Secubidi project

Accidents on two-way roads outside built-up areas over the period 2013-2017

Study of issues

Study report, April 2021

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Cerema study report

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Summary of the study :

The purpose of this report is to shed light on accident data for the two-way network outside built-up areas. The period studied covers the years 2013-2017.

CONTENTS

1. Choice of period

In the BAAC file*, the query targets accidents where the location is "outside built-up areas" and the traffic regime is "two-way". The study was carried out using Traxy's SAP module and Concerto for the "alcohol", "drug" and "user factor" queries.

The period 2013-2017 was chosen for 2 reasons:

- From 2018, for accidents occurring outside built-up areas and on non-motorways, the information contained in the BAAC will no longer make it possible to separate with certainty those occurring on dual carriageways from those on two-way roads,
- The announcement of the VMA80 measure from the beginning of 2018 with effective implementation in July 2018. Only 2019 is complete with this VMA (maximum authorised speed) change and then 2020 was disrupted by traffic restrictions imposed by health conditions to combat the spread of COVID19.

2. Trends and percentage of total accidents (mainland France)

Between 2013 and 2017, 56,090 bodily injury accidents occurred on two-way roads outside built-up areas, including 8,745 fatal accidents resulting in 9,579 fatalities.

	Accidents on two-way roads outside built-up areas			Accidents outside built- up areas			All accidents		
	Bodily	Deadly	Fatalities	Bodily	Deadly	Fatalities	Bodily	Deadly	Fatalities
2013	10263	1684	1832	17365	2120	2336	56812	3020	3268
2014	10500	1759	1917	17983	2183	2391	58190	3146	3384
2015	11040	1741	1948	19370	2215	2472	56603	3160	3461
2016	11452	1768	1936	20292	2241	2455	57522	3228	3477
2017	12835	1793	1946	21341	2240	2437	58613	3221	3448
2013-2017	56090	8745	9579	96351	10999	12091	287740	15775	17038

	Share of accidents on two-way roads outside built-up areas / accidents outside built-up areas			Share of accidents on two-way roads outside built-up areas /All accidents		
	Bodily	Deadly	Fatalities	Bodily	Deadly	Fatalities
2013	59%	79%	78%	18%	56%	56%
2014	58%	81%	80%	18%	56%	57%
2015	57%	79%	79%	20%	55%	56%
2016	56%	79%	79%	20%	55%	56%
2017	60%	80%	80%	22%	56%	56%
2013-2017	58%	80%	79%	19%	55%	56%

Over the period 2013-2017, accidents outside built-up areas on two-way roads accounted for one-fifth of all bodily injury accidents and 58% of accidents outside built-up areas.

* BAAC file : french national file gathering road accidents with killed or injured persons on road or street opened to traffic

They account for more than half of all fatalities and four-fifths of fatalities outside built-up areas.

In terms of fatalities, accidents on two-way roads outside built-up areas are the most significant road safety issue, both in terms of general accidents and accidents outside built-up areas. During this period, there were 1,915 deaths per year on average, compared with 2,418 deaths per year for accidents outside built-up areas and 3,407 deaths per year overall.

Between 2013 and 2017, the number of bodily injury accidents on two-way roads outside built-up areas increased by 25% (5 points more than bodily injury accidents on non-two way roads outside built-up areas: 20%), while all bodily injury accidents increased slightly by 3%.

The number of fatalities on two-way roads outside built-up areas rose by 6%, on a par with the overall number of fatalities (7%), while the number of fatalities on roads other than two-way roads outside built-up areas fell by 3%.

The sharp and steady rise in bodily injury accidents (25%) recorded on two-way roads outside built-up areas over the last five years has not been matched by an equivalent rise in the number of fatalities (6%).

3. Accidents outside intersections, at intersections and involving a pedestrian

Accidents on two-way roads outside built-up areas	Bodily	Deadly	Fatalities	BH	Mortality (number fatalities per 100 accidents)
Non-intersection accidents without pedestrians	44171	7250	7989	38950	18
Accidents at intersections with no pedestrians	9764	1052	1136	7814	12
Accidents involving pedestrians	2155	443	454	1378	21
Package	56090	8745	9579	48142	17
Breakdown by type of accident	Bodily	Deadly	Fatalities	BH	
Non-intersection accidents without pedestrians	79%	83%	83%	81%	
Accidents at intersections with no pedestrians	17%	12%	12%	16%	
Accidents involving pedestrians	4%	5%	5%	3%	
Package	100%	100%	100%	100%	
Share of accidents on two-way roads outside built-up areas / accidents outside built-up areas	Bodily	Deadly	Fatalities	BH	
Non-intersection accidents without pedestrians	54%	80%	80%	71%	
Accidents at intersections with no pedestrians	84%	91%	91%	87%	
Accidents involving pedestrians	62%	56%	56%	66%	
Package	58%	80%	79%	73%	

Among accidents on two-way roads outside built-up areas :

- 79% were non-intersection accidents with no pedestrians, accounting for 83% of fatalities.
- These accidents have a high fatality rate (number of fatalities per 100 accidents). They are the most important issue on two-way roads outside built-up areas (almost 1,600 fatalities per year).

- 17% of bodily injury accidents on two-way roads outside built-up areas are accidents without pedestrians at junctions, accounting for 12% of fatalities. These accidents present a lower risk, with fewer fatalities (almost 230 fatalities per year).

- 4% of bodily injury accidents on two-way roads outside built-up areas involve a pedestrian, accounting for 5% of fatalities. These accidents have a higher fatality rate than accidents without pedestrians. However, the accident rate is low (fewer than 100 deaths per year), but the risk to pedestrians is particularly high.

Share of fatal and bodily injury accidents (of each type of accident) on two-way roads outside built-up areas outside built-up areas :

- The proportion (80%) of fatal non-intersection accidents involving no pedestrians is much higher than that for accidents involving bodily injury (54%).
- The proportion (91%) of fatal accidents at intersections with no pedestrians is higher than for accidents involving injuries (84%).
- However, the proportion (56%) of fatal accidents involving pedestrians is lower than that for accidents involving injuries (62%).

4. Non-intersection accidents without pedestrians

4.1. According to the layout on plan

	Bodily injury	Fatal accident	Killed	BH	Mortality	fatal
Curve	17485	2986	3281	15785	19	17%
Straight	24780	4079	4512	21688	18	16%
No information	1904	185	196	1477	10	10%
Package	44171	7250	7989	38950	18	16%

In 4% of cases, the information on the plan layout was not provided.

56% of bodily injury and fatal accidents (56% of fatalities) occur on straight sections. For this type of accident, curves do not appear to be a serious factor.

These bodily injury accidents on two-way roads represent 47% of bodily injury accidents (76% of fatalities) outside built-up areas, outside pedestrian-free intersections and on straight sections.

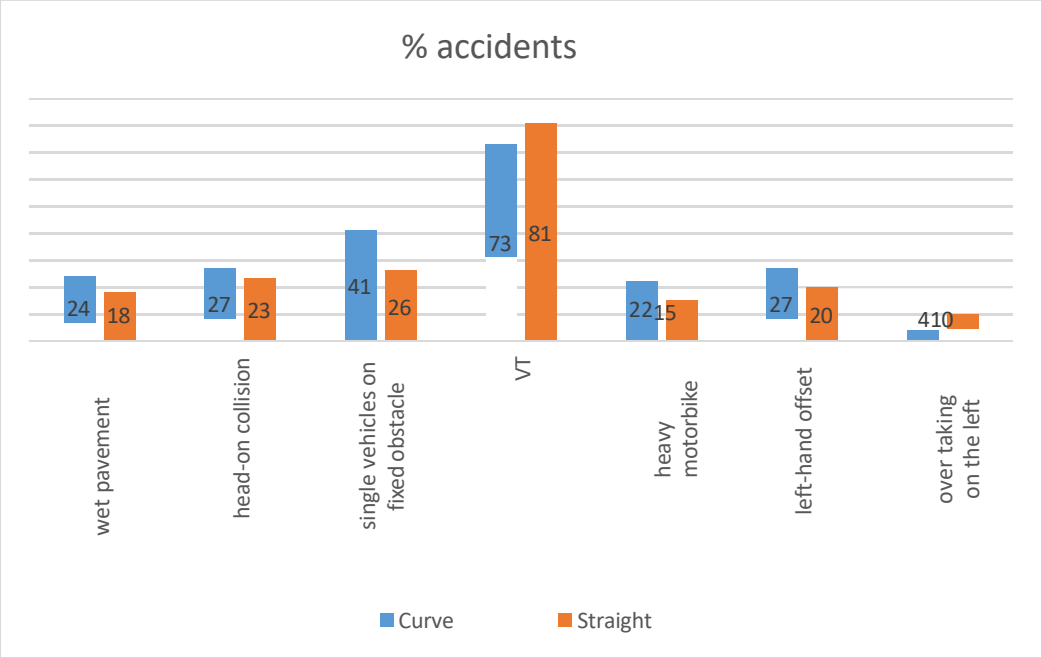
40% of bodily injury and fatal accidents (41% of fatalities) occur on bends. These bodily injury accidents on two-way roads account for 70% of bodily injury accidents (respectively 86% of fatalities) outside built-up areas, outside pedestrian-free intersections and on bends.

Curves are a key factor in accidents on two-way roads outside built-up areas and at intersections where there are no pedestrians, especially if we consider that the length of curves is less than the length of straight sections.

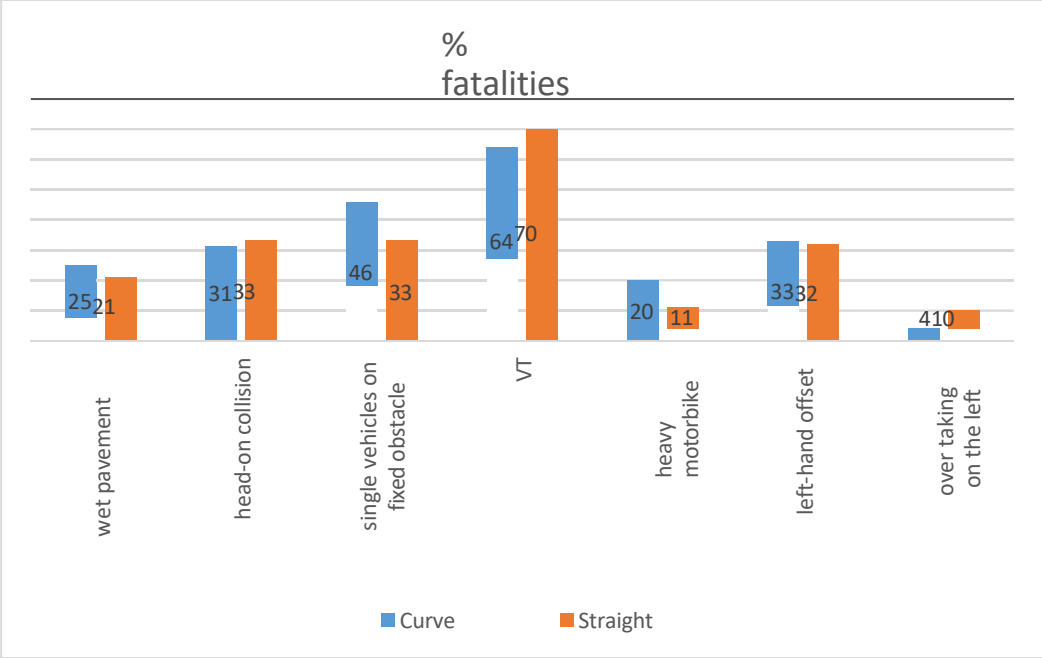
4.1.1. Characteristics of accidents in straight and curved sections

Straight section	Curved
- 33% of bodily injury accidents and 39% of fatalities at night - 18% of bodily injury accidents and 21% of fatalities on wet roads - 23% of bodily injury accidents and 33% of fatalities involve head-on collisions - 26% of bodily injury accidents and 33% of fatalities were caused by a single vehicle hitting a fixed obstacle: 35% of these accidents and 49% of fatalities involved hitting a tree; 32% of accidents and 22% of fatalities involved hitting an embankment, ditch or rock face; 4% of accidents and 2% of fatalities involved hitting a crash barrier. - 81% of bodily injury accidents involve a car and 70% of those killed are car occupants. - 15% of accidents involving bodily injury involve heavy motorbikes and 11% of fatalities are heavy motorbike users. - 20% of bodily injury accidents and 32% of fatal accidents involved a left-hand-drive vehicle - 10% of bodily injury and fatal accidents involve a vehicle overtaking on the left - 10% of bodily injury accidents and 6% of fatal accidents involve a vehicle turning left (presumably towards a local access road). - 20% of bodily injury accidents (alcohol known) and 32% of fatal accidents (alcohol known) involve an alcoholic driver - 11% of bodily injury accidents and 14% of fatal accidents involve a driver who is unwell or tired - 12% of bodily injury accidents and 8% of fatal accidents involve a driver with impaired attention	- 31% of bodily injury accidents and 39% of fatalities at night - 24% of bodily injury accidents and 25% of fatalities on wet roads - 27% of bodily injury accidents and 31% of fatalities involve head-on collisions - 41% of bodily injury accidents and 46% of fatalities were caused by a single vehicle hitting a fixed obstacle: 29% of these accidents and 41% of fatalities involved hitting a tree; 37% of accidents and 27% of fatalities involved hitting an embankment, ditch or rock face; 9% of accidents and 8% of fatalities involved hitting a crash barrier. - 73% of bodily injury accidents involve a car and 64% of those killed are car occupants. - 22% of bodily injury accidents involve heavy motorbikes and 20% of fatalities are heavy motorbike users - 27% of bodily injury accidents and 33% of fatal accidents involved a vehicle off to the left - 4% of bodily injury and fatal accidents involve a vehicle overtaking on the left - 3% of bodily injury accidents and 2% of fatal accidents involve a vehicle turning left - 23% of bodily injury accidents (alcohol known) and 39% of fatal accidents (alcohol known) involve an alcoholic driver - 7% of bodily injury accidents and 7% of fatal accidents involve a driver who is unwell or tired - 9% of bodily injury accidents and 5% of fatal accidents involve a driver with impaired attention - 47% of bodily injury and fatal accidents (on curves) occur on left-hand curves (in the direction of travel of the first vehicle described). assuming that it is generally the vehicle that causes the accident), a

	slightly more frequent than right-hand bends (45% and 43%) On wet roads, the opposite is true, 45% compared with 44% for the bodily injury accidents and 47% compared with 46% for fatal accidents



Read for example: on bends, 24% of accidents occur on wet roads



Read for example: on bends, 25% of fatalities are on wet roads

4.1.2 Main characteristics of accidents on straight sections

900 people are killed every year.

