

**INSTITUT FRANCAIS
DES SCIENCES
ET TECHNOLOGIES
DES TRANSPORTS,
DE L'AMMENAGEMENT
ET DES RESEAUX**

Why conducting In-Depth Naturalistic Riding Study... Examples from Rider Trainees and Novices in France

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IFSTTAR

1. Why iNRS ?

- ♦ General aim of studies : to design counter measures towards road safety improvement
- ♦ Efficient measures : if and only if accepted by road users
- ♦ Accepted measures : acceptable by users (cf. real practices / corresponding to real needs...)
- ♦ Practices / real needs :

Only the driver/rider can explain the motives that under lie his/her decision making process, and the elements of the context they manipulate

observation # understanding
NDS/NRS # iNDS/iNRS



1. The SIM2CO project (2011/13)

- ◆ Supported by the French National Research Agency
- ◆ Partners: IFSTTAR, Universities, Private societies, Riders associations
- ◆ Main goal
 - × *Improving French motorcycle pre-test training*
- ◆ How?
 - × *Identifying the typical hazardous situations of novices after licensing*
 - *Not only accidents (police actions required)*
 - × *Assure that training integrate these problems*



2. Procedure

Longitudinal study
14 430 km /
64 weeks

Novices	H/F	Age	Context	Monitoring	Distance travelled
Novice 1	H	33	Paris Region	11 weeks	3 680 km
Novice 2	H	26	Paris Region	11 weeks	4 100 km
Novice 3	H	24	Paris Region	11 weeks	2 450 km
Novice 4	H	29	Paris Region	8 weeks	300 km
Novice 5	F	26	Provinces	12 weeks	2 300 km
Novice 6	H	30	Provinces	11 weeks	1 600 km
TOTAL				64 weeks	14 430 km



3. Data collection


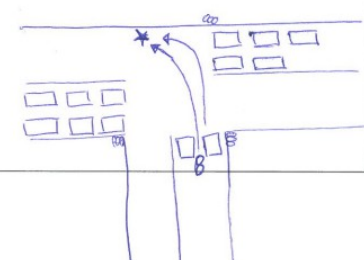
◆ Logbooks

- × Identification of the risky situations for the rider
- × Need to explain the type of situations to be included

SITUATION 5

Date: 05/12/2011
Time: 18h30
Journey: Crossed to my work - the first traffic light after leaving my job.

Description of the situation I am in the center of the two lanes at the red light. At the green light, the car which is at my right corner dangerously to me in the curve. I look at the driver but i am not sure he saw me. I had to swerve.
I was very scared.



3. Data collection

110 hours of recordings

Camera instrumentation



Rider face camera



Right camera



Left camera



Forward camera



Instrumented motorbike



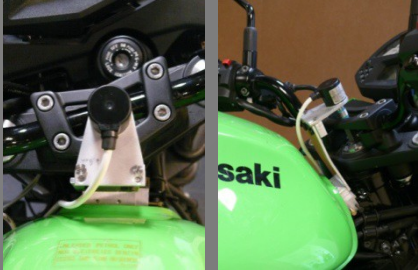
Data logger set in the top case



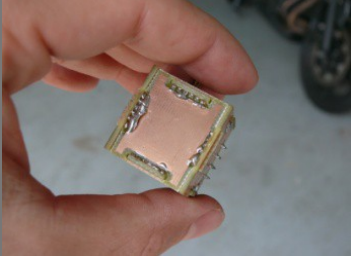
3. Data collection

240 hours of recordings

Instrumentation in sensors/GPS



Steering angle



3 axes accelerations and rotations



Brake contact



Front wheel turns



Data logger / GPS

Turn signal



3. Data collection

49 interviews
23 hours

Interviews

- 1) Description of the situations reported in the logbook
- 2) Self-confrontation interview based on the video

The composite image illustrates the data collection process. It is divided into three main sections:

