

# Texas Strategic Action Plan for Motorcycles

## 2013–2018





## **ACKNOWLEDGMENTS**

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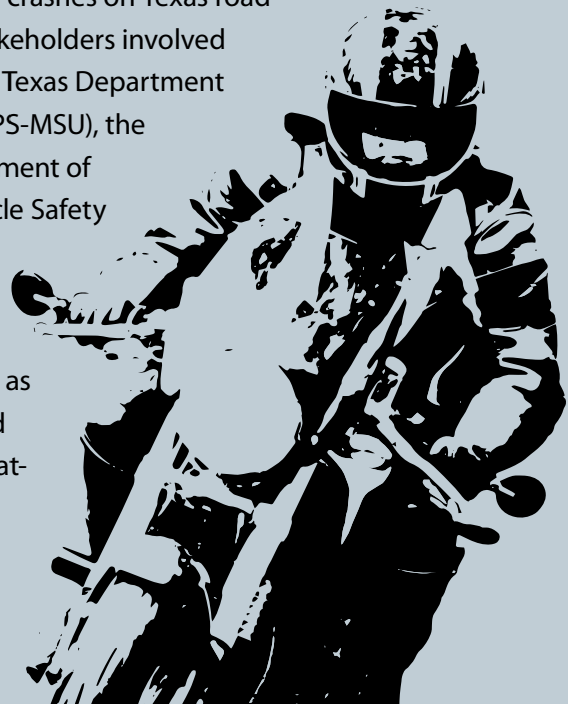
## EXECUTIVE SUMMARY

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The *Texas Strategic Action Plan for Motorcycles: 2013-2018* provides an integrated approach to identify implementable strategies and action steps to make the road environment and infrastructure safer for motorcyclists and other powered two- and three-wheelers in the State of Texas. The development of this plan spanned an 18-month period between August 2011 and February 2013 during the completion of Texas Department of Transportation (TxDOT) Project 0-6712, "Evaluation of the Measures and the Development of a Plan to Reduce the Number and Mitigate the Severity of Crashes Involving Motorcyclists on Texas Highways."

Several activities were completed during the course of the project to aid in the plan's development. The activities included a review of published literature on motorcycle safety countermeasures, a review of Intelligent Transportation System (ITS) and other advanced technologies for motorcycles and other vehicles, an analysis of motorcycle crash and injury data, and a statewide survey of motorcycle riders. These activities culminated in a list of potential motorcycle crash and injury countermeasures that were evaluated and prioritized in a workshop attended by motorcycle safety experts and advocates. A separate report, *Development of a Statewide Motorcycle Safety Plan for Texas: Research Report*, fully documents all steps completed under the project.

The five-year plan includes detailed strategies and action steps to reduce the number of motorcycle fatalities, injuries, and crashes on Texas roadways. It provides guidance to TxDOT and key stakeholders involved with improving motorcycle safety, including the Texas Department of Public Safety - Motorcycle/ATV Safety Unit (DPS-MSU), the Texas Education Agency (TEA), the Texas Department of State Health Services (DSHS), the Texas Motorcycle Safety Coalition (TMSC), law enforcement, local agencies, motorcycle clubs/groups, motorcyclists, and dealers. The plan is dynamic –as strategies are implemented, other strategies can be added as identified. The goal of the plan is to focus limited funding and resources on the areas with the greatest opportunity to reduce motorcycle fatalities, serious injuries, and crashes in Texas.





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Crashes occurring between 8 p.m. and 6 a.m. are more severe than crashes occurring between 6 a.m. and 8 p.m. This may be related to alcohol involvement, difficultly detecting adverse road conditions, higher speeds, etc.

