SEGURIDAD VIAL 2030

OBSERVATIONAL STUDY OF THE USE OF SAFETY EQUIPMENT AMONG VULNERABLE USERS IN THE PROVINCIAL CAPITALS

Summary of results

MINISTERIO DEL INTERIOR

DGT
Dirección General
de Tráfico

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1. EXECUTIVE SUMMARY

This report presents the results of the study carried out in the provincial capitals by the DGT's National Road Safety Observatory (ONSV) to analyse the use of safety equipment among vulnerable road users: cyclists, personal mobility vehicle (PMV) users, motorcyclists and moped riders.

For comparison, the report also includes the results of the observational study conducted between August and October 2022 as part of the European BASELINE project (with regard to helmet use among motorcyclists and moped riders), as well as data on the use of safety equipment among vulnerable users who were victims of accidents (from ONSV accident records), wherever these are available for situations similar to those in the observational study.

1.1. CYCLISTS

The most notable results of the study for this type of user are as follows:

1.1.1. HELMET USE

- **41.4% of riders** and **10.5% of passengers** wore a helmet.

- Helmet use was above average among **professional riders (56.9%).**

- In contrast, this was below average for riders of **shared or rental** bicycles **(26.8%).**

- Accident data for 2022 indicated that helmet use among accident victims was **higher than the average** use observed **(69% among people killed** and **62% among those seriously injured)**.

1.1.2. USE OF REFLECTIVE VESTS DURING NIGHT HOURS

- Overall, **22% of users observed wore a reflective vest**, although there were significant differences according to other variables observed.

- They were worn more by **men (23.6%)** than **women (13.5%)**.

- Vests were worn more at **weekends (25.2%)** than **on weekdays (19.3%)**.

- The use of reflective vests was higher in the case of **pedal-assist (electric) bicycles (45.7%)**, than in the case of **conventional bicycles (19.9%)**.

- It was above average among **professional users (37.6%)**.

- It was also above average for riders of **shared or rental** bicycles **(32.9%)**.

- In this case, accident data indicate that the use of reflective vests among accident victims was **lower than the average** use observed (for the different categories of victims and between 2016 and 2022, the highest figure was **10%**).

1.1.3. USE OF LIGHTS DURING NIGHT HOURS

- Overall, **61.7% of users observed used lights**, although there were once again differences according to other variables observed.

- The use of lights was notably higher in the case of **pedal-assist (electric) bicycles (89.2%)**, than in the case of **conventional bicycles (59.2%)**.

- It was above average among **professional riders (71.2%)**.

- It was also above average for riders of **shared or rental** bicycles **(82.3%)**.

1.2. PERSONAL MOBILITY VEHICLE (PMV) USERS

The most notable results of the study for this type of user are as follows:

1.2.1. HELMET USE

- Overall, **49% of all PMV users** observed wore a helmet, with a significant difference between **riders (49.3%)** and **passengers (16.3%)**.[1]

- They were worn slightly more by **female** riders **(53.2%)** than **male** riders **(47.7%)**.

- They were also worn more by riders **over 16 years old (51.2%)** than riders **up to 16 years old (24.6%)**.

- Helmet use was above average among **professional riders (73.4%).**

- Accident data for 2022 indicate that helmet use among accident victims was **lower than the average** use observed **(20% among people killed** and **38% among those seriously injured)**.

1.2.2. USE OF REFLECTIVE VESTS DURING NIGHT HOURS

- Overall, **21.9% of users observed wore a reflective vest**, although there were significant differences according to other variables observed.

- They were worn more by riders **over 16 years old (22.4%)** than riders **up to 16 years old (12.8%)**.

- The use of vests was above average among **professional riders (39.1%).**

- In this case, accident data indicate that the use of reflective vests among accident victims was **much lower than the average** use observed. Between 2020 and 2022, **almost none of the people killed or seriously injured were wearing a reflective vest**, and in the case of those with minor injuries, the highest figure was **7%**.

1.2.3. USE OF LIGHTS DURING NIGHT HOURS

- Overall, **72.2% of users observed used lights**, although there were once again differences according to other variables observed.

- They were used much more by riders **over 16 years old (74.7%)** than riders **up to 16 years old (36.1%)**.

- The use of lights was above average among **professional riders (84.6%)**.

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[1] Although the use of PMVs by "passengers" is prohibited by the General Regulations on Vehicles, which define Personal Mobility Vehicles as "vehicles with one or more wheels for a single passenger", the results of the study relating to passengers are included because the fact is that their presence was noted.

1.3. MOTORCYCLISTS AND MOPED RIDERS

1.3.1. HELMET USE

- **99.11% of riders** and **61.36% of passengers** wore a helmet.

- With regard to riders, there were no significant differences in terms of the other variables observed. Figures below 95% rarely appeared in any of the series of observed values for the other variables.

- Data from the BASELINE study were similar: on urban roads, **99.3% of motorcycle riders** wore a helmet.

- Accident records indicate that, on urban roads from 2013 to 2022, between **84% and 90% of motorcycle riders killed** were wearing a helmet at the time of the accident.

1.3.2. USE OF GLOVES

- Overall, **59% of motorcycle riders** wore gloves.

- They were worn more by **men (58.8%)** than **women (49.1%)**.

- There were also significant differences in terms of use depending on whether it was **cold (below 10°C) (85.2%)** or **hot (over 30°C) (49.2%)**.

- Accident records indicate that, on urban roads from 2014 to 2021, between **33% and 45% of motorcycle riders killed** were wearing gloves at the time of the accident.

1.3.3. USE OF LIGHTS DURING NIGHT HOURS

- Overall, **95.59% of users observed used lights**.

- There were no significant differences in terms of the other variables observed.

2. INTRODUCTION

At the beginning of 2023, the DGT's National Road Safety Observatory (ONSV) carried out a study in the provincial capitals to analyse the use of safety equipment among vulnerable road users: cyclists, personal mobility vehicle (PMV) users, motorcyclists and moped riders.

Based on the results collected, correlations between the use of different safety equipment, according to the type of user, and other variables observed were analysed.

The variables taken into account in the observations were:

- Sex.
- Estimated age: up to 16 years old/over 16 years old.
- Province.
- Autonomous Region.
- Time period:
    - Monday to Thursday from 07:00 to 19:00
    - Monday to Thursday from 21:00 to 06:59
    - Saturday to Sunday from 07:00 to 19:00
    - Saturday to Sunday from 21:00 to 06:59
- Lanes in the direction of observation.
- Weather conditions.
- Visibility:
    - no fog,
    - light fog.
- Apparent temperature:
    - Hot (over 30 °C)
    - Warm (10 to 30 °C)
    - Cold (below 10 °C).
- Light:
    - Natural,
    - Artificial,
    - No light.
- Type of vehicle (only for professional users, aka riders): motorcycle/bicycle/PMV.
- Type of bicycle: conventional/pedal-assist.
- Reason for travel: personal/delivery of goods.
- Ownership of the vehicle: private/shared or public or private rental system.