- Top Left:** A photograph of a researcher and a rider sitting at a desk with a computer. The researcher is pointing at the screen. A label "Researcher" with an arrow points to the man in the plaid shirt. A label "Rider" with an arrow points to the man in the dark shirt. A timestamp "29/07/2010 17:39:48" is visible in the top left corner of the photo.
- Top Right:** A video frame showing a car's rear view from a tunnel. A label "Footage of past riding activity" with an arrow points to the car. Text overlays include "CH2", "LECTURE", "0.0 km/h", and "29-07-2010 14:58:01".
- Bottom:** A close-up photograph of the rider's face and hand. A label "Face and gesture of the rider during the interview" with an arrow points to the rider's hand holding a circular object.

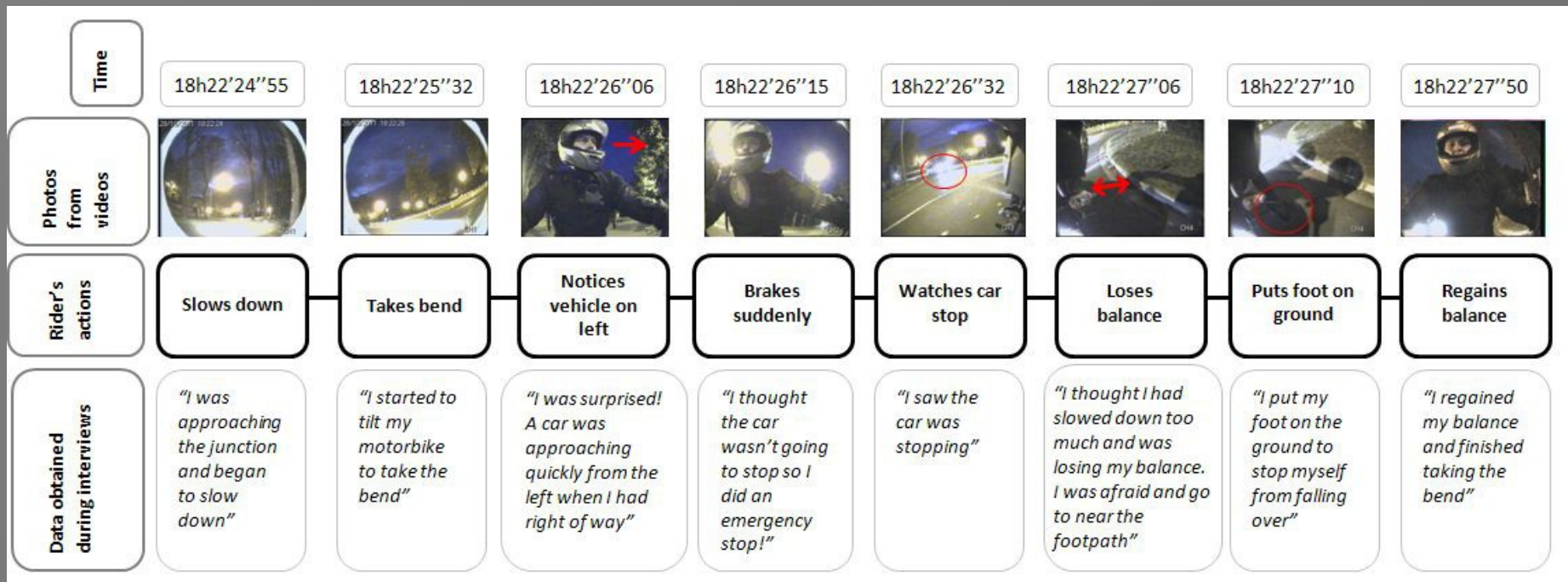
Additional text on the left side of the composite image:

Remote control. Used by the researcher and the rider to stop or wind back the video



