



Motorcycle Safety

March 19, 2019



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RSTF Goal:

To reduce roadway crashes and eliminate serious injuries and fatalities from crashes in the Delaware Valley

Share the conversation!

Use **#rstf** during today's meeting, and

tag **@DVRPC**

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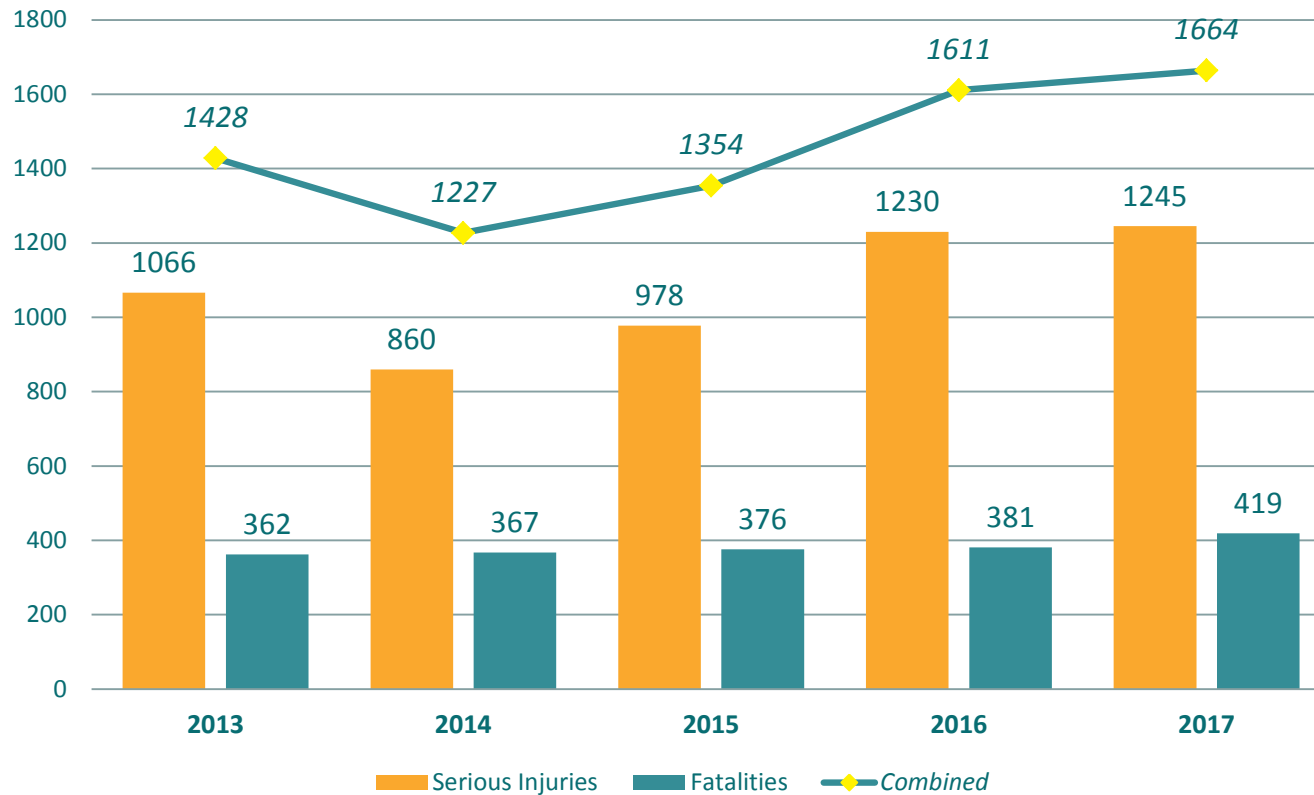
Motorcycle Safety

March 19, 2019



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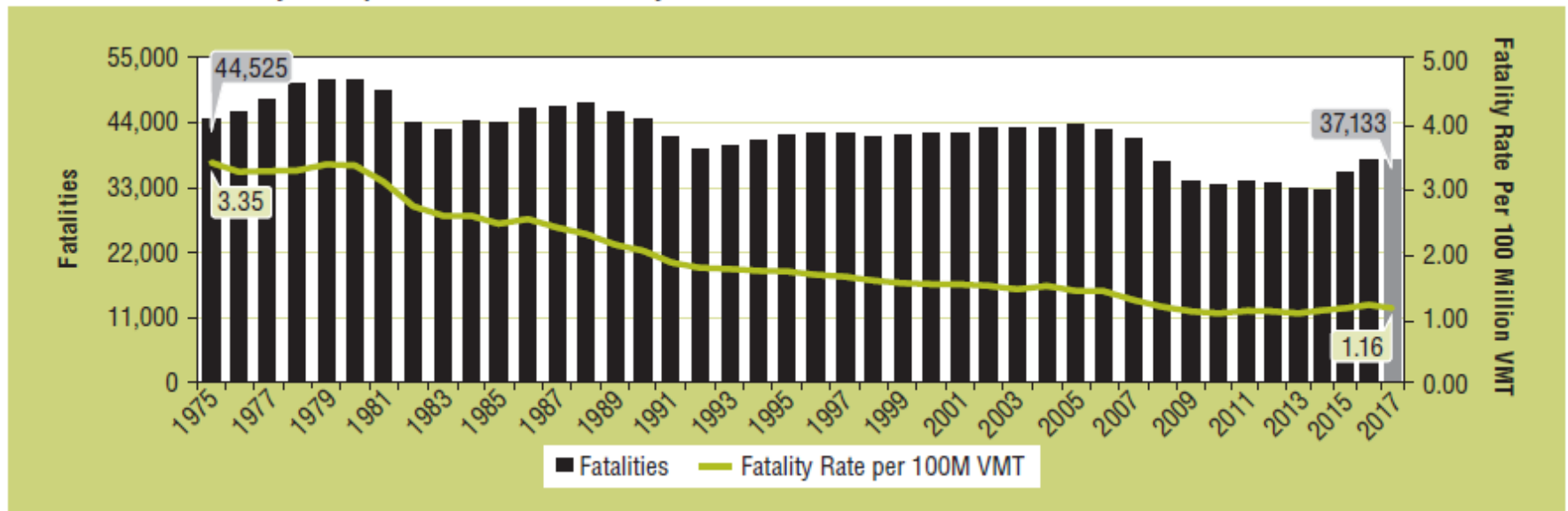
Total KSI - Regional Trend (by person), 2013-2017



NHTSA: U.S. Fatal Motor Vehicle Crashes, 2017

- 37,133 people killed in crashes:
 - 1.8-percent **decrease**, from 37,806 in 2016
 - vehicle miles traveled (VMT) **increased** by 1.2 percent from 2016 to 2017