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## DATA FINDINGS

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- Helmet use influences crash injury severity and reduces the chances of fatal and incapacitating injuries.
- Single-vehicle crashes are less likely to result in fatal or incapacitating injuries, compared to multi-vehicle crashes.
- Older riders tend to suffer more severe injuries in a crash compared to younger riders.
- Crashes occurring between 8 p.m. and 6 a.m. are more severe than crashes occurring between 6 a.m. and 8 p.m. This may be related to alcohol involvement, difficultly detecting adverse road conditions, higher speeds, etc.
- Roadway curvature (both horizontal and vertical) is correlated with motorcycle crash severity. These features increase the likelihood of more severe crashes. Horizontal curves have a more pronounced effect than the vertical curves on influencing crash severity.
- Riding under the influence of alcohol or drugs has a strong correlation with crash severity. Riding after drinking significantly increases the probability of a fatality, regardless if the crash occurs in an urban or rural area.
- Crashes involving higher speeds or lane indiscipline (failure to stay within lane of travel) are more severe in comparison to crashes without these two contributing factors.
- Crashes occurring on higher speed limit roads (such as interstate, U.S., and state highways) tend to be more severe than those occurring on other roads (such as city streets and county roads). In rural areas, crashes occurring on FM roads are more likely to result in more severe (fatal or incapacitating) injuries.



## DATA CONCLUSIONS

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- Continue efforts to increase helmet use, and educate riders about the effects of alcohol and drug use on riding skills and crash injury severity.
- Educate older riders about increased risks to severe injuries when involved in a crash.
- Inform riders about the increased crash risks associated with night time riding. Encourage riders to use high visibility gear, especially during evening and night time hours.
- Increase rider awareness about greater crash risks on roadway segments with horizontal and vertical curves.
- Speed limits should be uniformly enforced.
- Reiterate the consequences of speed, alcohol, and unsafe riding in rider training programs. Encourage safe riding.

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Continue efforts to increase helmet use, and educate riders about the effects of alcohol and drug use on riding skills and crash injury severity.

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The project goal was to develop a broad-based plan that includes strategies and action steps aimed to prevent and/or mitigate motorcycle crashes and injuries.

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## PLAN DEVELOPMENT

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The project goal was to develop a broad-based plan that includes strategies and action steps to prevent and/or mitigate motorcycle crashes and injuries. The plan will serve as a blue print to reduce motorcycle crashes, fatalities, and injuries on Texas roadways and provide a baseline from which the districts and TxDOT can measure and track implemented countermeasures and programs, and if necessary, make changes over time.

The plan development was based on:

- A review of published literature on countermeasures for reducing the incidence of and/or the severity of motorcycle-involved crashes and related injuries.
- A review of existing and emerging Intelligent Transportation System (ITS) and other technologies for motorcycles and vehicles.
- An analysis of motorcycle crash and injury data from 2006 through 2010.
- A survey of Texas motorcyclists capturing rider demographics, riding histories, training and licensing status, use of protective gear, crash involvement, and attitudes toward motorcycle safety countermeasures.
- A workshop in which motorcycle safety experts evaluated and prioritized potential crash countermeasures for inclusion in this plan.



The plan includes:

- Countermeasures to reduce motorcycle crashes.
- Countermeasures to reduce motorcyclist crash injury severity.
- ITS technologies to improve motorcycle safety.
- Implementation and outreach.

## IMPLEMENTATION AND OUTREACH

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A comprehensive approach for implementing the research findings is essential. Fortunately, Texas has several mechanisms and resources in place to ensure the successful implementation of the plan. Texas has been proactive in addressing motorcycle safety issues over the past decade through the leadership and support of TxDOT and many other diverse agencies and groups. Through the collaborative efforts of the National Highway Traffic Safety Administration (NHTSA), TxDOT, traffic safety specialists, TxDPS Motorcycle/ATV Safety Unit staff, Texas Motorcycle Safety Coalition (TMSC) members, TTI, and motorcycle safety instructors and trainers provide a strong infrastructure of support for broad-based implementation.

The TMSC will play a key role in the implementation of many of the countermeasures identified in this plan.

The TMSC serves as a public forum for addressing strategies to improve motorcycle safety; discusses effective programs, regulations, and other opportunities to improve motorcycle safety; reviews, proposes, and makes recommendations concerning motorcycle-related legislation; and serves to promote rider safety and inform the public about being aware of motorcycles and sharing the road safely. Representatives from engineering, planning, enforcement, education, emergency response, research, government agencies and organizations, and motorcyclists including riders, motorcycle groups, and organizations actively participate in the TMSC.

Outreach will include posting the plan on [www.LookLearnLive.org](http://www.LookLearnLive.org) (a dedicated website to promote motorcycle safety in Texas) to generate awareness and support. Other opportunities include advertising in Texas motorcycle magazines such as TMRA Folly, the Clubhouse, Ride Texas, etc. and through presentations at traffic and motorcycle safety conferences.



