

PBOT

PORTLAND BUREAU OF TRANSPORTATION


1120 SW Fifth Avenue, Suite 800 Portland, OR 97204 503.823.5185

Fax 503.823.7576 TTY 503.823.6868 www.portlandoregon.gov/transportation

Chloe Eudaly Commissioner **Chris Warner** Interim Director

November 28, 2018

TO: The Governor's Advisory Committee on Motorcycle Safety (GAC-MS)

FROM: Chris Warner, Director, Portland Bureau of Transportation 

RE: Portland Bureau of Transportation safety concerns regarding motorcycle lane-splitting

SUMMARY POSITION

Portland is a Vision Zero city and Oregon is a Road to Zero state, both share the goal to eliminate traffic deaths and serious injuries on our streets.

A key tenant of Vision Zero is to reduce conflicts between motor vehicles and vulnerable road users. Vulnerable road users – people walking and bicycling – make up a disproportionate number of deadly and serious injury crashes in Portland. In 2017, of the 45 people who died in Portland traffic crashes, 19 were pedestrians, 2 were bicyclists and 7 were motorcyclists. Our commitment to Vision Zero leads us to invest in infrastructure projects and pursue traffic laws that reduce conflicts and increase predictability for people moving about on Portland streets.

The Portland Bureau of Transportation (PBOT) has been participating in ODOT's Motorcycle Lane-Splitting Safety Subcommittee of the Governor's Advisory Committee on Motorcycle Safety. Motorcycle lane-splitting is the practice of motorcycles riding between lanes of traffic on public roads. Lane-splitting is legal in some countries around the world; in the U.S. it is legal only in California, other states cite concerns about safety and opposition from law enforcement as reasons that lane-splitting has not been legalized. Review of limited available literature and our on-the-ground experience both indicate that legalizing lane-splitting will lead to more conflicts and less safe interactions between road users.

In Portland, we are particularly concerned about the safety impact to pedestrians and bicyclists. People trying to walk and bike across four- and five-lane arterials are particularly vulnerable to the "double threat," when one driver stops for the person crossing and the other driver does not. By allowing lane-splitting, we would introduce an unexpected, unpredictable third threat. Pedestrians are already grossly over-represented in Portland's fatal crash data, making up almost half of our annual traffic deaths. Research also supports our concern for pedestrian safety. A 2014 study from Marseille, France found that pedestrians are 3.3 times more likely to be hit by a motorcyclist than they are to be hit by a car driver, and that part of the increased risk is due to lane-splitting. In addition, an urban lane-splitting trial in New South



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Wales, Australia (2014) found, "Safety risks posed by lane filtering were highest for pedestrians than any other road user group." For bicyclists, lane-splitting could lead motorcyclists to use the bicycle lanes to bypass congestion and introduce serious new conflicts.

We are also concerned about the safety of motorcyclists. In the U.S. in 2016 motorcyclist fatalities occurred nearly 28 times more frequently than car-related fatalities (NHTSA). In Portland in the past nearly six years, 35 people have died (an average of about 6 per year) riding motorcycles, making up 16% of traffic deaths. From examination of the 26 police reports PBOT has from those crashes, it appears that none of the fatalities would have been prevented had lane-splitting been legal (see summary of Portland motorcycle traffic deaths, 2013-2018 YTD as Attachment 1). A UC Berkeley study (2015) found that 17% of reported California motorcycle crashes involved lane-splitting – 997 out of 5,969 total motorcycle crashes – in a 14-month period. Ostensibly, many of those 997 crashes would not have occurred had the motorcyclist not been lane-splitting. Another study from Marseille, France in 2016 considered motorcycle injury crashes and found that lane-splitting leads to almost four times more injury crashes for motorcyclists. Clearly, there are significant risks associated with motorcycle riding already and legalizing lane-splitting will likely exacerbate that risk.

