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# Is Powered Two-Wheeler Lane splitting dangerous or not?

## Focus on the two experiments conducted in France on this practise

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### Abstract

Lane splitting (LS) describes when Powered two-wheelers drive between two vehicles heading in the same direction. This practice has been commonplace for many years despite being illegal.

The French government decided to experiment the legalization of LS in eleven departments for a period of three years from February 2, 2016. The results of this experimentation were contrasted on several aspects. Thus, a second experimentation was launched since August 2, 2021 for a duration of 3 years on 21 departments.

The evaluations of these experiments were entrusted to the Cerema, with the support of the Gustave Eiffel University and the company Ergo-Centre, by the French delegation for road safety.

The focus was placed on four complementary areas: tracking of accident rates, tracking of acceptance, behavioral analysis and training in legal lane splitting within the framework defined by the experiment. Data from the second assessment are currently being collected and analysed, first results are presented at the conference.

### Keywords

Road safety; lane splitting; powered Two-Wheeler

## Introduction

Lane splitting (LS) describes when Powered two-wheelers (PTW) drive between two vehicles heading in the same direction. It is most often the consequence of an increase in the number of PTW in increasingly congested traffic. This practice has been commonplace for many years despite being illegal.

In November 2012, following an information report by the parliamentary group for the causes of road traffic accidents, published on 19 October 2011 (Jung, 2011), Régis Guyot realized a report concerning the feasibility on lane splitting for motorcycles (Guyot, 2012). The report concluded that “it seems possible and even preferable to acknowledge it, regulate it, and teach it”.

Thus, from 01/02/2016, in application of French Decree 2015-1750, the first legal lane splitting (LLS) experiment was launched. The results of the first evaluation were generally positive but not good enough overall to consider the first experiment as a success. In order to facilitate the decision making of implementing LLS, a second experiment started since 01/08/2021.

This presentation will summarize the methodology of the first experiments and its results, the reasons that led the decision-makers to conduct a second experiment and the first available results of the second experiment.

## Methodology 1<sup>st</sup> experiment

### Differentiation between LLS and ILS

In France, the first experiment started by creating a distinction between legal lane splitting and illegal lane splitting:

- Legal lane splitting (LLS) can be understood as riding between the two leftmost lanes of motorized vehicles driving in the same direction. For lane splitting to be legal, both PTW and other traffic cannot bypass the speed limit of 50 km/h. LLS can also be realised only on sections of motorway and roads with at least a dual carriageway, with both directions separated by a central reservation and subject to a speed limit of between 70 km/h and 130 km/h.
- Illegal lane splitting (ILS) can be understood as LS that does not comply with at least one of the rules of the experiment (position on the road and/or speed).

### The four sections of the experiment

The experiment was evaluated according to four factors:

- Behaviours observed
- Tracking of accident rates
- Tracking acceptance
- Training in legal lane splitting

	Factor 1 "behaviour"	Factor 2 "accident rates"	Factor 3 "acceptance"	Factor 4 "education"
Means	Observations of PTW behaviour, using CCTV recordings and the analysis/measurement of images manually	Analysis bulletin of road traffic injury accidents (BAAC) and accident reports  <i>Additional study only for Ile-de-France region: RECIF_2020</i>	Online surveys	- Qualitative questionnaires - Quantitative online surveys
Duration	Four-monthly observations, 2x3 hours in the morning rush hour, and 3 hours in the evening rush hour per site (reduced to 2x3 hours in Ile-de-France). Directions of travel observed on a per site basis	Four-monthly and annual analyses	<b>Wave 1</b> 2016 (June 2016) <b>Wave 2</b> 2017 (June 2017) <b>Wave 3</b> 2018 (June 2018)	- 32 to 40 1-1.5 hour interviews per instructor - 2020 - 300 respondents - 2020
Purpose of the Study	<b>10 observation sites</b> in experiment areas: - 3 in Ile-de-France - 2 in Bouches-du-Rhône - 2 in Gironde (+1 site in 2018 <sup>1</sup> ) - 2 in the Rhône  <b>1 control site</b> in Haute Garonne	Departments covered by the evaluation	Populations surveyed: - PTW (and car drivers) - Car drivers only	Populations surveyed: - Driving instructors - Trained riders/drivers

<sup>1</sup> After the Pessac site was expanded to six lanes, the site was no longer congested, and so the conditions required for legal lane splitting were no longer in place as of 2017. As a result, this site was replaced by the Villenave-d'Ornon that still experienced congestion.

