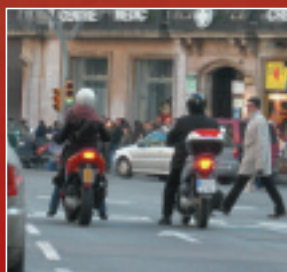
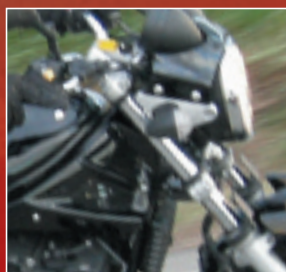




# Strategic Plan for the Road Safety of Motorcycles and Mopeds

Final Report



MINISTERIO  
DEL INTERIOR



Observatorio Nacional  
de Seguridad Vial



# Strategic Plan for the Road Safety of Motorcycles and Mopeds

Final Report

**Management and coordination**  
**National Road Safety Observatory of Traffic Directorate-General**

**NIPO: 128-08-199-6**

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# Presentation

Motorcycles are a topical question nowadays and as the Minister of the Interior, Alfredo Pérez Rubalcaba, says “they have come to stay” so now we have to manage their safety.

All studies and surveys show an increase in the number of motorcycles in the future since they have consolidated as an alternative to cars in urban travels. These reports point out that, no matter how much public transport is recommended, there will always be a vehicle to move individually in the city. We have to bear in mind that the car is a vehicle conceived, designed and manufactured to be used in roads whereas some motorcycles are vehicles conceived and adapted to be used in built-up areas; car features and characteristics will never compete with the advantages motorcycles provide in city travels.

In London, motorcycles proliferated, as an alternative to the car, since the city toll to gain access to the city centre was established and cars were excluded. In Paris, citizens discover motorcycle usefulness because of a public transport strike; French authorities explain that whenever there is a situation like this the sale of motorcycles rise. In Madrid, the increase in the number of motorcycles during the last few years has been spectacular. In cities such as Rome and Barcelona motorcycles have always been present for cultural and climatological reasons.

The number of motorcycles has increased in our country by more than three times as compared with cars. From 2003 and 2007 motorcycles have increased by 53% whereas cars have increased by 16% - figures speak for themselves.

We all knew that low capacity motorcycles were going to increase in cities, but what we did not expect was the increase of high capacity motorcycles. From 2003 to 2007, 316644 over 500cc motorcycles were registered and this means many and very big motorcycles.

Why? Because the accesses to cities in rush hours show flow difficulties for cars, so many citizens living far from the centre have found an alternative in high capacity motorcycles. Besides, motorcycles are attractive, well-made and they can also be used at weekends in short trips with a feeling of freedom, power and youthful in appearance.

So far everything would be normal if it weren't because motorcycles have a special risk and demand more attention and care when riding.

According to recent studies, the risk to die in a motorcycle road traffic accident is 17 times higher than in a car traffic accident.

In order to show how serious accident rate in this type of vehicle is, we are going to review the data from 2003 to 2007; although the total number of fatalities in road traffic accidents has decreased by 31% in Spain, the number of fatalities in motorcycle traffic accidents has increased by 77%. The summer of 2007 was of special concern because motorcycle fatalities increased by 53%. On 2 October, the Minister of the Interior, Alfredo Pérez Rubalcaba, called user representatives in order to boost the solution to a problem which means a tragedy, socially unacceptable.

The problem is not only ours, it also affects all Europe, to such an extent that the European Transport Commissioner, Jacques Barrot, stated that, at present, one out of four fatalities in road traffic accidents were in motorcycles. If we do nothing or take measures the trend will continue and in 2010 a third of the fatalities in traffic accidents would be motorcycle users.

At the beginning of 2007, the debate was open after setting up, in January, the working group GT-52 “Motorcycles and road safety”. The group was set up within the framework of the Higher Council for Road Safety; it had as the main aim to achieve a shared strategy to improve motorcycle safety.

In this debate we should avoid making the mistake of finding someone to blame – it is usually another one – and keep on counting accidents and casualties. It had to be avoided that motorcyclists blamed public administrations for the infrastructures and that public administrations blamed motorcyclists for their lack of attention and care.

Surprisingly enough, at the end common sense imposed and it was accepted that we faced a problem which required a shared view and to work together.

With the work carried out by this working group we realized that training had always been focused on cars as the name ‘autoescuela’ (driving school) reveals; motorcycle had been considered as a marginal vehicle and as regards the specific training to ride them motorcycles should be given the importance they have and deserve. This is a challenge for the administration and for driving schools.

We have admitted that road design was made according to the vehicle and, in an environment with more and more motorcycles we should rethink road design in order to tailor it to the new reality. Measures such as double white lines, a wider lane, bus lane for motorcycles, ... This is a challenge for engineers.

We value that automobile industry has evolved and it has gone from selling power to selling safety; motorcycle industry was still in the power, it had not taken a step forward as society was demanding. ABS, airbags, side protection, three wheels, ... This is a challenge for manufacturers.

We should distinguish between travelling in built-up areas and in roads because the users, the accidents and the problems are different.

We can confirm that in built-up areas accidents occur more frequently in junctions due to not obey traffic lights; we will have to use new technologies to monitor this matter and traffic lights control in built-up areas could be similar to radars in roads. This is a challenge for Town Halls.

We knew that authorized dealers and sellers are very keen on motorcycles and they know motorcycle buyers because they often have dealings with them; for this reason, they should assume their responsibility and spread rules of use, expert advice, instruction manual and even a course to familiarize with the vehicle.

All of us agreed that motorcyclist associations would have to lead and commit to the change towards safer behaviours, as motorist associations have already done.

We have discussed many other issues that have been reflected in a document made by us all and for us all: the Strategic Plan on Road Safety for Motorcycles and Mopeds.

Before, we did not have a Plan, now we have it. We only have to implement it and to work towards achieving a safer country, for motorcyclists too.

**Pere Navarro Olivella**  
Traffic Director-General

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# 1 Introduction

The Government's main target is to reduce the number of casualties in traffic accidents. So as to achieve this, during the last years the DGT [Traffic General Directorate] has developed a series of public road safety policies that have in part mitigated this serious social problem.

The targets as foreseen have come to be accomplished but the bad behaviour of the accident rates of motorcycles and mopeds remains outstanding. This bad behaviour combined with the growing popularity of motorbikes as transport means has highlighted the need for preparing a specific Plan for mopeds and motorcycles.

Therefore, in the course of 2007, the Government, counting on the active participation of the sector's main actors (manufacturers, dealers, insurers, local administrations, user associations, etc.) has been preparing the Strategic Road Safety Plan for mopeds and motorcycles. The preparation of the Plan has been an excellent experience regarding the coordination between all actors, and it allows counting on a consensus-based framework of measures and actions specifically designed to reduce the accident rates of motorcycles and mopeds.

