

UMTRI

RESEARCH REVIEW

• UNIVERSITY OF MICHIGAN TRANSPORTATION RESEARCH INSTITUTE • JULY–SEPTEMBER 2008 • VOLUME 39, NUMBER 3 •



on page 1:
**UMTRI Helps Improve
Reporting Accuracy of
Truck and Bus Crash
Statistics**

Inside:

Increase in Older Drivers	3
U.S. DOE PHEV Grant	4
Names & Faces	6
Conferences & Events	7
Recent UMTRI Publications.....	8

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UMTRI's Strategic Intent

To be the leader in transportation systems research integrating vehicles, people, and infrastructure to achieve a highway transportation system where:

- Fatalities and injuries are eliminated
 - People and goods flow efficiently
 - Reliance on nonrenewable energy is reduced
-

Evaluating and Improving State Reporting of Truck and Bus Crash Statistics

All states are required to report crashes involving a truck or bus, with defined severity criteria, to the Motor Carrier Management Information System (MCMIS), which is maintained by the Federal Motor Carrier Safety Administration (FMCSA). This data is then used to evaluate the safety of motor carrier companies, including the carrier's safety rating and whether the carrier is subject to a safety review.

In a project funded by FMCSA to improve data quality, UMTRI's Center for National Truck and Bus Statistics (CNTBS) assesses the accuracy and completeness of the MCMIS file on a state-by-state basis. Dan Blower, associate research scientist, Paul E. Green, assistant research scientist, and Anne Matteson, research area specialist, run the data analyses and write the reports, and Linda Jarossi, database administrator, prepares datasets for analysis.

The types of crashes that should be reported to the MCMIS system include those involving any of the following vehicles: a truck with a gross vehicle weight rating or a gross combined weight rating of over 10,000 pounds; a bus with seating for at least nine people including the driver; or a vehicle displaying a hazardous materials placard; *and* that involve a fatality; an injury transported to a medical facility for immediate medical attention; or a vehicle towed due to disabling damage.

Each state can collect the data in any manner it chooses, but it must report a specific set of data items, either by computer extraction or by manually entering each case into the MCMIS database. Each state is required to report crash data on qualifying vehicles

to the MCMIS crash file within 90 days of the crash occurrence.

In recent years, over 150,000 total cases have been reported annually to the MCMIS crash file. To ensure the accuracy of the information reported to MCMIS, the CNTBS staff acquires the crash data from individual states, and develops a method of determining which cases qualify for reporting to the MCMIS file. The staff then matches the cases that should have been reported with those that actually were, to determine reporting

rates and to identify the factors that affect reporting rates. Without this kind of comprehensive data comparison, states cannot know how accurate their reporting is. For example, crashes may have been reported to MCMIS although they may not have qualified, or crashes that should have been reported were not.

As an independent evaluator, CNTBS identifies data inaccuracies and incomplete reporting. CNTBS also attempts to determine the factors that influence reporting rates to help the state improve its process. The findings are presented in detailed reports for each state studied. The reports are sent to FMCSA and made available to the public on UMTRI's website. Over the last four years, the CNTBS staff has

completed these comparisons for twenty-seven states and hopes to perform twelve to fifteen comparisons per year, depending on the data available.

Each state faces its own challenges in identifying which cases to submit to MCMIS, based on its specific crash data collection process. Each state has a crash data system already in place, and has adapted that system to produce



UMTRI/CEOL LOCKHARD

the data required by the MCMIS file. Challenges arise because of the different ways that states have developed to capture crash details. The specific vehicles and crashes required for the MCMIS file are not always readily identified in state data, and sometimes the data captured does not translate cleanly from one system to another. There are also issues related to how much instruction police officers receive in filling out police accident reports and how accurately the states are in deciding which accident records and fields to report. Many states are already trying to improve their data quality, and so there is the additional problem of transitioning from older to newer systems.

State reporting rates vary widely, based on factors such as size of the

continued...