Fatalities and Fatality Rate per 100 Million VMT, by Year, 1975–2017

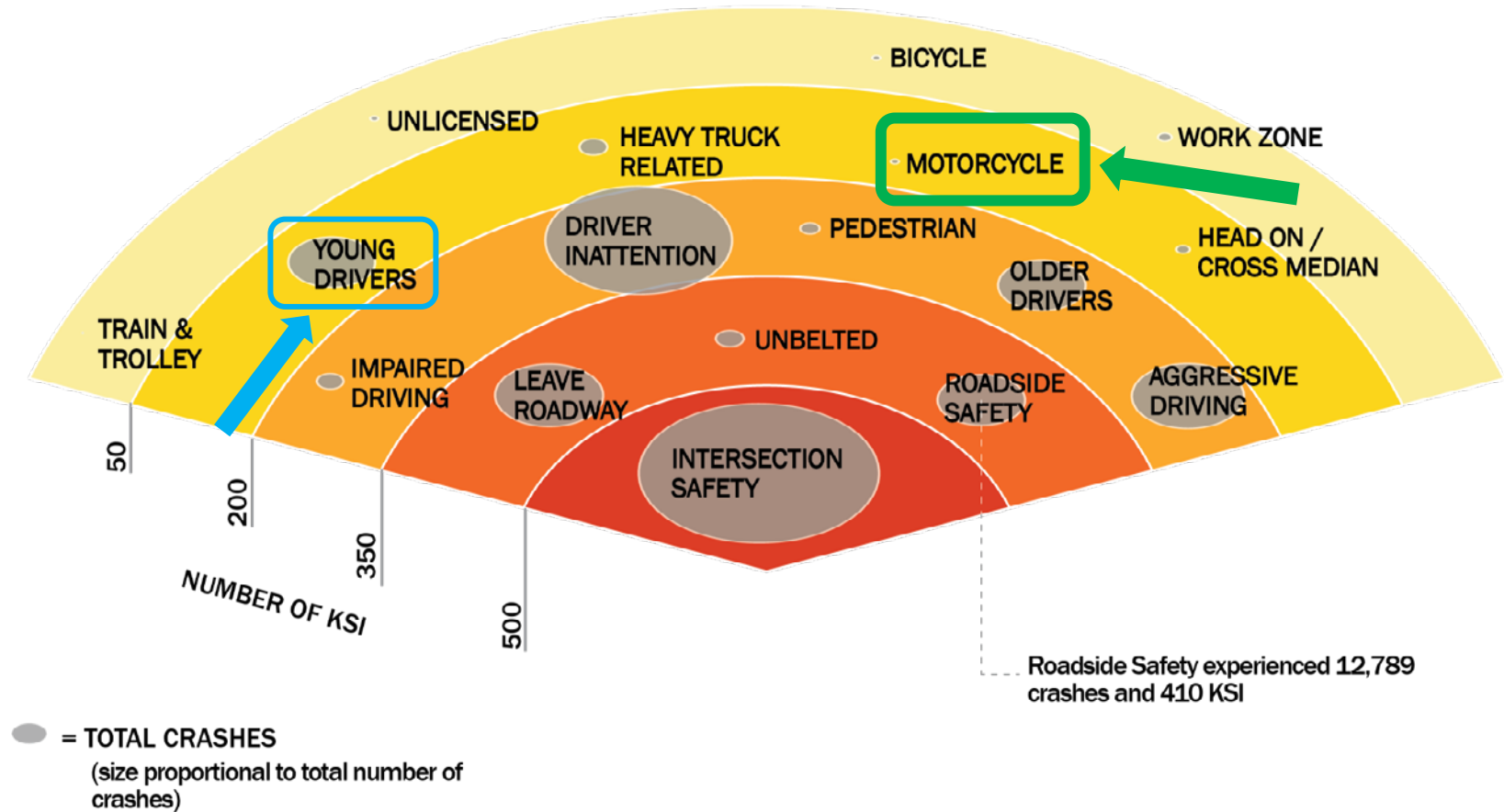


Sources: FARS 1975–2016 Final File, 2017 ARF; Vehicle Miles Traveled (VMT): FHWA.

NHTSA: Facts About Motorcyclists

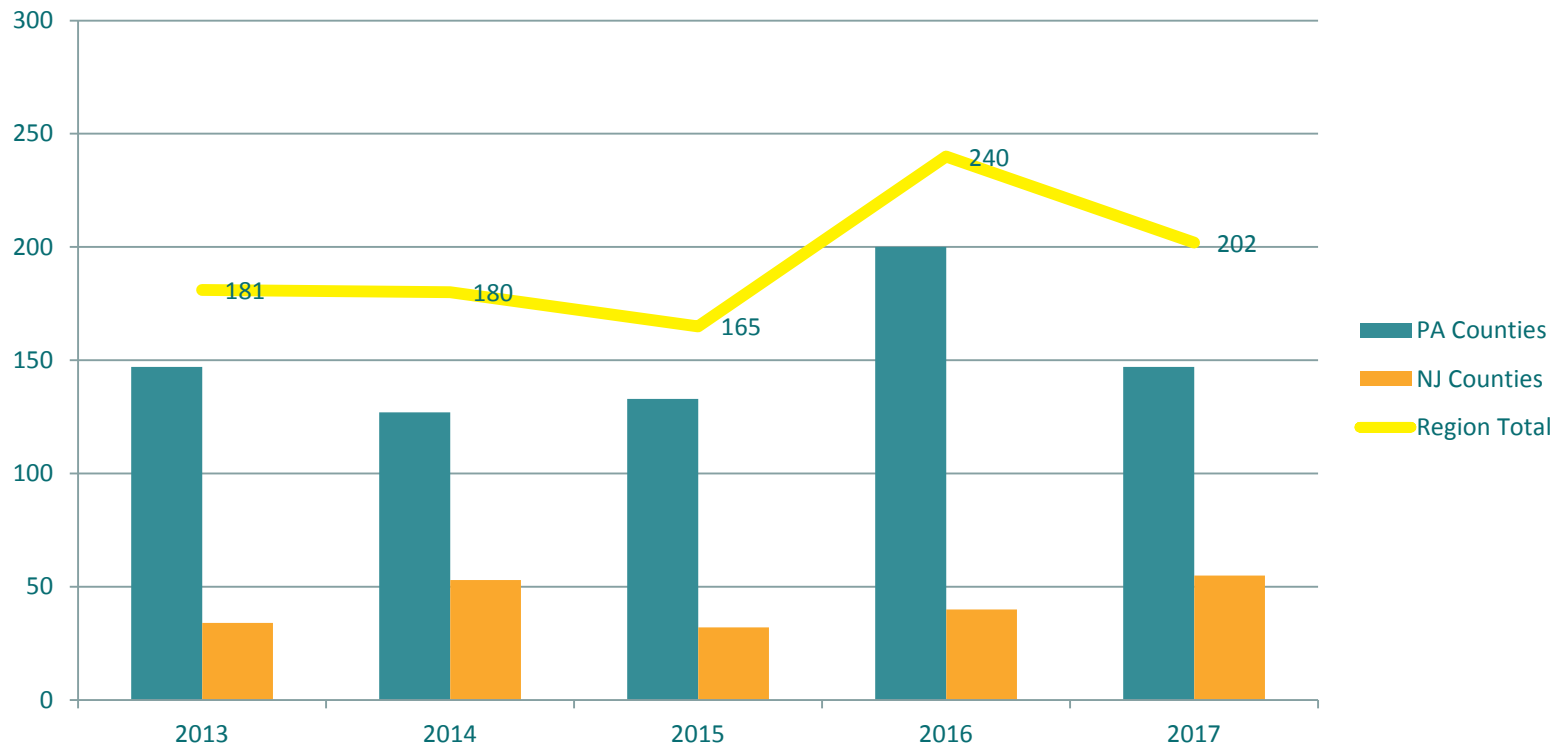
- **5,172**
 - Motorcyclists killed in 2017, down 2.2% from 2016
- **65.2%**
 - Percentage of DOT-compliant helmets in use (2017)
- **37%**
 - Percent of motorcyclists killed in single vehicle crashes were alcohol impaired.