The Plan will be launched in 2008 and it is structured into the following sections:

- 1 Present situation which presents the data concerning registrations and the fleets of these vehicles, historical records, the latest available figures and a comparative analysis with cars.
- 2 Targets of the Plan.
- 3 Methodology employed for developing the Plan.
- 4 The tree of solutions with all measures which will be implemented to improve the road safety of these vehicles.
- 5 The management system and models that will be used to deploy these measures
- 6 The deployment strategy and action plan for the next 4 years.

Finally, the main statistical data on the phenomenon and the sources of information and references employed in preparing the Plan are presented in two Annexes.

Hereafter, the meanings of some of the terms appearing in the Plan will be specified:

- a Two-wheeled motorcycle: a two-wheeled vehicle without sidecar, provided with an engine having a cylinder capacity of more than 50 cc if it is an internal combustion engine, and/or a construction-conditioned maximum speed higher than 45 km/h.
- b Two-wheeled moped: a two-wheeled vehicle provided with an engine having a cylinder capacity of not more than 50 cc if it is an internal combustion engine, and/or a construction-conditioned maximum speed of 45 km/h.
- c Motorized two-wheeled vehicles: this concept includes mopeds as well as two-wheeled motorcycles, mopeds being considered as the first cylinder segment of motorcycles. This is equivalent to the acronym PTW in the English language.
- d Motor bike: motorized two-wheeled vehicle.
- e Casualty: any person being killed or (seriously or slightly injured) as a consequence of a traffic accident.
- f Seriously injured: any person as injured in a traffic accident and whose condition requires a hospitalization for more than 24 hours.
- g Slightly injured: any person as injured in a traffic accident to whom the definition seriously injured cannot be applied.
- h Fatality: any person who, as a consequence of a traffic accident, dies instantly or within the subsequent 30 days.

The concept of the two-wheeled vehicle that includes both motorcycles and mopeds deserves special attention

## 2 Present situation

### 2.1 Information on registrations and on the fleet

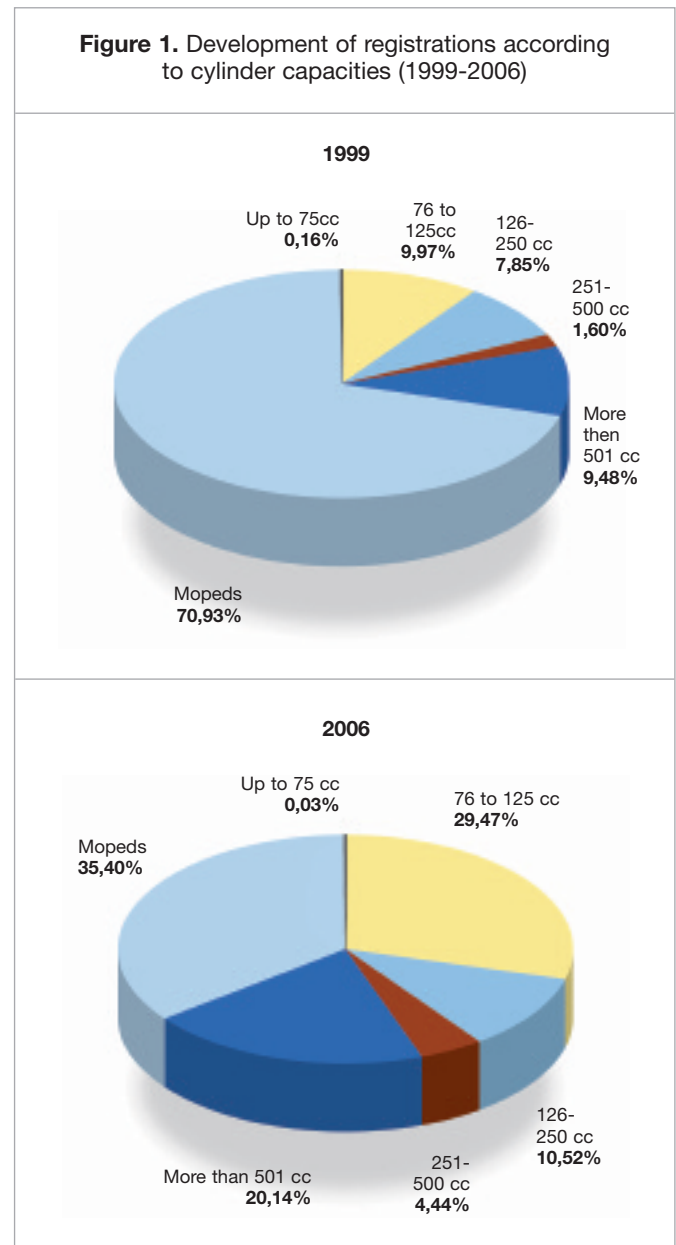
In 2006, the fleet of motorcycles and mopeds exceeded 4 million vehicles, 2,343,124 corresponding to mopeds and 2,050,531 to motorcycles.

Motorcycle registrations have been experiencing a strong growth, and already in 2006 they reached the figure of 274,918, 24% more than with respect to the previous year. Contrarily, mopeds have been seeing their number of registrations reduced in favour of motorcycles of 125 cc, despite the negative trend of recent years having reversed in 2006 by an increase of 2.41%.

When analyzing registrations by cylinder capacities, it can be observed that from 1999 to present time, the situation has changed significantly. The segment of motorcycles above 250 cc has increased slightly only, whilst that of motorcycles up to 125 cc has gained much importance to the detriment of mopeds. During the last years, registrations of motorcycles starting at 75 cc has increased, the increase in the segment of 75 to 125 cc in 2005 standing out greatly as a result of the changes in the regulations that has allowed holders of a B license having more than 3 years of experience to drive these vehicles.

The increase from 1999 to 2006 in the segment of motorcycles having more than 500 cc deserves special consideration, as it passed from representing 10% of all registration in 1999 to 20% in 2006. Only in 2006, 44.11% more motorcycles having a cylinder capacity of more than 500 cc were registered, than in 2005.

**Figure 1.** Development of registrations according to cylinder capacities (1999-2006)



Source: DGT. National Observatory for Road Safety

When analyzing the evolutions of registrations and the fleet in the period 2001-2006, it can be observed that, whilst motorcycle registrations have been increasing inter-annually at very high rates, those of mopeds have in turn

been decreasing. It is with emphasizing that more than 78% of motorcycle registrations took place between 2004 and 2005. This trend is still continuing albeit not at such high rates.

