

National Highway Traffic Safety Administration

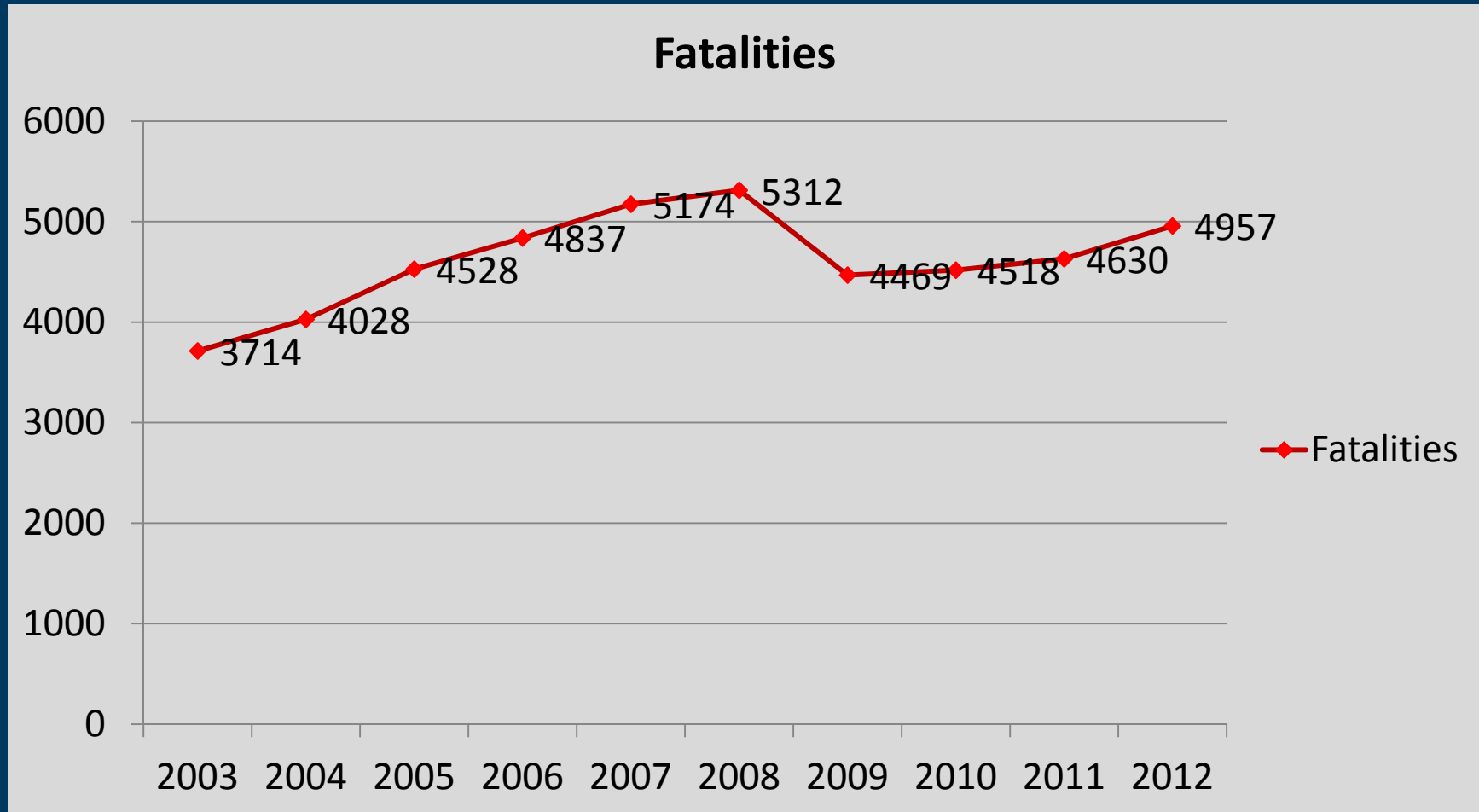


Motorcycle Safety and Technology

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Office of Behavioral Safety Research