KSI & Total Crashes by Emphasis Area

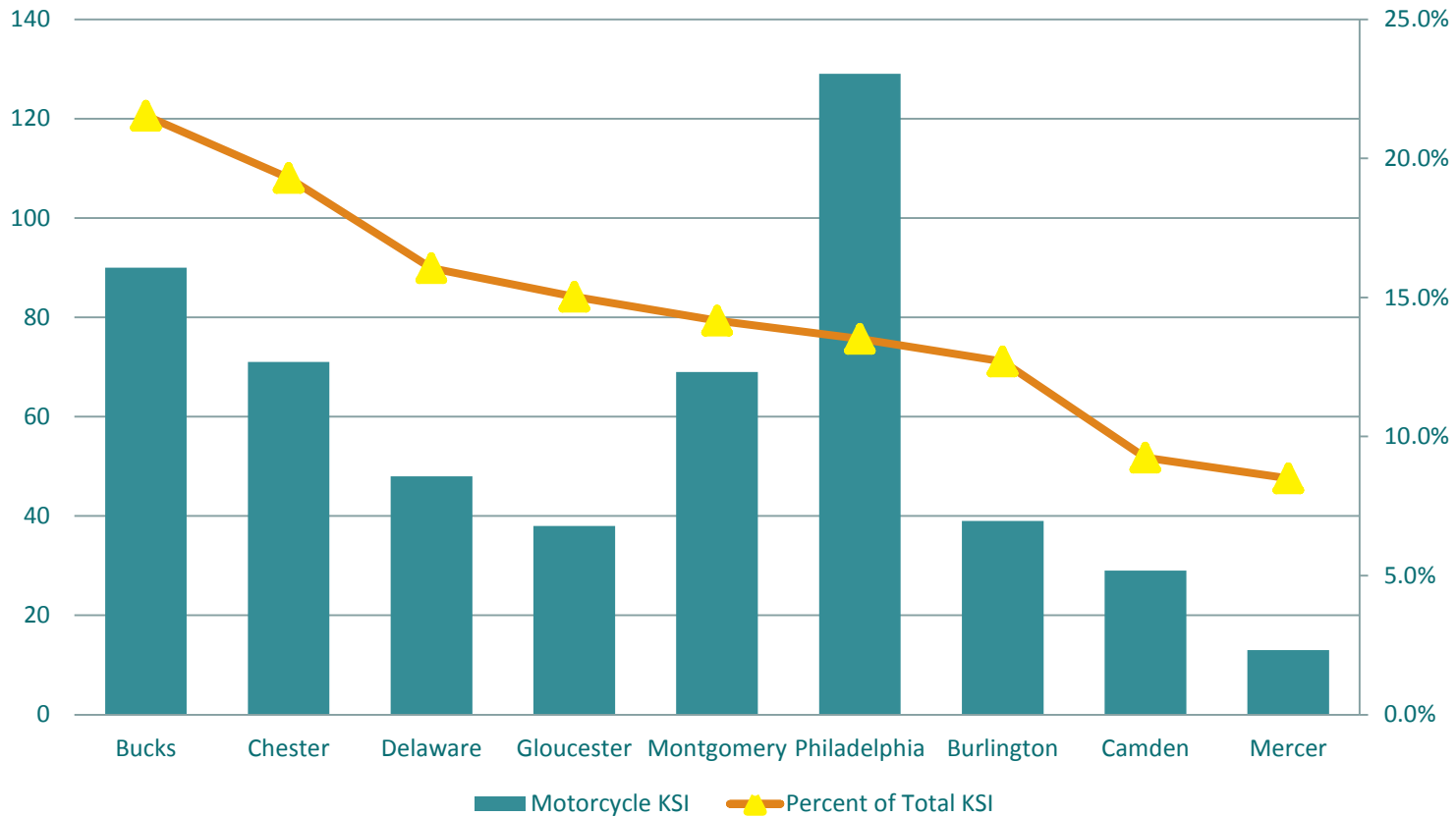


Motorcyclist Safety

Motorcyclist-Involved KSI, 5-year Regional Trend



Motorcyclist-Involved KSI Compared to Total KSI by County, 2013-2015



Motorcyclists

Coincidence Ratios by Emphasis Areas

Lane departure crashes and motorcyclists crashes:

- **1.81**



Emphasis Area	Intersection Safety	Lane Departure	Older Drivers	Young Drivers	Pedestrian & Bicyclist Safety	Impaired Driving	Distracted Driving	Aggressive Driving
Collision Type								
Intersection Safety	—	0.51	1.15	1.04	1.24	0.74	0.86	0.99
Work Zone	0.43	0.99	0.94	0.88	0.44	1.03	0.81	1.76
Lane Departure	0.51	—	0.62	1.01	0.18	2.22	0.89	1.05
Road User								
Older Drivers	1.15	0.62	—	0.64	0.62	0.44	1.09	1.20
Young Drivers	1.04	1.01	0.64	—	0.29	0.57	1.19	1.31
Truck-Related	0.71	0.79	0.92	0.54	0.37	0.48	1.01	1.32
Motorcycle	0.95	1.81	0.66	0.67	0.19	0.97	0.54	0.95
Train/Trolley	1.38	0.35	0.72	0.30	0.76	0.87	0.52	0.33
Pedestrian	1.20	0.20	0.62	0.30	—	0.87	0.41	0.20
Bicycle	1.36	0.14	0.60	0.26	—	0.51	0.47	0.24
Dangerous Behavior								
Impaired Driving	0.74	2.22	0.44	0.57	0.80	—	0.92	0.88
Unbelted	0.97	1.40	0.78	1.03	0.77	2.05	0.70	0.66
Distracted Driving	0.86	0.89	1.09	1.19	0.43	0.92	—	0.77
Aggressive Driving	0.99	1.05	1.20	1.31	0.21	0.88	0.77	—

Sources: PennDOT, NJDOT, DVRPC

Priority Recommended Strategies

Motorcycle Safety

- Work with roadway owners to identify roadway deficiencies that hinder motorcyclists. [Engineering]
- Promote the importance of all levels of motorcycle rider training and increase the availability of trainings. [Education]
- Increase general motorcycle awareness campaigns, and promote existing programs. [Education]
- Enact and enforce motorcycle helmet legislation for all ages and riders in Pennsylvania. [Policy]

Speakers

Joe Fiocco

Fiocco Engineering
Safe Highway Engineering

Suzanne O'Hearn

New Jersey Department of
Highway Traffic Safety

REGIONAL
SAFETY
TASK FORCE



Thank You!



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INTRODUCTION
JOE FIOCCO
MATER DOLOROSA 1976
NORTHEAST CATHOLIC 1980
TEMPLE 1986

STEM-SCIENCE-TECHNOLOGY-ENGINEERING-MATH



Fiocco Engineering



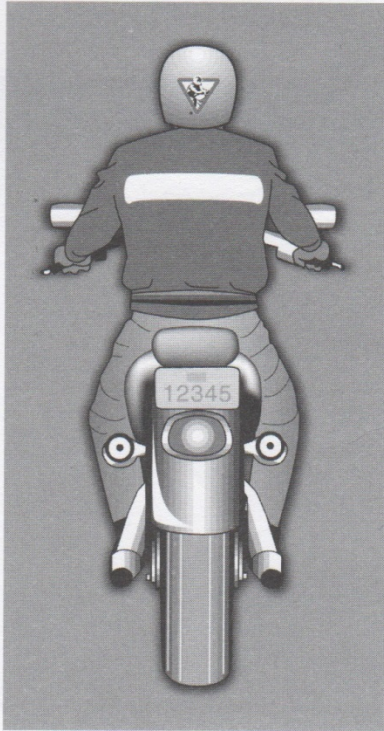
**HIGHWAY
ENGINEERING**

WHAT I DO:

**Engineering:
Traffic Engineering
Highway Safety Studies**

**Expert Witness Services:
Forensic Engineering**

VISIBILITY



Reflective Attire

Many motorcycle crashes are a result of a motorist's not seeing a motorcyclist until it is too late. Motorcycles are smaller and not as prevalent as cars and trucks, so they are more difficult to pick out in traffic and their speed is difficult for others to judge. You must assume the responsibility to be visible in traffic. You must communicate your presence and intentions to other highway users. Here are some suggestions for becoming more visible to others:

Clothing: Wear bright colored clothing and a light colored helmet. Use reflective material on your clothing, helmet, and motorcycle.

Headlight: Ride with the headlight on during the daytime.