UMTRI/MONICA MILLA

vehicle, seriousness of the crash, state of registration of the vehicle, reporting agency, and degree to which data extraction can be automated. Results from the data analyses completed so far have shown the following:

- The average reporting rate across the twenty-seven states examined is 60 percent (though likely the rate has been improving in recent years).
- Fatal crashes are more likely to be reported (at 80 percent) than less serious crashes.
- Truck crashes are reported more frequently (62 percent) than are bus crashes (39 percent) or crashes of vehicles carrying hazardous materials (28 percent).
- Large truck crashes are more likely to be reported than smaller truck crashes.
- Interstate truck crashes are reported at higher rates than intra-state truck crashes.
- States that capture all reporting criteria as coded data on the crash report have higher MCMIS reporting rates.
- The missing data rates are high for vehicles carrying hazardous materials, especially when the vehicle is a light vehicle (gross vehicle weight rating under 10,000 pounds).
- Buses are seriously underreported (often instructions to the officer are incorrect).

- MCMIS reporting rates are fairly equal whether the crash information is initially recorded onto a police accident report or a supplemental form.
- Data consistency is a challenge when state code levels differ from MCMIS code levels.

The results for each state are used as part of a much larger U.S. DOT project to improve data quality. CNTBS' contribution is so valued that the U.S. General Accounting Office, which was recently tasked via a congressional committee to evaluate motor-carrier safety-data improvement, relied on CNTBS reports for that purpose.

Many states are able to incorporate CNTBS' findings to improve their data quality. For example, after one state's data was reviewed, the state reassessed its data collection and reporting methods and made some changes that led to a much higher and more accurate reporting rate. In another state, 20 percent of cases originally submitted were identified as duplicates, and now the state's data contains less than 1 percent of duplicates. In another example, one data field was inadvertently leading to a pass/fail reporting scenario in which many reports were excluded. CNTBS discovered which field was causing this to happen, and the correction resulted in dramatically higher subsequent reporting rates for the state. In fact, reporting rates for

all states have improved from 90,000 cases in 2001 to about 154,000 cases in 2007.

Based on its findings, CNTBS has identified several best practices for data accuracy:

- All reporting criteria required by MCMIS should also appear on each state's crash report.
- Data should be coded, such that the officer chooses code values from a list, rather than fill-in-the-blank, which are subject to misspellings and can be a catch-all for miscellaneous information.
- Code levels, especially for vehicle type, should be consistent with the MCMIS codes.
- Reporting criteria should be correct (especially for buses). (This should go without saying, but needs to be said.)
- Cases should be extracted using a computer program, not by manual review.
- The same data should be collected for all cases, even those not reported to MCMIS, and then the correct cases should be identified and extracted using a computer algorithm.

The ideal system would minimize the burden on the reporting officer. One method to achieve this would be to use barcodes to record administrative details (such as driver license number, vehicle identification number, and gross vehicle weight rating), so that the officer is not tediously transcribing information. This way, the officer could focus on elements of the form that require judgment.

For more information on this project, and to read any of the reports generated for the states to date, go to www.umtri.umich.edu/divisionPage.php?pageID=4. **RR**

M-CASTL Addresses Growing Number of Older Drivers

According to the U.S. Census Bureau, the number of people in the United States age 65 or older is projected to grow from about 35 million in 2000 to more than 86 million in 2050, accounting for a much higher percentage of the total U.S. population. Even larger increases are expected for those 85 years of age or older. This marked increase in the population of older people will also result in many more older drivers on U.S. roadways. In fact, the AAA Foundation for Traffic Safety estimates that by 2025, people age 65 or older may account for 25 percent of all U.S. drivers. Understanding the implications of this increase and the needs of this population will present unique challenges to the field of

of importance are identification of at-risk drivers, interventions with at-risk drivers, and the elements that comprise a model older-driver licensing system. Given the impending increase in the number of aging drivers, it is critical that experts develop a plan to help motorists continue to drive safely for as long as possible, and provide alternative mobility options when independent driving is no longer feasible.

To address this problem, the AAA Foundation for Traffic Safety (AAAFTS) brought together a cross section of top transportation and health experts from federal and state governments, the insurance industry, the medical profession, universities, and advocates for the elderly. These experts participated in a two-day workshop that focused on licensing policies for older drivers in North America. The workshop took place in Washington, D.C., and was planned and managed by David Eby, head of UMTRI's Social and Behavioral Analysis (SBA) Division and director of M-CASTL, and Lisa Molnar, lead research associate in UMTRI's SBA Division and assistant director of M-CASTL. The objectives of the workshop were to synthesize the present state of knowledge related to older driver safety, assessment, and interventions; to develop a set of recommendations for stakeholders; and to identify the most important knowledge gaps in this area and provide research recommendations for AAAFTS to pursue to address those gaps.