A positive safety finding from the 2015 UC Berkeley study is that lane-splitting motorcyclists were rear-ended less frequently than motorcyclists who were not lane-splitting, a legitimate safety argument used to support legalizing lane-splitting. However, the study also found that motorcyclists were much more likely to rear-end other vehicles while lane-splitting. The benefits of reduced rear-end crashes for motorcyclists during lane-splitting is compelling but on its own does not compensate for significant increased risk of collisions with pedestrians, drivers and motorcyclists themselves while lane-splitting.

Beyond safety, two additional arguments that are often made in support of lane-splitting are congestion relief and environmental benefits. Allowing lane-splitting is unlikely to shift mode to achieve measurable congestion relief for the Portland Metro region. In New South Wales, Australia during the lane-splitting trial, there was no measurable congestion reduction (motorcycles made up 4% of total traffic, a quarter of them – 1% of total traffic – lane-split). Given Oregon's weather, it is unlikely that we would see a higher motorcycle mode-split than New South Wales. And the potential of increased crashes due to lane-splitting would negatively impact congestion. The second argument made for lane-splitting is a reduction in emissions from motorcycles. While motorcycles on average achieve high gas mileage (50-80 mpg), many of the greenhouse gases that they emit are at much higher levels than the average car.

In summary, both on-the-ground experience and research suggest that lane-splitting will create less predictable, more dangerous situations for people walking, biking, driving cars and riding motorcycles.

RESEARCH STUDIES

Oregon Revised Statute 814.240 explicitly states that motorcycles and mopeds in Oregon may not pass a vehicle in the same lane and attributes a \$260 fine to those who break the law.

California is the only state in the U.S. where lane-splitting is legal, and it is allowed on all streets.

SAFETY

Powered Two Wheeler Riders' Risk of Crashes Associated with Filtering on Urban Roads, Traffic Injury Prevention (2016)

- This study was conducted with three-years of injury crash data and observations from Marseille, France. The objective of the study was to estimate the crash risk per kilometer traveled by motorcycle riders (powered two-wheeler drivers) splitting low-speed traffic on urban streets.
- Findings: The risk of motorcycle drivers being involved in injury crashes while filtering is significantly higher than the risk for riders who do not filter. For the fourteen sections studied, it is 3.94 times greater.
- No space appears to be safer than others for filtering.
- Riders filtering forward along the curb or parked cars, along bus lanes or between traffic lanes all have a crash risk greater than the risk of those who do not filter.
- Conclusion: All measures limiting the practice of filtering by powered two-wheelers on urban roads would probably contribute to improving the safety of their users.

Powered Two Wheeler Drivers' Risk of Hitting a Pedestrian in Town, Journal of Safety Research (2014)

- This study was conducted in Marseille, France using injury crash data from 2011 and a campaign of observations of motorcycle traffic. The objective of the study was to determine the risk of motorcycle drivers (powered two-wheeler drivers) of hitting and injuring a pedestrian compared to the risk of drivers.
- Findings: The risk for motorcycle drivers of hitting and injuring a pedestrian is significantly higher than the risk run by car drivers (four-wheeled vehicle drivers). On the nine roads studied, it is on average 3.33 times higher.
- Conclusions:
 - There does indeed seem to be problems in the interactions between pedestrians and motorcyclists in urban traffic.
 - These interaction problems lead to a higher risk of hitting and injuring a pedestrian for motorcyclists and for car drivers.
 - Part of this increased risk comes from filtering maneuvers by motorcyclists.

Motorcycle Lane Filtering Trial: Summary of trial results, New South Wales, Australia (2014)

- Found that overall lane filtering was a relatively low-risk riding activity for motorcyclists under the conditions of the trial.

- However, safety risks posed by lane filtering were highest for pedestrians than any other road user group. Motorcyclists who lane filtered were found to cross the stop line at intersections, thereby intruding into the pedestrian crossing space.
- Also of risk to pedestrians, filtering curbside on a multilane road was observed by Police, splitting whatever gap they could fit their motorcycles.
- If allow lane filtering, doing so at a slow speed and restricting curbside filtering or near parked cars can reduce risk to pedestrians.
- Motorcycles represent only 4% of total traffic in NSW and only a quarter of those lane filtered, so there was no overall reduction in traffic congestion.