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**Texas Motorcycle Safety Coalition (TMSC) will oversee the implementation of the plan.**

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**67% of crashes involved  
new motorcycles (5 years old  
or newer).**

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The plan also benefits the larger traffic safety community, government, researchers, industry, highway designers, law enforcement, medical community, safety trainers/instructors, motorcycle rights groups, and enthusiasts who are committed to doing whatever is necessary to make motorcycling safer in Texas. Many of these people will be instrumental in the implementation of countermeasures and outreach activities identified in this plan.

## **BACKGROUND**

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After a two-year decline, motorcycle deaths in Texas increased by 10% in 2011, from 435 in 2010 to 479 (NHTSA, FARS). During the same period, motorcycle registrations also grew by 3%, from 424,218 to 437,878. In 2011 (TDS, 2011), Texas experienced a decrease in the number of motor vehicle traffic deaths. The increased percentage of motorcyclist deaths offset gains in road traffic deaths. When compared to all traffic fatalities, the percentage of motorcycle deaths is significant, accounting for 16% of total traffic fatalities in 2011.

Inattention is a significant factor in all motor vehicle crashes, especially motorcycle crashes. One half (50%) of car-motorcycle crashes are caused by drivers because they generally do not see the motorcyclist in time or they misjudged the bikes approaching speed. More and more drivers are talking on cell phones and texting while driving, making it more important than ever to remind drivers to pay attention and look for motorcycles.



Riders should take precautions, such as making themselves more visible, wearing protective gear, using turn signals, riding unimpaired, and allowing time for responding to heavy traffic periods and hazardous roadway conditions.

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Nonuse of helmets is also a major factor in the state's motorcycle fatalities.

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One-half of all traffic crashes involving motorcyclists are single vehicle. Many of these crashes are preventable. Riding under the influence of alcohol is a major problem. In 2010, 36% of Texas motorcycle riders killed had a BAC of 0.08 g/ml or higher compared to 29% in the US (FARS, 2011). Nonuse of helmets is also a major factor in motorcycle fatalities. In 2010, 41% of Texas riders killed did not wear a helmet compared to 58% nationally (FARS, 2011). Some of these deaths may have been avoided if riders had been properly trained on how to handle road conditions and curves.

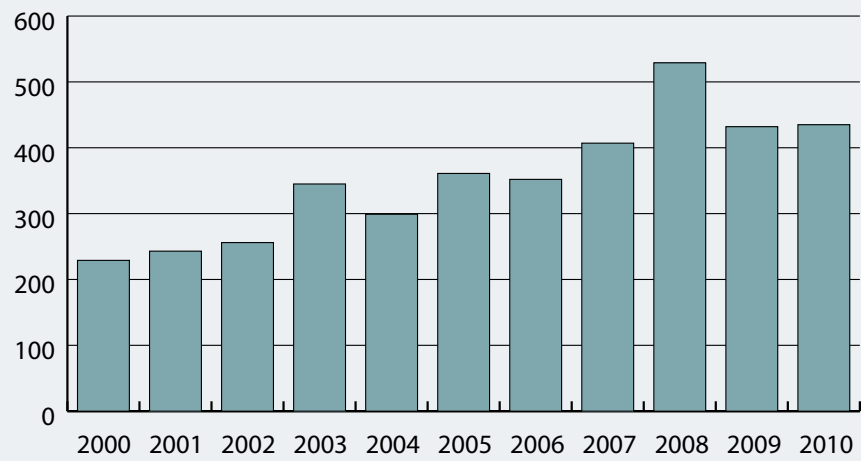
### Summary of Texas Motorcycle Crash Statistics

	Motorcycle crashes	Total traffic crashes	% of total	Motorcycle fatalities	Total traffic fatalities	% of total	Motorcycle injuries	Total traffic injuries	% of total
2003	6,425	459,725	1.4	345	3,822	9.0	6,024	308,360	2.0
2004	6,542	447,037	1.5	294	3,700	7.9	6,144	288,228	2.1
2005	7,894	463,830	1.7	359	3,558	10.1	7,285	292,655	2.5
2006	8,268	437,290	1.9	351	3,521	10.0	7,632	271,126	2.8
2007	8,617	458,289	1.9	408	3,463	11.8	7,814	266,318	2.9
2008	10,642	439,527	2.4	531	3,477	15.3	9,719	243,866	4.0
2009	9,044	428,667	2.1	432	3,089	14.0	8,213	232,580	3.5
2010	7,701	391,101	2.0	435	3,050	14.2	7,043	217,381	3.2