This report presents the results of the observation and the findings of the analysis.

With regard to helmet use among motorcyclists, the results of the observational study conducted between August and October 2022 as part of the European BASELINE project are also presented for comparison.

Lastly, all these data are also supplemented, where available, by data from ONSV accident records on the use of safety equipment among vulnerable users who were victims of accidents.

3. CYCLISTS

3.1. SAFETY EQUIPMENT FOR CYCLISTS

Safety equipment for cyclists includes:

BICYCLE AND CYCLIST EQUIPMENT

Let's not forget that when we get on a bicycle, we are no longer pedestrians because a bicycle is a vehicle and as such must comply with traffic regulations and respect other users, especially pedestrians. Let's go over the mandatory and recommended equipment for both bicycles and cyclists.

Helmet. In cities, helmets are mandatory for children under 16 years old and advisable for everyone else; on other roads, they are mandatory for everyone.

Glasses. Protect against insects and dust. Recommended.

Gloves. Protect us in the event of a fall. Recommended.

White front light (mandatory)

Bell (mandatory)

Bright and reflective clothing Reflective vests are mandatory on interurban roads at night and when there is poor visibility. They are also highly recommended in all other situations.

Red rear light Mandatory. On roads, this is the most important light to avoid rear-end collisions.

Retroreflector (mandatory)

Mudguard

Reflectors on wheels

Tool kit: 1 or 2 spare tubes, a chain tool, which is essential for repairing the bike chain if it breaks, and a pump.

Chain guard

IMPORTANT

It is advisable to have some knowledge of mechanics. If you don't, you must carry the tools so that someone can help you if you have a problem with your bicycle.

If you go mountain biking, it is highly recommended that you tell someone where you're going and carry a GPS so they can help you in the event of an accident or serious incident.

Source: Traffic and Road Safety Magazine. Available at:
https://revista.dgt.es/es/multimedia/infografia/2019/10OCTUBRE/1001-Bicicletas.shtml

3.2. RESULTS OF THE OBSERVATIONAL STUDY

3.2.1. HELMET USE AMONG BICYCLE RIDERS AND PASSENGERS

With regard to **helmet use among all cyclists**, all valid observations where the vehicle was a bicycle were selected for the study: **7,718 observations**, of which 6,784 corresponded to riders and 934 to passengers.

User	Helmet use	No. of observations
Rider	**41.4%**	6,784
Passenger	**10.5%**	934

3.2.2. HELMET USE AMONG BICYCLE RIDERS

The following tables show the proportions of **helmet use among bicycle riders**, disaggregating the results according to the variables observed.

These results are derived from **6,784** valid **observations**.

Sex	Proportions
Male	43.6%
Female	32.7%

Estimated age	Proportions
Up to 16 years old	35.0%
Over 16 years old	41.6%

Time period	Proportions
Monday to Thursday from 07:00 to 19:00	37.1%
Monday to Thursday from 21:00 to 06:59	34.6%
Saturday to Sunday from 07:00 to 19:00	50.8%
Saturday to Sunday from 21:00 to 06:59	39.4%

Lanes in the direction of observation	Number[2]	No. of observations
1	250	610
2	1,533	3,450
3	402	1,199
4	530	1,185
5	75	291
6	14	40

Weather conditions	Number	No. of observations
Clear	2,259	5,327
Cloudy	446	1,198
Rainy	73	193
Windy	26	57

Visibility	Proportions
No fog	40.9%
Light fog	54.3%

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[2] Throughout the document, in the tables where there is a category with less than 100 observations, instead of percentages, the number of cases is given in relation to the number of observations in each category.

Temperature	Proportions
Hot (over 30 °C)	26.1%
Warm (10 to 30 °C)	41.9%
Cold (below 10 °C)	40.1%

Light	Proportions
Natural	43.4%
Artificial	35.6%

Type of bicycle	Proportions
Conventional bicycle	41.4%
Pedal-assist bicycle	39.9%

Reason for travel	Proportions
Personal	38.6%
Delivery/distribution of goods	56.9%

Ownership of the vehicle	Proportions
Personal	43.5%
Shared or rental system	26.8%

3.2.3. HELMET USE AMONG BICYCLE PASSENGERS

The following tables show the proportions of **helmet use among bicycle passengers**, disaggregating the results according to the variables observed.

These results are derived from **934** valid **observations**.

Sex	Proportions
Male	9.2%
Female	14.2%

Estimated age	Number	No. of observations
Up to 16 years old	7	60
Over 16 years old	92	874

Time period	Proportions
Monday to Thursday from 07:00 to 19:00	8.9%
Monday to Thursday from 21:00 to 06:59	13.6%
Saturday to Sunday from 07:00 to 19:00	13.3%
Saturday to Sunday from 21:00 to 06:59	6.7%

Lanes in the direction of observation	Number	No. of observations
1	5	128
2	43	450
3	24	69
4	23	278
5	4	8
6	0	1

Weather conditions	Number	No. of observations
Clear	80	713
Cloudy	14	159
Rainy	1	38
Windy	4	24

Visibility	Number	No. of observations
No fog	89	867
Light fog	10	67

Temperature	Number	No. of observations
Hot (over 30 °C)	6	51
Warm (10 to 30 °C)	86	796
Cold (below 10 °C)	7	87

Light	Number	No. of observations
Natural	81	861
Artificial	18	73

Reason for travel	Proportions
Personal	11.6%
Delivery/distribution of goods	5.0%

3.2.4. USE OF REFLECTIVE VESTS DURING NIGHT HOURS

With regard to the **use of reflective vests among all cyclists**, all observations made during night hours where the vehicle was a bicycle were selected for the study: **2,301 observations**.

- Overall, **22% of users observed wore a reflective vest**.
- There were significant differences by **sex, time period, lanes, weather conditions, type of bicycle and reason for travel**[3].

Sex	Proportions
Male	23.6%
Female	13.5%

Estimated age	Number	No. of observations
Up to 16 years old	8	60
Over 16 years old	500	2,251

Time period	Proportions
Monday to Thursday from 21:00 to 06:59	19.3%
Saturday to Sunday from 21:00 to 06:59	25.2%

Lanes in the direction of observation	Number	No. of observations
1	15	113
2	261	1,214
3	104	416
4	118	463
5	7	81
6	-	-

Weather conditions	Number	No. of observations
Clear	448	2,050
Cloudy	33	107
Rainy	17	112
Windy	10	33

Visibility	Number	No. of observations
No fog	495	2,262
Light fog	13	40

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[3] Throughout the document, associations with 5 or more observations in all categories are shown in bold, as the chi-square test may fail if there are fewer than 5 observations in a category.

Temperature	Number	No. of observations
Hot (over 30 °C)	1	4
Warm (10 to 30 °C)	399	1,806
Cold (below 10 °C)	108	492

Light	Proportions
Natural	22.4%
Artificial	22.0%

Type of bicycle	Proportions
Conventional bicycle	19.9%
Pedal-assist bicycle	45.7%

Reason for travel	Proportions
Personal	15.0%
Delivery/distribution of goods	37.6%

Ownership of the vehicle	Proportions
Personal	20.0%
Shared or rental system	32.9%

3.2.5. USE OF LIGHTS DURING NIGHT HOURS

With regard to the **use of lights among all cyclists**, all observations made during night hours where the vehicle was a bicycle were selected for the study: **2,301 observations**.