**Chart 1.** Numbers of motorcycle and moped registrations and interannual evolution (%)

	2001	2002	2003	2004	2005	2006
Motorcycles	64.196	63.416	77.496	123.195	220.424	274.918
Mopeds	260.760	249.450	175.469	161.573	147.128	150.675
<b>Total motorcycles and mopeds</b>	<b>324.956</b>	<b>312.866</b>	<b>252.965</b>	<b>284.768</b>	<b>367.552</b>	<b>425.593</b>
Interannual growth of motorcycle registrations		-1,23%	22,20%	58,97%	78,92%	24,72%
Interannual growth of moped registrations		-4,34%	-29,66%	-7,92%	-8,94%	2,41%
Interannual growth of motorcycle and moped registrations		-3,72%	-19,15%	12,57%	29,07%	15,79%

Source: DGT. National Observatory for Road Safety

Upon making the same analysis using 2001 as the basis, it can be noted that motorcycle registrations have multi-

plied by four in 5 years, whilst moped registrations in 2006 are roughly half those of 2001.

**Chart 2.** Number of registrations and evolution taking 2001 as a basis

	2001	2002	2003	2004	2005	2006
Motorcycles	64.196	63.416	77.496	123.195	220.424	274.918
Mopeds	260.760	249.450	175.469	161.573	147.128	150.675
<b>Total motorcycles and mopeds</b>	<b>324.956</b>	<b>312.866</b>	<b>252.965</b>	<b>284.768</b>	<b>367.552</b>	<b>425.593</b>
Growth of motorcycle registrations taking 2001 as a basis	100	99	121	192	343	428
Growth of moped registrations taking 2001 as a basis	100	96	67	62	56	58
Growth of motorcycle and moped registrations taking 2001 as a basis	100	96	78	68	113	116

Source: DGT. National Observatory for Road Safety

The term “vehicle fleet” is intended to reflect the total number of vehicles in a certain kind of traffic, and it is calculated by summing the number of newly registered vehicles of one year to the fleet of the preceding year, and subtracting the number of deregistration in the said

one year. This concept must be taken with special caution in the case of motor bikes, as many of these vehicles are not deregistered. In 2006, motorcycle registrations increased by 24.72%, and the fleet by 13.55%.

**Chart 3.** Moped and motorcycle fleet, and interannual evolution (%)

	2001	2002	2003	2004	2005	2006
Motorcycles	1.483.442	1.517.208	1.513.526	1.612.082	1.805.827	2.050.531
Mopeds	1.806.758	2.044.242	2.143.593	2.242.046	2.311.773	2.343.124
<b>Total motorcycles and mopeds</b>	<b>3.290.200</b>	<b>3.561.450</b>	<b>3.657.119</b>	<b>3.854.128</b>	<b>4.117.600</b>	<b>4.385.422</b>
Interannual growth of the motorcycle fleet		2,28%	-0,24%	6,51%	<b>12,02%</b>	<b>13,55%</b>
Interannual growth of the moped fleet		13,14%	4,86%	4,59%	<b>3,11%</b>	1,36%
Interannual growth of the motorcycle and moped fleets		8,24%	2,69%	5,39%	6,84%	6,7%

Source: DGT. National Observatory for Road Safety

## 2.2 The accident rate of motorcycles and mopeds

### 2.2.1. Present situation

In 2006 there were, taking into account the whole all transport means, 99,797 traffic accidents that caused 147,554 casualties (fatalities, seriously injured and slightly injured) on the roads of Spain. Out of these almost 150,000 casualties, 25% were users of motorized two-wheeled vehicles.

Approximately 27% of the whole of motorcycle and moped casualties (fatalities, seriously injured and slightly injured) occurred on roads and 73 in urban areas.

However, when considering fatalities only, the figures are reversed as out of the 789 fatalities 70% occurred on roads.

In accordance with data of 2006, casualties in moped accidents are 55% of the whole of all casualties in accidents of motorized two-wheeled vehicles whilst, when taking into account fatalities, 40% correspond to motorcycles.

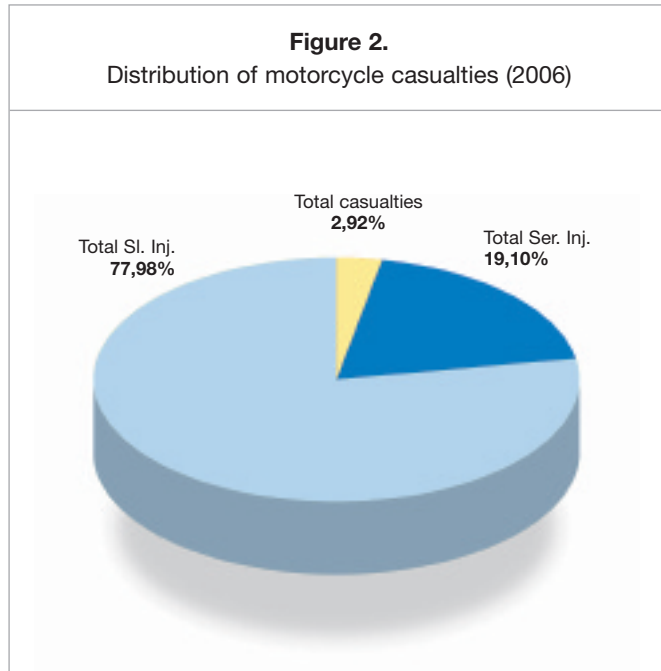
The KSI concept (Killed and Seriously Injured) is the sum of seriously injured and a fatality in accidents, and it is one of the most frequently used in the European Union in respect of accidents. In 2006, the number of KSIs both on motorcycles and mopeds approached 3,500.