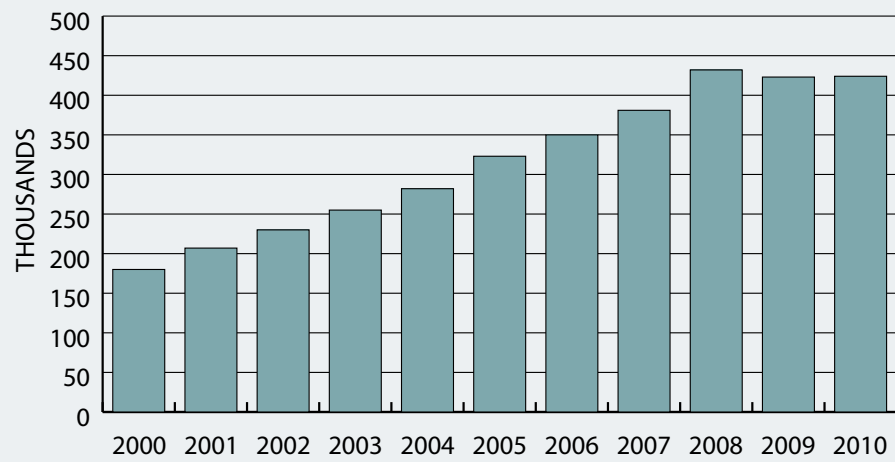
Source: Texas Department of Transportation (TxDOT) Crash Records Information System (CRIS) as of August 14, 2010. 2010 data as of February 28, 2013.