In mid July, AAAFTS released the results of this workshop. The efforts of the experts are now available in two documents on AAAFTS's website. The document containing recommendations is available at www.aaafoundation.org/pdf/LPWorkshopRecommendations.pdf, and the proceedings of the workshop are at www.aaafoundation.org/pdf/LPWorkshopProceedings.pdf.

traffic safety. The Michigan Center for Advancing Safe Transportation throughout the Lifespan (M-CASTL), which is managed by UMTRI staff members, is addressing the safety and mobility of both young and older drivers.

While the baby-boomer cohort is quickly approaching older adulthood, states have been slow to respond to this coming need. One important issue has to do with setting driver-license policies that effectively screen for at-risk drivers while also not penalizing safe drivers or putting undue burden on licensing agencies. Other issues



UMTRI/GREGORY KOSTYNIUK

UMTRI to Participate in \$30-Million PHEV Grant

UMTRI will participate in a U.S. Department of Energy (U.S. DOE) grant to study plug-in hybrid electric vehicles (PHEVs). The project will test PHEV fleets and improve battery technologies.

The \$30-million U.S. DOE grant consists of three projects awarded to General Motors (teamed with UMTRI), Ford, and General Electric. Over three years, the partners will test PHEV fleets and improve mass production of PHEV battery technologies. Each project will employ up to 80 vehicles, each with an all-electric range (AER) of a minimum of 10 miles. The project is broken into three 12-month cycles, where vehicles introduced in each cycle will utilize more advanced PHEV technology than those in the previous cycle. The long-range goal for AER is 40 miles.

General Motors is working with UMTRI, the Electric Power Research Institute, and the Michigan Economic Development Corporation to enhance lithium-ion battery packs, charging systems, powertrain development, and vehicle integration. GM will deploy a plug-in test fleet as part of the project. Following development, the PHEVs will be deployed over a three-year period into a demonstration fleet in three regions of the United States.

UMTRI's primary role for this project is to conduct consumer-behavior surveys associated with the project as applied to participating vehicle operators. Along with routine background surveys on driver gender, profession, income level, education level, driving patterns, etc., survey work will also be devoted to pre- and post-participation surveys regarding expectations and experience. There is particular interest in perceptions of vehicle performance, charging frequency and state of charge upon charging initiation, fuel-station stops, mileage, cost savings, and other metrics. The project will start in early 2009.

Ford is working with Southern California Edison and Johnson Controls-Saft in a project to identify a pathway that accelerates mass production of PHEVs. General Electric is working with Chrysler to build plug-in vehicles that contain

an innovative dual-battery energy storage system capable of 40 miles accumulated electric-driving range.

This is the second PHEV contract awarded to UMTRI this year. In May, UMTRI was one of the partners who received a \$5-million grant from DTE Energy to study PHEVs as part of the Michigan Energy Efficiency Grant. (See the previous issue of *UMTRI Research Review* for details). For more information on the U.S. DOE grant, see www.energy.gov/news/6337.htm.

M-CASTL Professional Education Program

In other M-CASTL news, the M-CASTL team recently conducted a survey about the educational needs of professionals working in various transportation-related fields. The information was sought to help implement M-CASTL's Professional Education Program. M-CASTL staff surveyed attendees of its recent Transportation Research and Education Conference about educational needs related to their work. Using those responses, a more detailed online survey was created to better understand these needs. On July 8, about 350 transportation safety professionals were invited via email to participate in the survey. The period of data collection is currently ongoing, but once it is complete, the organizations of those who participated will be contacted by telephone to discuss responses and better understand how M-CASTL can implement a program to meet some of the identified needs.

M-CASTL's Global Education Program also aims to educate people on transportation issues, but the target audience for this program is anyone interested in better understanding issues related to the safety and mobility of either young or older drivers. Given this audience, the Program will cover transportation topics at a more basic level, by way of web-based, interactive educational modules. These modules will cover many wide-ranging topics relevant to either older drivers or young drivers. Examples of planned modules include "Older Drivers: Dementia and Driving," and "Young Drivers: Distraction and Driving." **RR**

David W. Eby Elected GSA Fellow

UMTRI/SHERINAH BENINGTON



David W. Eby, head of UMTRI's Social and Behavioral Analysis Division and director of the Michigan Center for Advancing Safe Transportation throughout the Lifespan (M-CASTL), was recently elected a Fellow of the Gerontological Society of America (GSA).