- Overall, **61.7% of users observed used lights**.

- There were significant differences by **age, lanes in the direction of observation, apparent temperature, type of bicycle and reason for travel**.

Sex	Proportions
Male	61.8%
Female	60.8%

Estimated age	Number	No. of observations
Up to 16 years old	20	60
Over 16 years old	1,405	2,251

Time period	Proportions
Monday to Thursday from 21:00 to 06:59	60.3%
Saturday to Sunday from 21:00 to 06:59	63.2%

Lanes in the direction of observation	Number	No. of observations
1	53	113
2	760	1,214
3	271	416
4	280	463
5	49	81
6	10	15

Weather conditions	Number	No. of observations
Clear	1,263	2,050
Cloudy	71	107
Rainy	74	112
Windy	15	33

Visibility	Number	No. of observations
No fog	1,402	2,262
Light fog	21	40

Temperature	Number	No. of observations
Hot (over 30 °C)	2	4
Warm (10 to 30 °C)	1,078	1,806
Cold (below 10 °C)	343	492

Light	Proportions
Natural	61.1%
Artificial	62.1%

Type of bicycle	Proportions
Conventional bicycle	59.2%
Pedal-assist bicycle	89.2%

Reason for travel	Proportions
Personal	57.4%
Delivery/distribution of goods	71.2%

Ownership of the vehicle	Proportions
Personal	58.0%
Shared or rental system	82.3%

3.3. DATA FROM ACCIDENT RECORDS

3.3.1. DATA ON HELMET USE AMONG VICTIMS RIDING A BICYCLE

According to data contained in ONSV accident records, in 2022:

Helmet use cyclists	Died within 30 days		Suffered injuries requiring hospitalisation	
	Number	Proportion	Number	Proportion
Were wearing a helmet	9	69%	168	62%
Were not wearing a helmet	4	31%	102	38%
Total number for whom it is known whether they were wearing a helmet	13	100%	270	100%

3.3.2. DATA ON THE USE OF REFLECTIVE VESTS AMONG VICTIMS RIDING A BICYCLE

The following tables show data for the past few years on cyclists who were victims of accidents and were wearing a reflective vest at the time of the accident, broken down by type of road and type of victim, according to data contained in ONSV accident records:

Urban roads	Died within 30 days			Suffered injuries requiring hospitalisation			Suffered injuries not requiring hospitalisation		
Use of reflective clothing	Total	Wore reflective clothing		Total	Wore reflective clothing		Total	Wore reflective clothing	
2016	27	0	0%	380	2	1%	4,852	69	1%
2017	29	1	3%	356	10	3%	5,001	67	1%
2018	15	0	0%	324	13	4%	4,671	63	1%
2019	32	3	9%	322	8	2%	4,754	74	2%
2020	21	0	0%	374	5	1%	4,548	84	2%
2021	21	0	0%	393	9	2%	4,986	87	2%
2022	21	0	0%	394	4	1%	5,003	74	1%

Interurban roads	Died within 30 days			Suffered injuries requiring hospitalisation			Suffered injuries not requiring hospitalisation		
Use of reflective clothing	Total	Wore reflective clothing		Total	Wore reflective clothing		Total	Wore reflective clothing	
2016	40	2	5%	356	23	6%	1,783	109	6%
2017	49	3	6%	338	25	7%	2,074	86	4%
2018	43	3	7%	296	20	7%	1,962	89	5%
2019	48	5	10%	324	23	7%	2,039	72	4%
2020	50	5	10%	325	16	5%	2,032	87	4%
2021	42	2	5%	320	18	6%	2,104	60	3%
2022	60	1	2%	317	10	3%	2,030	76	4%

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4. PERSONAL MOBILITY VEHICLE (PMV) USERS

4.1. SAFETY EQUIPMENT FOR PMV USERS

Safety equipment for PMV users includes:

Source: Traffic and Road Safety Magazine. Available at:
https://revista.dgt.es/es/multimedia/infografia/2022/01ENERO/0122-INFO-Normas-Patinetes.shtml
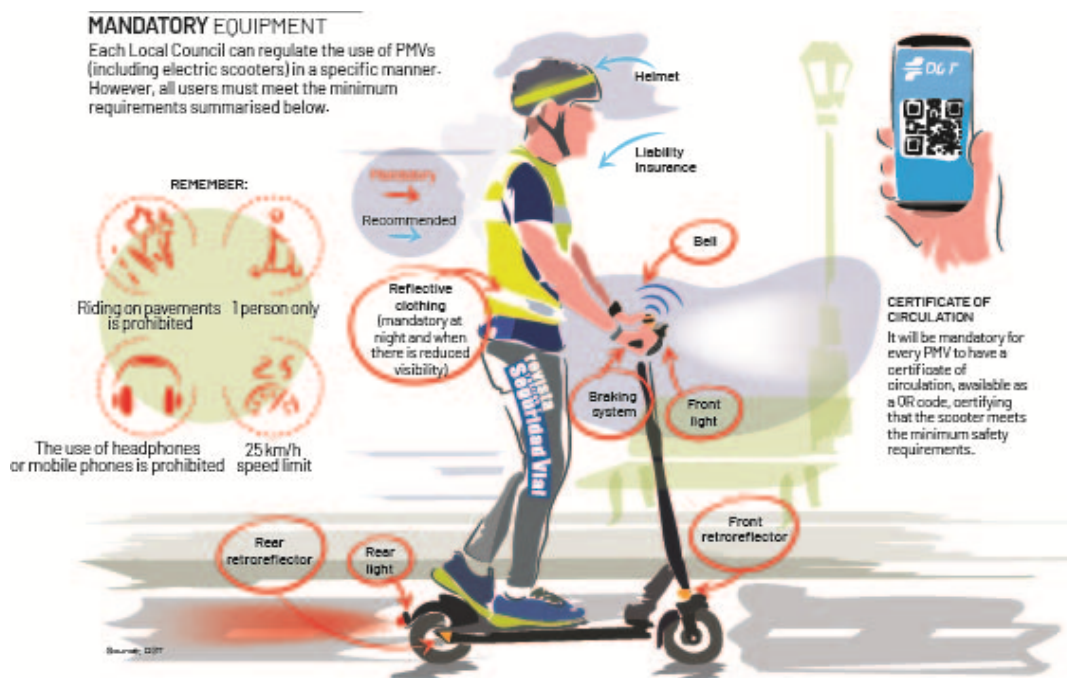
4.2. RESULTS OF THE OBSERVATIONAL STUDY

4.2.1. HELMET USE AMONG PMV RIDERS AND PASSENGERS

With regard to **helmet use among all PMV users**, all valid observations where the vehicle was a PMV were selected for the study: **5,146 observations**, of which 4,838 corresponded to riders and 308 to passengers[4].