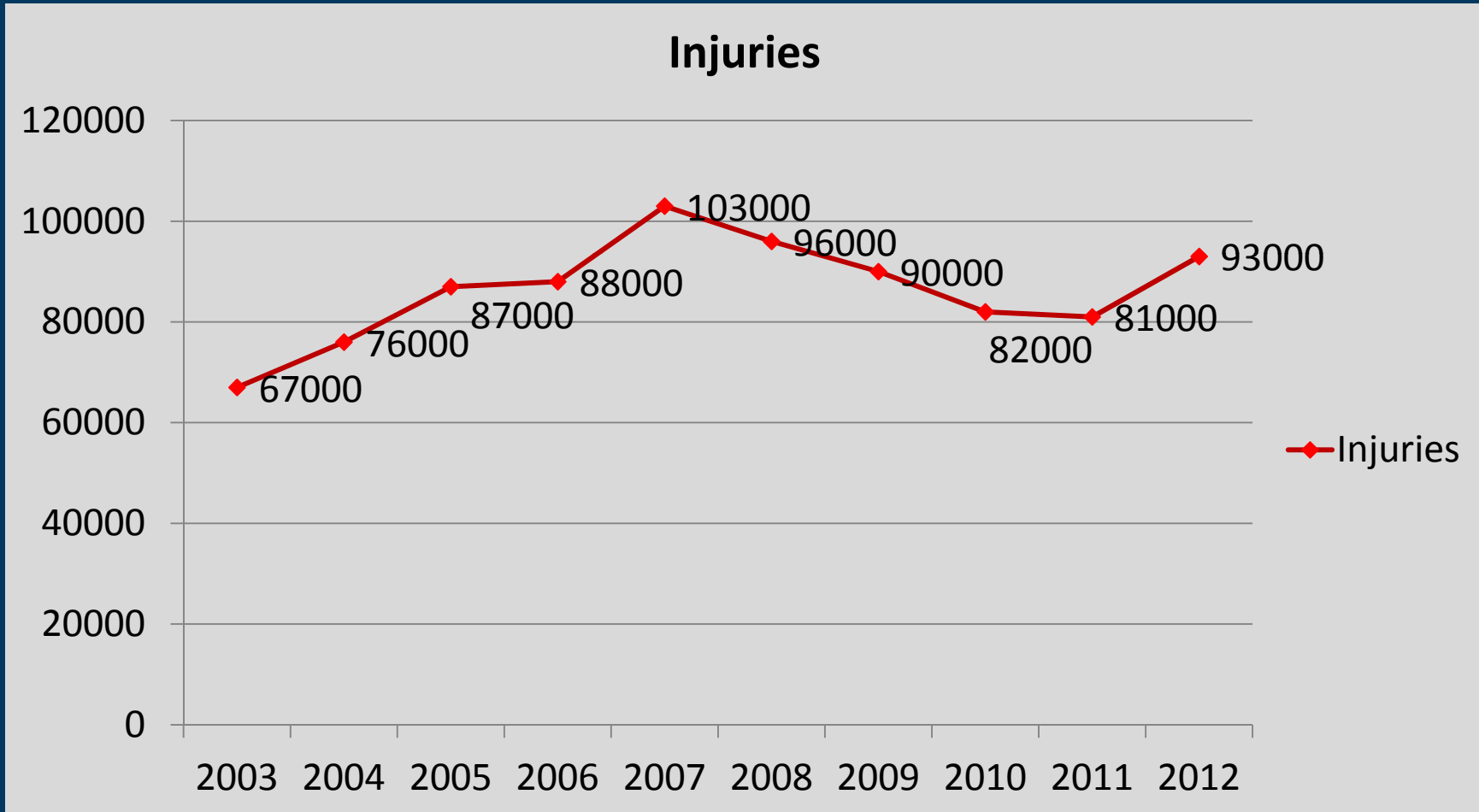
Lifesavers Conference, Chicago, IL
March 15, 2015