**Chart 4.** Conditions of the casualties (2006)

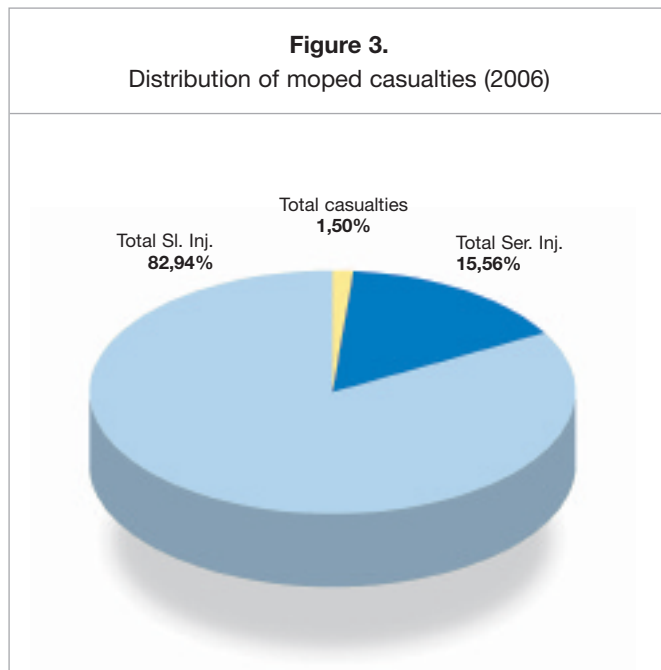
	Fatalities moped	Fatalities motorcyc	Ser. Inj. moped	Ser. Inj. motorcyc	Sl. Inj. moped	Sl. Inj. motorcyc	TOTAL
Urban A.	133	113	1.782	1.258	14.067	9.433	26.786
Roads	175	368	1.403	1.891	2.913	3.420	10.170
Total	308	481	3.185	3.149	16.980	12.853	36.956
Casualties motorcycles urban A.		10.804					5.679
Casualties mopeds urban A.		15.982					4.491
		26.786					10.170

Source: DGT. National Observatory for Road Safety

The harmfulness of motorcycles is higher than that of mopeds: In 2006, 22% of motorcycle casualties were KSIs compared to 17% moped casualties.



Source: DGT. National Observatory for Road Safety



Source: DGT. National Observatory for Road Safety

**Latest accident rate data after 24 hours** At the time of writing these lines, we are only having provisional data for the accident rate in 2007. These data refer exclusively to accidents occurred on roads (urban areas are not included), and these are data obtained within the 24 hours following the occurrence of the accidents and they are thus provisional (so as to be final, it is necessary to know the condition of the casualty at 30 days after the accident has occurred).

The accident-rate figures for motorcycles on roads after 24 hours referring to the first eight months of 2007 have raised serious concerns. From January to October 379 motor bikers died, 105 of them in August. The figures of this period of the year already exceeded those of the same period in 2006 by 33%. Moreover, the strong contrast to the 7.5% reduction of the total figure of fatalities due to traffic accidents can be stressed.

An in-depth analysis made of a representative sample of fatal accidents in that period has provided the following conclusions:

- 62% occurred on weekends, with concentrations on Sunday mornings and Saturday afternoons.
- The average age of the drivers killed is 34.6 years. 71% of the drivers involved in fatal motorcycle accidents were between 26 and 45 years old.
- 81% of the accidents occurred on secondary or conventional roads.
- 42% of fatal accidents were due to off-the-road goings.
- 64% of the motorbikes involved were new motorbikes being less than three years old, and 88% had a cylinder capacity of more than 500 cc.
- 97.6% of the drivers were driving with a license that was in conformity with the cylinder capacity of the motorbike they were driving in the moment of their accidents.
- 88% of the drivers had more than 2 years experience.
- 92.4% had never received any sanction in their driver's history.
- About 8% of the drivers as analyzed were foreigners.
- Regarding the concurrent factors and always according to the accident questionnaires, inadequate speed was the factor that was present in 44% of fatal motorcycle road accidents; traffic rules offenses in 36% and distractions in 19% thereof.

- According to the locations where they occurred, the geographic areas where there is the largest number of motorbike licenses and permits, are those which counted for most fatalities in road accidents: Barcelona, Murcia, Cádiz, Las Palmas and Cantabria..

Finally, it may be stressed that 88% of the motorcycles involved in fatal road accidents were of high cylinder capacities i.e. 500 cc or more.

**Chart 5. Fatalities in motorcycle road accidents (January-June 2007)**

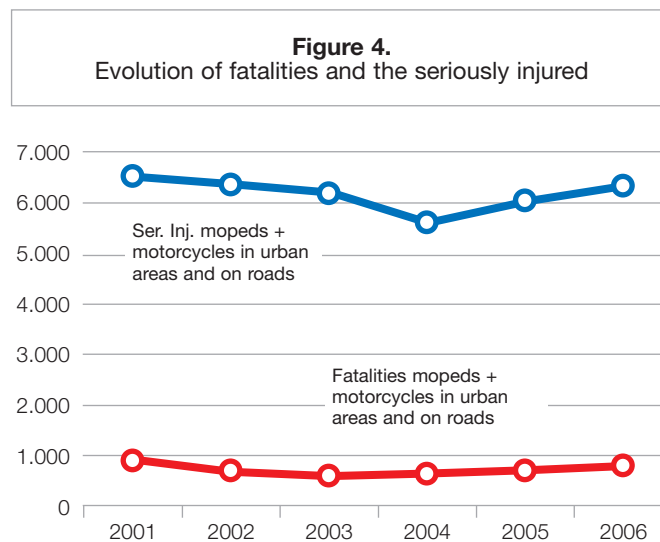
Cylinder capacity	No.	%
≤125cc	16	7,4%
125cc – 500cc	12	5,6%
500cc – 750cc	111	51,6%
≥ 750cc	78	36,3%
<b>Total</b>	<b>217</b>	

Remark: Data after 24h.  
Source: DGT. National Observatory for Road Safety

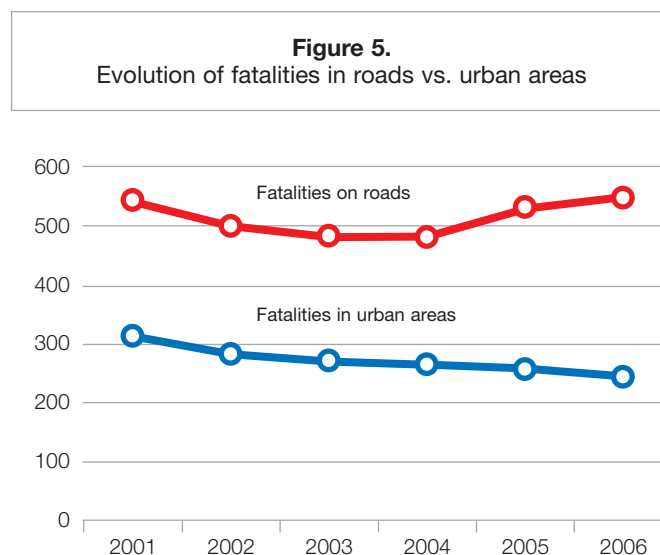
### 2.2.2. Evolution

The motorcycle is the only transport means regarding which the number of fatalities and seriously injured has been increasing. In 2003 there were 367 fatalities on motorcycles, and 2006 the figure of 481 was reached. The same applies for the seriously injured who passed from 2,161 in 2003 to 3,149 in 2006. It may be said that this trend, instead of having reversed during the last years, has been becoming even worse. In accordance with the data after 24 hours, fatalities on motorcycles on roads reached the number of 191 within the period January-July 2006, whilst in the same period of 2007 this figure has increased by 28% (243).