	Factor 1 "behaviour"	Factor 2 "accident rates"	Factor 3 "acceptance"	Factor 4 "education"
<b>Indicators observed</b>	For legal lane splitting: <ul style="list-style-type: none"> <li>- speed</li> <li>- positioning</li> <li>- PTW convoys</li> </ul> For illegal lane splitting: <ul style="list-style-type: none"> <li>- positioning</li> </ul>	Number of PTW accidents per: <ul style="list-style-type: none"> <li>- Department</li> <li>- Department legal lane splitting network</li> <li>- Department lane splitting network with PTW practising LLS</li> </ul> Annual density of LLS accidents per route (Ile-de-France)  LLS accident rate	<ul style="list-style-type: none"> <li>- Understanding of the rules</li> <li>- Opinion on relevance of regulations and benefits</li> <li>- Reported behaviours (any changes)</li> </ul>	<ul style="list-style-type: none"> <li>- Reported behaviours (any changes)</li> <li>- Ways of talking about lane splitting</li> <li>- Time spent on topic</li> <li>- Obstacles/difficulties</li> </ul>

### Road networks covered by the evaluation

The LLS experiment was launched in the French departments where the practice was the most widespread: the eight departments that make up the region of Ile-de-France, Bouches-du-Rhône, Gironde, and the Rhône. The department of Haute-Garonne was chosen as the control department.

### Results 1<sup>st</sup> experiment

#### Accident rates

Accident rates for powered two-wheelers (PTW) fell by 10% across France between the initial observation period (2012-2014) and the years in which the experiment was conducted (2016-2018). The mortality rate for PTW, which had been falling in the years preceding the start of the experiment, stabilised at between 734 and 786 users over the course of the experiment. Accident rates for PTW across all experiment areas as a whole (i.e. entire French departments) fell by 10%, while they increased by 12% within the scope of "road networks where experimental lane splitting was permitted", as well as in the control region. This increase must be taken in context, because data tended to stabilise over the course of the experiment.

A sample of around 4500 PTW accident reports taken from the experimental networks was analysed between 2015-2018 (one year before the experiment, and three years after), in order to ascertain the circumstances of each accident involving a PTW. Accidents in which PTW were practising LLS or ILS were as follows: 1650 light accidents, 161 serious, and 16 fatal. Among the 16 fatal PTW accidents, none were riding in compliance with the rules of the LLS experiment in terms of speed and positioning. In 90% of the physical accidents involving PTW practising LLS or ILS that we analysed, the PTW were driving between the two outside lanes (i.e. the lanes stipulated in the experiment). The main contributing factors to accidents that was observed were unexpected changes of lane, or the failure of non-PTW drivers to follow the French highway code, and excessive or inappropriate speed on the part of the PTW riders. In other words, ILS rather than LLS.

Statistical analysis of accidents contained in the national physical accident database for the period covering the experiment reveals that while the number of PTW accidents involving LLS or ILS increased slightly across all experimental networks, the department of Gironde stands out. Indeed, the number of PTW accidents involving LLS or ILS on the experimental network tripled in number from 13 in 2015 to 57 in 2018 (while total PTW accidents on the same network rose from 310 to 480, an increase of 54%). It should be noted that the region recorded a significant increase in road traffic on the ring road, where 90% of PTW accidents occurred. This increase in traffic resulted in an increase in congestion and the number of PTW, and therefore more LLS and ILS.

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## Behaviour

The evaluation compares the behaviour of PTW users in the experiment areas before the experiment (2015) and during the experiment (2016-2018). Behaviours were also evaluated on a control site where LLS was not trialled.

While remaining a minority behaviour, compliance with both speed and positioning rules tended to improve over the course of the experiment. With regard to PTW compliance with speed limits on the lines between the outside lanes, there was a clear general improvement across the ten experimental sites observed across the 11 experimental departments (23% compliance with 50 km/h speed limit for LLS in 2015, and 40% compliance in 2018), as well as on the control site. The speed of PTW drivers was mainly between 41 km/h and 70 km/h, with half of PTW drivers being eligible for speeding tickets (speed in excess of 55 km/h, while French law allows a 5 km/h margin of error).

Compliance with PTW positioning rules was very high (>80%), with little change since the start of the experiment, other than a trend for PTW to move away from the hard shoulder and into the normal lanes or the line between the two outside lanes. When traffic begins to flow once again in Ile-de-France and Gironde many users continue to lane split between the two lanes outside lanes instead of returning to normal lanes or traffic. One explanation for this irregularity may be the fact that traffic remains dense for longer periods in these areas.