Motorcyclists Fatalities 2003-2012



Fatality Analysis Reporting System (FARS)

Motorcyclists Injuries 2003-2012



General Estimates System (GES), NHTSA

Motorcycle Fatalities and Injuries 2003 -2012

Year	Fatalities ²	Registered Vehicles ¹	Fatality Rate per 100,000 Registered Vehicles	Vehicle Miles Traveled (millions) ¹	Fatality Rate per 100 million miles traveled
2003	3,714	5,370,035	69.16	9,576	38.78
2012	4,957	8,454,939	58.63	21,298	23.27

Year	Injured ³	Registered Vehicles ¹	Injury Rate per 100,000 Registered Vehicles	Vehicle Miles Traveled (millions) ¹	Injury Rate per 100 million miles traveled
2003	67,000	5,370,035	1.250	9,576	701
2012	93,000	8,454,939	1.099	21,298	436

¹ Federal Highway Administration (FHWA)

² Fatality Analysis Reporting System (FARS)

³ General Estimates System (GES), NHTSA

Motorcycle Fatalities and Injuries

In 2012, motorcyclists

- 15% of all traffic fatalities (93% rider, 7% passenger)
- 3% of all registered vehicles / 0.7% total VMT

Fatality Rate		Motorcycles	Passenger Cars	Light Trucks
2012	Per 100,000 Registered Vehicles	58.63	9.66	7.92
	Per 100 Million VMT	23.27	0.89	0.73

Motorcyclists, as compared to passenger car occupants:

- 26 times more likely to die in MVC per VMT
- 5 times more likely to be injured in a MVC per VMT
- 6 times the fatality rate per registered vehicles

2012 Motorcycle Fatalities

Of motorcycles involved in fatal crashes:

- 52% collided with another type of vehicle
- 22% collided with a fixed object

In two-vehicle crashes:

- 75% collided with vehicle in front of them
- 7% were struck from rear
- 41% other vehicles turning left while MC going straight, passing or overtaking vehicle
- 23% both vehicles going straight