GSA Fellows are nominated and elected by members of the organization in recognition of their overall contributions to the field of gerontology. The Fellow designation represents the highest class of membership in GSA. The recognition is awarded at varying points of a member's career for diverse activities that include research, teaching, administration, public services, practice, and notable participation in the organization.

Eby has been a member of GSA for about twelve years and was awarded Fellow status through the Behavioral and Social Sciences Section of the GSA. Eby is active in the GSA Transportation and Aging Interest Group, for which he has served as a convener and as a coconvener. As a new Fellow, Eby will be recognized in November at an award ceremony at the GSA annual meeting in National Harbor, Maryland.

The Gerontological Society of America is a nonprofit professional organization with more than 5,000 members in the field of aging. GSA provides researchers, educators, practitioners, and policy makers with opportunities to understand, advance, integrate, and use basic and applied research on aging to improve the quality of life as one ages.

Peter Sweatman Appointed to ITS America Board

COURTESY OF ITS AMERICA



UMTRI director Peter Sweatman has been appointed to the Intelligent Transportation Society of America's Board of Directors. He recently finished serving a one-year term as president of ITS America's Michigan chapter.

ITS America is the leading advocate for technologies that improve the safety, security, and efficiency of the nation's surface transportation system. Its members include private corporations, public agencies, and academic institutions involved in the research, development, and design of intelligent-transportation-systems technologies that enhance safety, increase mobility, and sustain the environment.

UMTRI NAMES & FACES

Leading Traffic Safety Experts Collaborate with UMTRI

Two international traffic safety experts collaborated with UMTRI this summer. Dr. Dinesh Mohan, the leading traffic safety expert in India, was a visiting researcher in UMTRI's Human Factors Division. Divera Twisk, a Dutch researcher in novice drivers, accident patterns, learning processes, and human-factors approaches, joined UMTRI as a visiting research scholar.



COURTESY OF DINESH MOHAN

Mohan performed research through the Strategic Worldwide Transportation 2020 program. He worked with Omer Tsimhoni, Michael Sivak, and Mike Flannagan of UMTRI's Human Factors Division to assess the current traffic-safety situation in India and recommend future interventions and direction. Their report will be available later this fall.

Mohan says his work at UMTRI provided collaborative insights from transportation experts outside of India, who bring different backgrounds, training, and perspectives to the project. The collaboration also provided him the opportunity to focus exclusively on this important research issue.

Mohan visited UMTRI from the Indian Institute of Technology, Delhi, where he is the Volvo chair professor for biomechanics and transportation safety, the coordinator of the Transportation Research and Injury Prevention Programme, and the head of the WHO Collaborating Centre for Research and Training in Safety Technology.

Mohan's research interests include the biomechanics of impact, human tolerance to injury, road safety, sustainable transportation, pollution, rehabilitation aids for the disabled, and childhood injuries. He is also interested in developing ways for varied modes of transportation to share the roadways safely.

Mohan holds a Ph.D. degree in bioengineering from the University of Michigan, and he worked for UMTRI's Biosciences Division in the early 1970s. He obtained a B.Tech. in mechanical engineering from the Indian Institute of Technology, Bombay, followed by a master's degree in mechanical and aerospace engineering from the University of Delaware.



COURTESY OF SWOV

Divera Twisk came to UMTRI from SWOV, the Institute for Road Safety Research in Leidschendam, the Netherlands, where she is the program director for human behavior research. Like UMTRI, SWOV is an interdisciplinary research institute that aims to promote road safety through scientific research.

Twisk is pursuing a Ph.D. in social sciences at Maastricht University. Her research focus is behavior, learning processes, education, and the young. She is studying adolescents and risk taking, especially educating youth about the risk of traffic and evaluating and improving the effectiveness of those education programs. Twisk worked with UMTRI's Jean T. Shope, a leading researcher on young drivers, who is also the cochair of Twisk's dissertation committee.

Twisk chairs the working group Young Driver Tasks and Effective Countermeasures for the Organisation for Economic Co-operation and Development as well as the Editorial Committee of the European Road Safety Observatory, an online data resource. She chaired a working committee that published the book *Young Drivers: The Road to Safety*, of which Shope was a reviewer.