**Texas Motorcycle Fatalities 2000–2010**



**Texas Motorcycle Registrations 2000–2010**

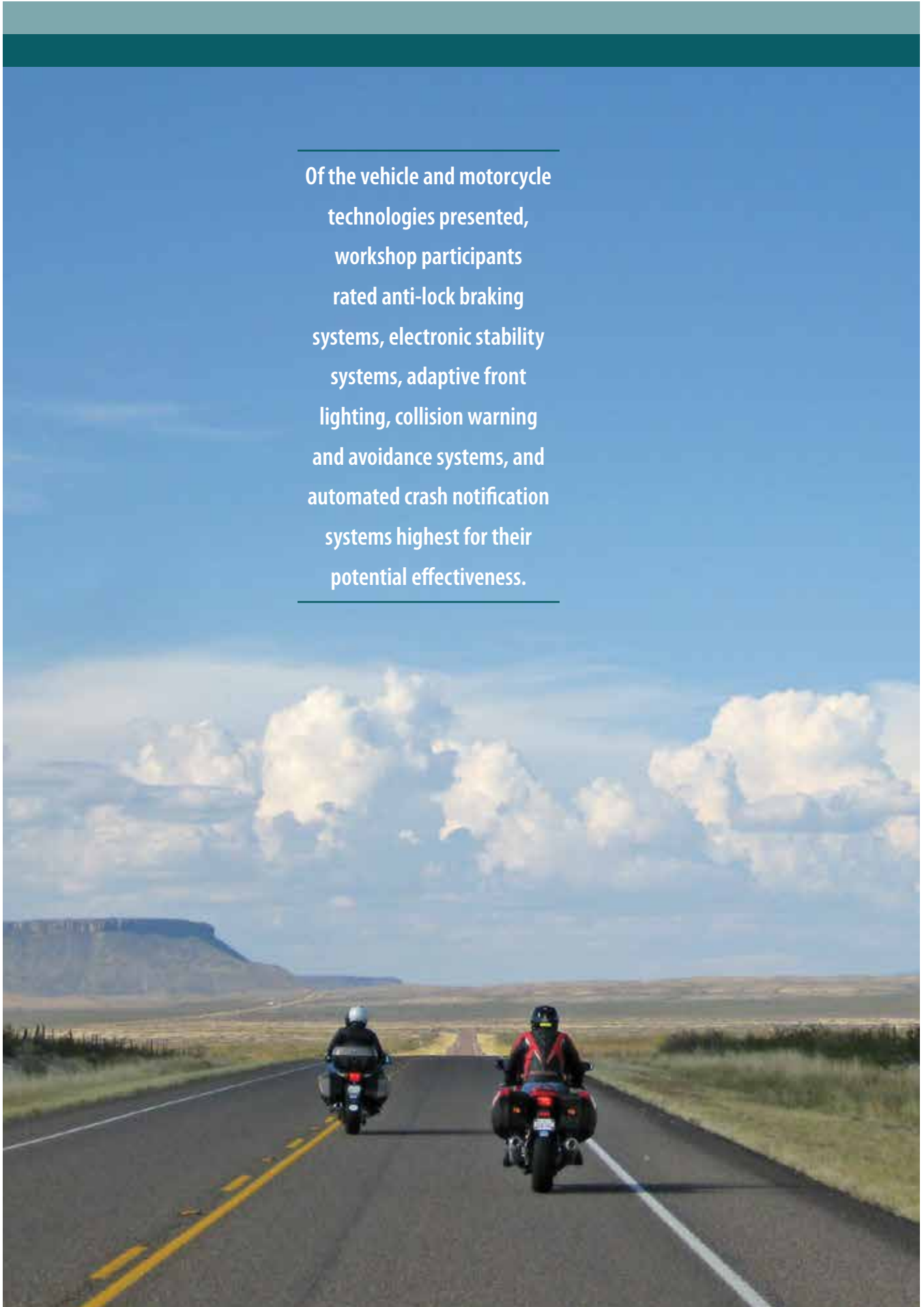




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Of the vehicle and motorcycle technologies presented, workshop participants rated anti-lock braking systems, electronic stability systems, adaptive front lighting, collision warning and avoidance systems, and automated crash notification systems highest for their potential effectiveness.

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46% of crashes and 38% of fatal crashes occurred in cities with populations of 100,000 or more; rural areas represented 31% of total crashes and 44% of fatal crashes.

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### Characteristics of Those Involved

- 92% of motorcyclists involved in crashes were male.
- 67% of motorcyclists involved in crashes were between 21 and 50 years old.
- 67% of crashes involved newer motorcycles (5 years old or newer).

### Contributing Factors

- In 1.6% of crashes, the rider was under the influence of alcohol.
- 27% of crashes involved excessive speed.
- 7% of crashes involved inattention.
- 5% involved a faulty evasive action.

### Where Crashes Occurred

- 46% of crashes and 38% of fatal crashes occurred in cities with populations of 100,000 or more; rural areas represented 31% of total crashes and 44% of fatal crashes.
- 37% of crashes and 25% of fatal crashes happened on city streets.
- 26% of crashes and 31% of fatal crashes happened on U.S. and state highways.
- 17% of crashes and 25% of fatal crashes happened on farm-to-market roads.
- 27% of crashes and 26% of fatal crashes occurred at intersections.



### When Crashes Occurred

- Most motorcycle crashes occurred on Saturday and Sunday; the least occurred on Monday.
- 60% of all motorcycle crashes occurred between noon and 8:59 p.m. On weekdays, the most crashes occurred between 6 and 9 a.m.; on weekends, the largest number occurred between 9 a.m. and noon.

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Most motorcycle crashes occurred on Saturday and Sunday; the least occurred on Monday.

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### Other Characteristics of Crashes

- 52% of all motorcycle crashes were single vehicle.

### Helmet Usage by Age, Ethnicity, and Gender: Texas, 2006–2010

Helmet Use by	Level	All (KABC) Crashes		Fatal (K) Crashes	
		Count	Percent	Count	Percent
Motorcyclist Age	20	3,279	95.4%	115	93.5%
	21<30	9,589	94.2%	509	91.2%
	31–40	7,004	92.4%	389	87.8%
	41–50	7,432	90.9%	458	87.2%
	51–60	5,384	91.6%	327	88.4%
	> 60	1,855	92.3%	139	90.3%
	Total	34,943	92.7%	1,939	89.1%
Motorcyclist Ethnicity	White	25,047	92.7%	1,422	88.7%
	Hispanic	6,226	91.6%	310	88.8%
	Black	2,989	95.2%	176	92.1%
	Asian	355	97.0%	12	100.0%
	Other	147	95.9%	15	100.0%
Motorcyclist Gender	Male	32,704	92.6%	1,874	89.1%
	Female	2,179	94.5%	63	90.0%

Source: Data on crashes involving motorcycles from 2006–2010 obtained from TxDOT CRIS.