Speeding and Alcohol-impaired Riding / Driving in 2012

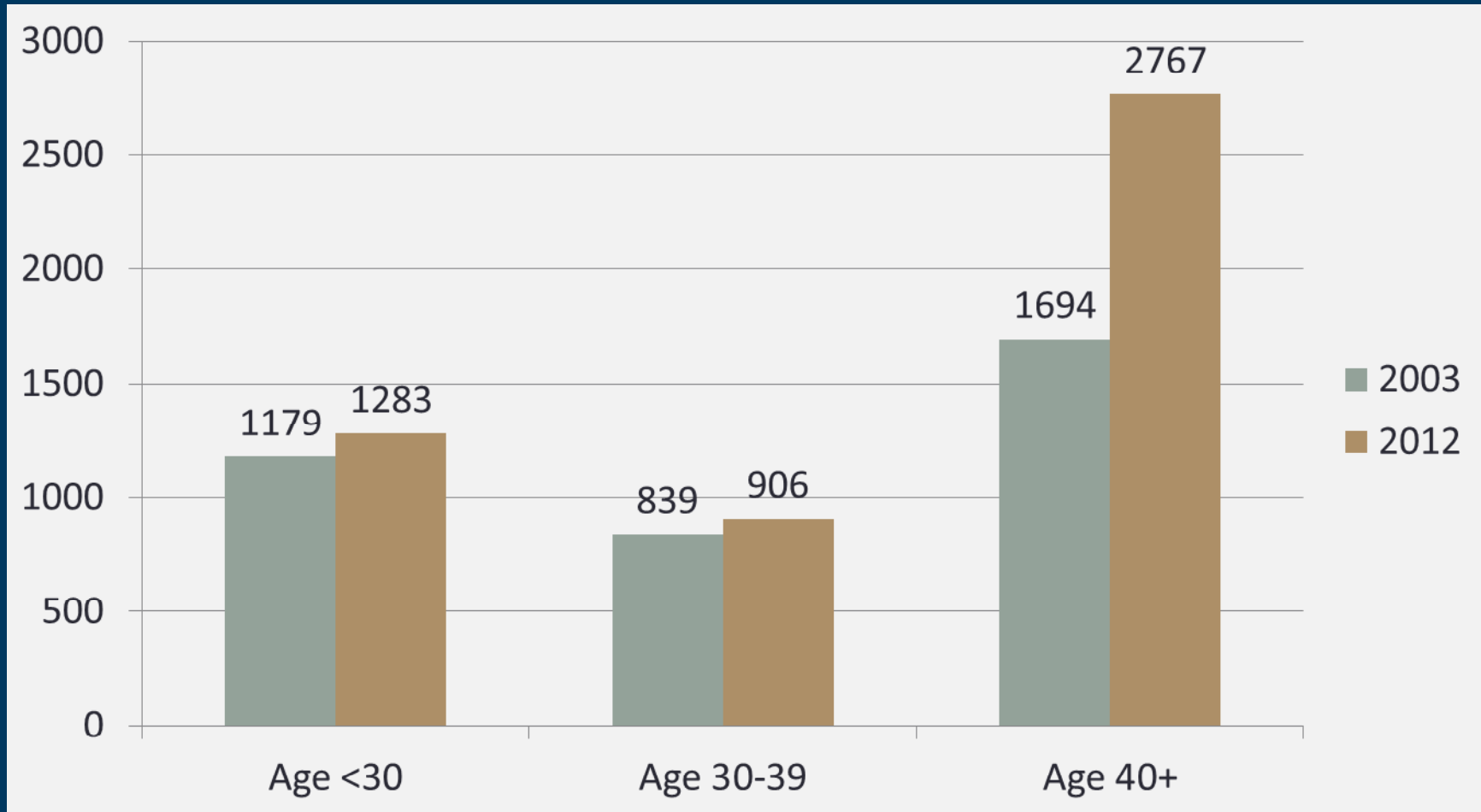
Drivers / Riders in Fatal Crashes		Motorcycles	Passenger Cars	Light Trucks	Large Trucks
2012	Speeding-related	34%	22%	18%	8%
	Alcohol-impaired	27%	23%	22%	2%