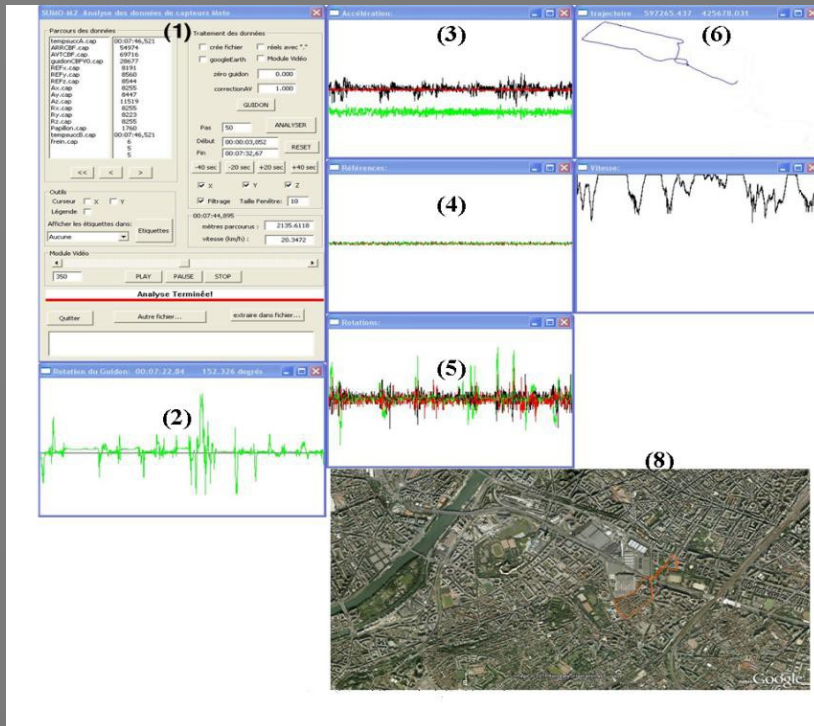
4. Data processing

- Represent the riders' activity in hazardous situations in activity graph thanks to logbooks, videos and interviews



4. Data processing

- ♦ Objective data browsing tools: (a) sensor and GPS data, (b) interface for video recordings viewing
- ♦ These 2 applications are synchronised



(a)



(b)

5. Results

1. Number of risky situations

Participant	M/F	Age	Context	Monitoring	Distance travelled	Number of risky situations
N1	M	33	Paris region	11 weeks	3 680 km	35
N2	M	26	Paris region	11 weeks	4 100 km	48
N3	M	24	Paris region	11 weeks	2 450 km	50
N4	M	29	Paris region	8 weeks	300 km	24
N5	F	26	Provinces	12 weeks	2 300 km	47
N6	M	30	Provinces	11 weeks	1 600 km	44
TOTAL				64 weeks	14 430 km	248