Four-fifths of accidents on straight sections involve a VT.

A third of those killed on straight sections are killed in head-on collisions, i.e. 300 people a year.

Among single-vehicle accidents involving a collision with a fixed obstacle (one-third of fatalities), half are caused by a collision with a tree (150 fatalities per year).

4.1.3. Main characteristics of accidents on curves

650 people are killed every year.

A quarter of all accidents occur on wet roads (around 165 fatalities per year). Transverse acceleration puts pressure on grip.

Almost half of all fatalities are caused by a single-vehicle collision with a fixed obstacle: of these, 41% are caused by a collision with a tree (around 125 fatalities per year).

Two-fifths of fatal accidents involve an alcoholic driver. One-fifth of those

killed were heavy motorbike users.

4.2. According to brightness

	Bodily	Deadly	Killed	BH	Mortality	%mortal
Day	29793	4464	4849	26341	16	15%
Overnight including :	14378	2786	3140	12609	22	19%
EP on	1003	100	106	727	11	10%
EP not lit	181	37	39	126	22	20%
without PE	9720	2016	2300	8791	24	21%
Dusk, dawn	3474	633	695	2965	20	18%
Package	44171	7250	7989	38950	18	16%

67% of bodily injury accidents and 62% of fatal accidents (61% of fatalities) occurred during the day. These bodily injury accidents on two-way roads represent 55% of bodily injury accidents (81% of fatalities) outside built-up areas, excluding intersections with no pedestrians, and during the day.

33% of bodily injury accidents and 38% of fatal accidents (39% of fatalities) occurred at night. These bodily injury accidents on two-way roads account for 53% of bodily injury accidents (77% of fatalities) outside built-up areas, outside pedestrian-free intersections and at night. Given the lower levels of traffic at night, the risk appears to be much greater than during the day.

There are more deaths at night than during the day: 22 fatalities per 100 bodily injury accidents compared with 16. This could be partly explained by the fact that road users drive at higher speeds at night than during the day[1] .

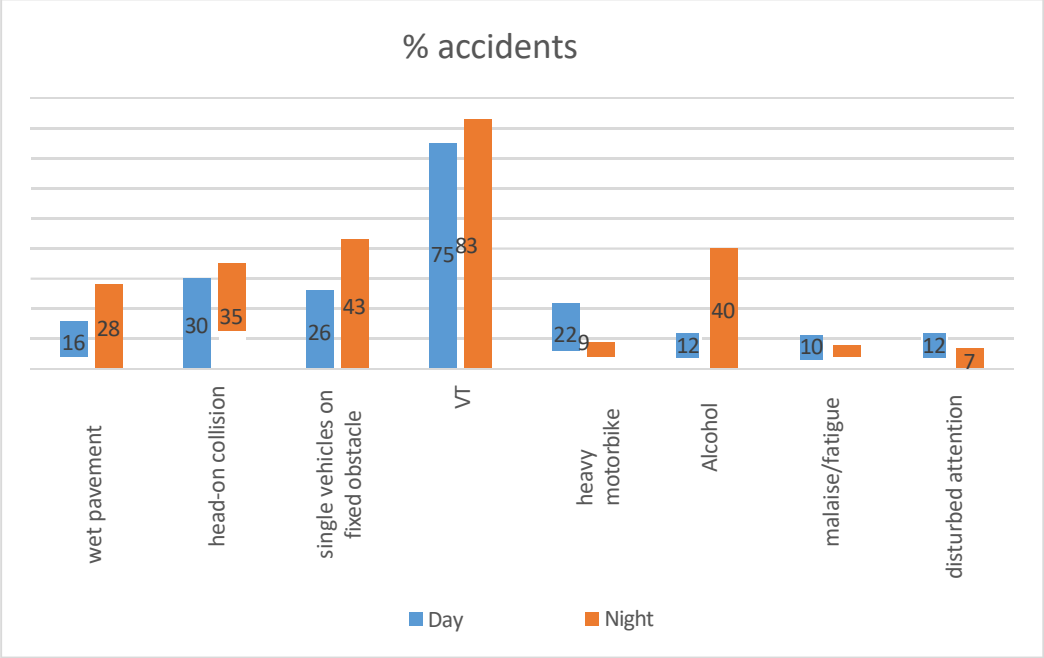
Two-thirds of night-time accidents occur without street lighting (i.e. with or without street lighting). These accidents have the highest fatality rate: 24 deaths per 100 bodily injury accidents. A quarter of night-time accidents occur at dusk or dawn, and 7% of them occur with the roadway lighting switched on.

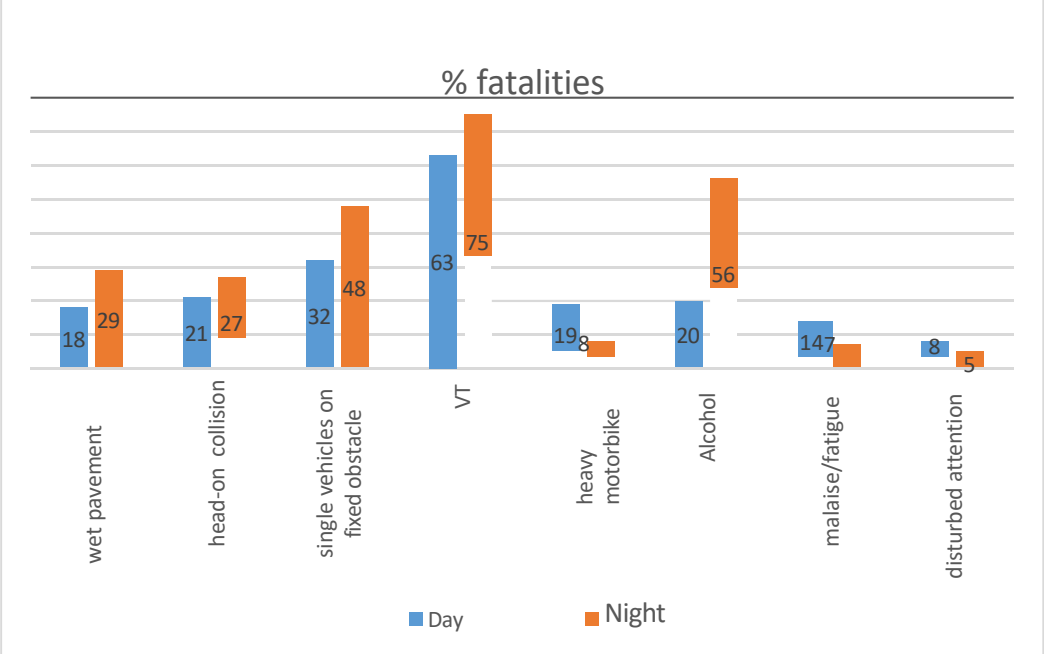
4.2.1. Characteristics of daytime and nighttime accidents

Day	Night
- 16% of bodily injury accidents and 18% of fatalities on wet roads - 40% of bodily injury accidents and 41% of fatalities on bends - 30% of bodily injury accidents and 35% of fatalities are caused by head-on collisions - 26% of bodily injury accidents and 32% of fatalities were caused by a single vehicle hitting a fixed obstacle: among these accidents, 30% of accidents and 43% of fatalities involved hitting a tree; 37% of accidents and 27% of fatalities involved hitting an embankment, ditch or rock face; - 75% of bodily injury accidents involve a car and 63% of those killed are car occupants. - 22% of bodily injury accidents involved a heavy motorbike and 19% of fatalities were heavy motorbike users. - 23% of bodily injury accidents and 34% of fatal accidents involved a vehicle off to the left - 9% of bodily injury accidents and 8% of fatal accidents involve a vehicle overtaking on the left - 9% of bodily injury accidents and 6% of fatal accidents involved a vehicle turning left (presumably towards a local access road). - 12% of bodily injury accidents (alcohol known) and 20% of fatal accidents (alcohol known) involve an alcoholic driver - 10% of bodily injury accidents and 14% of fatal accidents involve a driver who is unwell or tired 12% of bodily injury accidents and 8% of fatal accidents involve a	- 28% of bodily injury accidents and 29% of fatalities on wet roads - 38% of bodily injury accidents and 41% of fatalities on bends - 21% of bodily injury accidents and 27% of fatalities involve head-on collisions - 43% of bodily injury accidents and 48% of fatalities were caused by a single vehicle hitting a fixed obstacle: of these accidents, 34% of accidents and 46% of fatalities involved hitting a tree; 32% of accidents and 22% of fatalities involved hitting an embankment, ditch or rock face; - 83% of bodily injury accidents involve a car and 75% of those killed are car occupants. - 9% of accidents involving bodily injury involve heavy motorbikes and 8% of fatalities are heavy motorbike users. - 22% of bodily injury accidents and 29% of fatal accidents involved a vehicle off to the left - 5% of bodily injury accidents and 6% of fatal accidents involve a vehicle overtaking on the left - 4% of bodily injury accidents and 2% of fatal accidents involve a vehicle turning left - 40% of bodily injury accidents (alcohol known) and 56% of fatal accidents (alcohol known) involve an alcoholic driver - 8% of bodily injury accidents and 7% of fatal accidents involve a driver who is unwell or tired - 7% of bodily injury accidents and 5% of fatal accidents involve a

[1] Course Report: Statistiques appliquées à l'analyse de l'accidentologie de nuit, Typologie et élaboration d'indicateurs de risque en fonction des heures, Application à la Normandie, p76, INSA, CETE NC, 2003

driver with disturbed attention - 36% of bodily injury accidents and 40% of fatal accidents involving a driver with impaired attention occur between 2 p.m. and 6 p.m.	driver with disturbed attention





4.2.2. Main characteristics of accidents day

970 people are killed every year.

One-fifth of daytime accidents involve a heavy motorbike, and one-fifth of fatalities are heavy motorbike users.

One third of daytime accidents are head-on collisions, which means 340 people are killed every year.

Among single-vehicle accidents involving a collision with a fixed obstacle (one third of fatalities, i.e. 310 fatalities per year), 43% of fatalities are caused by a collision with a tree.

4.2.3. Main characteristics of night-time accidents

630 people are killed every year.

Four-fifths of night-time accidents involve a VT.

More than a quarter of all accidents occur on wet roads.

Almost half of all fatalities are caused by a single vehicle hitting a fixed obstacle (300 fatalities per year): of these, 46% are caused by hitting a tree.

56% of fatal accidents involve an alcoholic driver.

4.3. Depending on the condition of surface

	Bodily	Deadly	Fatalities	BH	Mortality	fatal
Normal	32656	5326	5840	28792	18	16%
Wet	8821	1584	1781	7987	20	18%
Icy	760	107	116	604	15	14%
Snow-covered	226	27	32	231	14	12%
Other	823	115	124	663	15	14%
No information	885	91	96	673	11	10%
Package	44171	7250	7989	38950	18	16%

74% of bodily injury accidents and 73% of fatal accidents occurred on normal carriageways. These bodily injury accidents on two-way roads account for 55% of bodily injury accidents (79% of fatalities) outside built-up areas, outside pedestrian-free intersections and on normal carriageways.

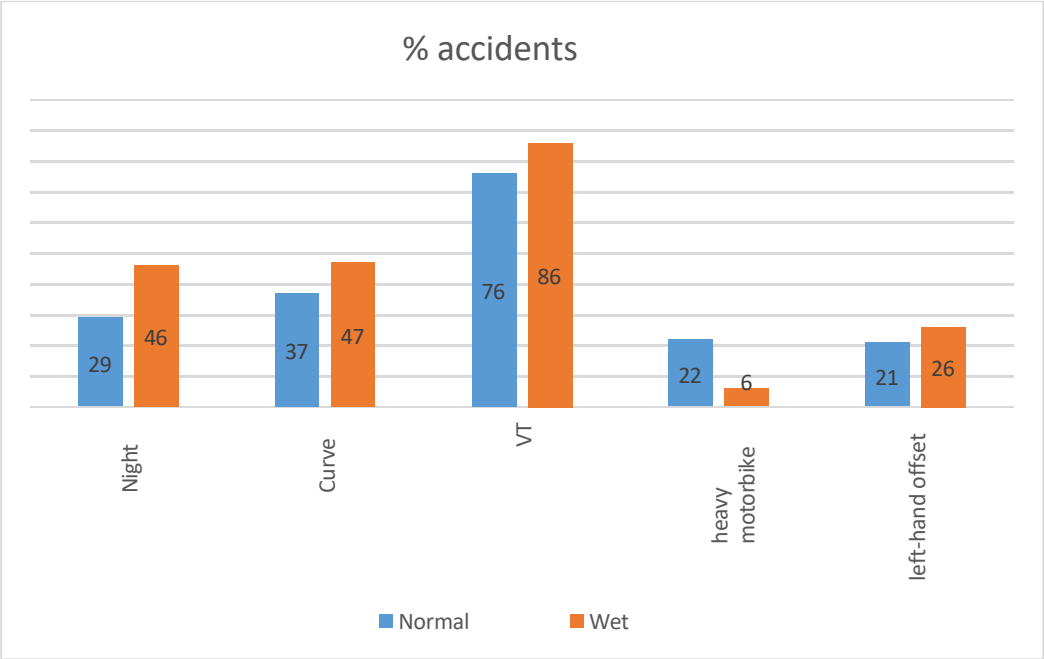
20% of bodily injury accidents and 22% of fatal accidents occur on wet roads. These bodily injury accidents on two-way roads account for 50% of bodily injury accidents (83% of fatalities) outside built-up areas, outside pedestrian-free intersections and on wet roads.