Twisk earned a bachelor's degree in psychology and sociology from Keele University in England and a master's degree in experimental psychology and human factors from the University of Groningen in the Netherlands. **RR**

Regional Asset Management Conference
September 10-11, Albuquerque, New Mexico
www.statehighwaysafety.org

FISITA World Automotive Congress
September 14-19, Munich, Germany
www.fisita2008.com

Conference on Tire Science and Technology
September 15-16, Akron, Ohio
www.tiresociety.org

Transportation Planning for Small and
Medium-Sized Communities
September 17-19, Portland, Oregon
www.trbtoolsofthetrade.org/conference.html

The Biomechanics of Impact
September 17-19, Bern, Switzerland
www.ircobi.org/conference.htm

IBTTA Annual Meeting
September 20-24, Baltimore, Maryland
www.ibtta.org/Events

Transportation Assoc. of Canada Conference
September 21-24, Toronto, Ontario
www.tac-atc.ca/english

TRANSP0 2008
September 22-25, Orlando, Florida
www.itstranspo.org

HFES Annual Meeting
September 22-26, New York, New York
www.hfes.org

Biomedical Engineering Society Annual
Meeting
October 2-4, St. Louis, Missouri
<http://bme.wustl.edu/BMES2008>

PCI Annual Convention
October 4-7, Orlando, Florida
www.pci.org/convention

Association for the Advancement of
Automotive Medicine Scientific Conference
October 5-8, San Diego, California
www.aaaml.org

Symposium on Advanced Vehicle Control
October 6-9, Kobe, Japan
www.intergroup.co.jp/avec08

Toward Zero Deaths Conference
October 7-8, Rochester, Minnesota
www.tzd.state.mn.us

V.I.S.I.O.N. 2008
October 7-8, Versailles Satory, France
www.sia.fr/evenement_detail_v_i_s_i_916.htm

URISA Annual Conference
October 7-10, New Orleans, Louisiana
<http://urisa.org/conferences/aboutannual>

World Energy Engineering Congress
October 8-9, Washington, D.C.
www.energycongress.com

Conference on Systems, Man, and Cybernetics
October 12-15, Singapore
www.smc2008.org

Intelligent Transportation Systems Conference
October 12-15, Beijing, China
www.ieeeitsc.org

Convergence 2008
October 20-22, Detroit, Michigan
www.sae.org/events/convergence

Impact of Changing Demographics on the
Transportation System
October 27-28, Washington, D.C.
www.trb.org/calendar/event.asp?id=440

Rethinking Transportation for a Sustainable
Future
October 28-29, Louisville, Kentucky
www.rethinkingtransportation.com

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CONFERENCES & EVENTS

RECENT UMTRI PUBLICATIONS

Most UMTRI reports are available in full text online. See the website address at the end of the citation. Please contact the UMTRI Library at 734-764-2171 or umtridocs@umich.edu to inquire about the availability of other publications listed here.

Bingham, C.R.; Shope, J.T.; Parow, J.E.; Raghunathan, T.E. 2007. *Crash Risk among Teen Drivers: Identification and Prediction of Excess Risk*. Report No. UMTRI-2007-13.

<http://hdl.handle.net/2027.42/57284>

The research documented in this report was sponsored by the Centers for Disease Control and Prevention.

Blower, D. 2007. *Comparison of Certain Variables in the Large Truck Crash Causation Study with Variables Coded in a Review of the Trucks Involved in Fatal Accidents Case Materials*. Report No. UMTRI-2007-28.

<http://hdl.handle.net/2027.42/57180>

The research documented in this report was sponsored by the Federal Motor Carrier Safety Administration.

Blower, D.F.; Kostyniuk, L.P. 2007. *Strategies to Reduce CMV-Involved Crashes, Fatalities and Injuries in Michigan*. Report No. UMTRI-2007-26.

<http://hdl.handle.net/2027.42/55485>

The research documented in this report was sponsored by the Michigan Office of Highway Safety Planning.

Green, P.E.; Blower, D.F. 2007. *Revised Ratio of Crash Severities Reportable to the MCMIS Crash File*. Report No. UMTRI-2007-15.

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The research documented in this report was sponsored by the Federal Motor Carrier Safety Administration.