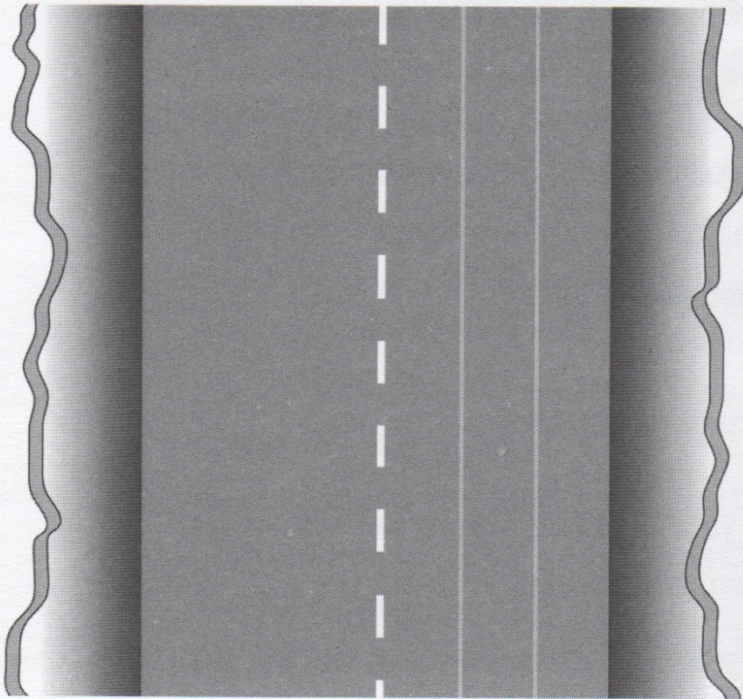
Signals: Communicate with other drivers by signaling intentions. Remember to cancel your turn signals. A false signal can create a conflict because it fails to accurately communicate intentions.

Brake Light: A flashing brake light is more visible than a steady one. Flash the brake light before and during stops (except of course for emergency stops).

Horn: Use the horn to gain attention, but don't rely on it. Many car and truck drivers may not be able to hear it.

LANE POSITION

Lane Positions: Positioning yourself properly within a lane can help you avoid windblast from other vehicles, help you see and avoid roadway hazards, and help

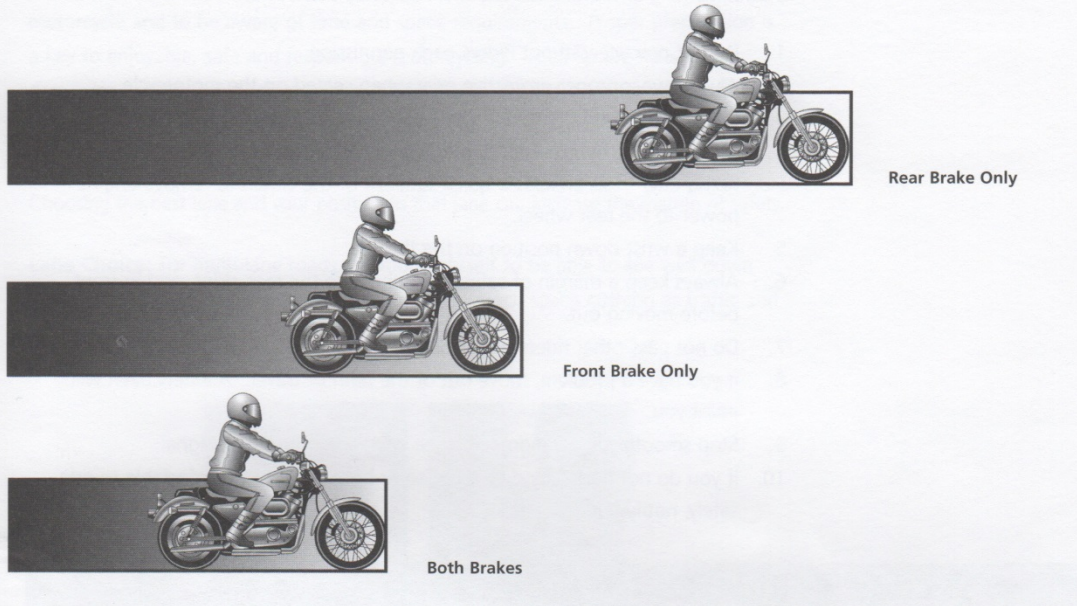


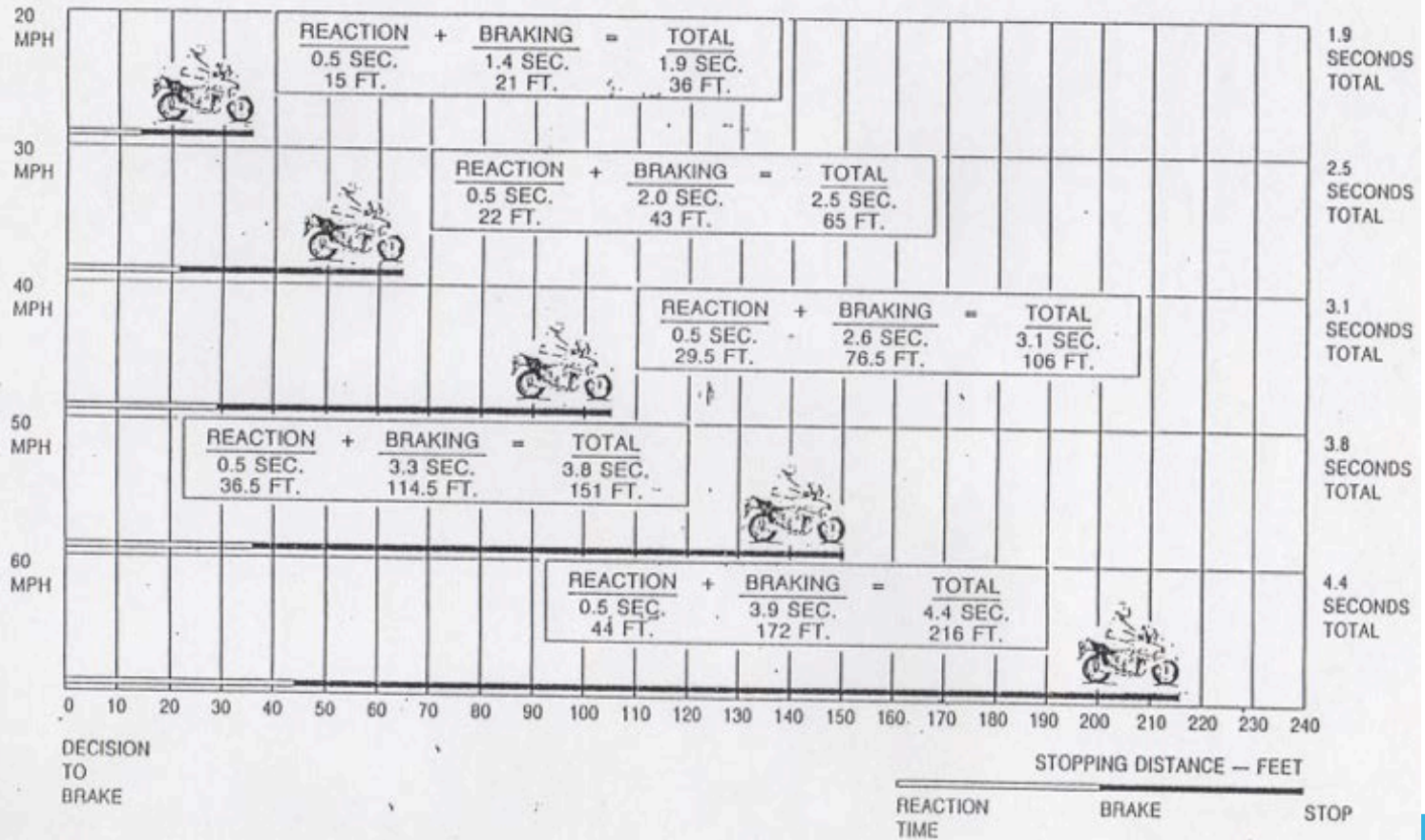
you create and maintain a space cushion between yourself and other traffic. Don't hide among other vehicles. Position yourself so that drivers ahead can see you in their mirrors. Choosing a position that helps you see potential problems ahead can also help drivers see you sooner.

BRAKING

To stop, the hands and feet work together in a coordinated and smooth fashion. Squeeze the clutch and the front brake lever while pressing on the rear brake pedal and downshifting to first gear. The front brake provides around 70% of the stopping power for your motorcycle.