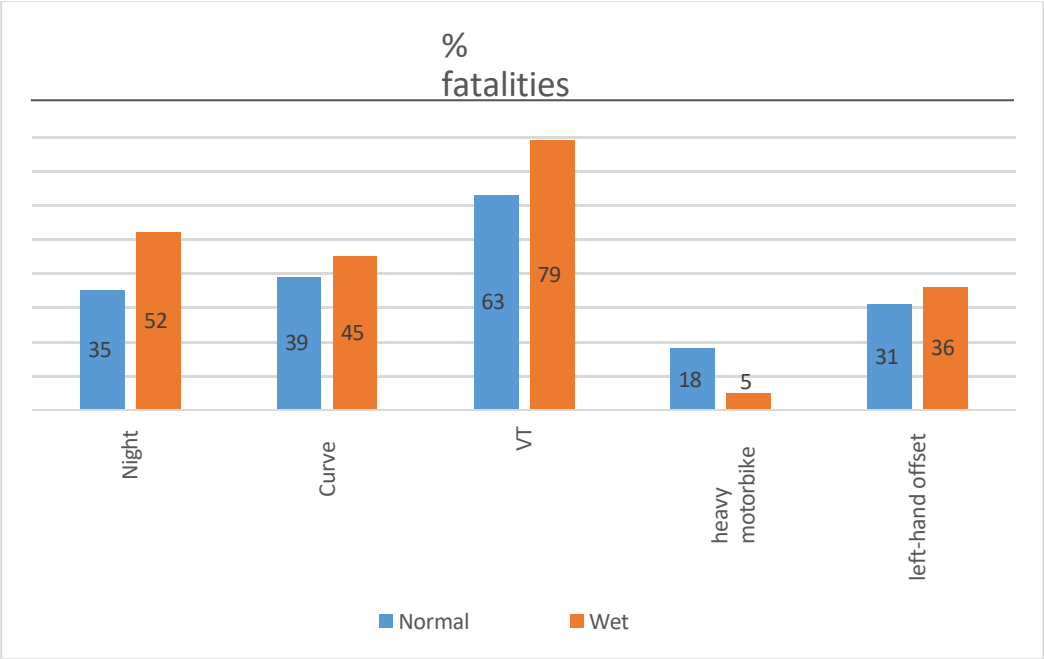
Fatalities on wet roads were slightly higher than on normal roads: 20 compared with 18.

4.3.1. Characteristics of accidents on normal roads and wet roads

Normal	Wet
- 29% of bodily injury accidents and 35% of fatalities at night - 37% of bodily injury accidents and 39% of fatalities on bends - 24% of bodily injury accidents and 32% of fatalities involve head-on collisions - 30% of bodily injury accidents and 38% of fatalities were caused by a single vehicle hitting a fixed obstacle: of these accidents, 30% of accidents and 42% of fatalities involved hitting a tree; 35% of accidents and 25% of fatalities involved hitting an embankment, ditch or rock face; - 76% of bodily injury accidents involve a car and 63% of those killed are car occupants. - 22% of bodily injury accidents involve heavy motorbikes and 18% of fatalities are heavy motorbike users. - 22% of bodily injury accidents and 31% of fatal accidents involved a vehicle off to the left - 9% of bodily injury accidents and 8% of fatal accidents involve a vehicle overtaking on the left - 9% of bodily injury accidents and 5% of fatal accidents involved a vehicle turning left (presumably towards a local access road). - 22% of bodily injury accidents (alcohol known) and 36% of fatal accidents (alcohol known) involve an alcoholic driver - 10% of bodily injury accidents and 12% of fatal accidents involve a driver who is unwell or tired - 12% of bodily injury accidents and 7% of fatal accidents involve a driver with impaired attention	- 46% of bodily injury accidents and 52% of fatalities at night - 47% of bodily injury accidents and 45% of fatalities on bends - 27% of bodily injury accidents and 34% of fatalities involve head-on collisions - 38% of bodily injury accidents and 38% of fatalities were caused by a single vehicle hitting a fixed obstacle: 36% of these accidents and 52% of fatalities involved hitting a tree; 33% of accidents and 22% of fatalities involved hitting an embankment, ditch or rock face; - 86% of bodily injury accidents involve a car and 79% of those killed are car occupants. - 6% of accidents involving bodily injury involve heavy motorbikes and 5% of fatalities are heavy motorbike users. - 26% of bodily injury accidents and 36% of fatal accidents involved a vehicle off to the left - 5% of bodily injury accidents and 6% of fatal accidents involve a vehicle overtaking on the left - 4% of bodily injury accidents and 2% of fatal accidents involve a vehicle turning left - 21% of bodily injury accidents (alcohol known) and 33% of fatal accidents (alcohol known) involve an alcoholic driver - 7% of bodily injury accidents and 8% of fatal accidents involve a driver who is unwell or tired - 9% of bodily injury accidents and 5% of fatal accidents involve a driver with impaired attention

Other surface condition details are given in the BAAC but were not included in the analysis because they are not necessarily relevant.





4.3.2. Main characteristics of accidents on normal roadways

1,170 people are killed every year.

One-fifth of accidents involved a heavy motorbike and one-fifth of fatalities were heavy motorbike users

The majority of accidents involve 2 vehicles.

4.3.3. Main characteristics of accidents on wet roads

360 people are killed every year.

More than four-fifths of accidents on wet roads involve a VT.

Two-fifths of those killed were killed when a single vehicle hit a fixed obstacle: 52% of those killed were killed when they hit a tree.

A quarter of all accidents (and more than a third of fatal ones) on wet roads occur when drivers are swerving to the left.

4.4. According to the number of vehicles involved

	Bodily	Deadly	Fatalities	BH	Mortality	fatal
Vehicle only	19686	3396	3576	15725	18	17%
Of which with fixed obstacle	14047	2869	3030	11345	22	20%
2 vehicles	21102	3241	3682	19552	17	15%
Of which with head-on collision	10975	2206	2557	11901	23	20%
> 2 vehicles	3383	613	731	3673	22	18%
Package	44171	7250	7989	38950	18	16%

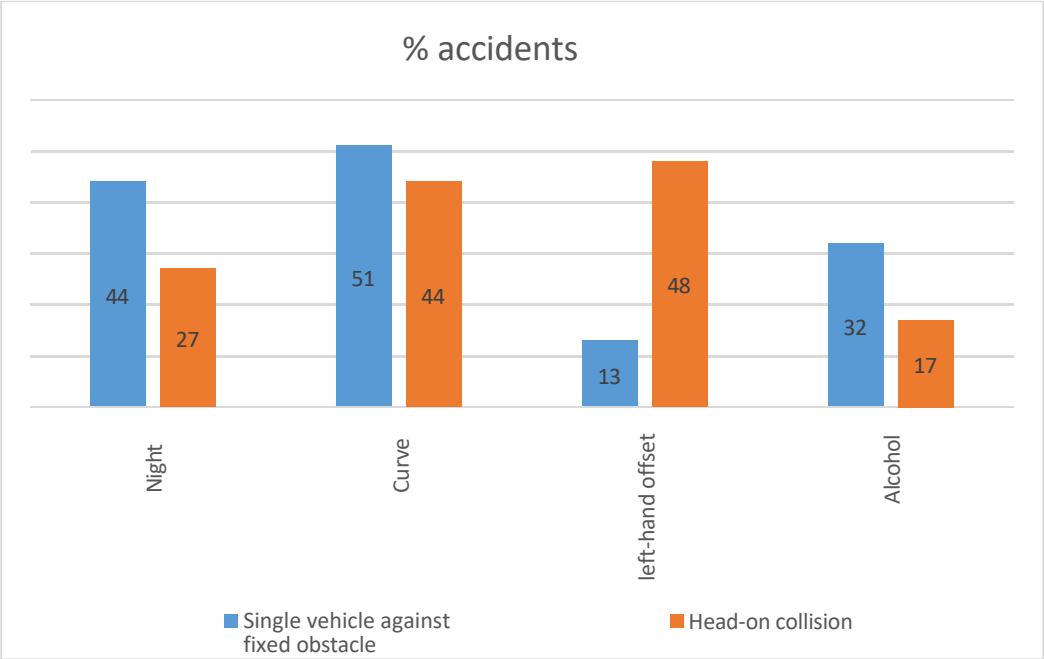
45% of bodily injury accidents and 47% of fatal accidents involved a single vehicle. These accidents involving bodily injury on two-way roads represent 61% of accidents involving bodily injury (81% of fatalities) outside built-up areas, excluding intersections with no pedestrians, involving a single vehicle. In 71% of these accidents and 84% of fatal accidents, the vehicle hit a fixed obstacle.

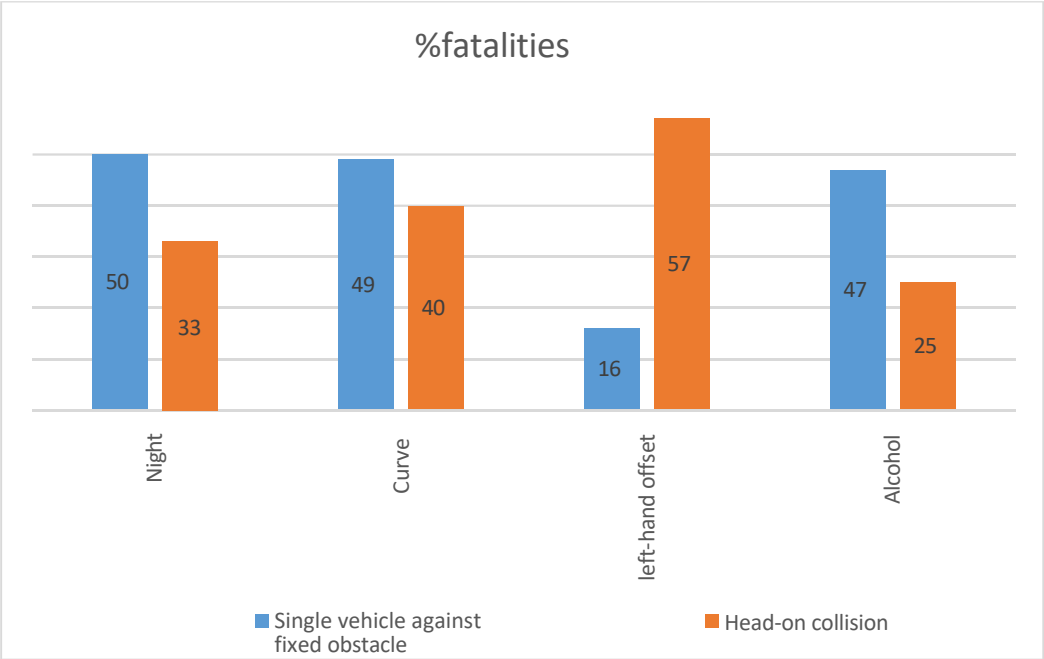
48% of bodily injury accidents and 45% of fatal accidents involved 2 vehicles. These accidents involving bodily injury on two-way roads accounted for 55% of accidents involving bodily injury (82% of fatalities) outside built-up areas, excluding intersections without pedestrians, involving 2 vehicles. Head-on collisions accounted for 52% of these accidents and 68% of fatal accidents.

Accidents involving a single vehicle on a fixed obstacle have a high fatality rate, equivalent to that for head-on collisions. However, the proportion of road users killed is almost double: 14% (3,030 killed out of 20,962 road users involved) compared with 9% (2,557 killed out of 29,734 road users involved).

4.4.1. Characteristics of single vehicle accidents against a fixed obstacle and in a head-on collision

Single vehicle against fixed obstacle	Head-on collision
- 44% of bodily injury accidents and 50% of fatalities at night - 24% of bodily injury accidents and 23% of fatalities on wet roads - 51% of bodily injury accidents and 49% of fatalities on bends - 73% of bodily injury accidents involve a car and 74% of those killed are car occupants. - 12% of accidents involving bodily injury involve heavy motorbikes and 12% of fatalities are heavy motorbike users. - 13% of bodily injury accidents and 16% of fatal accidents involved a vehicle off to the left - 11% of bodily injury accidents and 11% of fatal accidents involved a right-hand-drive vehicle - 32% of bodily injury accidents (alcohol known) and 47% of fatal accidents (alcohol known) involve an alcoholic driver - 11% of bodily injury accidents and 12% of fatal accidents involve a driver who is unwell or tired - 7% of bodily injury accidents and 10% of fatal accidents involve a driver with impaired attention	- 27% of bodily injury accidents and 33% of fatalities at night - 22% of bodily injury accidents and 24% of fatalities on wet roads - 44% of bodily injury accidents and 40% of fatalities on bends - 91% of bodily injury accidents involve a car and 69% of those killed are car occupants. - 14% of bodily injury accidents involve a heavy motorbike and 14% of fatalities are heavy motorbike users. - 48% of bodily injury accidents and 57% of fatal accidents involved a vehicle off to the left - 8% of bodily injury accidents and 9% of fatal accidents involve a vehicle overtaking on the left - 4% of bodily injury accidents and 3% of fatal accidents involve a vehicle turning left - 17% of bodily injury accidents (alcohol known) and 25% of fatal accidents (alcohol known) involve an alcoholic driver - 11% of bodily injury accidents and 12% of fatal accidents involve a driver who is unwell or tired - 12% of bodily injury accidents and 7% of fatal accidents involve a driver with impaired attention





4.4.2. Main characteristics of accidents involving a single vehicle on a fixed obstacle

610 people are killed every year.

Half of those killed are killed at night.

Half of all accidents (half of all fatalities) occur on bends.

A third of accidents and almost half of fatal accidents involve a drink-driver.

Fixed obstacles hit

	Bodily	%	Fatalities	%	Mortality
Tree	4427	32%	1353	45%	31
Ditch, embankment or rock face	4835	34%	736	24%	15
Posts	1319	9%	316	10%	24
Masonry	1332	9%	284	9%	21
Other	1034	7%	170	6%	16
slide	944	7%	153	5%	16
Parking	156	1%	18	1%	12
Fixed obstacle	14047	100%	3030	100%	22

Trees are the most important fixed obstacle in terms of fatalities: almost half of all fatalities, i.e. 270 per year. The fatality rate for accidents involving a tree is particularly high: 9 points higher than for all accidents involving a fixed obstacle. Point obstacles (trees and poles) are the most dangerous obstacles (29 fatalities), with 335 fatalities per year.

4.4.3. Main characteristics of accidents in head-on collisions

510 people are killed every year. 91% of accidents involve a car.

Half of all accidents (57% of fatal ones) involved a vehicle off to the left.