User	Proportions	No. of observations
Rider	49.3%	4,838
Passenger	16.3%	308

- There were significant differences by **sex, age, lanes in the direction of observation, weather conditions, visibility (fog)** and light.

- However, no association was found for **time period** or **apparent temperature**.

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[4] Although the use of PMVs by "passengers" is prohibited by the General Regulations on Vehicles, which define Personal Mobility Vehicles as "vehicles with one or more wheels for a single passenger", the results of the study relating to passengers are included because the fact is that their presence was noted.

4.2.2. HELMET USE AMONG PMV RIDERS

The following tables show the proportions of **helmet use among PMV riders**, disaggregating the results according to the variables observed.

These results are derived from **4,838** valid **observations**.

Sex	Proportions
Male	47.7%
Female	53.2%

Estimated age	Proportions
Up to 16 years old	24.6%
Over 16 years old	51.2%

Time period	Proportions
Monday to Thursday from 07:00 to 19:00	51.0%
Monday to Thursday from 21:00 to 06:59	47.8%
Saturday to Sunday from 07:00 to 19:00	50.0%
Saturday to Sunday from 21:00 to 06:59	47.5%

Lanes in the direction of observation	Number	No. of observations
1	188	451
2	1,329	2,458
3	336	855
4	424	801
5	95	247
6	12	24

Weather conditions	Number	No. of observations
Clear	1,893	3,876
Cloudy	374	752
Rainy	87	165
Windy	30	43

Visibility	Proportions
No fog	48.8%
Light fog	62.4%

Temperature	Proportions
Hot (over 30 °C)	45.9%
Warm (10 to 30 °C)	49.0%
Cold (below 10 °C)	51.8%

Light	Proportions
Natural	50.8%
Artificial	46.3%

Reason for travel	Proportions
Personal	46.2%
Delivery/distribution of goods	73.4%

Ownership of the vehicle	Proportions
Personal	49.7%
Shared or rental system	37.5%

4.2.3. HELMET USE AMONG PMV PASSENGERS

The following tables show the proportions of **helmet use among PMV passengers**, disaggregating the results according to the variables observed.

These results are derived from **308** valid **observations**.

Sex	Number	No. of observations
Male	43	207
Female	6	93

Estimated age	Number	No. of observations
Up to 16 years old	5	52
Over 16 years old	46	256

Time period	Number	No. of observations
Monday to Thursday from 07:00 to 19:00	11	154
Monday to Thursday from 21:00 to 06:59	15	56
Saturday to Sunday from 07:00 to 19:00	16	55
Saturday to Sunday from 21:00 to 06:59	9	43

Lanes in the direction of observation	Number	No. of observations
1	4	77
2	30	157
3	1	13
4	14	56
5	2	5
6	-	-

Weather conditions	Number	No. of observations
Clear	37	189
Cloudy	13	113
Rainy	0	1
Windy	1	5

Visibility	Number	No. of observations
No fog	43	277
Light fog	8	31

Temperature	Number	No. of observations
Hot (over 30 °C)	3	11
Warm (10 to 30 °C)	46	283
Cold (below 10 °C)	2	14

Light	Number	No. of observations
Natural	31	220
Artificial	20	88

Reason for travel	Number	No. of observations
Personal	44	289
Delivery/distribution of goods	7	19

Ownership of the vehicle	Number	No. of observations
Personal	47	298
Shared or rental system	4	10

4.2.4. USE OF REFLECTIVE VESTS DURING NIGHT HOURS

With regard to the **use of reflective vests among all PMV users**, all observations made during night hours where the vehicle was a PMV were selected for the study: **2,097 observations**.

- Overall, **21.9% of users observed wore a reflective vest**.

- There were significant differences by **age, lanes observed, weather conditions, light (natural/artificial) and reason for travel**.

Sex	Proportions
Male	21.9%
Female	21.8%

Estimated age	Proportions
Up to 16 years old	12.8%
Over 16 years old	22.4%

Time period	Proportions
Monday to Thursday from 21:00 to 06:59	22.2%
Saturday to Sunday from 21:00 to 06:59	21.4%

Lanes in the direction of observation	Proportions
1	14.2%
2	24.6%
3	19.8%
4	23.1%
5	-
6	-

Weather conditions	Number	No. of observations
Clear	392	1,873
Cloudy	24	97
Rainy	25	101
Windy	16	24

Visibility	Number	No. of observations
No fog	443	2,032
Light fog	14	63

Temperature	Number	No. of observations
Hot (over 30 °C)	2	9
Warm (10 to 30 °C)	396	1,787
Cold (below 10 °C)	59	299

Light	Proportions
Natural	16.3%
Artificial	23.1%

Reason for travel	Proportions
Personal	18.2%
Delivery/distribution of goods	39.1%

Ownership of the vehicle	Number	No. of observations
Personal	441	2,029
Shared or rental system	16	68

4.2.5. USE OF LIGHTS DURING NIGHT HOURS

With regard to the **use of lights among all PMV users**, all observations made during night hours where the vehicle was a bicycle were selected for the study: **2,097 observations**.

- Overall, **72.2% of users observed used lights**.

- There were significant differences by **age, time period, lanes, visibility, light (natural/artificial) and reason for travel**.

Sex	Proportions
Male	71.3%
Female	75.5%

Estimated age	Proportions
Up to 16 years old	36.1%
Over 16 years old	74.7%

Time period	Proportions
Monday to Thursday from 21:00 to 06:59	74.2%
Saturday to Sunday from 21:00 to 06:59	70.1%

Lanes in the direction of observation	Number	No. of observations
1	89	155
2	799	1,102
3	267	338
4	279	402
5	77	93
6	-	-

Weather conditions	Number	No. of observations
Clear	1,361	1,873
Cloudy	66	97
Rainy	68	101
Windy	18	24

Visibility	Number	No. of observations
No fog	1,477	2,032
Light fog	36	63

Temperature	Number	No. of observations
Hot (over 30 °C)	5	9
Warm (10 to 30 °C)	1287	1787
Cold (below 10 °C)	221	299

Light	Proportions
Natural	70.5%
Artificial	72.6%

Reason for travel	Proportions
Personal	69.7%
Delivery/distribution of goods	84.6%

| Ownership of the vehicle	Number	No. of observations
Personal	1,453	2,029
Shared or rental system	62	68

4.3. DATA FROM ACCIDENT RECORDS

4.3.1. ACCIDENT DATA FOR PMV USERS

The report "Key Road Accident Figures - Spain 2022"[5] contains accident figures for 2022 (Table 15 of this report) and shows their evolution over the two previous years (Graph 32 of this report). They are reproduced below:

Accidents involving PMVs	Road accidents		Persons killed		Persons hospitalised due to injury		Persons injured but not hospitalised	
	Number	%	Number	%	Number	%	Number	%
Interurban roads	134	3%	1	13%	19	6%	115	3%
Urban roads	4,513	97%	7	88%	293	94%	3,888	97%
Total	**4,647**	**100%**	**8**	**100%**	**312**	**100%**	**4,003**	**100%**