Stopping



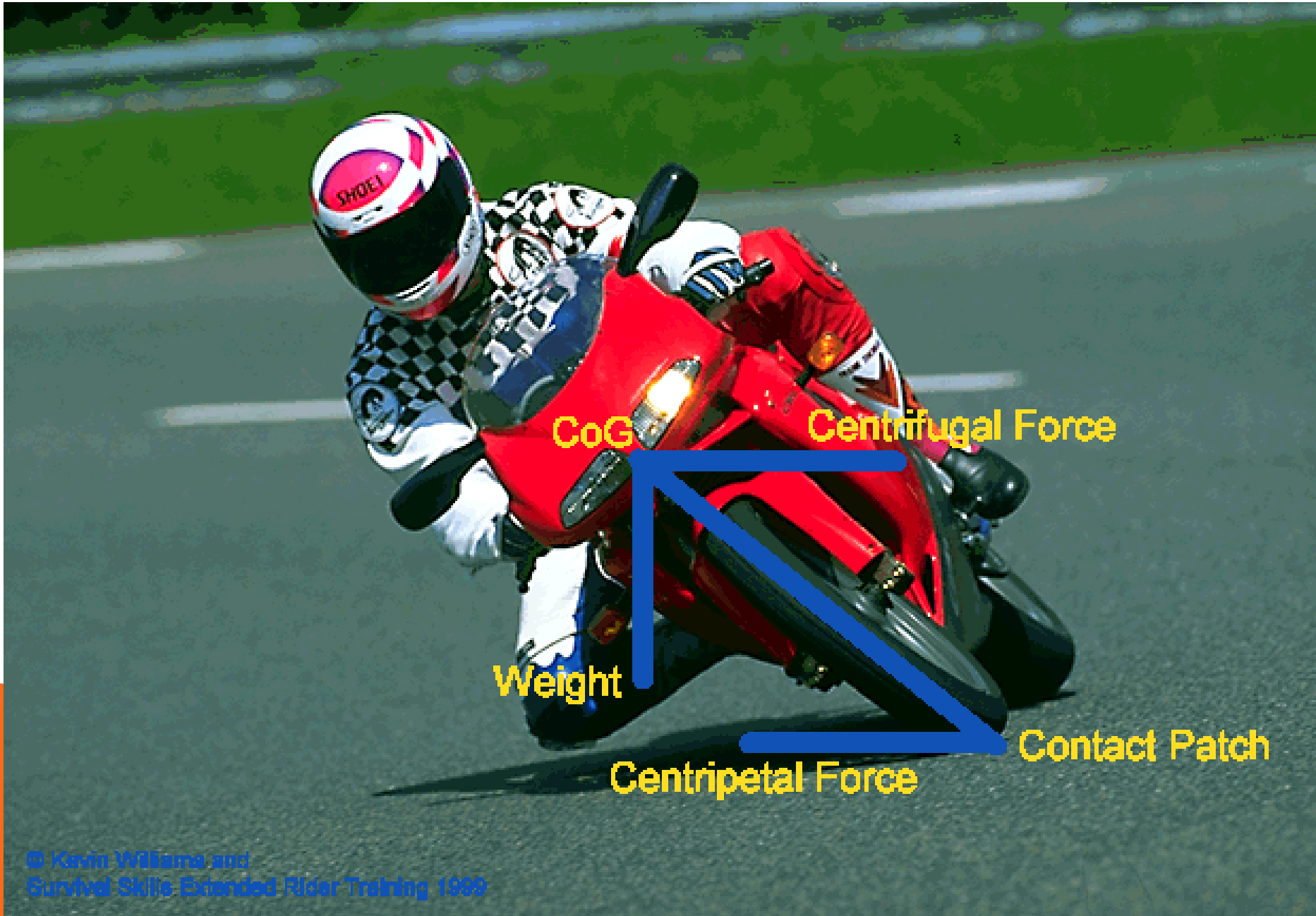


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Stopping a motorcycle in the shortest possible distance is one of the most important skills to possess. Practice in a safe area as often as possible to keep the technique fresh.

The best way to achieve maximum braking is to apply both brakes fully without locking either wheel. Simultaneously squeeze the front brake lever and apply the rear brake pedal. Keep the body centered and look well ahead, not down; it helps you keep the motorcycle in a straight line.

Straight-Line Braking



CoG

Centrifugal Force

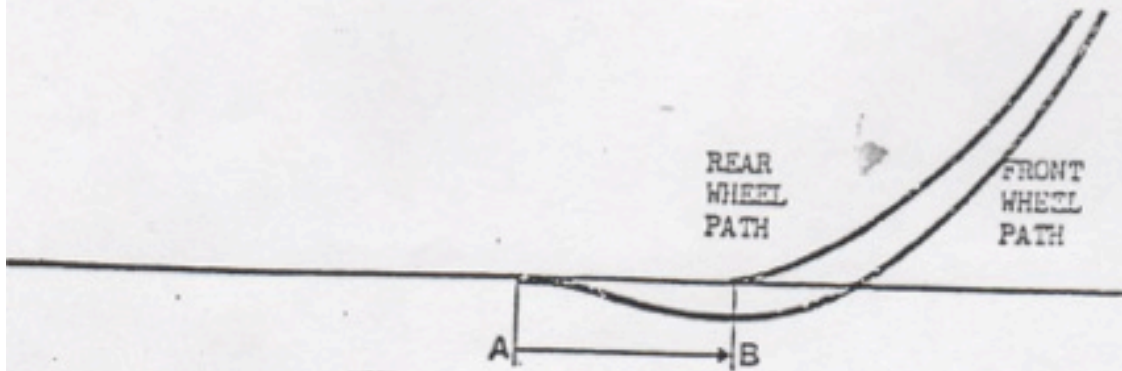
Weight

Centripetal Force

Contact Patch

Gyroscopic Precession Steering

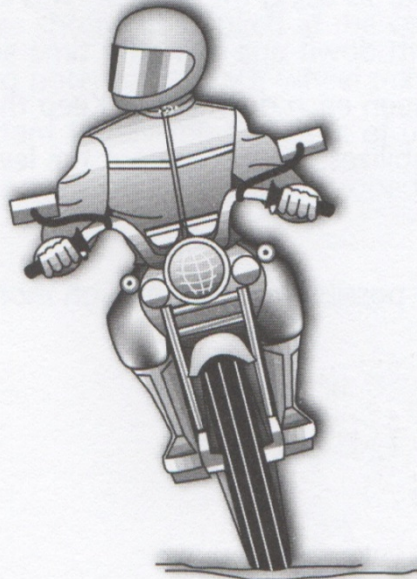
Motorcycles, like bicycles, and all other single track vehicles, must be banked, or leaned over when turning to counter the effects of centrifugal force. It also exhibits an action called "out-tracking" in making the turn. This refers to the fact that the path followed by the front wheel is "outside" the path followed by the rear wheel through the corner. This diagram illustrates:



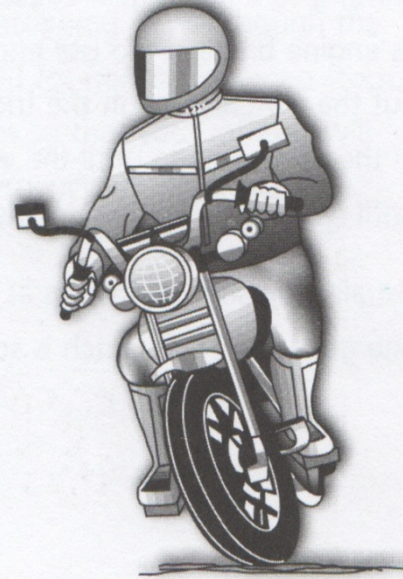
-from point A to point B, the motorcycle is in the process of banking

-after point B, the process of turning the corner is performed

TURNING



Turning Posture



Counterweighting Posture

It's important to remember when stopping in a curve that the amount of traction available for braking is reduced. This is because there is a limited amount of grip existing between the tires and the road surface when the motorcycle is leaning over.