Fatally Injured Motorcycle Riders with BAC of .08 g/dL

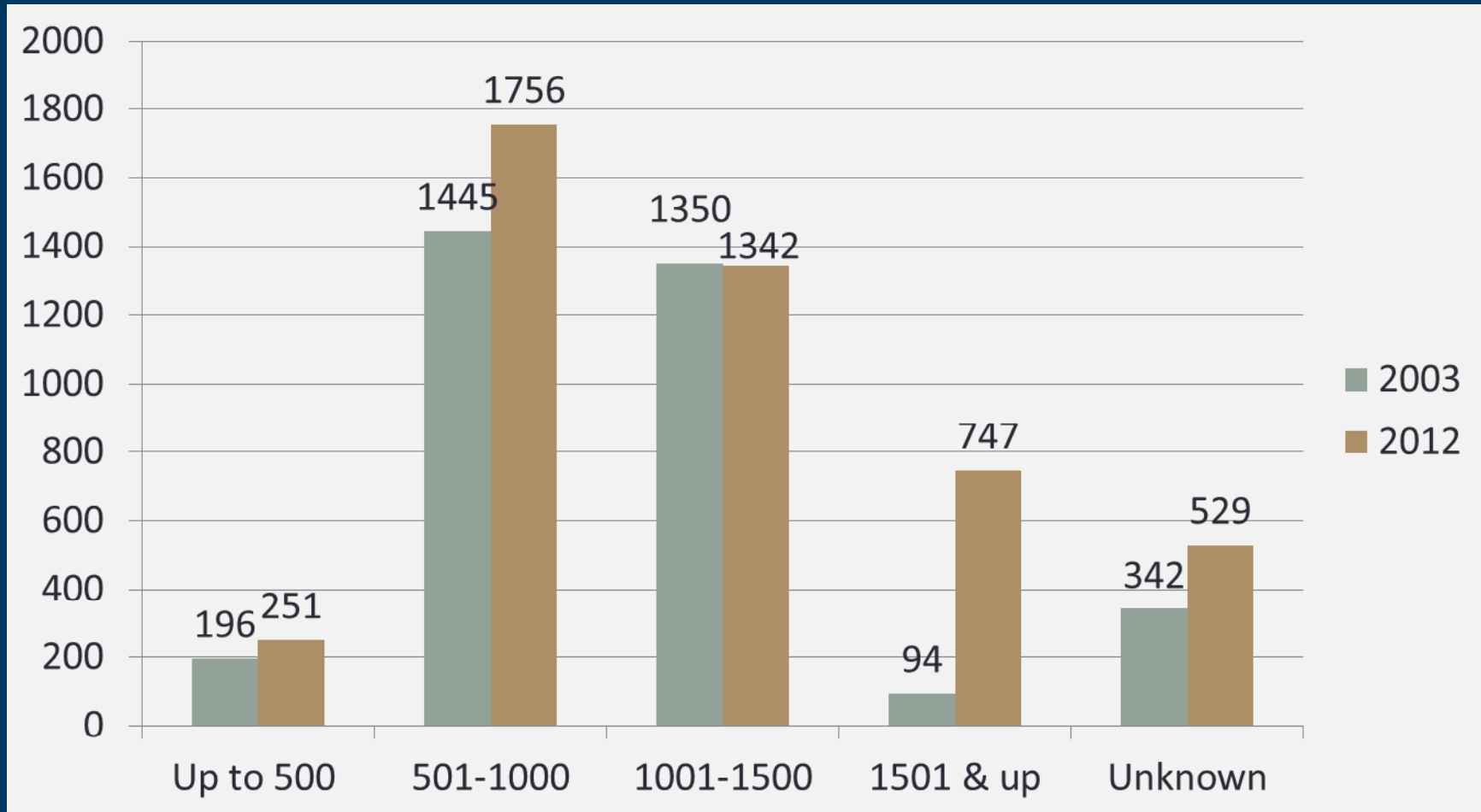
- 37% age 40-44
- 36% age 45-49
- 35% age 35-39

- 43% in single vehicle crashes
- 64% in single vehicle crashes on weekend nights

Motorcyclists Fatalities by Age



Motorcycle Rider (Operator) Fatalities by Engine Size (cubic centimeters)



Economic and Societal Impact of Motorcycle Crashes in 2010

Economic Impact

\$13.5 billion

Societal Harm / Comprehensive Impact

\$66 billion

Blincoe, L.J., Miller, T.R. Zaloshija, E. & Lawrence, B.A., (2014, May). The economic and societal impact of motor vehicle crashes 2010. (Report No. DOT HS 811 751). Washington, D.C. National Highway Traffic Safety Administration.

Instrumented On-Road Study of Motorcycle Riders

- COR: Randy Atkins
- Contractor: Virginia Tech Transportation Institute (VTTI)
- Principle Investigator: Shane McLaughlin
- Period of Performance: 9/15/11 to 8/14/16
- Subcontractors:
 - Motorcycle Safety Foundation (MSF)
 - CA DMV
- Data Collection: Poway, CA – San Diego area

Instrumented On-Road Study of Motorcycle Riders

- Naturalistic driving studies - use a package of instrumentation to collect data from a vehicle and the driver of the vehicle, as the person normally drives
- Pilot naturalistic motorcycle riding study completed for NHTSA in 2010
- Project Objectives:
 - Collect naturalistic data from 160 motorcycles continuously, over the course of one year, whenever the motorcycle is ridden (60 fully instrumented and 100 with mini-DAS)
 - Reduce and analyze appropriate data to answer research questions of interest to NHTSA
- Sample: Stratified by Bike Type (Cruisers, Sport, Touring)
- Stratified by Riding Experience (Novice, Returning Rider, Experienced)
- Examples of Research Questions:
 - How do riders successfully avoid crashes?
 - What are behaviors associated with safe riding, vs. unsafe riding?
 - What is the exposure of motorcycle riders?
 - How do all of these factors interact with variables such as age, experience, training, motorcycle type, personality?