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Texas riders were surveyed to capture information about riding history and training, protective gear use, crash experiences, and demographic characteristics.

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## TEXAS RIDER SURVEY

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Texas riders were surveyed to capture information about riding history and training, protective gear use, crash experiences, and demographic characteristics. A total of 1,507 riders responded to the online survey. Findings include:

- Male - 85% with an average age of 52.5 years. The largest age group was 50 to 59 years, representing 35 percent of respondents.
- Approximately 70 percent of respondents ride primarily for recreation.
- Most respondents ride on a mixture of roadway types, with rural roads and highways predominating; however, 38% ride on city streets at least part of the time.
- The most common motorcycle type overall and among respondents aged 18–49 is a cruiser (40% of all riders, 47% of riders 18–49). Touring motorcycles are more popular among riders 50 and older; dual-purpose and sport bikes were frequent choices for riders aged 18–29.
- Nearly all of the riders surveyed (96.5%) hold a motorcycle license, endorsement, or learner’s permit, and most (74%) have been riding for more than 10 years. About 72% have completed one or more motorcycle training courses; of these, 82% rated the training courses they took as highly effective for improving safe riding skills.





- Most surveyed riders wear safety gear most or all of the time; 84% wear DOT-approved helmets, 89% wear boots, 85% wear gloves, 73% wear protective eyewear, and 57% wear protective jackets. Protective pants, reflective clothing, and body armor were all worn by more than 20% of riders. Of the riders who do not choose to wear a helmet, the most frequent reason given was “personal freedom.”
- When asked about alcohol consumption, 69% of surveyed riders stated that during the past year, they had not consumed any alcohol within an hour of riding. Another 28% had consumed one to two drinks within an hour of riding; 3% had consumed three or more drinks.
- Over half (56%) of surveyed riders have been in at least one motorcycle crash. Characteristics of these self-reported crashes are similar in many ways to the statistics revealed by the analysis of crash data described in the next section. A contributing factor mentioned by 47% of riders who had been involved in a crash that involved another vehicle was “the vehicle driver said he/she didn’t see me.”



## THE AIM OF THE PLAN

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In an environment where motorcycles and other two- and three-wheeled motor vehicles are an increasing component in roadway vehicle-mix in Texas, the plan seeks to identify strategies and action steps that will:

- Reduce the rate of motorcycle crashes per registered motorcycles.
- Reduce the rate of fatal and severe motorcycle injuries by 15% by 2015, as compared to 2010.\*

\*Goal established in the *Texas Strategic Highway Safety Plan, Report of Progress 2012*.

## KEY FOCUS AREAS

The plan is organized under 13 key focus areas. For each area, the plan identifies several initiatives and action steps, prioritized by motorcycle safety experts who participated in a one-day workshop. The group prioritized and ranked approximately 73 crash reduction countermeasures on the basis of their effectiveness in preventing motorcycle crashes and in reducing the severity of injuries to riders. The initiatives under each key area are not listed in any particular order of importance.

**GOAL: Improve awareness among motorcyclists of their vulnerability in a crash and ways to increase conspicuity.**

MOTORCYCLE/RIDER CONSPICUITY	TIMEFRAME
Educate motorcycle riders in conspicuity products, techniques, and strategies	2 Years
Increase motorcyclists' use of high-visibility clothing, conspicuity products	3-5 Years
Encourage visibility enhancements for motorcycles, such as auxiliary headlights, auxiliary brake lights, headlight modulators, position lamps, underbody LED lighting, etc.	3-5 Years
Compile and distribute information on legal lighting/technology options in Texas	2 Years
Enhance training on strategic lane positioning for increasing motorcyclist conspicuity in traffic	3-5 Years
Encourage industry participation	3-5 Years