4.5. By category of routes

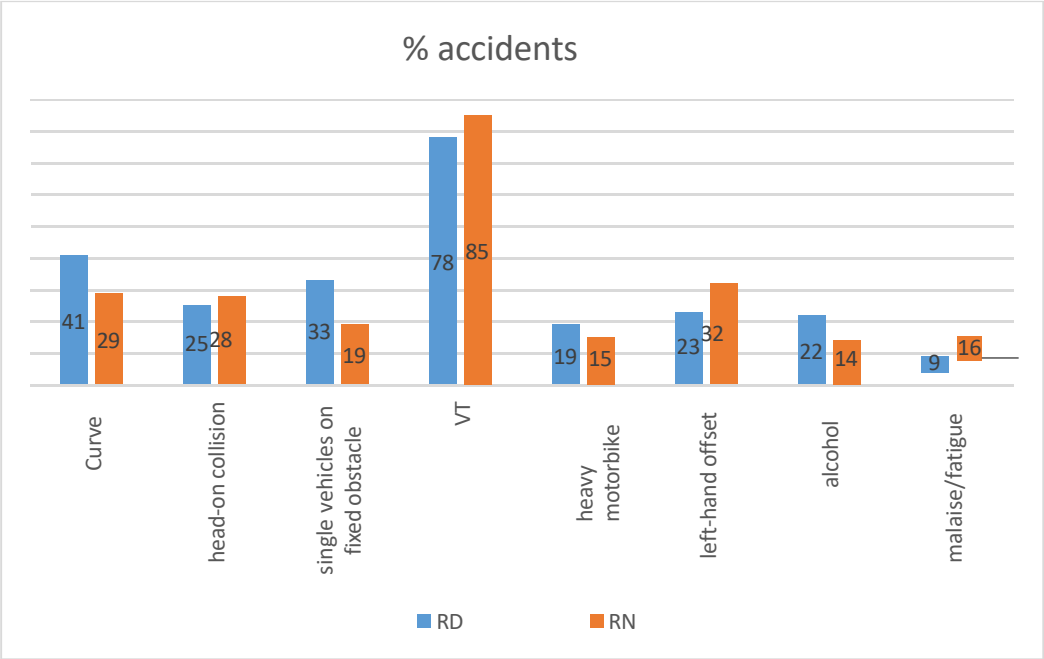
	Bodily	Deadly	Fatalities	BH	Mortality	%mortal
A	344	25	30	184	9	7%
RN	2757	505	615	2624	22	18%
RD	36204	6199	6797	32815	19	17%
VC	4584	482	505	3139	11	11%
Other	634	64	72	372	11	10%
Package	44171	7250	7989	38950	18	16%

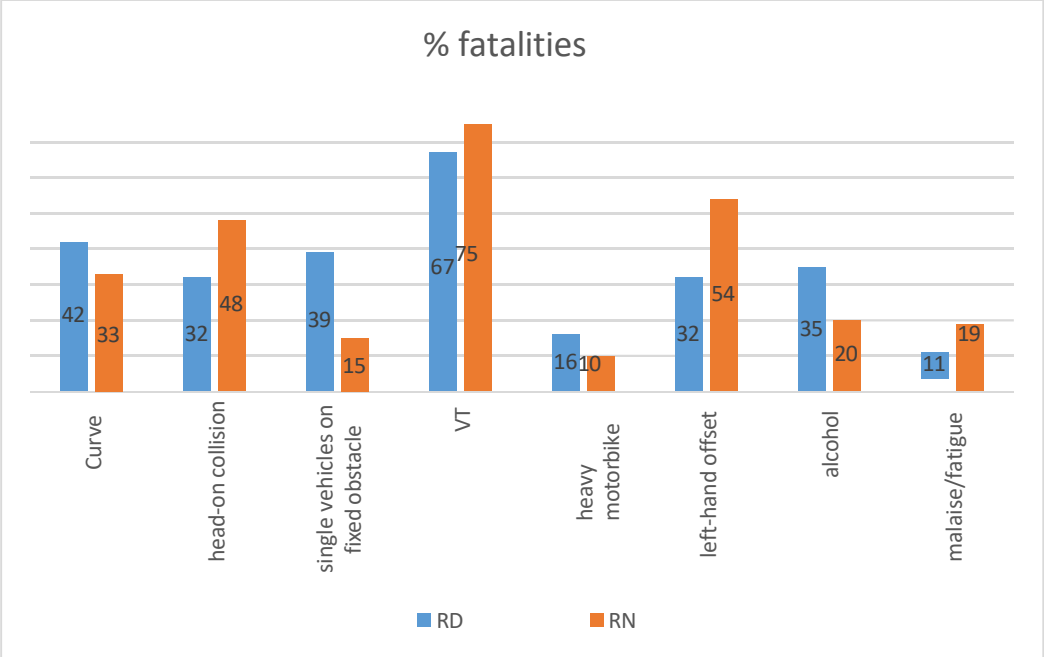
82% of bodily injury accidents and 86% of fatal accidents occurred on departmental roads. These bodily injury accidents on two-way roads account for 88% of bodily injury accidents (93% of fatalities) outside built-up areas, excluding intersections with no pedestrians and on dual carriageways.

Accident fatalities on RNs are three points higher than on RDs and twice as high as on VCs. The length of the RN is much less than that of the RD.

4.5.1. Characteristics of accidents on main roads and on RN

RD	RN
- 33% of bodily injury accidents and 39% of fatalities at night - 20% of bodily injury accidents and 22% of fatalities on wet roads - 41% of bodily injury accidents and 42% of fatalities on bends - 25% of bodily injury accidents and 32% of fatalities involve head-on collisions - 33% of bodily injury accidents and 39% of fatalities were caused by a single vehicle hitting a fixed obstacle: among these accidents, 33% of accidents and 46% of fatalities involved hitting a tree; 35% of accidents and 24% of fatalities involved hitting an embankment, ditch or rock face; - 78% of bodily injury accidents involve a car and 67% of those killed are car occupants. - 19% of bodily injury accidents involved a heavy motorbike and 16% of fatalities were heavy motorbike users. - 23% of bodily injury accidents and 32% of fatal accidents involved a vehicle off to the left - 8% of bodily injury accidents and 8% of fatal accidents involve a vehicle overtaking on the left - 8% of bodily injury accidents and 5% of fatal accidents involve a vehicle turning left - 22% of bodily injury accidents (alcohol known) and 35% of fatal accidents (alcohol known) involve an alcoholic driver - 9% of bodily injury accidents and 11% of fatal accidents involve a driver who is unwell or tired - 11% of bodily injury accidents and 7% of fatal accidents involve a driver with impaired attention	- 32% of bodily injury accidents and 38% of fatalities at night - 22% of bodily injury accidents and 25% of fatalities on wet roads - 29% of bodily injury accidents and 33% of fatalities on bends - 28% of bodily injury accidents and 48% of fatalities involve head-on collisions - 19% of bodily injury accidents and 15% of fatalities were caused by a single vehicle hitting a fixed obstacle: among these accidents, 20% of accidents and 34% of fatalities involved hitting a tree; 19% of accidents and 15% of fatalities involved hitting an embankment, ditch or rock face; - 85% of bodily injury accidents involve a car and 75% of those killed are car occupants. - 15% of accidents involving bodily injury involve heavy motorbikes and 10% of fatalities are heavy motorbike users. - 32% of bodily injury accidents and 54% of fatal accidents involved a vehicle off to the left - 9% of bodily injury accidents and 9% of fatal accidents involve a vehicle overtaking on the left - 7% of accidents involving injuries and 3% of fatal accidents involve a vehicle turning left - 14% of bodily injury accidents (alcohol known) and 20% of fatal accidents (alcohol known) involve an alcoholic driver - 16% of bodily injury accidents and 19% of fatal accidents involve a driver who is unwell or tired - 10% of bodily injury accidents and 6% of fatal accidents involve a driver with impaired attention





4.5.2. Main characteristics of accidents on RD

1,360 people are killed every year.

Two-fifths of accidents (same proportion of fatalities) occur on curves (570 fatalities per year).

A third of accidents (and two-fifths of fatalities) involved a single vehicle hitting a fixed obstacle (530 fatalities).

One-fifth of accidents involved a heavy motorbike, and 16% of fatalities were heavy motorbike users.

A fifth of accidents (a third of fatal ones) involve an alcohol-impaired driver.

Compared with the RN, the percentage of bodily injury accidents involving fixed obstacles and single vehicles is much higher on the RD (33% compared with 19%). In terms of fatalities, the difference is even greater (39% compared with 15%).

4.5.3. Main characteristics of accidents on RN

120 people are killed every year.

Half of those killed were involved in a head-on collision, and half when a vehicle was making a left-hand offset maneuver.

Three quarters of those killed were occupants of a VT.

A fifth of fatal accidents involve a driver who is unwell or tired.

The higher mortality on RN than on RD can be explained by higher mortality on :

- Head-on collision (+14 points)
- Left-hand offset (+11 points)
- Overtaken by the left (+7 points)
- Curve (+7 points)
- Malaise/fatigue (+4 points)

4.6. By type of vehicle

	Bodily	%	Deadly	%	fatal
Bike	2249	5%	330	5%	15%
Moped	2853	6%	252	3%	9%
Light motorbikes	1429	3%	136	2%	10%
Heavy motorbikes	8023	18%	1165	16%	15%
VT	34412	78%	5761	79%	17%
VU	4241	10%	801	11%	19%
PL	3065	7%	932	13%	30%
TC	332	1%	68	1%	20%
other	1438	3%	268	4%	19%
Package	44171	100%	7250	100%	16%

	Passengers in vehicle	%	BH users in vehicle	%	Users killed in vehicles	%	of road users killed
Bike	2450	2%	1571	4%	327	4%	13%
Moped	3275	3%	2087	5%	249	3%	8%
Light motorbikes	1591	2%	1042	3%	132	2%	8%
Heavy motorbikes	9525	10%	6374	16%	1196	15%	13%

VT	68726	70%	24916	64%	5376	67%	8%
VU	6142	6%	1758	5%	376	5%	6%
PL	3556	4%	491	1%	124	2%	3%
TC	1210	1%	98	0%	55	1%	5%
other	1773	2%	613	2%	154	2%	9%
Package	98248	100%	38950	100%	7989	100%	8%

78% of bodily injury accidents and 79% of fatal accidents involved a car. These accidents involving bodily injury on two-way roads represent 53% of accidents involving bodily injury (81% of fatalities) outside built-up areas, excluding intersections with no pedestrians involving a VT.

18% of bodily injury accidents and 16% of fatal accidents involved a heavy motorbike. These accidents involving bodily injury on two-way roads represent 52% of accidents involving bodily injury (77% of fatalities) outside built-up areas, excluding intersections with no pedestrians, involving a heavy motorbike.

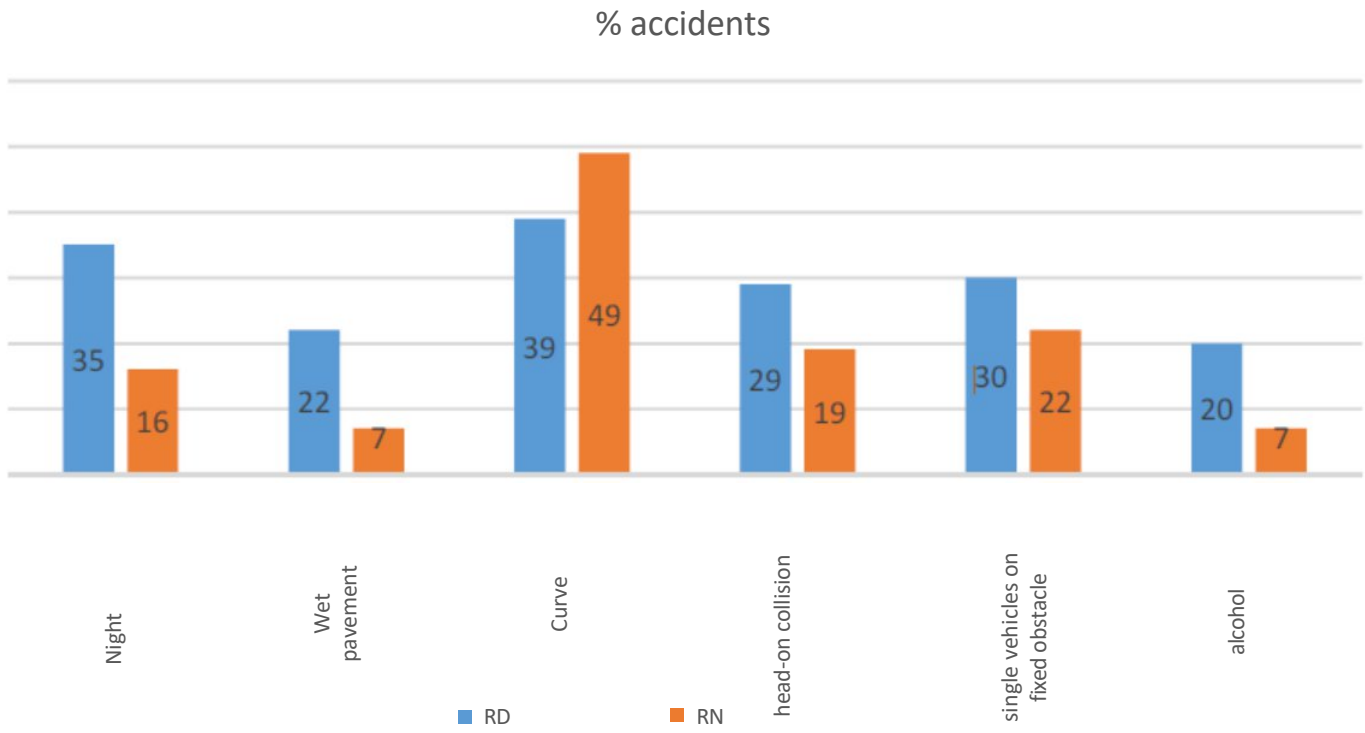
The proportion of road users killed (number of road users killed in one type of vehicle out of the number of road users involved in accidents in that type of vehicle) is highest (13%) for cyclists and heavy motorcyclists, 5 points higher than for all road users.