Instrumented On-Road Study of Motorcycle Riders - Instrumentation



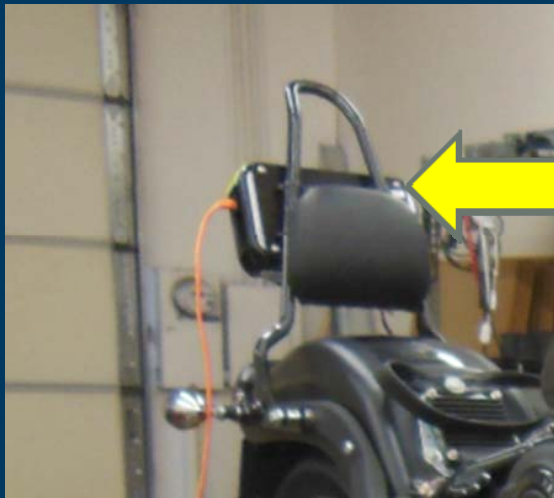
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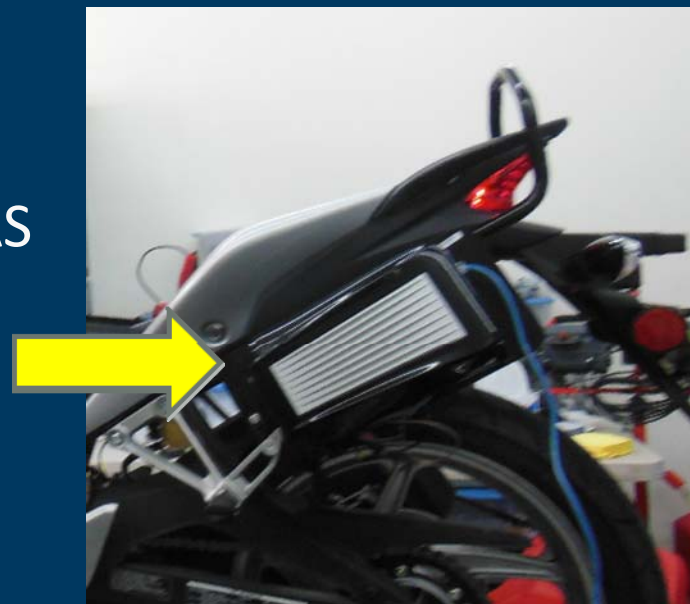
Instrumented On-Road Study of Motorcycle Riders - Instrumentation



Radar
GPS
Forward Camera



Main DAS
Unit



Instrumented On-Road Study of Motorcycle Riders - Instrumentation



Mini
DAS



Instrumented On-Road Study of Motorcycle Riders – Camera Views



Instrumented On-Road Study of Motorcycle Riders - Data

- Naturalistic riding data - speed, braking, yaw, head position, hand position, road position, road environment, etc.
- Questionnaires:
 - Demographics and Riding History
 - Sensation / Thrill Seeking & Personality
 - Motorcycle Riding Behavior

Naturalistic Motorcycle Research and Integrated Technology on Highways

Potential Uses of On-road Riding Data:

- Improve our understanding of riding behaviors
- Improve rider education and training
- Inform development of automated rider warning systems
- Inform development of integrated technology for motorcycles

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Reduce motorcycle crashes and save lives!

Other NHTSA Motorcycle Research

- Feasibility of Ignition Interlocks for Motorcycles
- The Effect of Entry-Level Motorcycle Rider Training on Motorcycle Crashes
- The Effect of Sight Distance Training on Motorcycle Skills
- Motorcycle Crash Causes and Outcomes: Pilot Study

<http://www.nhtsa.gov/Safety/Motorcycles>

Thank You!

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www.NHTSA.gov