**GOAL: Increase motorists' awareness of the presence of motorcycles on the road.**

MOTORIST AWARENESS OF MOTORCYCLES	TIMEFRAME
Increase motorist knowledge/awareness about sharing the road with motorcyclists and other vulnerable road users: <ul style="list-style-type: none"> <li>• Produce brochure on TxDOT's "Share the Road" sign program and process for requesting a sign</li> <li>• Update and add information on sharing the road and rider conspicuity in the Texas driver's education handbook</li> <li>• Develop smartphone application (e.g., a game called "How Many Motorcycles Have You Seen Today?"), YouTube/social media, etc.</li> </ul>	2 Years
Support the use of emerging vehicle technologies (add-on or original from manufacturer)	3-5 Years
Enact legislation that permits drivers who are ticketed for right of way (ROW) violations involving a motorcycle to attend a motorcycle safety class or other modified course emphasizing motorcycle awareness	3-5 Years
Add questions about sharing the road on Texas driver's license exam, i.e. (a) about #1 type of collision (turning left in front of a motorcycle); (b) why are motorcycles difficult to see? Add course content about scanning for motorcycles (legislative change required)	3-5 Years

**GOAL: Ensure proper licensing of all motorcycle operators riding on public roadways in Texas.**

LICENSING	TIMEFRAME
Revise regulations to require specific license for operators of 3-wheel motorcycles	2 Years
Enact legislation to require a motorcycle endorsement before registering a motorcycle	3-5 Years
Encourage law enforcement to use a zero tolerance approach regarding unlicensed riders	3-5 Years
Require proof of motorcycle endorsement before issuing parking permits (large employers, state and local government agencies, university campuses, etc.)	3-5 Years

**GOALS: Provide training to all riders who need or seek it; increase motorcyclists' knowledge of the benefits of advance training, including awareness of hazards, motorcycle operation techniques, and conspicuity.**

RIDER EDUCATION AND TRAINING	TIMEFRAME
Increase/reallocate funding toward safety training: <ul style="list-style-type: none"> <li>• Improve type and quantity of motorcycles used for rider training</li> <li>• Update quality assurance plan to increase the number of site and instructor visits and standardizes the review and remediation process</li> </ul>	2 Years
Promote importance of rider training to new and experienced motorcyclists	2 Years
Educate riders on potential roadway obstacles (pavement markers, manhole covers, steel plates, etc.) and collision avoidance	2 Years
Revise and update DPS motorcycle operator's manual and translate into Spanish	3-5 Years
Expand course availability for three-wheeled vehicles classified as motorcycles OR change classification of vehicles	3-5 Years

**GOAL: Reduce the number of crashes in which motorcyclists are impaired by alcohol or other drugs.**

IMPAIRED RIDING	TIMEFRAME
Encourage zero BAC/reduced BAC laws for all motorcycle riders	3-5 Years
Promote peer-to-peer outreach among riders discouraging drinking and riding	2 Years
Engage rider's group leadership to discourage alcohol use at motorcycle events	2 Years
Explore effectiveness of alcohol interlock devices for motorcycles	3-5 Years
Promote Bikers Responsibility Initiative (BRI) and taking responsibility for actions	2 Years



**GOALS: Reduce the number of speed-related motorcycle crashes and increase motorcyclists knowledge on the dangers of excessive speed.**

SPEEDING	TIMEFRAME
Include motorcycles in speeding enforcement activities	2 Years
Develop outreach/education to riders about dangers of excessive speed	2 Years
Educate riders about selecting a motorcycle compatible with skill level	2 Years

**GOAL: Increase the usage of all protective equipment by motorcyclists and passengers.**

PERSONAL PROTECTIVE GEAR	TIMEFRAME
Conduct PI&E campaign to promote using motorcycle safety gear (helmets, jacket, pants, footwear, etc.)	2 Years
Work with riders' groups and dealerships to promote the use of protective gear	2 Years
Provide training for law enforcement on identifying non-DOT compliant helmets	3-5 Years

**GOAL: Accommodate the safety needs of motorcyclists in road design, construction, and maintenance.**

ROADWAY/INFRASTRUCTURE	TIMEFRAME
Communicate roadway condition information (construction, maintenance, hazardous locations) on DOT websites, social media, and 511)	2 Years
Include information regarding fresh seal-coat and milled surface areas during construction. Add potential for crowd-sourcing roadway condition information. Develop a smartphone application	2 Years
Post specific warnings for motorcyclists where unavoidable hazardous conditions exist (reduced traction, roadway surface irregularities)	3-5 Years