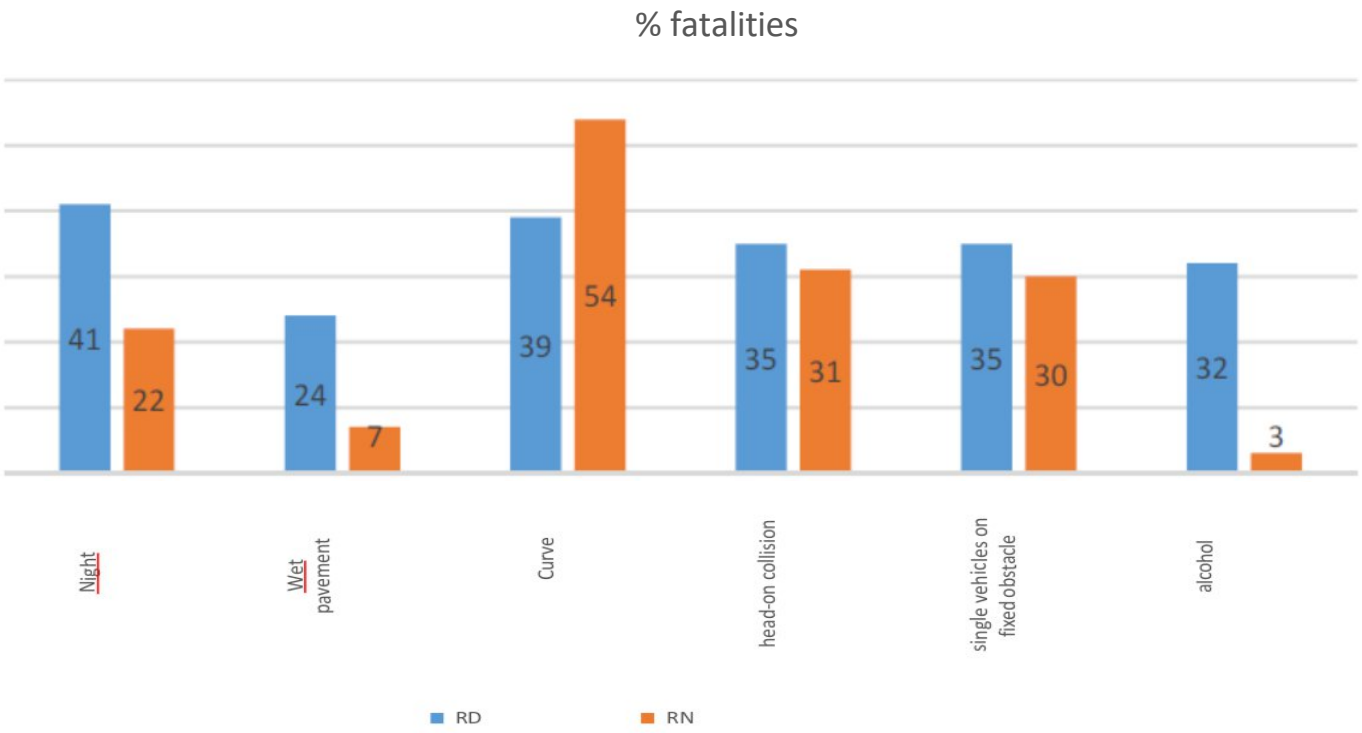
Almost 1 in 3 accidents involving HGVs are fatal.

4.6.1. Characteristics of VT and heavy motorbike accidents

VT	Heavy motorbikes
35% of bodily injury accidents and 41% of fatalities at night - 22% of bodily injury accidents and 24% of fatalities on wet roads - 39% of bodily injury accidents and 39% of fatalities on bends - 29% of bodily injury accidents and 35% of fatalities involve head-on collisions - 30% of bodily injury accidents and 35% of fatalities were caused by a single vehicle hitting a fixed obstacle: of these accidents, 37% of accidents and 51% of fatalities involved hitting a tree; 34% of accidents and 23% of fatalities involved hitting an embankment, ditch or rock face; - 22% of bodily injury accidents and 31% of fatal accidents involved a left-hand drive VT - 4% of bodily injury accidents and 5% of fatal accidents involve a right-hand drive heavy motorbike - 20% of bodily injury accidents (alcohol known) and 32% of fatal accidents (known alcohol) involved an alcohol impaired VT driver 10% of bodily injury accidents and 12%	- 16% of bodily injury accidents and 22% of fatalities at night - 7% of bodily injury accidents and 7% of fatalities on wet roads - 49% of bodily injury accidents and 54% of fatalities on bends - 19% of bodily injury accidents and 31% of fatalities involve head-on collisions - 22% of bodily injury accidents and 30% of fatalities were caused by a single vehicle hitting a fixed obstacle: 11% of these accidents and 19% of fatalities involved hitting a tree; 39% of accidents and 29% of fatalities involved hitting an embankment, ditch or rock face; 11% of accidents and 11% of fatalities involved hitting a metal barrier; - 8% of bodily injury accidents and 10% of fatal accidents involve a heavy motorbike off to the left - 9% of bodily injury accidents and 14% of fatal accidents involve a right-hand drive heavy motorbike - 8% of bodily injury accidents (alcohol known) and 18% of fatal accidents (alcohol known) involved an alcohol impaired driver of a heavy motorbike 1% of bodily injury accidents and 1% of

of fatal accidents involve a VT driver who is unwell or tired - 9% of bodily injury accidents and 6% of fatal accidents involve a VT driver with impaired attention	fatal accidents involve a heavy motorbike driver who is unwell or tired - 2% of bodily injury accidents and 2% of fatal accidents involve a heavy motorbike driver with impaired attention.





4.6.2. Main characteristics of accidents VT

1,075 people are killed every year.

Two-fifths of those killed were killed at night.

One third of fatalities are caused by a single vehicle hitting a fixed obstacle, i.e. 375 fatalities per year. A third of fatal accidents involve an alcoholic driver.

4.6.3. Main characteristics of motorbike accidents

240 people are killed every year.

Half of all accidents (and more than half of all fatalities, i.e. 130 fatalities per year) occur on bends.

4.7. Depending on the presence of alcohol or drugs

	Bodily	Deadly	Fatalities	BH	Mortality	fatal
Alcohol and/or drugs including :	7405	2164	2400	7044	32	29%
Alcohol alone	3478	983	1074	3029	31	28%
Alcohol and drugs	1976	622	707	1898	36	31%
Stup alone	1951	559	619	2117	32	29%
Alcohol-free and stupide-free	17511	1314	1476	15544	8	8%
Package	44171	7250	7989	38950	18	16%

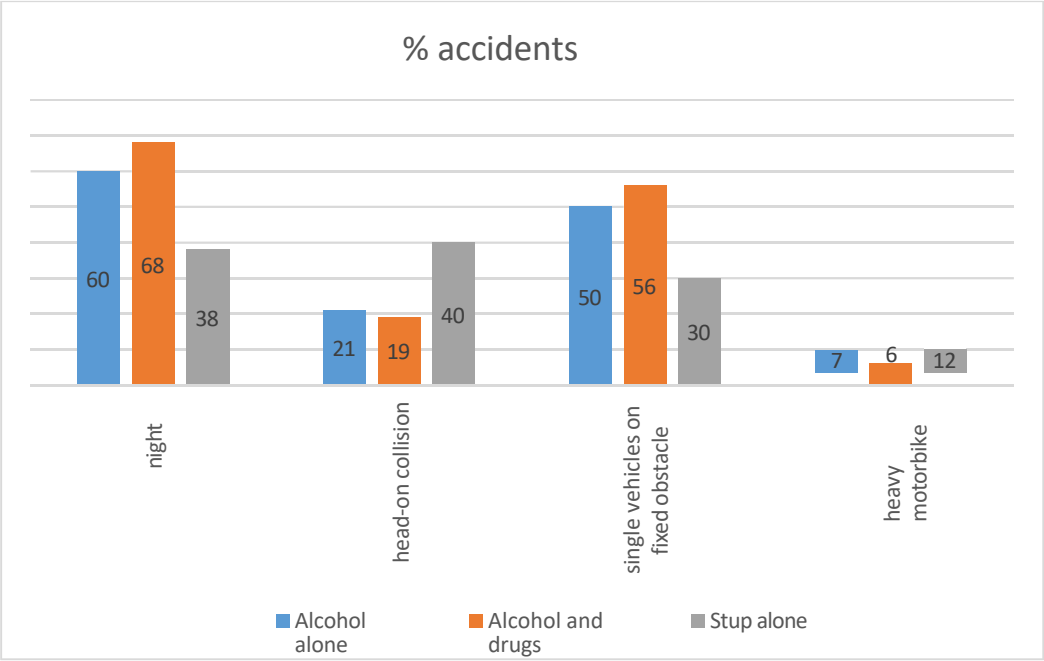
17% of bodily injury accidents and 30% of fatal accidents involved a driver under the influence of alcohol and/or drugs. These bodily injury accidents on two-way roads account for 76% of bodily injury accidents (81% of fatalities) outside built-up areas, excluding intersections without pedestrians, involving a driver under the influence of alcohol and/or drugs.

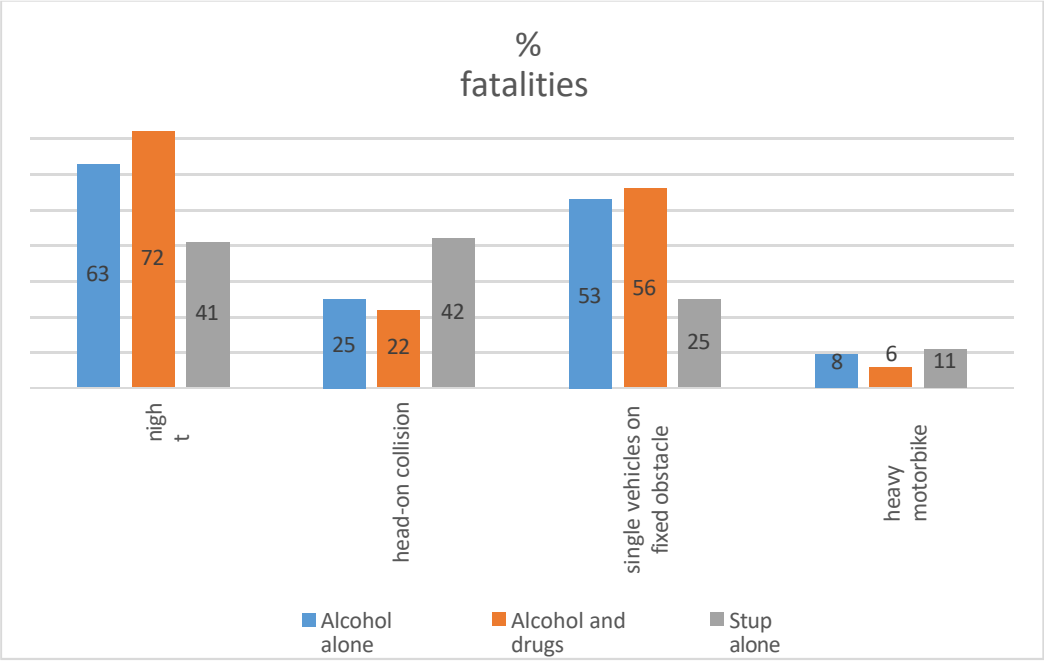
The fatality rate for accidents involving alcohol and/or drugs is almost 4 times higher than for accidents without alcohol or drugs. The fatality rate for accidents involving alcohol and stup is 5 points higher than for accidents involving alcohol alone and 4 points higher than for accidents involving stup alone.

4.7.1. Characteristics of accidents involving alcohol alone, alcohol and drugs and drugs alone

Alcohol-only driver	Driver with alcohol and drugs	Driver with stup only
- 60% of bodily injury accidents and 63% of fatalities at night - 21% of bodily injury accidents and 23% of road deaths wet	- 68% of bodily injury accidents and 72% of fatalities at night - 19% of bodily injury accidents and 20% of road deaths wet	- 38% of bodily injury accidents and 41% of fatalities at night - 20% of bodily injury accidents and 21% of road deaths wet

- 45% of bodily injury accidents and 46% of fatalities on bends - 21% of bodily injury accidents and 25% of fatalities involve head-on collisions - 50% of bodily injury accidents (77% of single-vehicle accidents) and 53% of fatalities (86% of fatalities in single-vehicle accidents) involved a single-vehicle collision with a fixed obstacle: of these accidents, 33% of accidents and 45% of fatalities involved a collision with a tree; 33% of accidents and 27% of fatalities involved a collision with an embankment, ditch or rock face; - 76% of bodily injury accidents involved a VT (driver with alcohol alone) and 78% of those killed were occupants of this VT. - 7% of bodily injury accidents involved a heavy motorbike (driver with alcohol alone) and 8% of fatalities were on this heavy motorbike.	- 45% of bodily injury accidents and 45% of fatalities on bends - 19% of bodily injury accidents and 22% of fatalities involve head-on collisions - 56% of bodily injury accidents (82% of single-vehicle accidents) and 56% of fatalities (89% of fatalities in single-vehicle accidents) involved a single-vehicle collision with a fixed obstacle: 36% of these accidents and 46% of fatalities involved a collision with a tree; 30% of accidents and 21% of fatalities involved a collision with an embankment, ditch or rock face; - 79% of bodily injury accidents involved a DWI (driver under the influence of alcohol or drugs) and 83% of those killed were occupants of that DWI. - 6% of bodily injury accidents involve a heavy motorbike (driver under the influence of alcohol or drugs) and 6% of fatalities are the users of this heavy motorbike.	- 38% of bodily injury accidents and 36% of fatalities on bends - 40% of accidents involving injuries and 41% of fatalities involve head-on collisions - 30% of bodily injury accidents (80% of single-vehicle accidents) and 25% of fatalities (80% of fatalities in single-vehicle accidents) involved a single-vehicle collision with a fixed obstacle: of these accidents, 39% of accidents and 48% of fatalities involved a collision with a tree; 27% of accidents and 20% of fatalities involved a collision with an embankment, ditch or rock face; - 68% of bodily injury accidents involved a single occupant vehicle and 72% of those killed were occupants of that vehicle. - 12% of accidents involving bodily injury involve a heavy motorbike (driver with stupidity alone) and 11% of fatalities are users of this heavy motorbike.
- 24% of bodily injury accidents and 28% of fatal accidents involved a vehicle off to the left	- 24% of bodily injury accidents and 25% of fatal accidents involved a vehicle (driver with alcohol and drugs) in left-hand offset	- 26% of bodily injury accidents and 34% of fatal accidents involved a vehicle (driver with only stup) off-set at left





The characteristics of accidents involving drugs alone are different from those involving alcohol (alcohol alone or alcohol and drugs). The proportion of head-on collisions (twice as high) and accidents involving heavy motorbikes is higher. On the other hand, the proportion of night-time accidents was lower, as were those involving curves and single vehicles hitting a fixed obstacle.

The combination of alcohol and stupidity (36 deaths) is a higher risk of death than alcohol alone (31 deaths) or stupidity alone (32 deaths), which is explained by higher deaths at night, accidents involving a single vehicle hitting a fixed obstacle and accidents involving VTs.