Las cifras de muertos y heridos graves de motos aumentan tanto en zona urbana como en carretera, pero si tan solo consideramos las víctimas mortales, nos encontramos con que las víctimas mortales sí aumentan en carretera mientras que no lo hacen en zona urbana.



Source: DGT. National Observatory for Road Safety

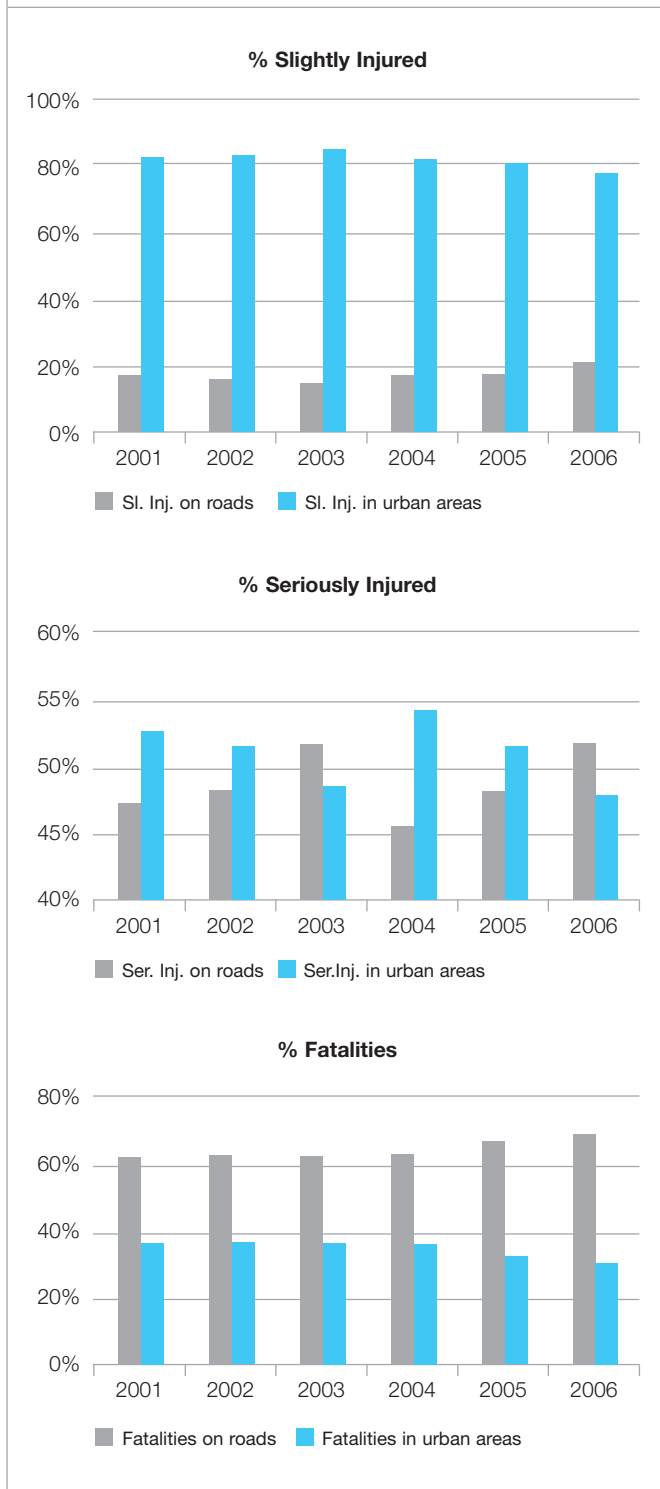


Source: DGT. National Observatory for Road Safety

When considering the figures of fatalities and of the seriously and slightly injured in urban areas and on roads, a similar pattern of behaviour along time except for the seriously injured can be found.

About 80% of the slightly injured occurred in urban areas whilst 70% of the fatalities occurred on roads. This analysis cannot be made in respect of the seriously injured due to that they do not follow a uniform pattern.

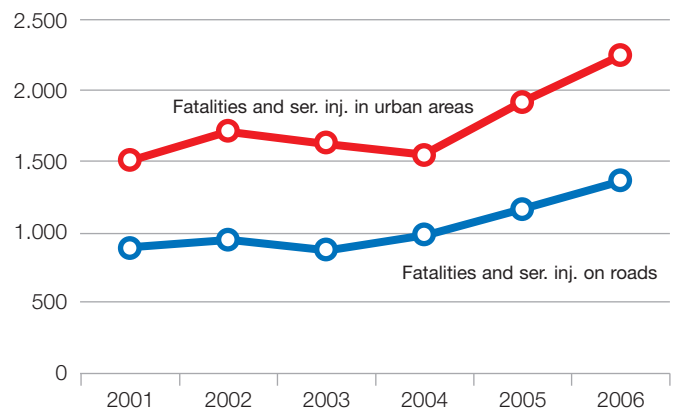
**Figures 6 and 7.** Relative evolution of motorbike victims on roads and in urban areas



Source: DGT. National Observatory for Road Safety

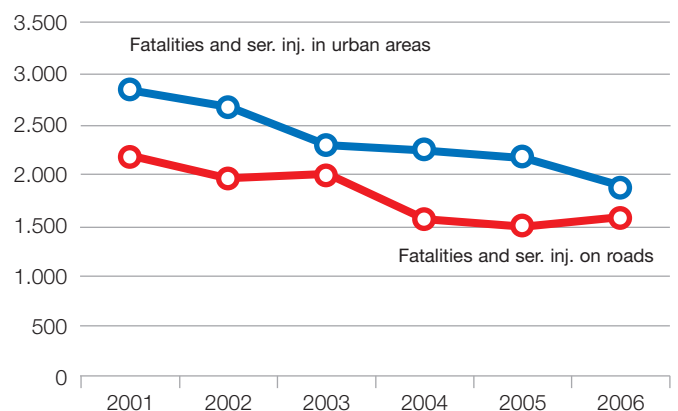
As apparent, since 2003 fatalities in moped accidents have dropped whilst fatalities in motorcycle accidents increased from 367 (2003) to 481 (2006). This tendency is ratified when considering the data on KSIs that show a clear difference between motorcycles and mopeds. Motorcycles follow an increasing trend whilst the data on mopeds show a drop, especially in urban areas, since 2001. This may be due to the reductions in the registrations of mopeds for use in urban areas to the benefit of 125 cc motorcycles.