Personas fallecidas

Personas heridas hospitalizadas

[5] Available at: https://www.dgt.es/menusecundario/dgt-en-cifras/dgt-en-cifras-resultados/dgt-en-cifras-detalle/?id=00879

28
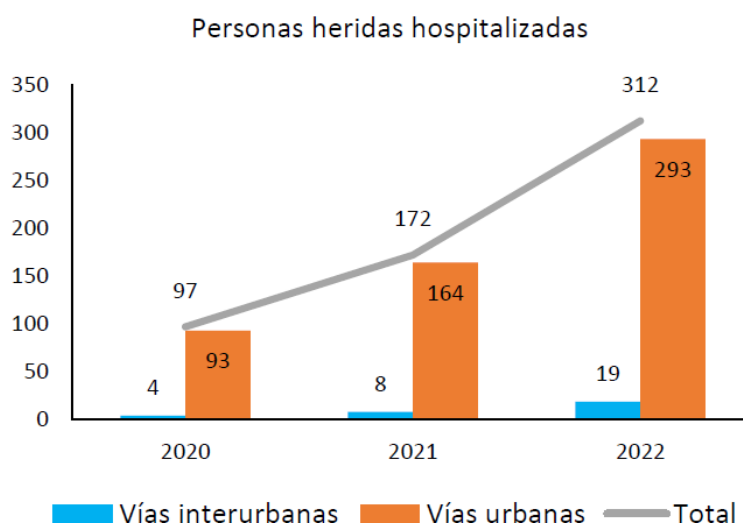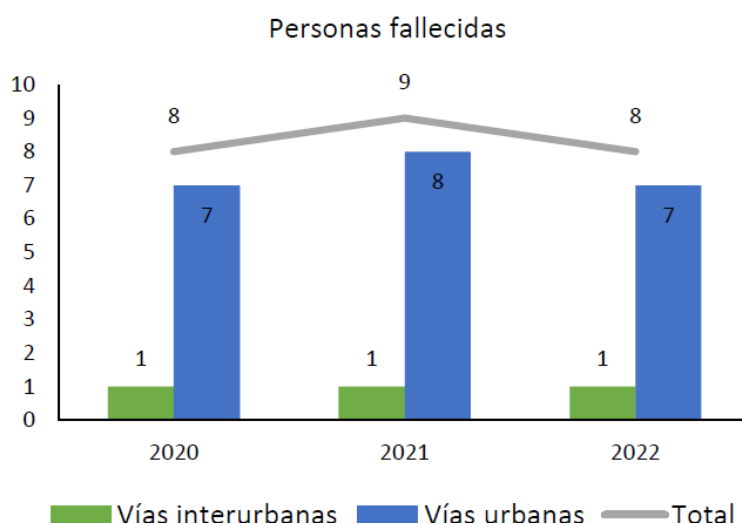
The following tables provide a more detailed breakdown of the above data:

Accidents involving PMVs	2020	2021	2022	Variation 2022/2021	Distribution in 2022
Interurban roads	28	53	134	+81	3%
Urban roads	1,277	2,359	4,513	91%	97%
Total	1,305	2,412	4,647	93%	100%

PMV users killed	2020	2021	2022	Variation 2022/2021	Distribution in 2022
Interurban roads	1	1	1	=	13%
Urban roads	7	8	7	-1	88%
Total	2028	9	8	-1	100%

Of the 7 people killed on urban roads:

- 3 were killed in accidents where no other vehicle was involved.
- The other 4 were killed in accidents involving four-wheeled motor vehicles.

PMV users hospitalised due to injury	2020	2021	2022	Variation 2022/2021	Distribution in 2022
Interurban roads	4	8	19	11	6%
Urban roads	93	164	293	79%	94%
Total	97	172	312	81%	100%

Of the 293 people who suffered injuries requiring hospitalisation on urban roads:

- 123 (42%) were injured in accidents where no other vehicle was involved.
- 141 (45%) were injured in accidents involving four-wheeled motor vehicles.

PMV users injured but not hospitalised	2020	2021	2022	Variation 2022/2021	Distribution in 2022
Interurban roads	23	45	115	+70	3%
Urban roads	1,074	2,017	3,888	93%	97%
Total	1,097	2,062	4,003	94%	100%

Of the 3,888 people who suffered injuries not requiring hospitalisation on urban roads:

- 1,215 (31%) were injured in accidents where no other vehicle was involved.
- 2,295 (59%) were injured in accidents involving four-wheeled motor vehicles.

4.3.2. DATA ON THE LOCATION OF INJURIES SUFFERED BY PMV USERS WHO WERE VICTIMS OF ACCIDENTS

According to the data on fatal accidents involving PMV users on ARENA2, 3 of the 7 people killed in accidents on urban roads in 2022 suffered head injuries.

4.3.3. DATA ON HELMET USE AMONG VICTIMS USING A PMV

Data for 2022 are shown in the table below:

Helmet use PMV users	Died within 30 days		Suffered injuries requiring hospitalisation	
	Number	Proportion	Number	Proportion
Were wearing a helmet	1	20%	66	38%
Were not wearing a helmet	4	80%	107	62%
Total number of users for whom it is known whether they were wearing a helmet	5	100%	173	100%

4.3.4. DATA ON THE USE OF REFLECTIVE VESTS AMONG VICTIMS USING A VMP

The following tables show data for the past few years on PMV users who were victims of accidents and were wearing a reflective vest at the time of the accident, broken down by type of road and type of victim:

Urban roads	Died within 30 days			Suffered injuries requiring hospitalisation			Suffered injuries not requiring hospitalisation		
Use of reflective clothing	Total	Wore reflective clothing		Total	Wore reflective clothing		Total	Wore reflective clothing	
2020	7	0	0%	93	0	0%	1,074	8	1%
2021	8	0	0%	164	2	1%	2,017	35	2%
2022	7	0	0%	293	1	0%	3,888	55	1%

Interurban roads	Died within 30 days			Suffered injuries requiring hospitalisation			Suffered injuries not requiring hospitalisation		
Use of reflective clothing	Total	Wore reflective clothing		Total	Wore reflective clothing		Total	Wore reflective clothing	
2020	1	0	0%	4	0	0%	23	0	0%
2021	1	0	0%	8	0	0%	45	3	7%
2022	1	0	0%	19	0	0%	115	0	0%