5. Intersection accidents without pedestrians

5.1. Depending on the type of intersection

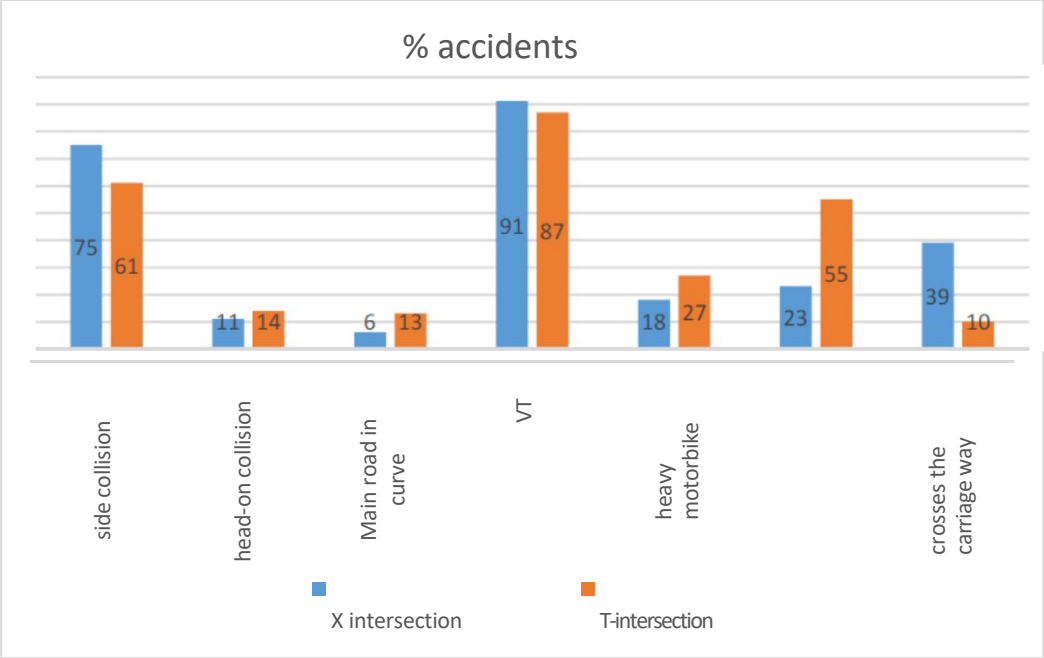
	Bodily	Deadly	Fatalities	BH	Mortality	% fatal
In X	4360	498	549	3786	13	11%
In T	2975	284	296	2233	10	10%
Roundabout	989	77	81	603	8	8%
Other	749	93	98	619	13	12%
Y-shaped	572	70	74	456	13	12%
Level crossing	60	22	30	69	50	37%
+4 branches	52	7	7	47	13	13%
Place	5	1	1	0	20	20%
N/C	2		0	1	-	0%
Package	9764	1052	1136	7814	12	11%

45% of bodily injury accidents and 47% of fatal accidents occur on an X junction.

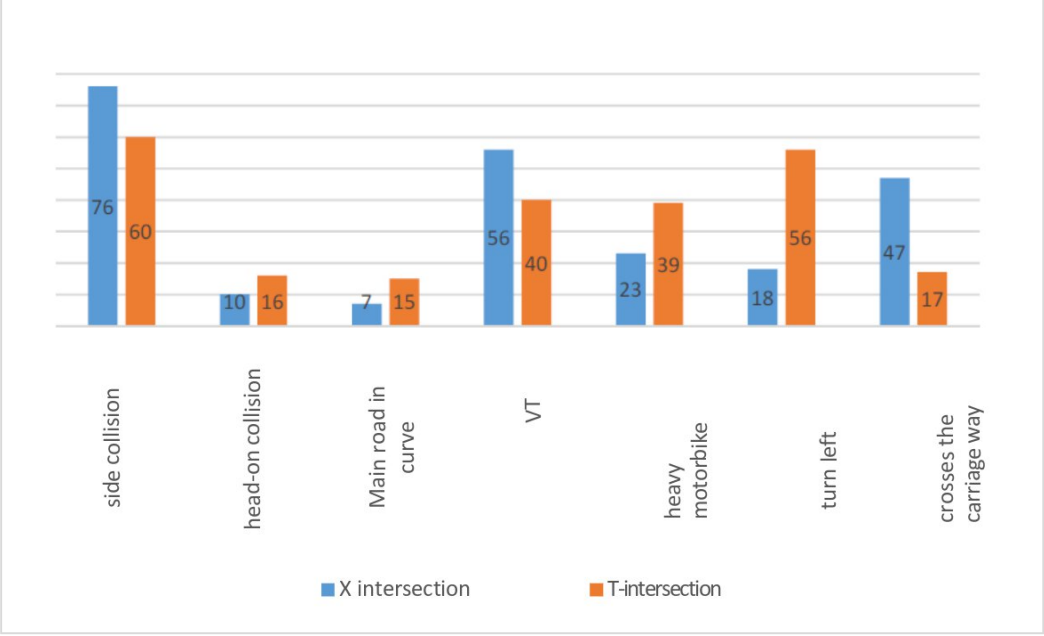
30% of bodily injury accidents and 27% of fatal accidents occur on a T junction.

10% of bodily injury accidents and 7% of fatal accidents occur on a roundabout.

0.6% of bodily injury accidents and 2% of fatal accidents occur on level crossings.



Read for example: 75% of accidents at X junctions are side collisions



Read for example: 76% of accidents at X junctions are side collisions

110 people are killed each year at X intersections and 60 at T intersections.

The proportion of side collisions and road crossings (accidents and fatalities) is higher when the intersection is X-shaped than when it is T-shaped. The opposite is true for head-on collisions and left-turn manoeuvres. This trend seems to be linked to the nature of the intersections studied (more interchange movements at X junctions).

For both X- and T-intersections, the proportion of accidents (and fatalities) when the main road curves is low, but this proportion is twice as high for a T-intersection.

As far as T-junctions are concerned, heavy motorbikes account for a large proportion of the fatalities, especially in terms of fatalities: they account for the same proportion of fatalities as VTs (39% compared with 40%), while VTs account for 87% of accidents compared with 27% for heavy motorbikes.

Depending on brightness

	Bodily				Fatalities			
	In X	In T	Roundabout	other	In X	In T	Roundabout	other
Day	3447	2316	589	1061	424	230	26	140
Night of which	929	672	415	389	130	66	59	72
Night with EP on	142	117	116	58	11	2	15	5
Night without EP (including EP not switched on)	487	336	229	225	77	42	36	48
Dusk or dawn	285	206	55	97	37	22	4	18
Package	4361	2975	989	1441	549	296	81	211

75% (7,413 accidents) of accidents (72% of fatalities) at intersections without pedestrians occurred during the day, except for roundabout accidents. This is 8 points more than for non-intersection accidents without pedestrians and 11 points more for fatalities.

The fatality rate for accidents on an unlit intersection is 16, twice that of accidents on a lit intersection.

Whether it's an X junction, a T junction or a roundabout, there is a higher fatality rate when there is no lighting:

- X: mortality of 8 in the presence of lighting compared with 16 in the absence of lighting.
- T: mortality of 2 in the presence of lighting compared with 12 in the absence of lighting.
- Roundabout: a fatality rate of 13 when there is lighting compared with 16 when there is no lighting.

Accident fatalities on an unlit roundabout are the same as those on an unlit X intersection. However, it is higher on a lit roundabout than on a lit X intersection.

On roundabouts, 40% of fatalities occur at night and 68% of fatalities occur at night:

- 55% of accidents and 61% of fatalities without street lighting,
- 28% of accidents and 25% of fatalities with street lighting switched on.

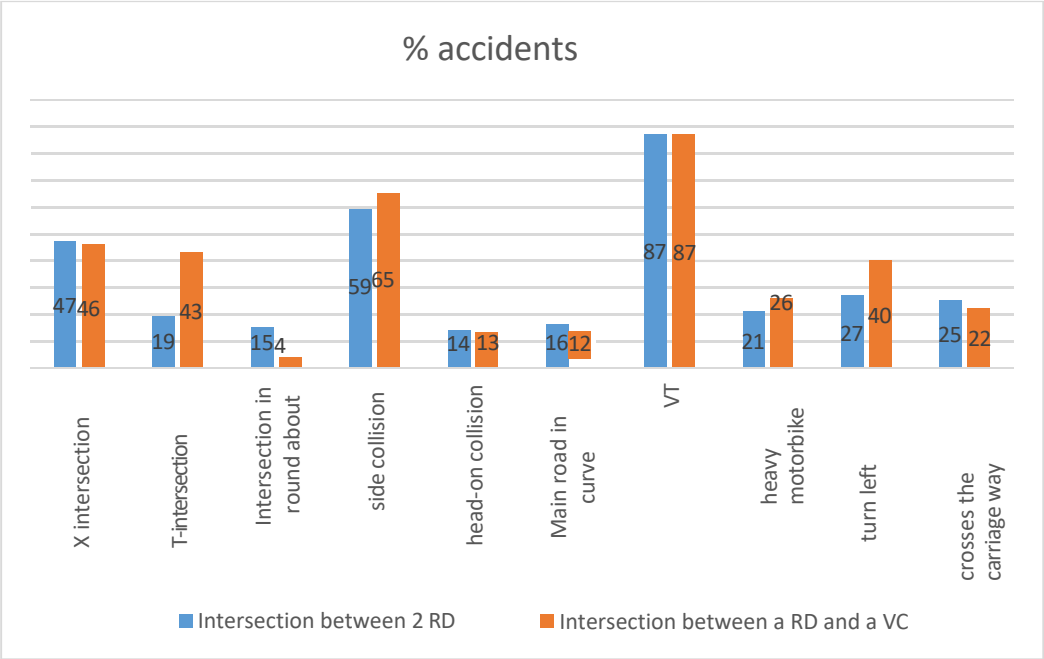
5.2. According to the intersection of roads

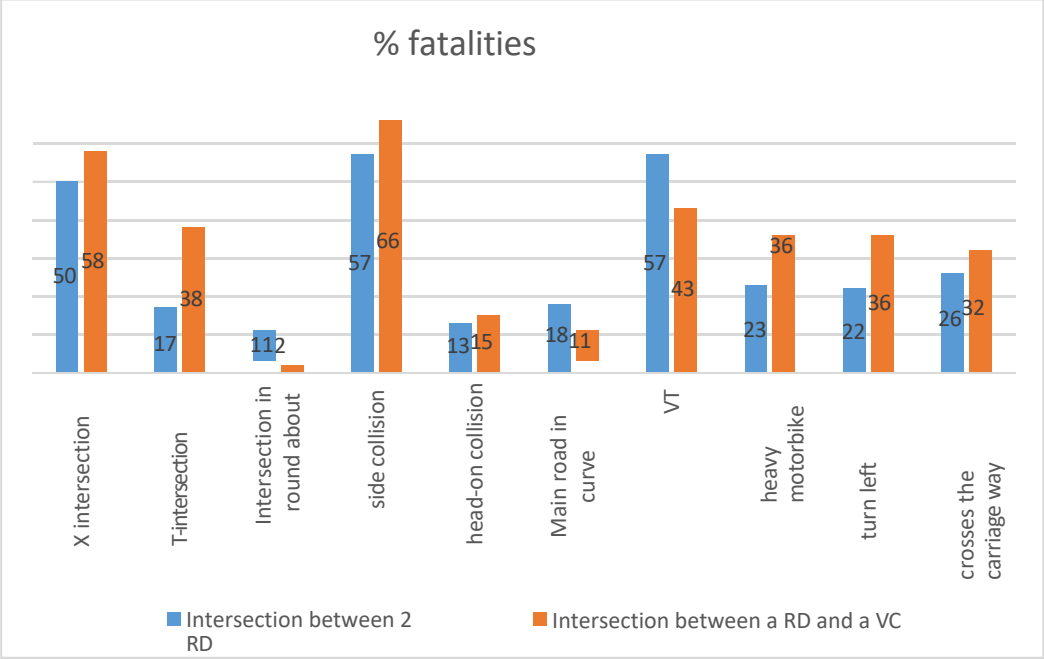
	Bodily	Deadly	Fatalities	BH	Mortality	% fatal
RD-RD	4474	563	513	3978	11	13%
RD-VC	3167	376	399	2503	13	12%
VC-VC	1081	58	63	597	6	5%
RN-RD	292	34	38	227	13	12%
RN-VC	142	11	11	94	8	8%
RN-RN	111	12	12	81	11	11%
Package	9764	1052	1136	7814	12	11%

46% of bodily injury accidents and 54% of fatal accidents occur at an intersection between 2 main roads.

30% of bodily injury accidents and 27% of fatal accidents occur at an intersection between a RD and a VC.

11% of bodily injury accidents and 6% of fatal accidents occur at an intersection between 2 dual carriageways. Fatalities are 2 times lower at these intersections than for all accidents on two-way roads at intersections with no pedestrians.





110 people are killed every year at an intersection between 2 RDs and 75 between an RD and a VC.

The shares of roundabout intersections and curved main roads (accidents and fatalities) are higher when the intersection is between 2 dual carriageways than between a dual carriageway and a dual carriageway, as is the share of fatalities involving users of a motorised vehicle. The opposite is true for the shares of T-intersections, side collisions, heavy motorbikes and left-turn maneuvers (accidents and fatalities), as well as the shares of X-intersections and road crossings for fatalities.

Heavy motorbikes account for a large proportion of the fatalities at intersections between a main road and a minor road, especially in terms of fatalities: the fatality rate is close to that for light vehicles (36% compared with 43%), while the proportion of light vehicles in the accident rate is 87% compared with 26% for heavy motorbikes.