Green, P.E.; Matteson, A.M. 2007. *Evaluation of 2004 Tennessee Crash Data Reported to the Motor Carrier Management Information System Crash File*. Report No. UMTRI-2007-24.

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The research documented in this report was sponsored by the Federal Motor Carrier Safety Administration.

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<http://hdl.handle.net/2027.42/55668>

The research documented in this report was sponsored by the Federal Motor Carrier Safety Administration.

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<http://hdl.handle.net/2027.42/57731>

The research documented in this report was sponsored by the Federal Motor Carrier Safety Administration.

Karamihas, S.M. 2007. *Profile Analysis of the LTPP SPS-1 Site in Arizona*. Report No. UMTRI-2007-16.

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The research documented in this report was sponsored by Nichols Consulting Engineers.

Karamihas, S.M. 2007. *Profile Analysis of the LTPP SPS-9A Site in Arizona*. Report No. UMTRI-2007-17.

<http://hdl.handle.net/2027.42/55480>

The research documented in this report was sponsored by Nichols Consulting Engineers.

Karamihas, S.M. 2007. *Profile Analysis of the LTPP SPS-9P Site in Arizona*. Report No. UMTRI-2007-18.

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The research documented in this report was sponsored by Nichols Consulting Engineers.

Kostyniuk, L.P.; Molnar, L.J.; Neumeyer, A.L. 2007. *Evaluation of the Prosecuting Attorneys' Association of Michigan Traffic Safety Training Program*. Report No. UMTRI-2007-38.

<http://hdl.handle.net/2027.42/57998>

The research documented in this report was sponsored by the Michigan Office of Highway Safety Planning.

RECENT UMTRI PUBLICATIONS

Matteson, A.; Pettis, L.; Green, P.E.; Woodrooffe, J. 2007. *Trucks Involved in Fatal Accidents Codebook 2004 (Version March 23, 2007)*. Report No. UMTRI-2007-12.

<http://hdl.handle.net/2027.42/55400>

The research documented in this report was sponsored by the Federal Motor Carrier Safety Administration.

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The research documented in this report was sponsored by the Federal Motor Carrier Safety Administration.

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http://assets.aarp.org/www.aarp.org_/articles/families/Promising_FINAL.pdf

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Sivak, M. 2008. *Is the U.S. on the Path to the Lowest Motor Vehicle Fatalities in Decades?* Report No. UMTRI-2008-39.

<http://hdl.handle.net/2027.42/60424>

The research documented in this report was sponsored by The University of Michigan, Strategic Worldwide Transportation 2020.

RR

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TRANSPORTATION TIDBITS

- The Milwaukee Mile, the oldest major speedway in the world, opened in the Wisconsin State Fair Park on September 11, 1903. In earlier years, the track was used exclusively for horseracing. Horses continued to share the track with cars (though not at the same time) until 1954 when the track was paved.
- On July 27, 1904, Dr. Herbert Hills of Flint, Michigan, purchased the first Buick automobile. In a test run earlier that month, the car averaged 30 mph on a drive through Flint, going so fast at one point that the driver “couldn’t see the village six-mile-an-hour sign.” Sixteen Buicks were sold in the next few months. William Durant eventually bought founder David Buick’s company and incorporated Buick into his General Motors project.
- On May 15, 1918, Nantucket Island reversed its twelve-year ban on automobiles, becoming the last community in Massachusetts to do so. Nantucket Island was becoming an exclusive tourist attraction, and the residents did not want automobiles overrunning their island. Eventually, as automobiles became more common, fears about their safety decreased. Today, there is a year-long waiting list for the car ferry.
- The Rolls-Royce Silver Ghost successfully passed a 15,000-mile official trial on August 8, 1907. The trial showed off the Ghost’s seven-liter engine and four-speed overdrive gearbox, earning Rolls-Royce the name “The Best Car in the World.” A total of 6,173 Silver Ghosts were produced.
- On August 27, 1859, Edwin Drake struck oil at 69 feet near Titusville, Pennsylvania. The location became the world’s first successful oil well. Within a few decades, oil drilling was widespread in the U.S., Europe, the Middle East, and the East Indies.
- A U.S. law requiring all newly manufactured cars to install an airbag on the driver’s side was enacted on September 1, 1989. The airbag was invented in 1952 by John W. Hetrick of Newport, Pennsylvania. **RR**

Source:

This Day in Automotive History, www.historychannel.com/tidih



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