5. MOTORCYCLISTS AND MOPED RIDERS

5.1. SAFETY EQUIPMENT FOR MOTORCYCLISTS

Safety equipment for motorcyclists includes:
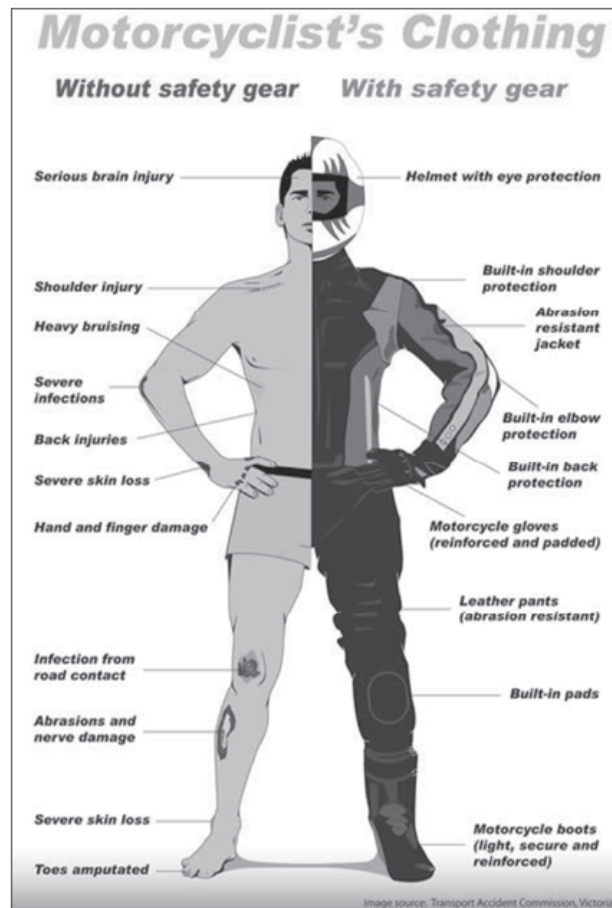
Source: Transport Accident Commission, Victoria (Australia).
Cited in:Improving Safety for Motorcycle, Scooter and Moped Riders (OECD-ITF), available at:
https://read.oecd-ilibrary.org/transport/improving-safety-for-motorcycle-scooter-and-moped-riders_9789282107942-en#page117

5.2.   RESULTS OF THE OBSERVATIONAL STUDY

5.2.1. HELMET USE AMONG MOTORCYCLE RIDERS AND PASSENGERS

With regard to **helmet use among all motorcyclists and moped riders**, all valid observations where the vehicle was a motorcycle or moped were selected for the study: **20,008 observations**, of which 16,178 corresponded to riders and 3,830 to passengers.

User	Proportions
Rider	99.11%
Passenger	61.36%

5.2.2. HELMET USE AMONG MOTORCYCLE RIDERS

The following tables show the proportions of **helmet use among motorcycle riders**, disaggregating the results according to the variables observed.

These results are derived from **16,178** valid **observations**.

Sex	Proportions
Male	99.2%
Female	98.6%

Estimated age	Proportions
Up to 16 years old	94.2%
Over 16 years old	99.2%

Time period	Proportions
Monday to Thursday from 07:00 to 19:00	98.9%
Monday to Thursday from 21:00 to 06:59	99.3%
Saturday to Sunday from 07:00 to 19:00	99.1%
Saturday to Sunday from 21:00 to 06:59	99.3%

Lanes in the direction of observation	Proportions
1	99.2%
2	99.3%
3	99.2%
4	98.4%
5	99.4%
6	97.4%

Weather conditions	Proportions
Clear	99.2%
Cloudy	98.6%
Rainy	99.2%
Windy	98.9%

Visibility	Proportions
No fog	99.2%
Light fog	95.5%

Temperature	Proportions
Hot (over 30 °C)	97.7%
Warm (10 to 30 °C)	99.1%
Cold (below 10 °C)	99.6%

Light	Number	No. of observations
Natural	10,341	10,441
Artificial	5,606	5,646
No light	89	89

Reason for travel	Proportions
Personal	99.0%
Delivery/distribution of goods	99.6%

Ownership of the vehicle	Proportions
Personal	99.2%
Shared or rental system	98.9%

5.2.3. HELMET USE AMONG MOTORCYCLE PASSENGERS

The following tables show the proportions of **helmet use among motorcycle passengers**, disaggregating the results according to the variables observed.

These results are derived from **3,830** valid **observations**.

Sex	Proportions
Male	61.5%
Female	60.4%

Estimated age	Number	No. of observations
Up to 16 years old	29	42
Over 16 years old	2,331	3,788

Time period	Proportions
Monday to Thursday from 07:00 to 19:00	53.3%
Monday to Thursday from 21:00 to 06:59	60.1%
Saturday to Sunday from 07:00 to 19:00	70.2%
Saturday to Sunday from 21:00 to 06:59	61.6%

Lanes in the direction of observation	Number	No. of observations
1	175	426
2	1,351	2,136
3	313	394
4	447	800
5	65	65
6	8	8

Weather conditions	Proportions
Clear	68.8%
Cloudy	44.5%
Rainy	25.2%
Windy	44.2%

Visibility	Proportions
No fog	63.2%
Light fog	31.8%

Temperature	Proportions
Hot (over 30 °C)	50.0%
Warm (10 to 30 °C)	62.1%
Cold (below 10 °C)	58.9%

Light	Number	No. of observations
Natural	1,614	2,894
Artificial	741	931
No light	4	4

Reason for travel	Proportions
Personal	67.5%
Delivery/distribution of goods	20.3%

Ownership of the vehicle	Proportions
Personal	63.7%
Shared or rental system	34.8%

5.2.4. HELMET USE: KPI FOR THE BASELINE PROJECT

According to the results of the observational study conducted between August and October 2022 as part of the European BASELINE project[6], the use of helmets (all types of helmets) was very high among motorcyclists:

Type of road	Helmet use
Motorway	100.0%
Dual carriageway	100.0%
Single carriageway	100.0%
Urban roads	99.3%
Total	**99.4%**

Period	Helmet use
Weekday/daytime	99.5%
Weekend/daytime	99.3%

5.2.5. USE OF GLOVES AMONG MOTORCYCLE RIDERS

With regard to the **use of gloves among motorcyclists and moped riders**, all valid observations that met these two criteria were selected for the study: **16,178 observations**.

- There were significant differences by **sex, time period, lanes, weather conditions, apparent temperature and light**.

- However, no association was found for **age** or **visibility (fog)**.

Sex	Proportions
Male	58.8%
Female	49.1%

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[6] Presentation of results available at:
https://www.dgt.es/export/sites/web-DGT/.galleries/downloads/nota_prensa/Espana-bien-posicionada-en-el-uso-del-casco-y-cinturon-pero-con-margen-de-mejora-en-velocidad-alcohol-y-distracciones/Indicadores_-proyecto_Baseline_web.pdf

Estimated age	Proportions
Up to 16 years old	54.7%
Over 16 years old	58.2%

Time period	Proportions
Monday to Thursday from 07:00 to 19:00	55.2%
Monday to Thursday from 21:00 to 06:59	63.6%
Saturday to Sunday from 07:00 to 19:00	50.9%
Saturday to Sunday from 21:00 to 06:59	64.9%

Lanes in the direction of observation	Proportions
1	46.8%
2	56.8%
3	62.1%
4	66.1%
5	40.4%
6	91.3%

Weather conditions	Proportions
Clear	56.5%
Cloudy	66.7%
Rainy	74.8%
Windy	29.1%

Visibility	Proportions
No fog	58.2%
Light fog	56.3%

Temperature	Proportions
Hot (over 30 °C)	49.2%
Warm (10 to 30 °C)	54.5%
Cold (below 10 °C)	85.2%

Light	Number	No. of observations
Natural	5,706	10,441
Artificial	3,680	5,646
No light	27	89

Ownership of the vehicle	Proportions
Personal	57.9%
Shared or rental system	62.0%

5.2.6. USE OF LIGHTS DURING NIGHT HOURS

With regard to the **use of lights among all motorcyclists and moped riders**, all valid observations made during night hours where the vehicle was a motorcycle or moped were selected for the study: **7,180 observations**.