The key to stopping quickly in a curve is to get the motorcycle straight up as soon as possible so that the maximum amount of traction is available for braking. If road and traffic conditions permit, straighten the motorcycle first and "square" the handlebar (center the steering) before the brakes are applied for a maximum-braking, straight-line stop.

Braking in Curves

Front-Tire Skid

It is important to emphasize the need to smoothly and progressively squeeze the front brake lever. It takes time for the forward weight transfer to occur during deceleration. If the brake lever is grabbed abruptly and high brake pressure is applied before the extra traction due to the forward weight transfer is available, the wheel can lock and a front-tire skid will occur. This will result in immediate loss of steering control and the ability to balance. If such a front-tire skid occurs, immediately release the front brake completely to allow the wheel to resume rolling, and then reapply the brake properly. Improper application could lead to a "low side" fall.

Rear-Tire Skid

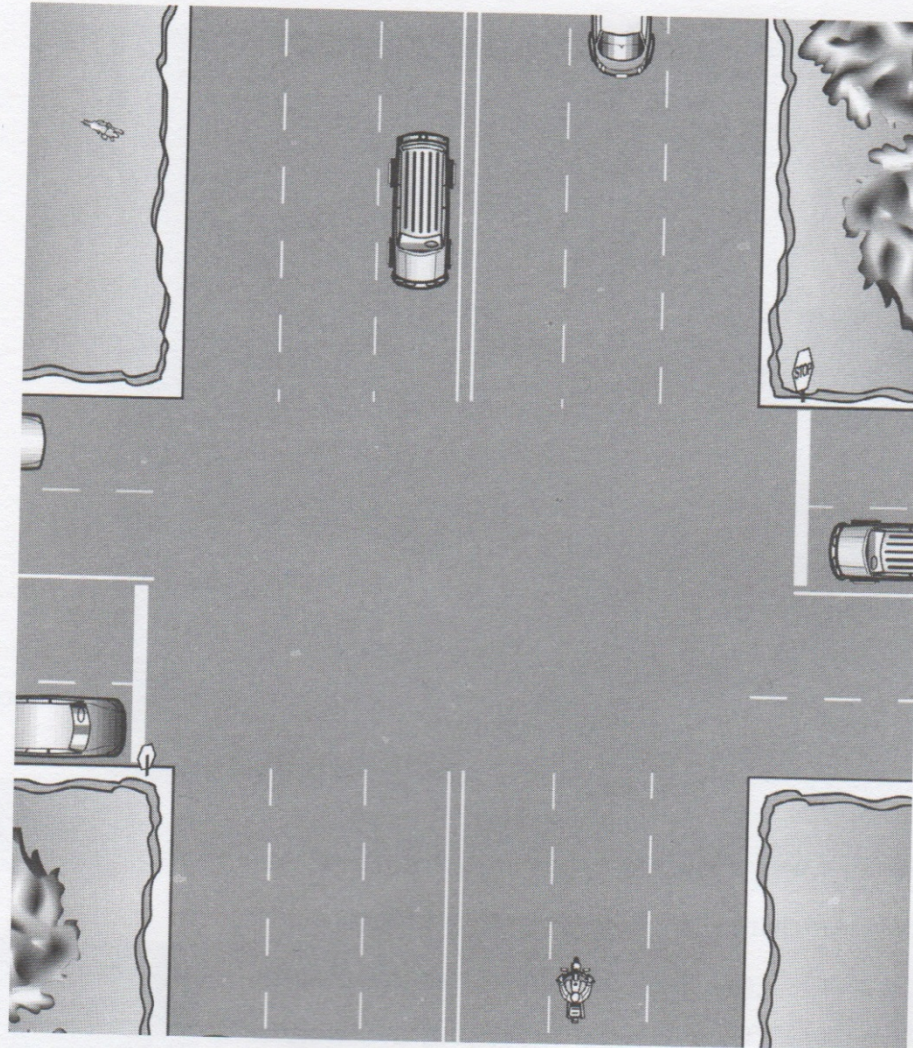
Rear-tire skids can occur in quick stops or rapid speed reductions because the weight of the motorcycle and rider is transferred away from the rear wheel and to the front. This reduces the traction available to the rear tire and, consequently, the amount of brake pressure required to lock the wheel. When a rear tire skids, the ability to turn is lost.

The biggest danger in any rear-tire skid is releasing the rear brake when the rear wheel is out of alignment with the front wheel. If the rear wheel stops skidding and resumes rolling when it is out of line with the direction of travel, the motorcycle will immediately straighten and could result in loss of control. You could be thrown off in what is commonly called a “high-side” fall, and it is very likely to produce serious injury.

You can prevent a “high-side” by intentionally keeping the rear brake locked and skidding to a stop. If a fall occurs, it will be to the “low side,” and you will have only a short distance to fall.

If the rear wheel is nearly aligned with the front wheel, it is possible to regain control by releasing the rear brake and allowing the wheel to resume rolling. It is important to emphasize that releasing the rear brake should only be considered if both wheels are nearly aligned with the direction of travel. Even moderate misalignment can produce a “high-side”.

INTERSECTIONS



12-Second Anticipated Path

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CRASH AVOIDANCE

Swerving

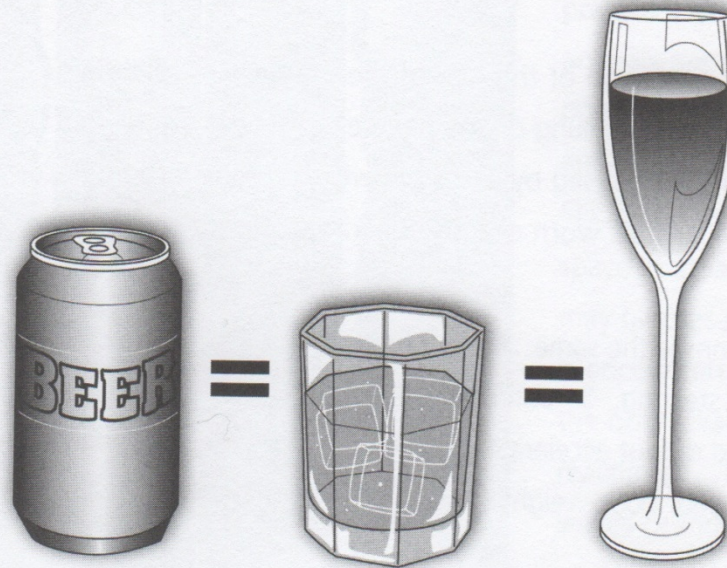
Good searching techniques can prevent situations where swerving becomes necessary. Swerving to avoid a crash may be appropriate if stopping isn't a solution. Research has shown that at speeds above about 18 mph, a motorcycle can swerve to avoid a car-sized obstacle in less distance than it takes to stop. Be sure you have enough time and space to swerve.

Swerving is basically two consecutive turns or countersteers, one to avoid an obstacle followed immediately by another to regain the original direction. As with all turns, both are made by applying forward pressure to the appropriate handgrip (press right-

RIDE SOBER!

b. Blood Alcohol Concentration

The more alcohol there is in the blood, the greater the degree of impairment. The adult male body is able to eliminate alcohol at the rate of almost "one drink" per hour. Women process alcohol at about three-fourths of that rate. If a person drinks at a rate faster than his or her body can eliminate it, the alcohol begins to accumulate in the bloodstream. At a BAC of approximately .05%, most people are impaired.



Drink Comparison



Frame Time
-2.50
Event Recorder
ER9389ED
Date
6/2/2014
Time
2:45:11 PM CST

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Event B: Helmet just to left of Fisher Scientific sign, t=3:37:049



t=3:37:050



t=3:37:051



Event C: Helmet aligned with utility pole on south side, t = 3:37:052



Event D: Helmet aligned just to left of light post on FS property, t = 3:37:053



t=3:37:054



t=3:37:055



Event E: Helmet aligned with edge of curb at west side of driveway, t = 3:37:056



QUESTIONS???