**Figure 8.** Evolution of motorcycle fatalities and the seriously injured on roads and in urban areas



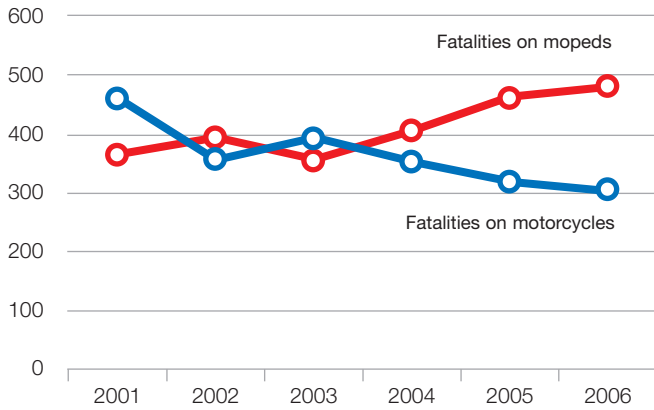
Source: DGT. National Observatory for Road Safety

**Figure 9.** Evolution of moped fatalities and the seriously injured on roads and in urban areas



Source: DGT. National Observatory for Road Safety

**Figure 10.** Evolution of fatalities and the seriously injured of motorcycles vs. mopeds



Source: DGT. National Observatory for Road Safety

This analysis may be summarized by emphasizing two key points regarding the accident rate of motorized two-wheeled vehicles:

- The absolute number of motorcycle accident casualties follows a tendency that rises along time, contrarily to that of mopeds where the trend is decreasing, probably due to the dropping popularity of this kind of vehicles.
- The ratio between casualties on roads and in urban areas has remained constant along time: 80% of the slightly injured in urban areas and 70% of the fatalities on roads.
- Fatalities in road accidents are increasing, especially within the segment of users of motorcycles with more than 500 cc.

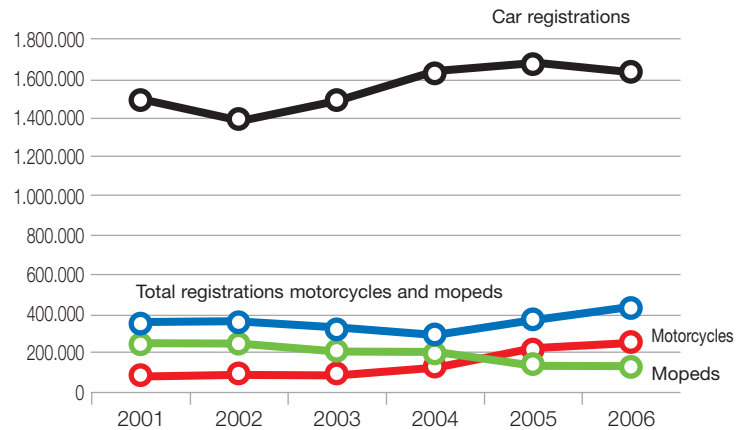
### 2.2.3. Comparison with other transport means

To establish the importance of the accident rate of two-wheeled vehicles, it is advisable to put into perspective the data on the existing vehicle fleet and on registrations on the one hand, and in respect of the accident rate for cars on the other.

In the course of the last years, motorcycle registrations have been increasing at very high rates, this being the same trend as that for cars, although at lower pace. In absolute terms, in 2006 registrations of motorcycles reached 274,918 units, whilst registrations of cars reached 1,660,627 units. Although the registrations of motorcycles only represent 17% of the figure corresponding to cars,

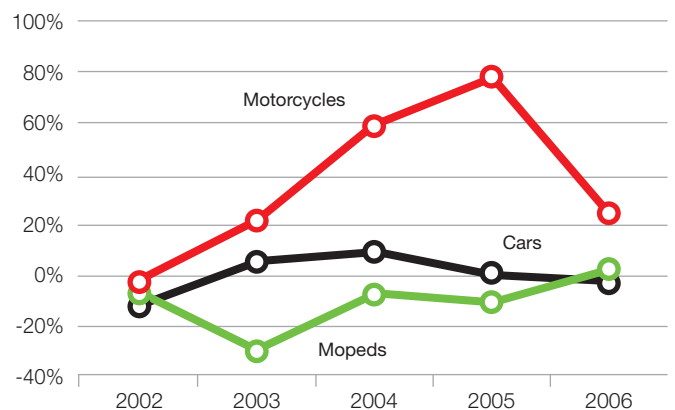
the interannual growth thereof has been much higher. Just the contrary has been occurring in respect of mopeds the registrations of which have been dropping year after year at both absolute and relative levels.

**Figure 11.** Evolution of registrations



Source: DGT. National Observatory for Road Safety

**Figure 12.** Interannual evolution of registrations



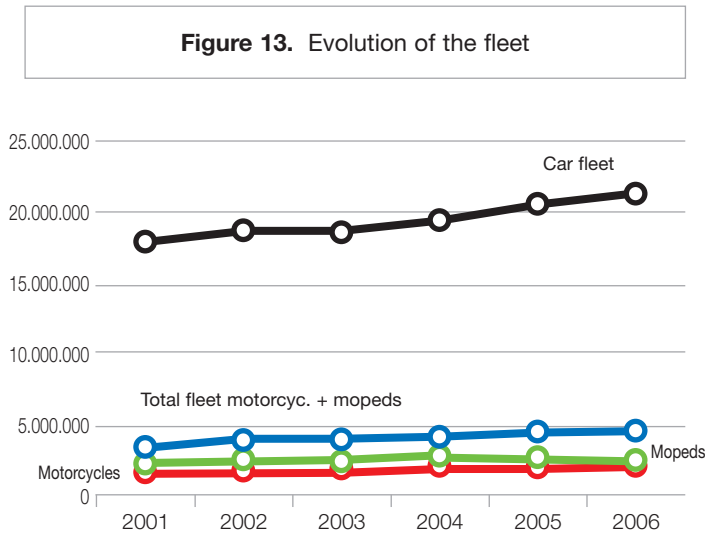
Source: DGT. National Observatory for Road Safety

The same situation is encountered when comparing the fleets of motorcycles, mopeds and cars. At absolute levels, in 2006 the fleet of cars exceeded 20 million vehicles whilst the fleet of motorized towwheeled vehicles slightly exceeded 4 million.