**GOAL: Encourage and support legislative initiatives that promote motorcycle safety.**

LEGISLATION AND REGULATIONS	TIMEFRAME
Reinstate universal helmet use law	3-5 Years
Re-examine and update motorcycle laws: <ul style="list-style-type: none"> <li>• Review, streamline, and modernize terminology and laws</li> <li>• Coordinate among all agencies responsible for motorcycle laws, definitions, and regulations (DPS, DOT, DMV, and other) to develop legislation specifying who is in charge of what regarding motorcycles</li> <li>• Review committee comprised of TxDOT, law enforcement, DMV licensing, TMSC</li> </ul>	3-5 Years

**GOAL: Ensure that state and local motorcycle safety program include and involve a law enforcement component.**

LAW ENFORCEMENT	TIMEFRAME
Create a quick reference guide for law enforcement officers specific to motorcycles with statute references. Develop a website with this information for print-out. Consider designing as a mobile website or application instead of printing hard copies	2 Years
Increase funding for motorcycle safety efforts by law enforcement	3-5 Years

**GOALS: Incorporate plan initiatives with TxDOT Traffic Safety motorcycle safety program goals and objectives. Ensure funding of projects that support the initiatives outlined in the plan. Ensure funding of projects that support the initiatives outlined in the plan.**

PROGRAM MANAGEMENT	TIMEFRAME
Increase funding for motorcycle safety by elevating their importance to state highway safety office	3-5 Years
Focus resources in the top 10 counties for motorcycle fatalities and identify countermeasures that work then develop best practices tools for use statewide	3-5 Years

**GOALS: Ensure availability of accurate data on motorcycle crashes, injuries, and fatalities to assist state and local agencies prioritize motorcycle safety activities. Conduct targeted studies on motorcycle-related issues to ensure that motorcycle safety decisions are data-driven.**

PROGRAM EVALUATION AND DATA	TIMEFRAME
Add motorcycle specific information to the Texas traffic crash report for increased understanding of motorcycle crashes; promote inter- and intra-agency efforts to link crash, injury, licensing, violation, training, and registration records	2 Years
Conduct detailed evaluation of police-reported motorcycle crash reports to determine contributing crash causation factors. Compare findings to existing training materials and adjust curricula to address the issues	3-5 Years
Conduct research to determine why motorcyclists are unlicensed and how to reach out to this group	2 Years
Develop partnerships with trauma centers, health department, insurance agencies, and dealerships (if possible) for data sharing	2 Years
Determine the impact of funded research and programs on reducing motorcycle crashes, injuries, and fatalities: <ul style="list-style-type: none"> <li>• Fatigue</li> <li>• Edge drop-off design</li> <li>• Use mileage data (from vehicle inspection data) to normalize crash rates</li> </ul>	3-5 Years
Investigate simulation and computer modeling to better understand motorcycle crash risk and injuries	3-5 Years

**GOALS:** Ensure that motorcycles are included for key technology that improves safety by making other road users more aware of their presence and movements, and motorcycles more visible to other road users.

MOTORCYCLE AND VEHICLE TECHNOLOGIES/ITS	TIMEFRAME
Promote availability and benefits of technologies that improve motorcyclist safety and increase rider conspicuity	3-5 Years
Engage with the motorcycle industry to encourage the development and promotion of motorcycles with safety-related technologies	3-5 Years

## ITS TECHNOLOGIES

Workshop participants ranked up to five technologies that they felt had the most potential for reducing motorcycle crashes and injuries. Based on weighted scores, the top five technologies included anti-lock braking systems, electronic stability program, adaptive front lighting, airbag vest, and airbag system.

TECHNOLOGY	WEIGHTED TOTAL SCORE (10 PARTICIPANTS)
Anti-lock Braking Systems	37
Electronic Stability Program	18
Adaptive Front Lighting	15
Airbag Vest	15
Airbag System	14
Collision Warning and Avoidance Systems	12
Electronic Licenses or Smart Cards	11
Curve Speed Warnings	10
Brake Assist	8
Linked Braking Systems	8
Crash Data Recorder	7
Helmet Mounted Displays	7
Road Surface Condition Monitoring	7
Lane Keeping and Departure Warnings	6
Pedestrian Detection System	5
Driver Status Monitoring	4
Speed Alert/Limiting Systems	4
Automated Crash Notification System	3
Rearview Displays	2



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