## Acceptance

The surveys conducted over the three years of the experiment revealed generally low awareness of the LLS experiment. Over the three years of the experiment, car drivers forgot that the experiment was running, resulting in no changes to their reported behaviour. This observation may be linked to the fact that car drivers did not feel that the experiment affected them, or affected them very little. Two thirds of LV drivers believe that it is the responsibility of PTW riders to change their driving habits. Aggressively moving to stop PTW getting past did not feature in the behaviours reported by car drivers. Answers from participants did not change much over time. Major disparities between regions were revealed: differences in terms of how often PTW riders engaged in LLS or ILS, or in terms of how they practised LLS or ILS. Whatever the case, the principle of LLS remains well-received by both PTW riders and LV drivers.

Data revealed an annual increase in the reported practise of LLS, as well as a regular increase in PTW drivers reporting that they sought eye contact with other drivers on motorways and expressways in the experimental areas. An increase in the use of flashing headlights and hazard lights to signal their presence was also noted in 2018 and, to a lesser extent, use of the horn. In addition to these practices, it appears that PTW riders are in the habit of checking their blind spots and rear-view mirrors, as well as what other drivers are doing in their cars (using the phone, in particular).

## Training in driving school

The study found that in 2016, LLS was covered more frequently in lessons for PTW licenses in the experimental regions than it was in the rest of the country. The vast majority of instructors teaching in the control (89%) and experimental (100%) departments were aware of the regulations and the experiment. Furthermore, in the main and with no differences between the control and experimental regions, they were able to describe the main criteria for legal LLS. Instructors generally reported finding this information via their own personal research (54%). It should be noted that the percentage of instructors that mention lane splitting remains higher in the experimental regions (73%) than in the control region (55%). However, no changes in the training provided since the start of the experiment were revealed. LLS is not practised during PTW lessons for various reasons (lack of CPD for instructors, difficulty performing it safely, very few tools for introducing experimental LLS, etc.). Examples with diagrams, photos, and videos have been created to teach the technique.

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## 2<sup>nd</sup> experiment

### Results of the first experiment contrasted

In the end, the experiment had a positive impact on behaviour, despite compliance with regulations remaining a minority occurrence. It consolidated training, but there remains room for improvement in driving schools. Legal lane splitting by PTW under the rules of the experiment was well-received and clearly understood by light vehicle drivers.

However, accident rates seem to indicate a slight increase in physical accidents linked to legal and illegal lane splitting. In one department in particular, Gironde, physical accidents linked to this particular PTW behaviour tripled on the experimental road networks, as part of a trend of increased PTW accident rates (+54% between 2015 and 2018). Thus a new experiment was decided in order to improve safety for 2PW while doing LSS.

### Rules complementary

The rules of the first experiment were kept with three main changes :

- In addition to the limit of 50 km/h, the 2PW users have to keep a differential speed of maximum 30 km/h. For example If the traffic is entirely stopped, the 2PW can do LSS but must not go over 30 km/h;
- Information boards were added on the roads in order to raise communication and awareness in the different departments where the experiment is taking place;
- Added to the 11 department of the first experiment, 10 new departments were added in the experiment for the practise of LSS.

### Methodology

Concerning the evaluation of the second experiment, the four main part were retained but simplified overall (the behaviour analysis is now partly automated with an application, the accident rates are only looked by the BAAC).

Concerning the tracking of accident rate, in order to strengthen the link between accidents and traffic, in each department there will be analysis of traffic during three to seven days, twice a year.

The second experiment report will also contain a new part: the influence of the police presence. In 3 sites of the experiment, the police shall stay a few hours in order to be seen by users vehicle's in particular 2PW user's. The main objective is to observe the presence of the police will cause change in the behaviours. It will also permit to conclude whether users do not respect the rules because they are not aware of it or because they choose not to respect it.

### First Results

The method used to analyze the video data being different between the first and the second evaluation, the first tests were intended to ensure that comparisons between the data are possible. From the first analyses, it appears that comparisons can be made.

At the time of writing this article, the video analyzes of the observations made for the second experiment are being processed. The first trends could be presented during the conference.

Regarding the part on the analysis of road accidents, tests are in progress to determine whether the comparisons are also reliable.

## Conclusion

The first experiment showed a positive impact on behaviour, despite speed limit that wasn't entirely respected, acceptance, with an increase year by year of the understanding of the rules, judged

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positively, and was taken into account in training school even if there remains room for improvement. However the fact that accidents rates seem to indicate a slight increase in physical accidents linked to LS and ILS, specifically in a department, Gironde, stopped the experiment from being validated. A second experiment is therefore conducted and the first analysis, concerning behaviour, seems to be in adequacy with the previous experiment. The analysis concerning accidents rate is still going on.

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