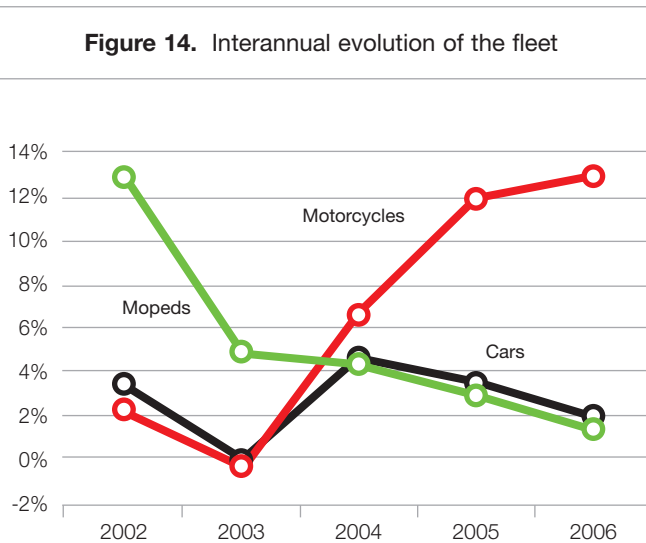
However, the same as in the case of the interannual analysis of registrations, it can be noted that the fleet of motorcycles which has been developing at increasing rates, contrary to what is occurring in respect of rates of the fleets of mopeds and cars that have been decreasing since 2003. These figures indicate that in proportion there are more and more new motorcycles being driven when compared to cars being driven.

**Figure 13. Evolution of the fleet**



Source: DGT. National Observatory for Road Safety

**Figure 14. Interannual evolution of the fleet**



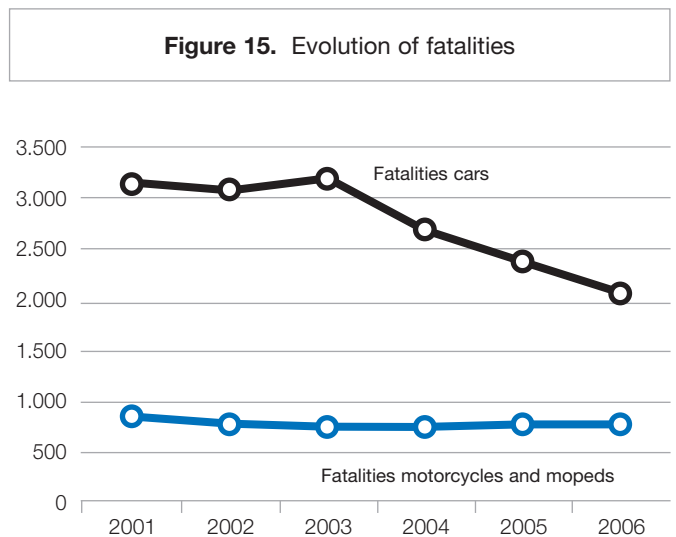
Source: DGT. National Observatory for Road Safety

Upon having compared the data on registrations and the fleet of cars and the fleet of motorized two-wheeled vehicles, it is appropriate to make a similar analysis in respect of the casualties.

In 2006, the number of slightly and seriously injured in car accidents was 79,236, and there were 2,096 fatalities. Regarding motorcycles, there were 16,002 slightly and seriously injured and 481 fatalities.

When analyzing the evolution of the fatalities, it can be clearly observed that the figure is much higher for cars than for motorcycles; however, the fleets participating in traffic are to be taken into account. The difference lies in the respective evolutions as, whilst the number of fatalities in car accidents have diminished drastically, fatalities on motorbikes have not become less and even have become slightly more. The interannual rate of decrease in 2006 compared with 2005 was 12.41% for cars, whilst fatalities on motorcycles and mopeds grew by 1%.

**Figure 15. Evolution of fatalities**

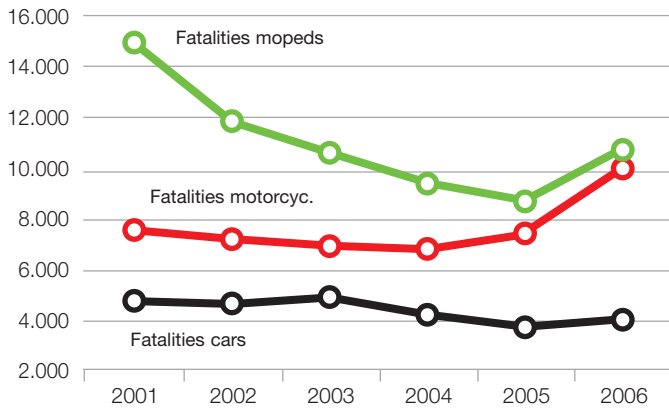


Source: DGT. National Observatory for Road Safety

When putting into perspective casualties and the fleet, an analogous situation can be observed. The total number of casualties per million vehicles of the fleet has diminished along time in respect of both mopeds and cars. However, motorcycles follow an absolutely contrary trend. The casualties per million motorcycles has increased along the time (7,493 to 8,071 in the period 2001-2006) compared to cars and mopeds, whilst when considering the rate of fatalities per million of the fleet, the trend has not changed

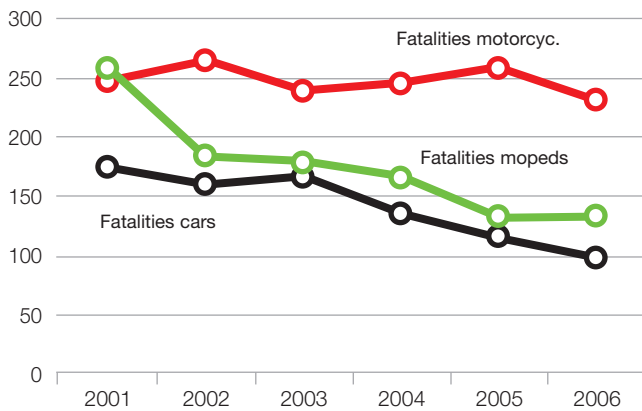
in respect of motorcycles along the last 5 years despite having decreased in the last year, whilst it has sharply decreased in respect of cars and mopeds.

**Figure 16.** Total rate of casualties per million vehicles of the fleet



Fuente: DGT. Observatorio Nacional de Seguridad Vial

**Figure 17.** Rate of fatalities per million vehicles of the fleet



Source: DGT. National Observatory for Road Safety

On the grounds of this comparative analysis between cars and two-wheeled vehicles it may be concluded that:

- There are more cars in circulation than motorcycles and mopeds, and the number of casualties is also higher.
- However, when the absolute figures are put into perspective in respect of the cars, it may be noted that per million vehicles there are more casualties on motorcycles than on cars..
- Upon analyzing trends, both the number of registrations and the number of casualties are growing. In respect of cars, registrations have grown but at a slower rate, and casualties have diminished.