× 4 risky situations per week in average

× 40 risky situations per novice in average



5. Results

2. Dynamics of occurrence of the risky situations

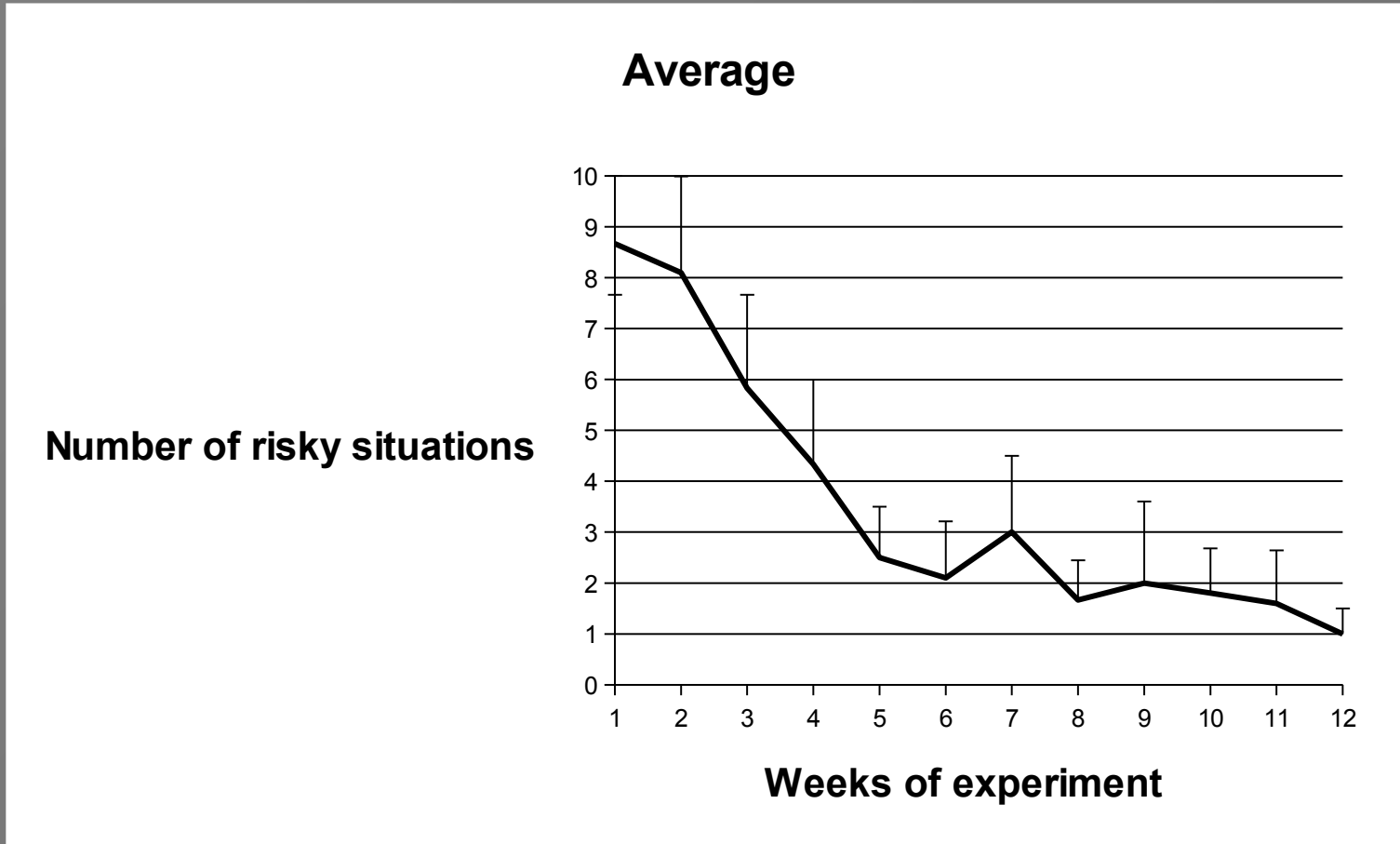
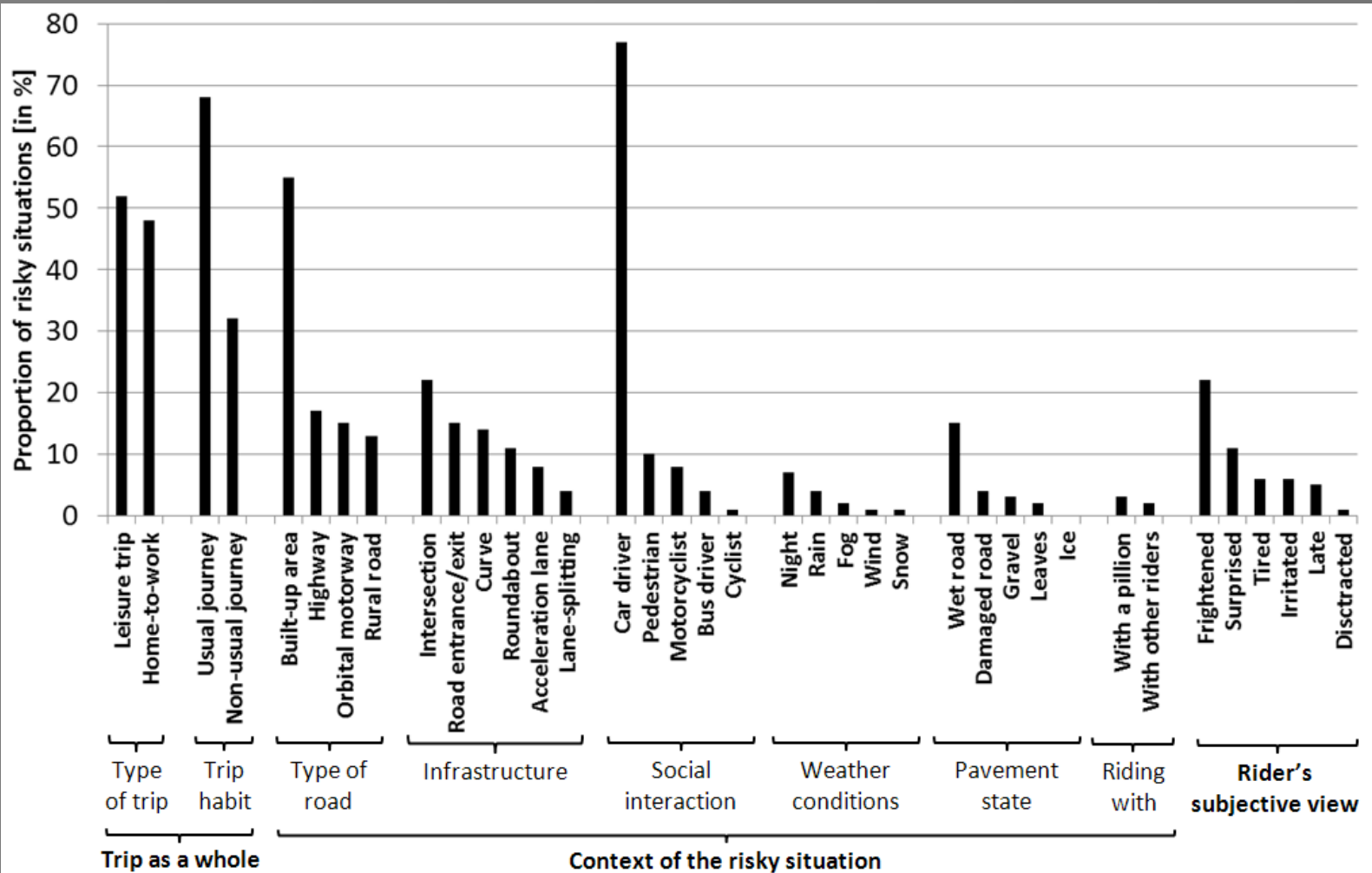