UC Berkeley studies. A UC Berkeley study, [Motorcycle Lane-splitting and Safety in California \(2015\)](#), is the most recent and specific study examining lane-splitting. The study collected lane-splitting crash data from law enforcement reports over a 14-month period, June 2012 to August 2013. During that period, there were 5,969 motorcycle crashes recorded, and 997 of those (17%) involved lane-splitting.

The study compared two different types of motorcycle crashes when lane-splitting is allowed in California. The comparison is severity of motorcycle crashes when the motorcyclist was lane-splitting to the severity of crashes when the motorcyclist was not lane-splitting. This gives the relative difference in severity between the different types of riding. It does not answer the bigger question about overall crash increases or decreases when lane-splitting is allowed.

Main take-aways from the study:

- 17% of California motorcycle crashes involve lane-splitting.
- Crashes that occur when motorcyclists lane split are less severe than crashes that occur when motorcyclists are not lane splitting.
- Crashes that occur when motorcyclists lane split are at slower speeds and include less injury, and the lane-splitting motorcyclists use better helmets.
- Motorcyclists lane-splitting are *less* likely to be rear-ended (4.6% v. 6%)
- Motorcyclists lane-splitting are *more* likely to rear-end another vehicle (38.4% v. 15.7%)
- A speed differential of 15 MPH or less between traffic and motorcycles makes lane splitting safer than at higher speed differentials.
- Traffic speeds of 50 MPH or less makes lane splitting safer than when done at higher speeds.

Vision Zero concerns about the study:

- The key question, “Does lane-splitting lead to more crashes? If so, what is the severity of those crashes?” is not answered.
- To answer this, a study should compare number and severity of motorcycle crashes before and after lane-splitting was allowed in California. I have found no such study.
- We can assume that overall motorcycle crashes could increase about 17% if lane-splitting is allowed in Oregon, but that those crashes will be less severe than the typical motorcycle crash in Oregon today.

CONGESTION

It is doubtful that the Portland Metro area would see significant mode shift from cars or trucks to motorcycles that would realize any measurable congestion relief for the region. If crashes increase from lane-splitting (California's data indicates that 17% of California motorcycle crashes involve lane-splitting), one could expect a negative impact on congestion and the time it takes to clear the crashes.

The state's Rose Quarter project aims to reduce crash-related congestion delay by reducing weaving movements and providing auxiliary lanes. Lane-splitting crash-related to congestion could negate statewide congestion reduction efforts.

New South Wales Motorcycle Lane Filtering Trial

Motorcyclists in the trial represented only 4% of the total traffic, and with only around a quarter lane filtering, only 1% of total traffic reported to participate in lane filtering related maneuvers. For this reason, the trial did not show a reduction in congestion for all traffic.

Melbourne policy

In Melbourne, Australia, lane splitting is legal and a tactic to relieve traffic congestion in their Motorcycle Plan for 2015-2018 (June 2016 City of Melbourne Motorcycle Plan 2015-18.)

Belgian study

A Belgian study found that "a 10 percent shift from cars to motorcycles could reduce travel time by an average 8 minutes for the remaining 90 per cent of drivers and the number of 'lost vehicle hours' would decrease by 63 percent." (Commuting by Motorcycle: Impact Analysis, I. Yperman, Transport & Mobility Leuven, Brussels, September 2011.)

ENVIRONMENTAL IMPACT

While motorcycles are typically more fuel efficient than the average car, getting 50-80 miles per gallon, their greenhouse gas emissions are mixed. The average motorcycle emits about 30% less carbon dioxide than a car but "416% more hydrocarbons, 3,220% more oxides of nitrogen, and 8,065% more carbon monoxide" (<http://latimesblogs.latimes.com/greenspace/2011/09/mythbusters-motorcycle-emissions.html>, Susan Carpenter, September 2011.)