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Fiocco Engineering



**HIGHWAY
ENGINEERING**

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DVRPC RTSF CONNECT & Scooters

March 19, 2019



City of
Philadelphia



CONNECT in a nutshell

Philadelphia's strategic transportation plan 2019-2025

Values – equity, safety, opportunity & access, health, and sustainability

Guided by engagement and driven by data

Vision - A transportation system that benefits everyone

Published 10/10/18



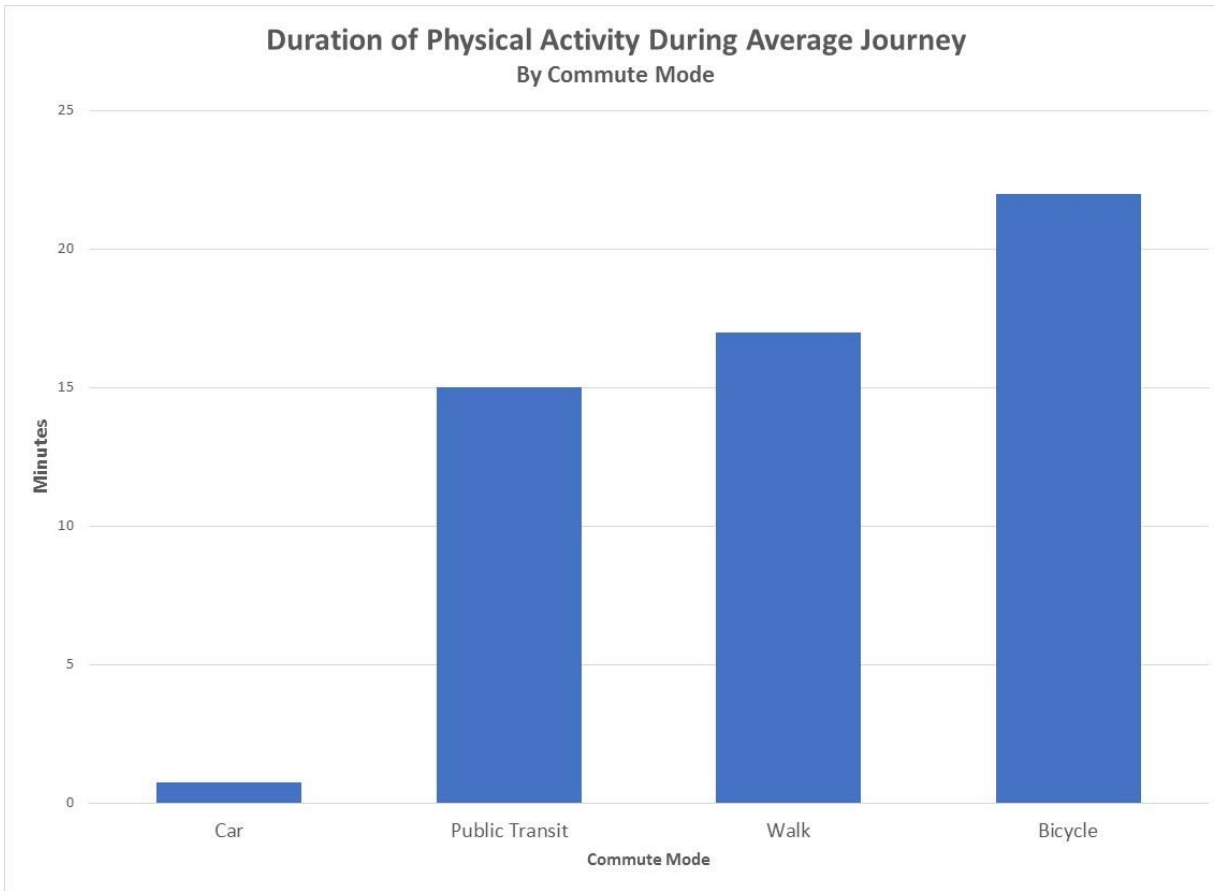
How Bird Works

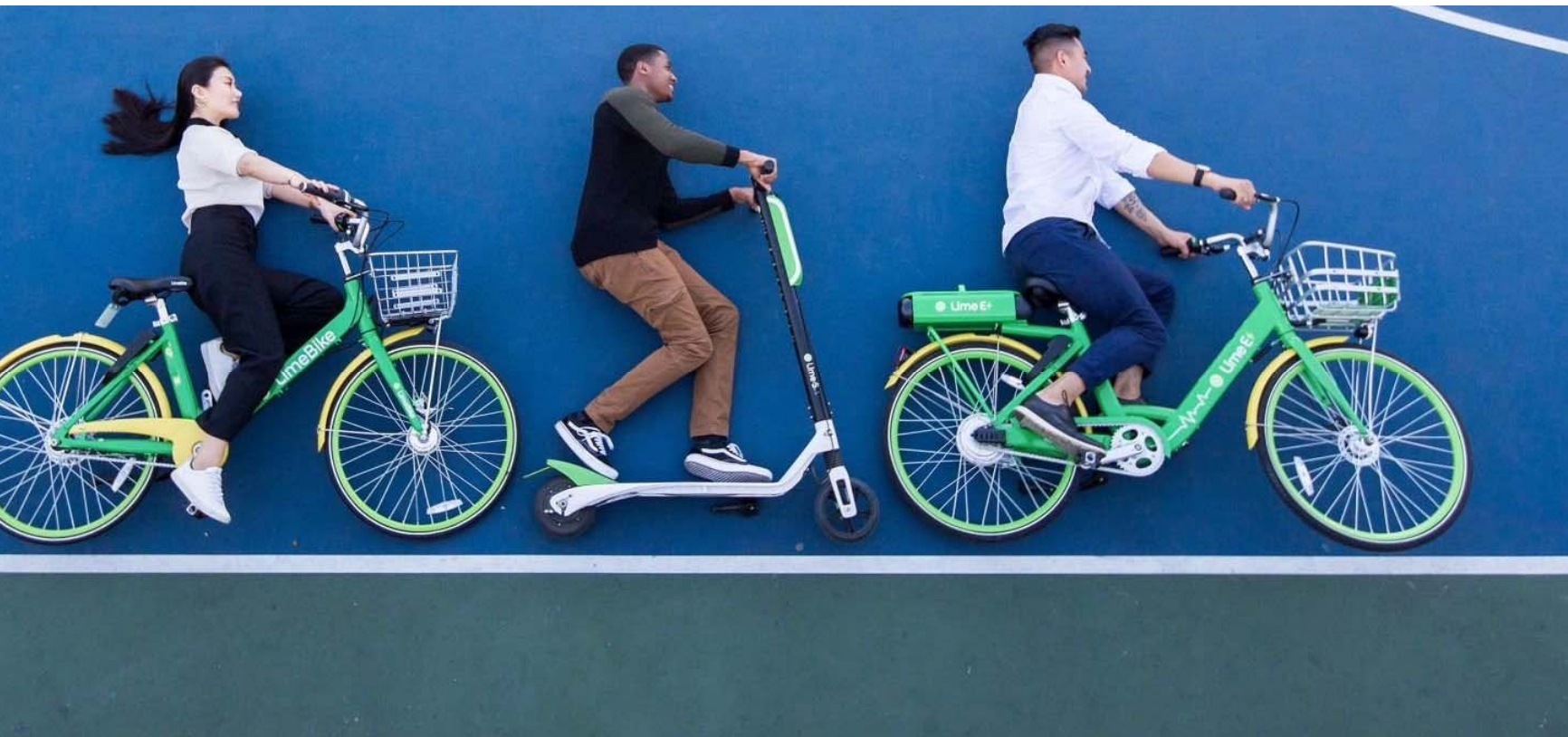
Equipment

Riders push-off with their feet to get going and to assist the scooter during steep inclines