Figure. Mean number of risky situations reported during the experiment
Espie, S., Aupetit, S.



5. Results

3. Context of the risky situations



5. Results

4. Typical incident scenarios

n°	Title of the scenario	#	%
1	Near-miss during lane changing in dense traffic	38	15%
2	Near-miss when another user does not give way at an intersection	32	13%
3	Loss of control on a sharp bend	27	11%
4	Loss of control on a slippery road	25	10%
5	Near-miss after a lane change by a user in front of the rider	23	9%
6	Near-miss after an unanticipated slowing of the traffic	20	8%
7	Near-miss during an overtaking manoeuvre performed by the rider	18	8%
8	Near-miss when the rider does not give way at an intersection	17	7%
9	Near-miss during filtering when a user desires to turn left	17	7%
10	Near-miss while looking for a route in dense traffic	12	5%
11	Loss of control when turning after starting	7	3%
12	Near-miss when another user overtakes the rider on the wrong side	6	2%
13	Loss of control due to wind	6	2%
Total		248	100%



5. Results

5. Identification of drivers' near misses or falls

Audiovisual recordings data

The trainer: "Go faster!"



Slalom



Half-turn

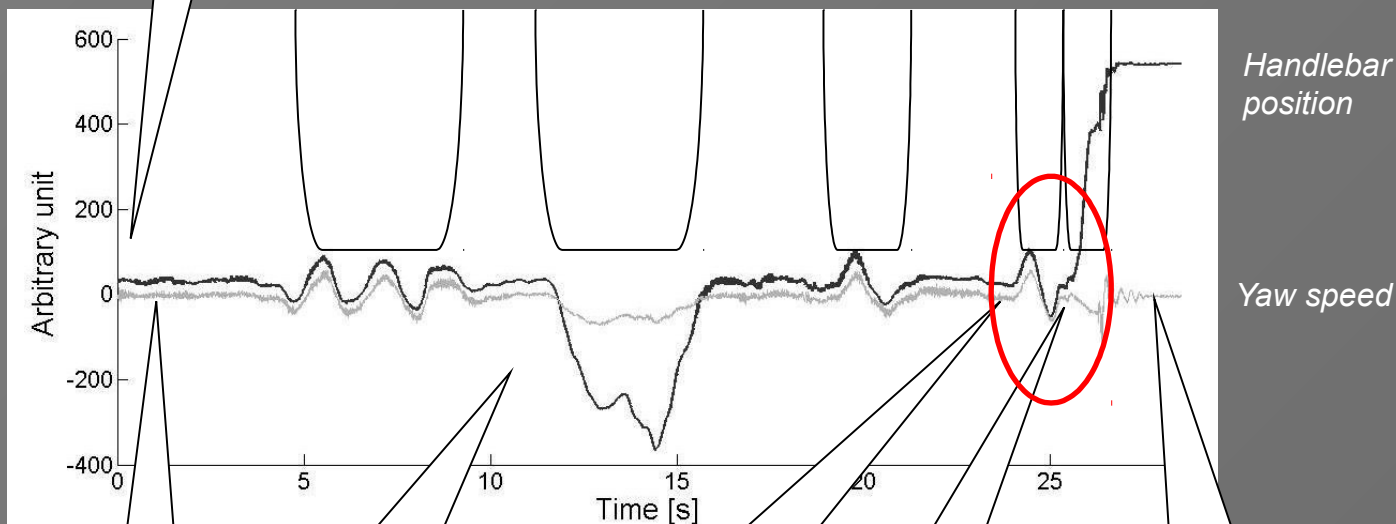


Slalom Avoidance



Fall

Instrumented motorbike data



Handlebar position

Yaw speed

Selfconfrontation interview data

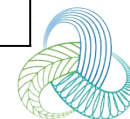
"I was already afraid in the last attempt!"

"Here I am looking at my speedometer,

"I felt that I arrived too fast, I cannot succeed!"

"I could not stop within the limits so I took too early the brake!"

"I was glad to fall! I wanted to fall before licensing to know it!"



To go further...

- Espié, S., Boubezoul, A., Aupetit, S., & Bouaziz, S. (2013). Data collection and processing tools for naturalistic study of powered two-wheelers users' behaviours. *Accident Analysis and Prevention*, 58, 330-339.
- Aupetit, S., Riff, J., Buttelli, O., & Espié, S. (2013). Naturalistic study of rider's behaviour in initial training in France: evidence of limitations in the educational content. *Accident Analysis and Prevention*, 58, 206-217.
- Aupetit, S., Riff, J., Espié, S., & Buttelli, O. (2013). Study in real world environment of the educational content of initial motorcycle training in France. *European Transport Research Review*, DOI 10.1007/s12544-013-0102-4.
- Aupetit, S., Espié, S., Larnaudie, B., Riff, J., & Buttelli, O. (2011). Tools and methodologies for the study of motorcyclist's behaviour in real context. *Advances in Transportation Studies*, 24, 15-22.



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