5.3. According to conflict

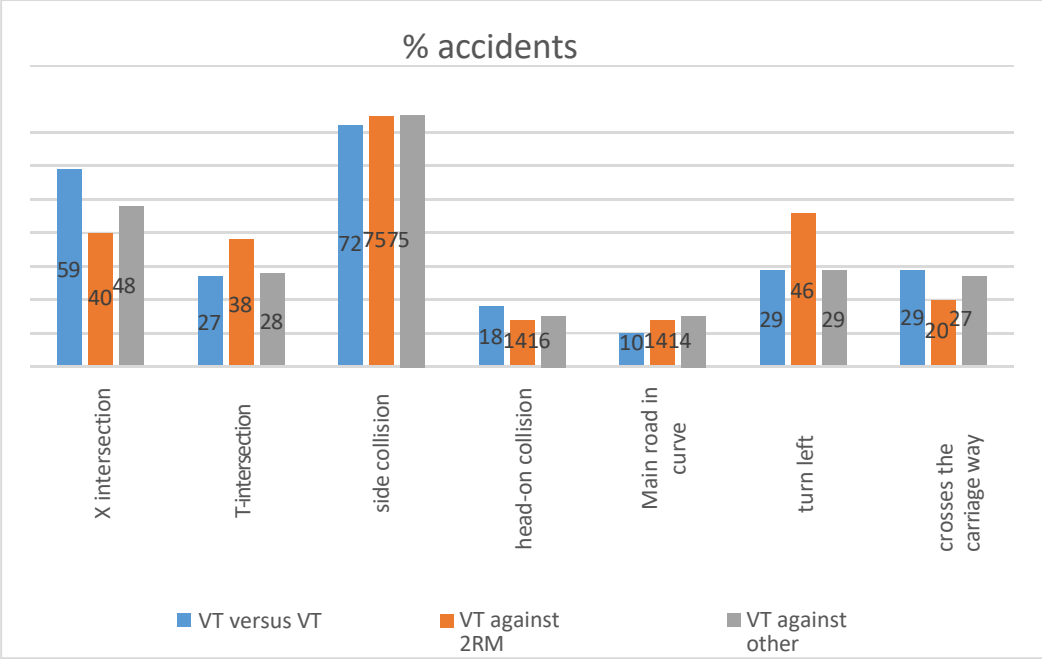
	Bodily	%	Deadly	Fatalities	%	BH	Mortality	% fatal
2 VT-VT vehicles	3185	33%	224	245	22%	2704	8	7%
2 VT-2RM vehicles	2469	25%	232	242	21%	1909	10	9%
a VT against another vehicle (excluding 2WD)	1621	17%	226	249	22%	1230	15	14%
> 2 vehicles	654	7%	76	84	7%	544	13	12%
VT only	560	6%	94	101	9%	445	18	17%
2WD against another vehicle (excluding VT)	538	6%	112	115	10%	388	21	21%
2 RM only	352	4%	41	42	4%	247	12	12%
2 vehicles without VT and without 2WD	240	2%	31	41	4%	218	17	13%
Other single vehicle	89	1%	12	12	1%	62	13	13%
2 vehicles 2WD-2WD	56	1%	4	5	0%	67	9	7%
Package	9764	100%	1052	1136	100%	7814	12	11%

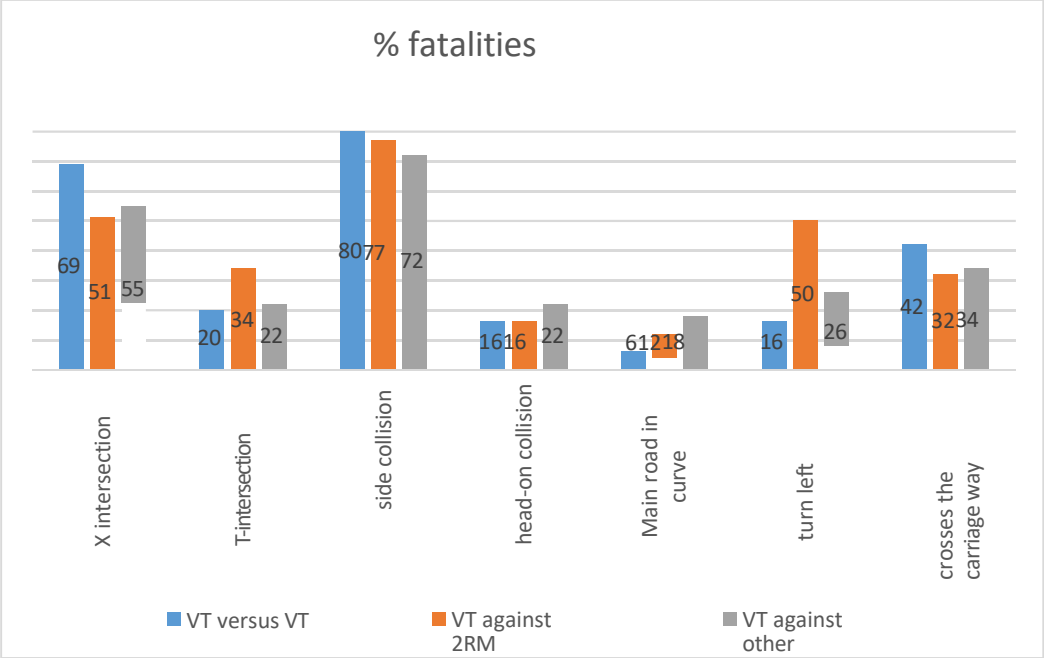
A third of bodily injury accidents and 21% of fatal accidents involve conflicts between 2 VTs.

A quarter of bodily injury accidents and 22% of fatal accidents are conflicts between a motorcycle and 2WD.

17% of bodily injury accidents and 21% of fatal accidents were conflicts between a car and another vehicle (excluding 2WDs).

Fatalities are particularly high for conflicts between 2WD and another vehicle (excluding VT) and VT alone.





50 people are killed every year in conflicts between 2 VTs, between a VT and a 2WD and between a VT and another vehicle.

The proportion of X-intersections and road crossings (accidents and fatalities) is higher when the conflict is between 2 VTs than between a VT and another vehicle.

The proportions of T-junctions and left-turn maneuvers (accidents and fatalities) are higher when the conflict is between a VT and a 2WD.

In terms of conflicts between a car and another vehicle (excluding 2WDs), only curving main roads accounted for the highest proportion of fatalities.

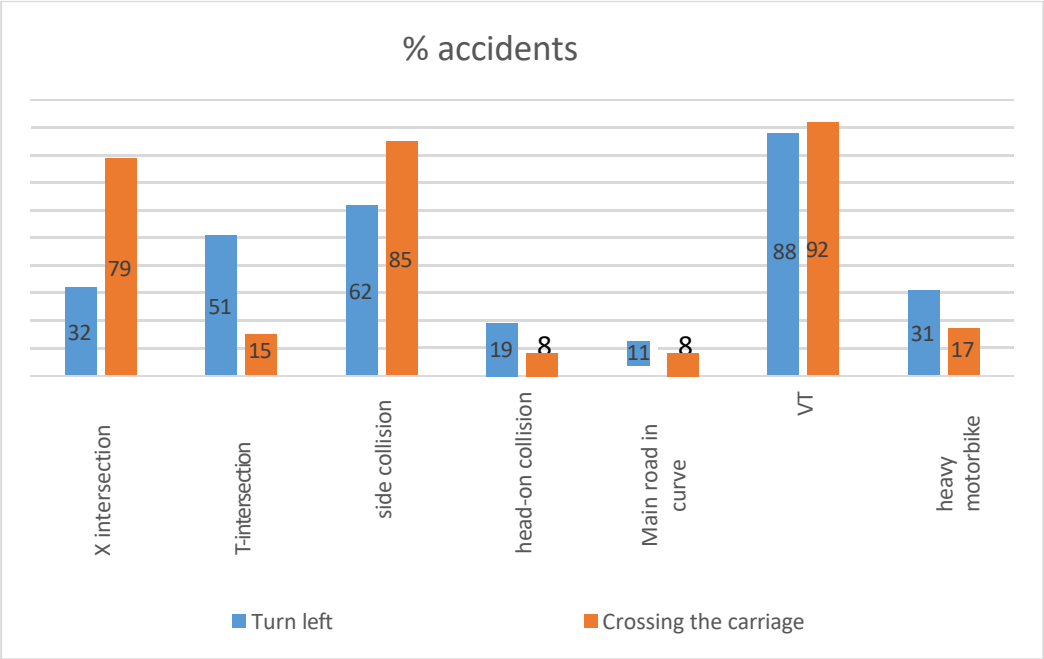
5.4. According to the main maneuver before accident

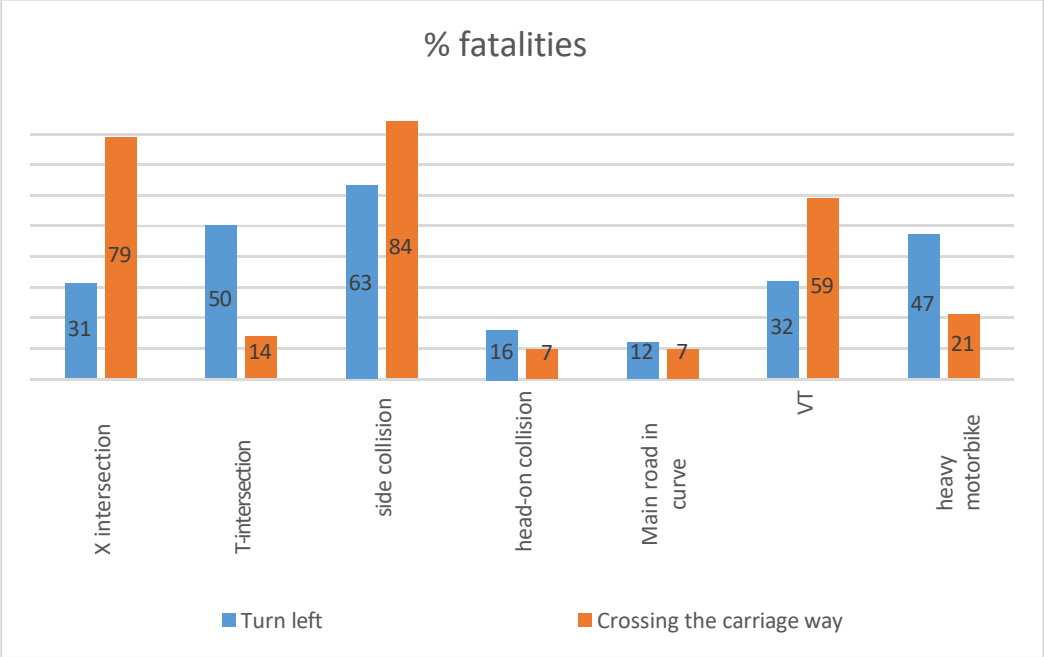
	Bodily	Deadly	Fatalities	BH	Mortality	% fatal
Turn left	3154	312	331	2500	10	10%
Crossing the carriageway	2144	301	327	1960	15	14%
Package	9764	1052	1136	7814	12	11%

A third of bodily injury accidents and 30% of fatal accidents at intersections where there are no pedestrians involve a left-turn maneuver, whether on the main or secondary carriageway.

22% of bodily injury accidents and 29% of fatal accidents involve a vehicle crossing the carriageway.

The fatality rate for road crossings is 50% higher than for left-turn maneuver.





60 people are killed every year when crossing the carriageway or turning left.

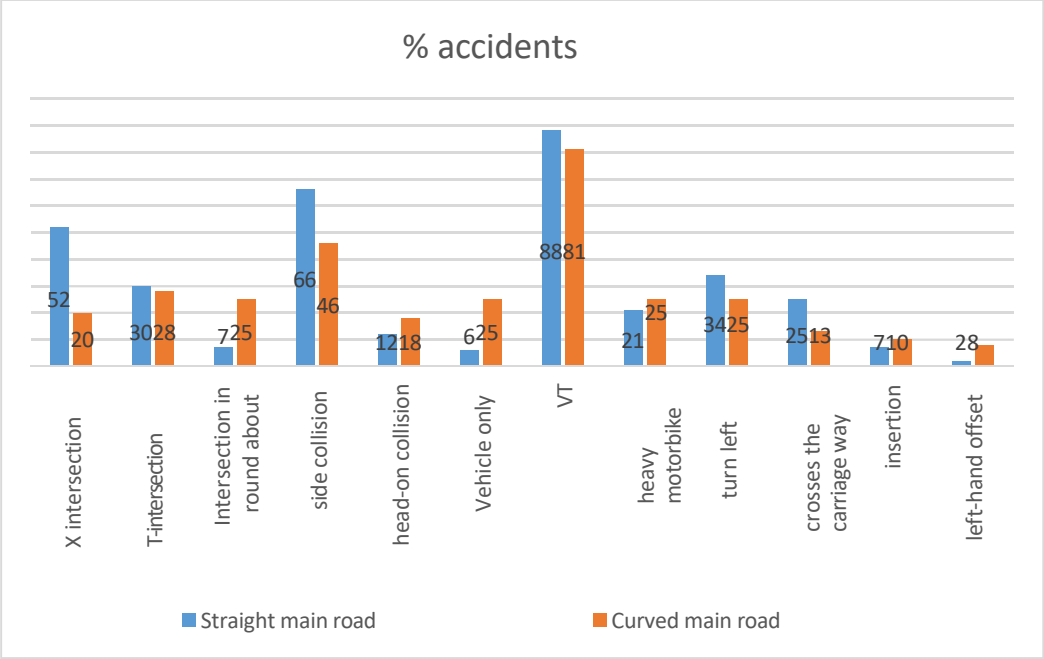
The shares of T-junctions, head-on collisions, curving main roads and heavy motorbikes (accidents and fatalities) are higher when turning left than when crossing the carriageway. The opposite is true for X intersections, side collisions and VTs (accidents and fatalities).

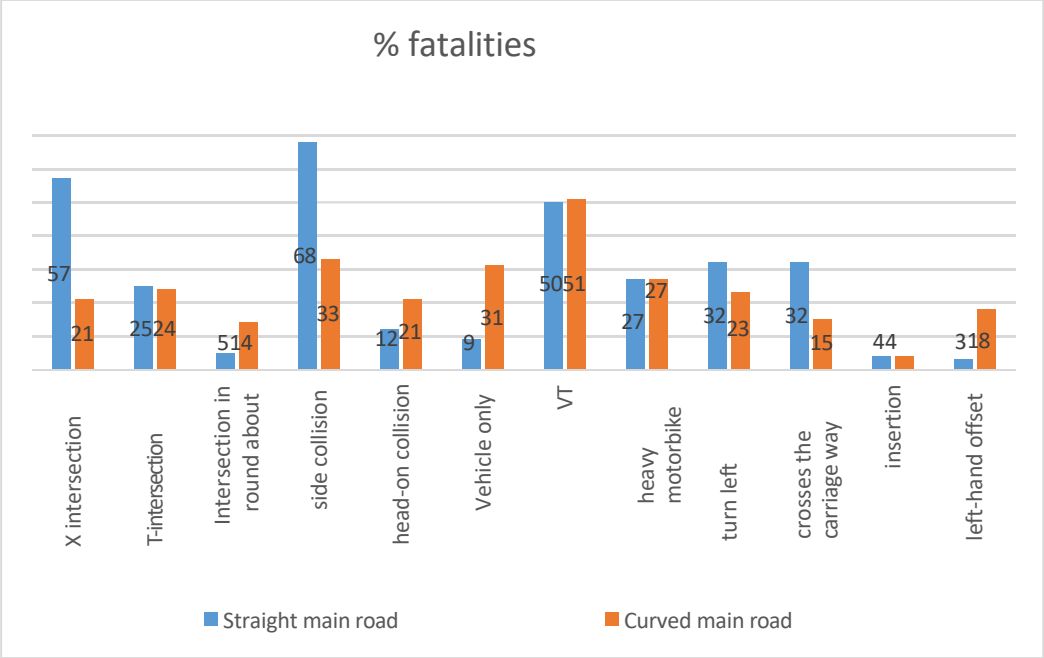
5.5. According to the plan of the main road

	Bodily	Deadly	Fatalities	BH	Mortality	% fatal
Straight main road	6191	670	726	4935	12	11%
Curved main road	1424	165	182	1157	13	12%
Package	9764	1052	1136	7814	12	11%

63% of bodily injury accidents and 64% of fatal accidents at intersections without pedestrians occur on straight main roads.