Xiaomi Scooter Hack

XiaomiMi363Locker

Scanning true | Attack false | Unlock false

MiScooter7513

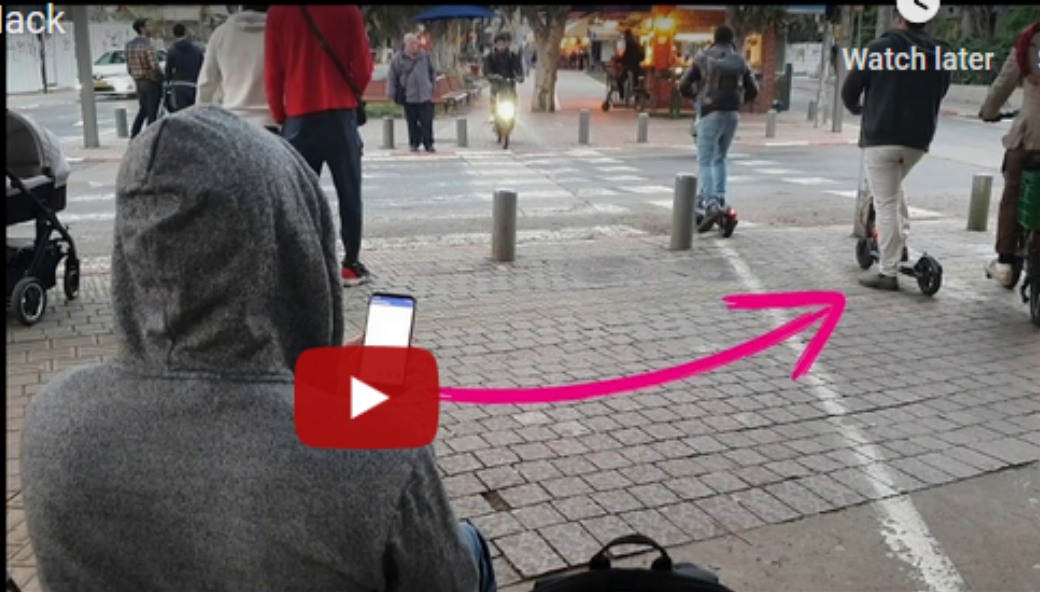
F5:5F:C7:AE:36:04

MiScooter2898

EB:31:08:99:81:2F



Tap here to fill entire screen



Watch later

Share



The attacker will now remotely lock the scooter







Survey Results

March 19, 2019 RSTF Meeting

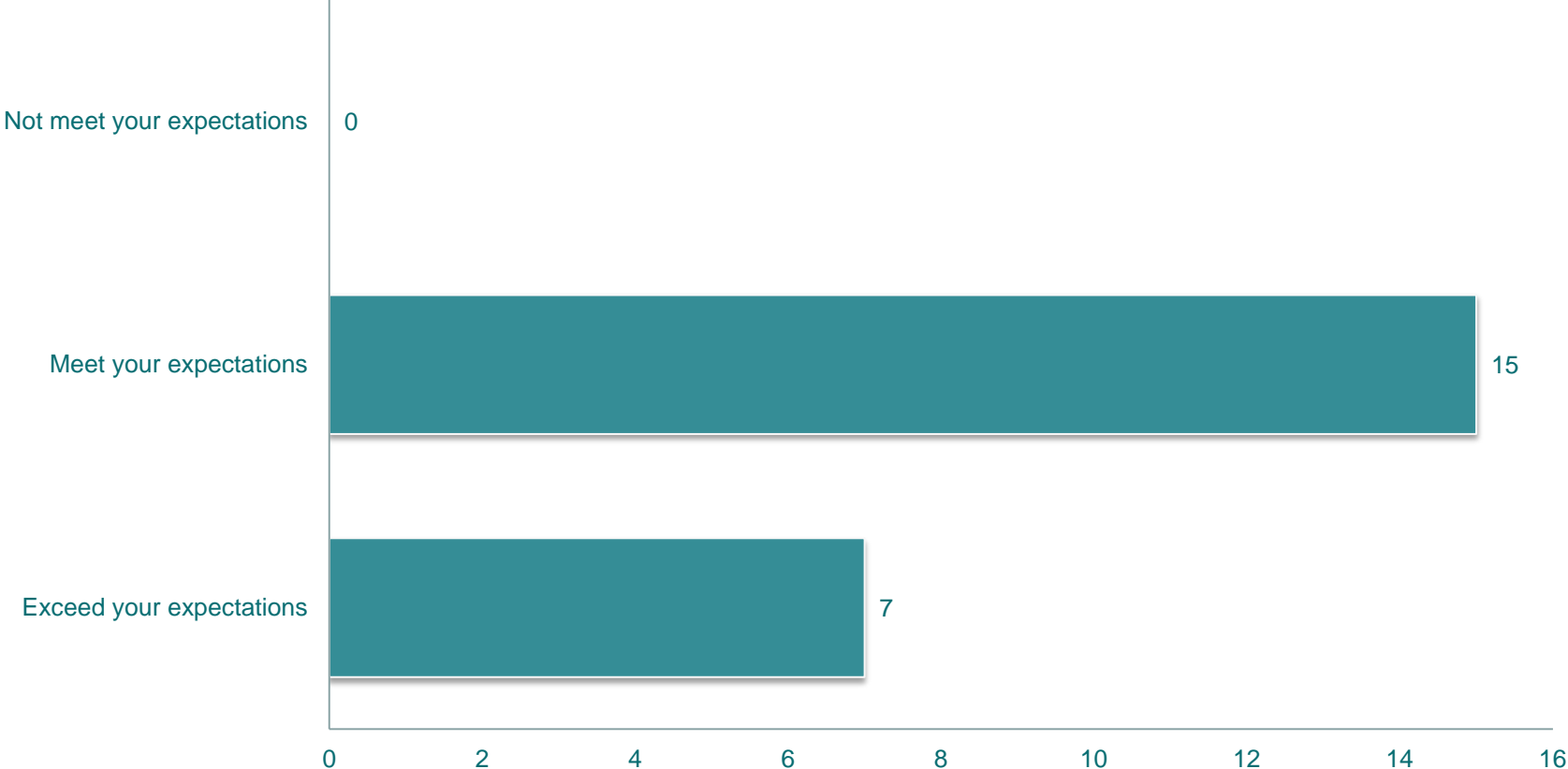


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Overall Survey Results

- 22 out of 50 meeting attendees responded
- The meeting either met or exceeded the expectations of all respondents
- Some write-in comments offered potential areas for improvement

Question 1: Did this meeting:



Question 2: What at today's meeting met, exceeded, or didn't meet your expectations?

Convinced me to never get on a motorcycle

Motorcycle safety presentations were informative, handouts were helpful

Was hoping for a good e-scooter discussion and got it

Really liked the "values" framework around scooters

I appreciated the holistic approach to the scooter discussion, as well as the knowledge shared about motorcycles

I am glad that motorcycles and e-scooter safety is a topic now that they are increasing on our roads

Interesting topic that doesn't get as much attention

Question 3: How else can the RSTF raise awareness or take action on this topic?

Sharing resource links with municipalities to paste on their websites and newsletters during Motorcycle Safety Month (May)

Create a social media page (Facebook or Instagram) – great platform to raise awareness on safety topics

Increase our analysis on the topic (beyond what has been done in the past) – we need more data related to motorcycles

Share statistics directly to county partners

Question 4: Are there any topics you would like to discuss at future RSTF meetings?

Impaired driving

Pedestrian safety

Bicyclist safety

Regional crash trends

Scooters

Connected vehicles and safety

Railroad crossing safety

Corridor planning

Question 5: Additional comments/suggestions

Provide more “take home” items that members can incorporate into their daily operations

Moderate breakout discussions better so that all members can participate equally

Joe Fiocco’s presentation seemed a bit too technical for the RSTF audience – Suzanne O’Hearn’s presentation was better

REGIONAL **SAFETY** TASK FORCE



For more information, please contact:
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www.dvrpc.org/transportation/safety



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