DRIVER ATTITUDES

Two studies look at driver attitudes toward lane-splitting, both motorcyclists and car drivers.

Drivers' attitudes and knowledge regarding motorcycle lane filtering practices, Research School of Psychology, The Australian National University, Canberra, ACT 2601, Australia (2015) found that "over two-thirds of drivers do not support legalizing lane filtering.... Whereas surveys of riders consistently reveal a belief that filtering should be legalized to improve safety, our results indicate that drivers believe that lane filtering is unsafe and should remain illegal." Drivers also expressed concern that they may fail to detect motorcyclists, which "is consistent with empirical research indicating that drivers do indeed possess inadequate schemata for detecting motorcyclists."

Motorcycle lane-share study among California motorcyclists and drivers 2014 and comparison to 2012 and 2013 data, The Safe Transportation Research and Education Center, University of California Berkeley, (May 2014)

- 709 motorcyclists and 951 vehicle drivers were intercepted for the survey
- 81% of motorcyclists lane-split on freeways, 62% lane-split on freeways and multi-lane roads
- When vehicle drivers were asked, “How would you rate your approval or disapproval of lane-splitting?” they responded:
 - 34% strongly disapprove
 - 27% somewhat disapprove
 - 30% somewhat approve
 - 10% strongly approve

ADDITIONAL RESEARCH NEEDED

Safety

To better understand the safety impacts of lane-splitting, more research from California is necessary. Specifically, we should better understand:

- Since legalization of lane-splitting in California, have motorcycle-involved crashes increased as a result of lane-splitting? What is the severity of those crashes? What types of road users were involved in those crashes?
- Since legalization of lane-splitting in California, have non-freeway motorcycle-involved crashes increased as a result of lane-splitting? How many have involved pedestrians? How many have involved bicyclists?

Congestion

Motorcycle riding conditions in Oregon are very different from motorcycle riding conditions in California.

- If motorcycle lane-splitting is legalized in Oregon, what number of Portland Metro area commuters could be expected to shift mode from driving a vehicle to riding a motorcycle? What percent of commute trips would that be? Would that shift offer meaningful, measurable congestion relief?
- In the Portland Metro area, what is the time it takes to respond to and clear a traffic crash during PM peak by severity (property damage only, moderate injury, serious injury) and what is the total impact to recovery time of the network? What could we expect the congestion impact to be as a result of motorcycle lane-splitting crashes?

CONCERNS ABOUT LANE-SPLITTING

PRIMARY CONCERNS

Safety for pedestrians. Portland’s 4- and 5-lane arterials are the city’s most dangerous streets. Pedestrians make up about 40% of Portland traffic fatalities. The preponderance of 4- and 5-lane arterials are in East Portland, which is also where pedestrians are twice as likely to be killed while walking compared to the city

at large. One of the most dangerous street situations for pedestrians is the double-threat, where one vehicle stops for a pedestrian to cross but the vehicle in the adjacent lane does not stop and hits the pedestrian. A chief concern is that lane splitting would add a third threat to pedestrians trying to cross Portland's biggest streets.

Safety for bicyclists. Bicyclists would be vulnerable to the same triple threat while crossing the street as pedestrians. In addition, lane-splitting could lead to motorcyclists using the bicycle lanes to bypass congestion.

Safety for drivers. In motorcycle crashes in California, another vehicle is more than twice as likely to be rear-ended by a motorcycle in a lane-splitting crash than in a non-lane-splitting crash (38.4% v. 15.7%).

Safety for motorcyclists. In California, 17% of motorcycle crashes occur while lane-splitting. We could expect that legalized lane-splitting in Oregon could lead to increased motorcycle crashes.

Safety for truck drivers. Truck drivers are managing big, heavy vehicles with limited visibility and maneuverability. Lane-splitting would increase the potential for serious crashes between motorcyclists and heavy trucks.