15% of bodily injury accidents and 16% of fatal accidents at intersections without pedestrians occur on curved main roads.





145 people are killed every year on a straight main road and 35 on a bend.
The most characteristic features of accidents on a curved main road at an intersection without a pedestrian (compared with a straight road) are the proportion of single vehicles (especially for fatalities), the proportion of head-on collisions, the proportion of roundabouts (on curves because of the roundabout) and the proportion of left-hand offsets (especially for fatalities). A large proportion of these accidents on bends appear to be similar in type (loss of control) to accidents on two-way non-intersection roads without pedestrians.

5.6. Alcohol

At intersections with no pedestrians	Accidents	Deadly	Fatalities	BH	Mortality	% fatal
With alcohol	879	159	174	716	20	18%
Unknown alcohol	1020	217	234	771	23	21%
Known alcohol	8742	835	902	7042	10	10%
Alcohol/ known alcohol	10%	19%	19%	10%		

Out of intersection with no pedestrians	Accidents	Deadly	Fatalities	BH	Mortality	% fatal
With alcohol	8248	2023	2233	7394	27	25%
Unknown alcohol	4979	1427	1549	4102	31	29%
Known alcohol	39193	5823	6440	34850	16	15%
Alcohol/ known alcohol	21%	35%	35%	21%		

35 people are killed every year in accidents involving a drink-driver at a pedestrian-free intersection.

The alcohol content of accidents at intersections with no pedestrians is 9 times lower than that of accidents at non-intersections with no pedestrians.

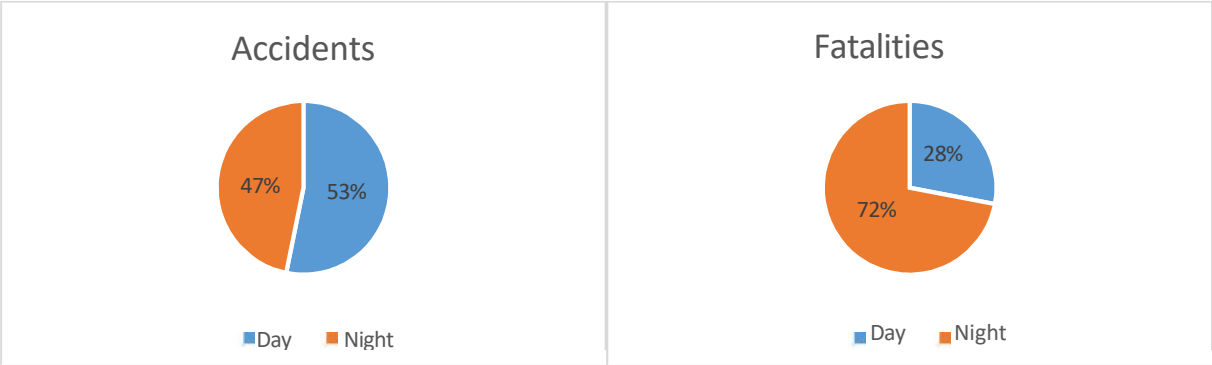
The proportion of alcohol in bodily injury and fatal accidents is half as high in accidents at intersections.

6. Accidents involving a pedestrian

On two-way roads outside built-up areas, 2,155 bodily injury accidents (443 fatal) were recorded, resulting in 454 fatalities including 446 pedestrians (90 per year) and 1,378 accidents with serious injuries including 1,273 pedestrians.

89% of accidents (and 94% of fatalities) occur outside intersections.

6.1. According to brightness



While the majority of accidents occur during the day, three-quarters of fatalities occur at night. 85% of those killed at night are killed without street lighting.

The fatality rate for accidents without street lighting is 40 compared with 16 with street lighting.

Compared with non-intercity and intercity accidents (67% and 76% respectively of bodily injury accidents occurred during the day), bodily injury accidents involving pedestrians occurred much less frequently during the day (53%). On the other hand, fatal accidents are more likely to occur at night.

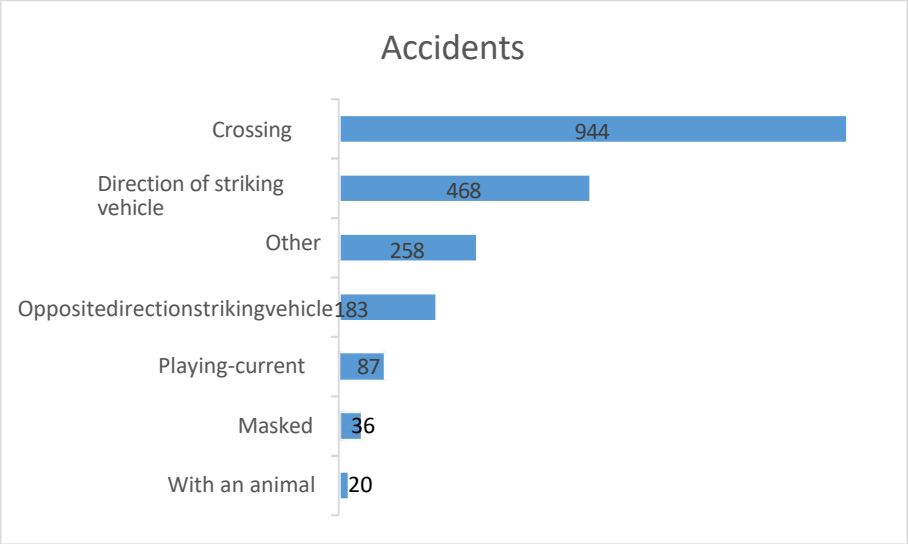
6.2. According to the layout on plan

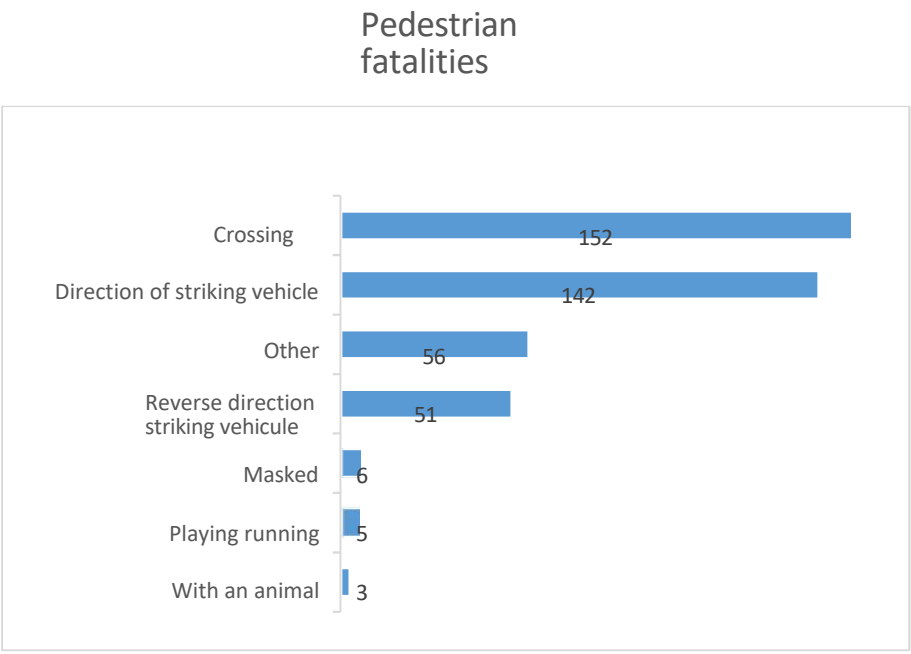
Bodily injury accidents (and fatalities) occur mainly on straight sections.

6.3. Depending on the condition of surface

The proportions of accidents (and fatalities) involving pedestrians on normal or wet road surfaces are similar to those for non-intersection accidents without pedestrians.

6.4. Depending on the action of the pedestrian





Around 30 pedestrians are killed every year, either crossing the road or moving in the direction of the vehicle that hits them.

In almost half of all accidents, the pedestrian crosses the carriageway at the moment of impact, and more than a third of pedestrian fatalities (34% = 152/446) are caused by crossing the carriageway.

In 22% of accidents (one third of pedestrian fatalities), at the time of impact, the pedestrian was travelling in the same direction as the striking vehicle. If we take into account pedestrians travelling in the same and opposite direction as the striking vehicle, the number of fatalities rises to almost half the total (47%).

These results are consistent with those of a study[2] on pedestrian accidents outside built-up areas based on BAAC data over the previous 5-year period 2008-2012: 46% of pedestrians injured crossing and a third of pedestrians killed crossing and a third travelling in the direction of the striking vehicle.

6.5. Depending on the presence of alcohol

Driver or pedestrian	Accidents	Deadly	Fatalities	BH	Mortality	% fatal
With alcohol	411	171	174	246	42	42%
Unknown alcohol	684	123	126	426	18	18%
Known alcohol	1471	320	328	952	22	22%
Alcohol share / known alcohol	28%	53%	53%	26%		
With an alcoholic pedestrian	326	146	146	186	45	45%

[2] Cerema, Pedestrians outside built-up areas - Accident analysis - BAAC data 2008-2012 - March 2018

30 drink-driving pedestrians are killed every year, the same number as for pedestrians without alcohol, even though there are 3 times more accidents without a drink-driving pedestrian than with one.

Alcohol accounts for a very high proportion of accidents and, above all, of fatalities: 53% of fatalities in accidents involving alcohol, compared with 35% outside intersections with no pedestrians and 19% in intersections with no pedestrians.

In 79% of accidents involving alcohol (85% of fatal accidents), there was at least one pedestrian who had been drinking.

The proportion of pedestrian deaths involving alcohol is lower when pedestrians are crossing (29%) than when they are moving in the direction of the striking vehicle or in the opposite direction (55%).

7. Summary

The primary aim of this study was to define precisely the **scale of** the **problem and the seriousness of accidents on two-way roads outside built-up areas**.

On average, over the period 2013-2017, 3,400 people were killed each year in mainland France, 2,400 of them outside built-up areas. Of these 2,400 people killed outside built-up areas, 1,900 (80%) are killed each year on two-way roads. Two-way roads are very serious: 80% of fatalities outside built-up areas, for 58% of bodily injury accidents outside built-up areas.

Moreover, the number of accidents has not declined over the period observed: in 5 years, the number of bodily injury accidents on two-way roads outside built-up areas has risen by 25% (5 points more than on non two-way roads), while the total number of bodily injury accidents in France has risen slightly by 3%.

The study also identified **different accident types**. It appears that the main issue is accidents outside intersections, and without pedestrians. The number of fatalities (1,900) per year on two-way roads outside built-up areas breaks down as follows:

- 1,600 fatalities in non-intersection accidents involving no pedestrians (84%),
- 230 killed in accidents at intersections with no pedestrians (12%),
- 90 killed in accidents involving pedestrians (4%).

The analyses showed that each type of accident had specific characteristics and accident factors.

For **non-intersection** accidents **involving pedestrians**, the main road safety issues are :

- Accidents on bends: with 41% of fatalities (650 fatalities per year) on this type of cross-section, although the proportion of bends on the entire length of the road under consideration is certainly much lower,
- Night-time accidents account for 39% of fatalities (630 fatalities per year). Given the lower levels of traffic at night, the risk appears to be much greater than during the day. The number of deaths at night (22) is higher than during the day (16). This can be explained in part by the higher speeds used.

- Single vehicle accidents against a fixed obstacle (610 fatalities per year), in which almost one in two fatalities is against a tree,
- Head-on collisions (510 fatalities per year),
- Accidents involving a driver under the influence of alcohol or drugs (480 deaths per year).

Accidents **at intersections without pedestrians** present the following challenges:

- The stakes are higher at X intersections (47% of fatal accidents) than at T intersections (27%) or roundabouts (7%);
- Higher fatality rates when intersections are not lit, whatever the type of intersection.
- On the other hand, alcohol is less of a factor in this type of accident (9 times less than in non-intersection accidents involving no pedestrians).

Accidents **involving pedestrians** are a low priority for accidents on two-way roads outside built-up areas. Their main characteristics are as follows:

- 61% of accidents occur at night without street lighting (55 fatalities per year), and 85% of fatalities in night-time accidents occur without street lighting. The fatality rate for accidents without public lighting is 40, compared with 16 with public lighting,
- 34% of pedestrians killed were crossing the carriageway (30 deaths per year), and 32% were walking in the same direction as the striking vehicle,
- Alcohol was involved in 32% of fatalities.

Finally, a **comparison between RD and RN** shows the specific nature of accidents on these 2 networks. 86% of fatal accidents not involving pedestrians occur on a RD, compared with 7% on RN, a network on which accident fatalities are three points higher than on RD.

Because of its configuration, the RD has a high concentration of accidents on bends (41% compared with 29% on the RN) and of single-vehicle accidents against fixed obstacles (39% of fatalities on the RD compared with 15% on the RN), whereas the RN is heavily involved in head-on collisions (48% of fatalities compared with 32% on the RD).

In terms of user factors, alcohol is more prevalent on the main roads (35% of fatal accidents, compared with 20% on the main roads), while the main road network is characterised by a higher incidence of discomfort/fatigue (19% of fatal accidents, compared with 11% on the main roads).

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