- Overall, **95.6% of users observed used lights**.

Sex	Proportions
Male	95.9%
Female	96.1%

Estimated age	Number	No. of observations
Up to 16 years old	36	40
Over 16 years old	6,857	7,140

Time period	Proportions
Monday to Thursday from 21:00 to 06:59	95.8%
Saturday to Sunday from 21:00 to 06:59	96.2%

Lanes in the direction of observation	Number	No. of observations
1	474	506
2	4,072	4,154
3	1,066	1,077
4	1,138	1,263
5	134	137
6	7	41

Weather conditions	Proportions
Clear	95.8%
Cloudy	97.7%
Rainy	97.0%
Windy	95.5%

Visibility	Proportions
No fog	96.0%
Light fog	94.4%

Temperature	Number	No. of observations
Hot (over 30 °C)	10	10
Warm (10 to 30 °C)	6,037	6,318
Cold (below 10 °C)	844	850

Light	Proportions
Natural	88.8%
Artificial	98.2%

Reason for travel	Proportions
Personal	96.4%
Delivery/distribution of goods	95.5%

Ownership of the vehicle	Proportions
Personal	95.7%
Shared or rental system	98.5%

5.3. DATA FROM ACCIDENT RECORDS

In 2022, 27,018 accidents with victims involving at least one motorcycle were recorded. In these accidents, there were 30,875 motorcycles involved, 401 people killed, 2,621 people hospitalised due to injury and 25,406 people injured but not hospitalised. The distribution by type of road was as follows:

Type of road	Accidents	Motorcycles involved	Persons killed	Suffered injuries requiring hospitalisation	Persons injured but not hospitalised
Urban roads	20,395	23,182	126	1,516	19,516
Interurban roads	6,623	7,693	275	1,105	5,890
Total	27,018	30,875	401	2,621	25,406

5.3.1. DATA ON HELMET USE AMONG PEOPLE KILLED WHILE RIDING A MOTORCYCLE

The following table shows data for 2012-2021, published in the report "Key Road Accident Figures - Spain 2022"[7].

Helmet use (%)	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Urban roads	84%	88%	88%	89%	90%	87%	89%	84%	93%	89%
Interurban roads	96%	97%	95%	98%	99%	96%	96%	98%	98%	98%

5.3.2. DATA ON THE USE OF OTHER PROTECTIVE EQUIPMENT AMONG VICTIMS RIDING A MOTORCYCLE

On the basis of ONSV accident data, an analysis was performed on the use of safety equipment among motorcyclists killed on interurban roads who died within 30 days in 2021 (excluding Catalonia and the Basque Country).

The following table shows data for the past few years, indicating for each year, the percentage of users killed who were using each type of protection at the time of the accident in relation to the total number of motorcyclists killed that year. For each year, the percentages are not exclusive, as a user may have used more than one type of protection:

Type of protection	2014	2015	2016	2017	2018	2019	2020	2021
Hands (gloves)	33%	35%	41%	39%	41%	39%	45%	41%
Arms	29%	32%	35%	35%	36%	33%	40%	36%
Torso	27%	33%	31%	31%	32%	30%	38%	32%
Back	29%	28%	32%	31%	32%	30%	37%	31%
Feet	20%	23%	26%	26%	27%	22%	28%	28%
Legs	18%	22%	26%	20%	24%	16%	25%	24%

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[7] Available at: https://www.dgt.es/menusecundario/dgt-en-cifras/dgt-en-cifras-resultados/dgt-en-cifras-detalle/?id=00879

In 2022, out of the total of 401 people killed, 2,621 people hospitalised due to injury and 25,406 people injured but not hospitalised, it is known that:

- 593 motorcyclists were wearing safety accessories for the back.
- 557 motorcyclists were wearing safety accessories for the torso.
- 662 motorcyclists were wearing safety accessories for the legs.
- 471 motorcyclists were wearing safety accessories for the feet.

The distribution of these figures by type of road is shown in the following tables:

Accessories for the back	Persons killed	Suffered injuries requiring hospitalisation	Persons injured but not hospitalised	Total
Urban roads	2	16	80	98
Interurban roads	40	94	361	495
Total	42	110	441	593

Accessories for the torso	Persons killed	Suffered injuries requiring hospitalisation	Persons injured but not hospitalised	Total
Urban roads	1	18	77	96
Interurban roads	38	95	328	461
Total	39	113	405	557

Accessories for the legs	Persons killed	Suffered injuries requiring hospitalisation	Persons injured but not hospitalised	Total
Urban roads	1	17	70	88
Interurban roads	26	86	462	574
Total	27	103	532	662

Accessories for the feet	Persons killed	Suffered injuries requiring hospitalisation	Persons injured but not hospitalised	Total
Urban roads	1	12	46	59
Interurban roads	28	86	298	412
Total	29	98	344	471

6. PROFESSIONAL USERS (RIDERS). HELMET USE

In all the previous sections, mention has been made of the results applicable in each to professional users of vulnerable modes of transport (known as riders), by means of the reason for travel variable: "delivery/distribution of goods".

However, the study specifically looked at helmet use among these users with regard to the three modes of transport (motorcycle, bicycle and PMV), and in particular helmet use among professional cyclists. These results are presented in the following two sections.

6.1. HELMET USE AMONG ALL PROFESSIONAL USERS

For the particular case of observation of **helmet use among professional users**, all valid observations where the reason for travel was "delivery/distribution of goods" were selected for the study: **5,419 observations**.

Sex	Proportions
Male	88.8%
Female	85.0%

Estimated age	Number	No. of observations
Up to 16 years old[8]	15	23
Over 16 years old	4,803	5,396

Time period	Proportions
Monday to Thursday from 07:00 to 19:00	86.2%
Monday to Thursday from 21:00 to 06:59	87.9%
Saturday to Sunday from 07:00 to 19:00	86.6%
Saturday to Sunday from 21:00 to 06:59	91.1%

Lanes in the direction of observation	Number	No. of observations
1	319	365
2	2,972	3,244
3	603	763
4	849	957
5	39	54
6	35	35

[8] The validity of this data must be relativised, as this is an estimated age at the time of the observation. Legally, a child under 16 years old should not be carrying out professional work.