SECONDARY CONCERNS

Congestion. Any increase in crashes from lane-splitting would have a negative impact on congestion including time of the crash, investigation, clearing the scene, and traffic flow recovery. Also, it is doubtful that the Portland Metro area would see significant mode shift from cars or trucks to motorcycles that would realize any measurable congestion relief for the region.

Enforcement. Setting and enforcing standards for appropriate speeds and conditions for lane-splitting can be difficult. If lane-splitting is allowed only under certain conditions (e.g. on the interstate system during times of congestion at no more than a 15 MPH differential) it will be difficult to enforce and difficult to educate motorists about the rules. Oregon State Police have shared that it is difficult for an officer in a Police car to catch a person driving a motorcycle.

Education and Funding. Oregon has a mandatory motorcycle training requirement for obtaining a motorcycle license. [Team Oregon](#) offers a variety of the motorcycle safety trainings. Lane-splitting is not part of their existing curriculum. If lane-splitting were to move forward, they would need funding to change the curriculum and to perform outreach to existing licensed motorcyclists. There would also need to be significant funding to perform statewide outreach to the driving community.

Liability. Determining liability for collisions that occur while lane-splitting when it is legal can be difficult. California considers the comparative negligence of each party when determining fault in a car/truck v. motorcycle lane-splitting crash.

Street design. Portland streets are designed for standard 10' lanes. The lanes are intentionally narrow to encourage driving at safe speeds. There would be little space on most Portland streets for a motorcyclist to pass between motor vehicles.

Deadly motorcycle crashes, 2013-2018 year-to-date

- Total deaths on motorcycles: 35 (crash reports available for 26)
- At least 13 crashes, 37 percent of total, were single vehicle crashes that did not involve other street users.
- Of the remaining 22 crashes, at least nine involved riders traveling too fast for conditions.

Crash date	Report available	Speed	Single vehicle	Location	Description
3/3/2013	Yes	n/a	X	N Greeley & Going	Rider lost control of the motorcycle, jumped the east curb of N. Greeley Ave and hit a large wooden utility pole. Conditions were dry, traffic in the area was light. Cause of loss of control unknown. Speed not noted in report.
6/10/2013	Yes	n/a		NE MLK & Prescott	Improper lane change by motorcycle rider led to a collision with an adjacent vehicle and loss of control.
7/11/13	Yes	X	X	SE Milwaukie & Mitchell	Failed to negotiate curve in street.
8/9/2013	Yes	X	X	N Interstate Ave., SB off-ramp near Larrabee	Failed to negotiate curve in street.
6/1/2014	Yes	X		SE Powell & 29 th	Rider drifted into opposing lane and collided head-on with a vehicle. Alcohol likely a factor.
6/22/2014	No	n/a	n/a	NE Prescott Dr & 129 th Pl	(No online news articles available)
7/14/2014	Yes	X	X	6700 block of NE Cornfoot Rd	Failed to negotiate curve in street. Alcohol likely a factor.
8/5/2014	Yes	n/a		SE Powell & 7 th	Rider rear-ended another motorcycle rider and fell into the opposing driving lane, where he was run over, resulting in his death. The two riders were traveling together, but the rear rider did not realize the other individual was stopping to make a U-turn.
12/6/2014	Yes	n/a		EB I-84 to SB I-205 on-ramp	Rider failed to negotiate curve in street. Possibly lost control after attempting to avoid a vehicle in front of them, but not confirmed in report.
2/22/2015	Yes	n/a	X	7688 SW Capitol Hwy.	Rider collided with a parked vehicle while practicing to ride a motorcycle within a parking lot. (This crash would be excluded by NHTSA criteria because it is in a parking lot.)
8/9/2015	No	n/a		N Monroe & Williams	Officers learned that a delivery truck driver was heading northbound on North Williams Avenue and took a left turn onto North Monroe Street when it collided with a motorcycle.
8/14/2015	No	X		I-205 & Division	Motorcyclist traveling 100+ mph rear ends vehicle
8/23/2015	Yes	X		6102 N Marine Drive	Rider traveling too fast for conditions (approximately 100 mph), collided with side of truck making a U-turn.
9/20/2015	Yes	n/a		SW Multnomah & 34 th	Rider impaired by drugs. Available report does not include much detail, and there is little information online.
1/24/2016	Yes	n/a	X	NE Airport Way & 148 th	Rider hit curb and collided with street light pole.
3/31/2016	Yes	X		SE Powell & 49 th	Rider collided with side of truck making a left turn from the opposing lane.

