosciences Division. Published by Ann Arbor, Mich. : University of Michigan, Transportation Research Institute. 26 p. Sponsored by Michigan University, Ann Arbor, Transportation Research Institute, Industry Affiliation Program for Human Factors in Transportation Safety. Report No. UMTRI-2002-14. UMTRI-95818.

Sullivan, J.M.; Flannagan, M.J. 2001. *Reaction time to clear-lens turn signals under sun-loaded conditions.* Michigan University, Ann Arbor, Transportation Research Institute. Published by Ann Arbor, Mich.: University of Michigan, Transportation Research Institute ; Springfield, Va.: National Technical Information Service. 14 p. Sponsored by Michigan University, Ann Arbor, Industry Affiliation Program for Human Factors in Transportation Safety. Report No. UMTRI-2001-30. UMTRI-96156.

Tsimhoni, O.; Smith, D.; Green, P. 2002. *Destination entry while driving: speech recognition versus a touch-screen keyboard.* Michigan University, Ann Arbor, Transportation Research Institute, Human Factors Division/ Mitsubishi Motors Corporation (Japan) Published by Ann Arbor, Mich.: University of Michigan, Transportation Research Institute, Human Factors Division. 102 p. Sponsored by Mitsubishi Motors Corporation (Japan) Report No. UMTRI-2001-24. UMTRI-95820.

Tsimhoni, O.; Green, P. 2002. *Night vision enhancement systems for ground vehicles: the human factors literature.* Michigan University, Ann Arbor, Transportation Research Institute, Human Factors Division. Published by Michigan University, Ann Arbor, Transportation Research Institute. 122 p. Sponsored by Army Research Office, Life Sciences Division, Washington, D.C. Report No. UMTRI-2002-05. UMTRI-95616. RR

Transportation Tidbits

• New Zealand implemented the world's first graduated driver licensing (GDL) system on August 1, 1987. The three-stage program applied to all new drivers aged 15 to 24 at the time of introduction. Today, most states and provinces, and many countries, have some form of GDL program.

• In October 1966, a seventy-five-year-old male driver in McKinney, Texas, drove on the wrong side of the road four times, committed four hit-and-run offenses, and caused six accidents, all within twenty minutes. This is ironic as Texans, especially residents of Houston, are consistently ranked as the best drivers in the nation.∞

• In 1955, the California Vehicle Code is amended to require state approval of seat belts before their sale or use.‡

• In 1954, American Medical Association House of Delegates votes to support installation of lap belts in all automobiles.‡

• In 1953, the Colorado State Medical Society publishes policy supporting installation of lap belts in all automobiles.‡

• In 1948, a week before the organization was officially incorporated, NASCAR held its first race for modified stock cars on a 3.2 mile course at Daytona Beach, Florida.∞

• In the 1930s, several U.S. physicians equip their own cars with lap belts and begin urging manufacturers to provide them in all new cars.‡

• Rudolf Diesel received a German patent for the diesel engine on February 23, 1893. The diesel engine burns fuel oil rather than gasoline and uses compressed air in the cylinder rather than a spark to ignite the fuel. Diesel engines were used widely in Europe for their efficiency and power, and are still used today in most heavy industrial machinery.∞

Sources

∞"This Day in Automotive History," www.historychannel.com

‡ "Seat Belt History," www.stnonline.com/

RR

To Subscribe to the *UMTRI Research Review*...

Complete the form below and send it with a check for $35 made out to the University of Michigan.
This entitles you to a one-year subscription to the *UMTRI Research Review*.

NAME _____ DATE _____

TITLE _____ ORGANIZATION _____

ADDRESS _____

CITY _____ STATE _____ ZIP _____ INCLUDE +4

Mail your check for $35 and the form above to:

• Monica Milla, Editor • UMTRI Research Review • University of Michigan Transportation Research Institute •
• 2901 Baxter Rd • Ann Arbor, MI 48109-2150 •

University of Michigan
UMTRI
Transportation Research Institute
2901 Baxter Rd
Ann Arbor MI 48109-2150

Non-Profit Organization
U.S. Postage
PAID
Ann Arbor, MI
Permit No. 144