Weather conditions	Number	No. of observations
Clear	3,911	4,380
Cloudy	492	578
Rainy	331	375
Windy	83	85

Visibility	Proportions
No fog	88.9%
Light fog	90.6%

Temperature	Number	No. of observations
Hot (over 30 °C)	13	17
Warm (10 to 30 °C)	4,134	4,627
Cold (below 10 °C)	670	774

Light	Number	No. of observations
Natural	2,218	2,492
Artificial	2,573	2,899
No light	26	27

Mode of transport	Proportions
Motorcycle/moped	99.6%
Bicycle	56.9%
Personal mobility vehicle	73.4%

Ownership of the vehicle	Proportions
Personal	87.5%
Shared or rental system	94.1%

6.2. HELMET USE AMONG PROFESSIONAL CYCLISTS

For the particular case of observation of **helmet use among professional cyclists**, all valid observations where the reason for travel was "delivery/distribution of goods" and the vehicle was a bicycle were selected for the study: **1,020 observations**.

- There were significant differences in terms of helmet use by **time period**, **lanes in the direction of observation**, **weather conditions** (eliminating "windy" from the analysis), **light** (eliminating "no light") and **type of bicycle**.

Sex	Number	No. of observations
Male	549	967
Female	31	50

Estimated age	Number	No. of observations
Up to 16 years old	4	9
Over 16 years old	576	1,011

Time period	Proportions
Monday to Thursday from 07:00 to 19:00	48.8%
Monday to Thursday from 21:00 to 06:59	53.5%
Saturday to Sunday from 07:00 to 19:00	61.2%
Saturday to Sunday from 21:00 to 06:59	59.6%

Lanes in the direction of observation	Number	No. of observations
1	33	69
2	290	493
3	102	210
4	149	232
5	6	16
6	-	-

Weather conditions	Number	No. of observations
Clear	504	851
Cloudy	48	109
Rainy	26	56

Visibility	Number	No. of observations
No fog	570	1,004
Light fog	10	16

Temperature	Proportions
Hot (over 30 °C)	-
Warm (10 to 30 °C)	56.2%
Cold (below 10 °C)	59.8%

Light	Proportions
Natural	61.0%
Artificial	52.8%

Type of bicycle	Proportions
Conventional bicycle	53.5%
Pedal-assist bicycle	78.7%

Ownership of the vehicle	Proportions
Personal	52.4%
Shared or rental system	73.7%

7. Conclusions

7.1. Cyclists

7.1.1. Results of the observational study:

- **Helmets:** **41.4% of riders** and **10.5% of passengers** wore a helmet.

  Their use **was higher among professional riders** (56.9% of riders), **but lower among riders of shared or rental bicycles** (26.8%).

- **Reflective vests** during night hours: **22% of users** wore a reflective vest.

  Their use **was higher among professional users** (37.6%) **and riders of shared or rental bicycles** (32.9%).

- **Lights** during night hours: **61.7% of users** used lights.

  Their use **was well below average among riders up to 16 years old** (20 and 60 cases), and **higher among professional users** (71.2%) and **users of shared or rental bicycles** (82.3%).

  Their use **was also notably higher in the case of pedal-assist (electric) bicycles** (89.2%) than in the case of conventional bicycles (59.2%).

7.1.2. Data from accident records:

- Helmets: in 2022, **69% of people killed** and **62% of those hospitalised due to injury** were wearing a helmet.

  These use data contrast with those obtained in the observational study, as **helmet use among accident victims was higher than the average observed**.

- **Reflective vests** during night hours: for the different categories of victims and from 2016 to 2022, **the highest percentage of use recorded was 10%**.

  Once again, the data contrast with those obtained in the observational study, but in the opposite sense, as **the use of reflective vests among accident victims was lower than the average observed**.

7.2. Personal Mobility Vehicle (PMV) users:

7.2.1. Results of the observational study:

- **Helmets:** **49.3% of riders** and **16.3% of passengers** wore a helmet.

  Their use **was well below average among riders up to 16 years old** (24.6%), and **higher among professional riders** (73.4%).

- **Reflective vests** during night hours: **21.9% of users** wore a reflective vest.

  Their use **was higher among professional riders** (39.1%).

- **Lights** during night hours: **72.2% of users** used lights.

  Their use **was well below average among users up to 16 years old** (36.1%), and **significantly higher among professional users** (84.6%).

7.2.2. Data from accident records:

- Helmets: in 2022, **20% of people killed** and **38% of those hospitalised due to injury** were wearing a helmet.

  These use data contrast with those obtained in the observational study, as **helmet use among accident victims was lower than the average observed**.

- **Reflective vests** during night hours: between 2020 and 2022, **almost none of the people killed or hospitalised due to injury were wearing a reflective vest**, and in the case of those with minor injuries, the highest percentage obtained for the different categories of victims was 7%.

  Once again, the data contrast with those obtained in the observational study, as **the use of reflective vests among accident victims was significantly lower than the average observed**.

7.3. MOTORCYCLISTS AND MOPED RIDERS

7.3.1. RESULTS OF THE OBSERVATIONAL STUDY:

- **Helmets:** their observed use was **very high**. Overall, **99.11% of riders** and **61.36% of passengers** wore a helmet.

- **Gloves:59% of motorcycle riders** wore gloves.

  The greatest variation in use was seen in relation to ambient temperature: **85.2% when it was cold** (below 10°C) and **49.2% when it was hot** (over 30°C).

- **Lights** during night hours: **95.6% of users** used lights.

  In this case, there were hardly any variations in terms of the other variables observed.

7.3.2. RESULTS OF THE BASELINE PROJECT:

- **Helmets:** in 2022, **99.3% of riders** wore a helmet on urban roads.

  This result is in line with those obtained in the observational study.

7.3.3. DATA FROM ACCIDENT RECORDS:

- **Helmets:** from 2013 to 2022, **between 84% and 90% of motorcycle riders killed** were wearing a helmet at the time of the accident.

- **Gloves:** on urban roads, between 2014 and 2021, between **33% and 45% of riders killed** were wearing gloves at the time of the accident.

7.4. PROFESSIONAL USERS (RIDERS)

- The use of safety equipment among **professional bicycle and PMV riders was above average** for all the types of equipment observed:

Safety equipment	Bicycle riders		PMV riders	
	Professionals	**All**	**Professionals**	**All**
Helmet	**56.9%**	41.4%	**73.4%**	49.3%
Reflective vest	**37.6%**	22.0%	**39.1%**	21.9%
Light	**71.2%**	61.7%	**84.6%**	72.2%

7.5. USERS UP TO 16 YEARS OLD

- The use of safety equipment among **bicycle and PMV riders up to 16 years old was below average** for all the types of equipment observed.

Safety equipment	Bicycle riders		PMV riders	
	Up to 16 years old	**All**	**Up to 16 years old**	**All**
Helmet	**35.0%**	41.4%	**24.6%**	49.3%
Reflective vest	**8 of 60**	22.0%	**12.8%**	21.9%
Light	**20 of 60**	61.7%	**36.1%**	72.2%