Crash date	Report available	Speed	Single vehicle	Location	Description
4/5/2016	Yes	X	X	I-5 NB on-ramp at Morrison Bridge	
4/16/2016	Yes	n/a		SE 92 nd & Crystal Springs	Rider collided head-on with vehicle in opposing travel lane. Factors leading to crash not clear from report.
7/2/2016	Yes	X		NE 82 nd & Schiller	Rider collided with a vehicle in the opposing lane making a left turn. High speeds potentially a factor.
8/12/2016	Yes	X	X	NE Lloyd & Grand	
3/19/2017	Yes	X		2400 block NE 57 th Ave.	Rider collided with vehicle making U-turn. Speed likely a factor.
3/21/2017	Yes	n/a	X	SE 92 nd & Steele	Not clear what led to crash.
4/21/2017	Yes	X		Powell & 37th	Rider collided with turning vehicle.
6/17/2017	Yes	n/a		7911 NE 33 rd Dr.	Motor vehicle driver failed to yield right of way to the motorcycle rider.
8/27/2017	Yes	X	X	I-205 NB at on-ramp to I-84 WB	Rider failed to negotiate curve in street.
10/12/2017	Yes	n/a	X	Ramp from NB I-405 to Hwy 30	Rider failed to negotiate curve in street.
10/27/2017	Yes	n/a		7701 NE 33 rd Dr.	Rider collided with vehicle turning left from the opposing lane.
2/6/2018	No	X		SE Powell Blvd. and SE 141st	Witnesses told officers that the motorcyclist was traveling at a high speed, passing vehicles and driving into the oncoming lane of traffic. Officers said motorcyclist was heading east when he crashed into a pickup at the intersection, throwing the man off the motorcycle. After the man landed in the roadway, he was then hit by a sedan heading west on Powell.
4/19/2018	Yes	n/a		NE Marine Drive & 6 th Dr.	Rider potentially lost control while trying to avoid colliding with a vehicle turning left from the opposing lane. No evidence of contact between motorcycle and vehicle.
5/8/2018	No	n/a		I-205 at Glisan exit	
5/13/2018	Yes	n/a	X	I-205 NB at on-ramp to I-84 WB	Rider lost control after striking raised curbing separating NB lanes from exit lanes.
6/25/2018	No	X	X	300 block NE Tomahawk Island Dr.	Based on information learned at this time in the investigation, members of the Traffic Investigation Unit believe the motorcycle operator traveled east on Northeast Tomahawk Island Drive when he collided with a legally parked vehicle. Investigators believe that speed was one of the contributing factors to this crash.
8/15/2018	No	n/a		Hwy. 30 & Bridge Avenue	
10/2/2018	No	n/a		I-5 at the Interstate Bridge	Preliminary information suggests the man who died in this crash was traveling south on I-5 when he collided with a Nissan Sentra that had slowed because of construction zone traffic congestion. Intoxication is believed to be a factor.
10/10/2018	No	X		8300 block NE Marine Dr.	Officers believe the semi-truck driver was driving west on NE Marine Drive and the motorcycle operator was traveling east on NE Marine Drive. Information learned at this time suggests the motorcycle operator left the eastbound lane of travel, attempted to correct his direction of travel, lost control of the motorcycle and collided with the semi-truck. Officers believe speed was a factor in this fatal traffic crash.