### 2.3 The drivers of motorized two-wheeled vehicles

The age and kind of vehicle driven are two relevant factors when defining public policies in the field of road safety. Thus, there are various surveys on the profiles of the drivers of motorcycles and mopeds that have been taken into account so as to make the measures of the plan respond satisfactorily to the problems of the various user segments.

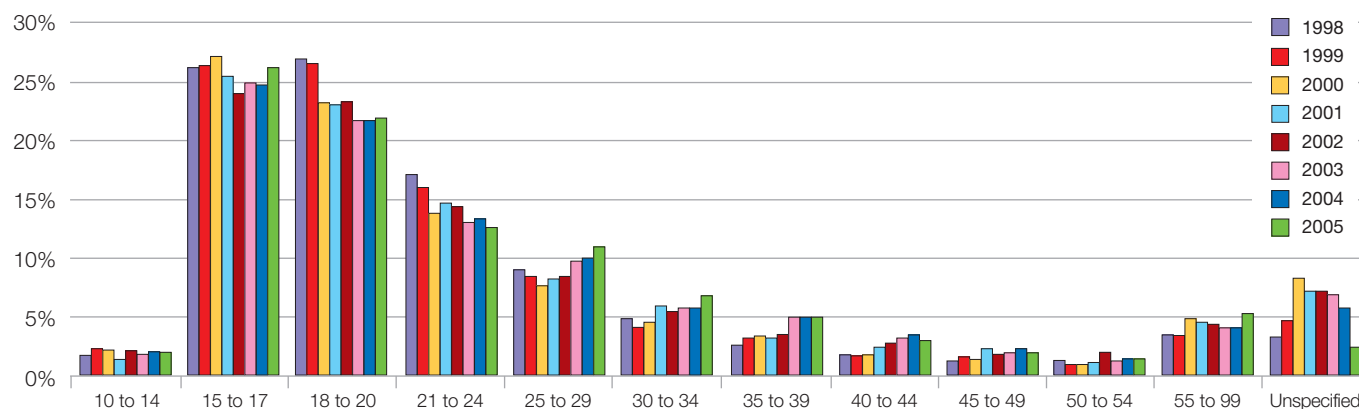
#### Psychosocial profile of moped users

*Profile of young moped drivers. Inmark Estudios y Estrategias, S.A. April. 2007.*

- Mopeds still are for many the first access step to the world of the two-wheelers. The majority of the users thus are young persons with little experience in driving this kind of vehicles.
- In accordance with a survey made by Inmark Estudios y Estrategias (April 2007) on 825 young drivers, these are characterized in that most of them are young males being 16 to 20 years old, of a medium and medium-low social status, and studies at the level of secondary education.
- Albeit almost 80% of these young people use mopeds daily or almost daily, in the afternoons and especially for leisure in urban areas, special attention is to be paid to those who use mopeds for professional purposes. This kind of drivers mainly uses their mopeds in urban areas and drives an average of 220 km per week.
- It may be pointed out that almost 50% of moped drivers did not have a suitable permit when driving their vehicles for the first time. 43.5% of them do not carry out periodic revisions of their transport means.

- The majority of the drivers are very confident in their driving technique, prudence and degree of nervousness, and the vast majority of them, almost 60%, considers that the speed at which they are driving is low or reasonable. Nevertheless, these data are in contrast with the information on risk driving that they themselves are providing.
  - Risk driving conducts are common to all drivers, whereby the following are outstanding: exceeding speed limits, inadequate overtaking, not respecting traffic signs and not respecting traffic light discipline. In addition to the afore stated conducts, they do not have a serious perception of the risk of accidents on mopeds, more than half of them considering that the level of risk they are assuming is “the normal” one. One of the most common risk driving practices among the users of mopeds is the manipulation thereof. By construction, their maximum speed is limited to 45 km/h and their cylinder capacity to 50 cc. Once altered, their maximum speed may reach more than 80 km/h.
  - The above stated risk situations become accentuated when we are talking about young people who use their mopeds for professional reasons. They do however show more respect to security, 90% of them always wearing helmet when working. The perception of the risk of accidents is larger within this group. 25% of them consider that driving a moped involves a high risk albeit 25% is of the opinion that it is low or very low.
  - A last segment to be considered in this analysis would be that of those who are using the motorcycle in a correct and suitable manner for professional use, or for their personal use for going to work, sometimes of frequently as a means for leisure.
- In the following, data of the accident rate for moped users in accordance with their ranges of age and considering only fatalities and seriously injured within the period 1998-2005 will be analyzed.

**Figure 18.** Distribution regarding the total number of fatalities and ser. inj. on mopeds in urban areas 1998-2005

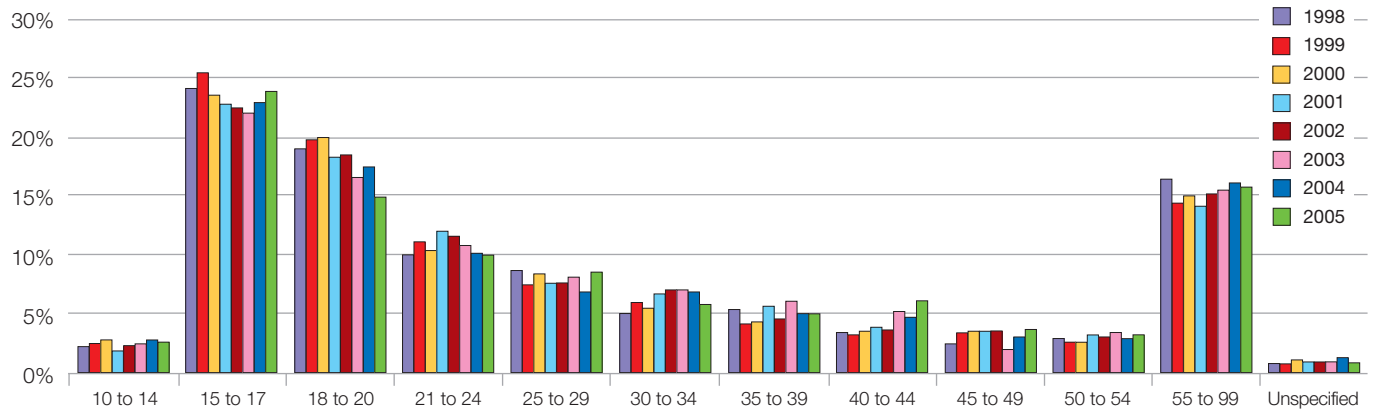


Source: DGT. National Observatory for Road Safety

Young persons aged between 15 and 24 years have been historically and are still representing the major percentage of fatalities and the seriously injured in moped accidents in urban areas comprising almost 64% of all cases. Within

this group, the youngest aged between 15 and 17 years are those who are keeping a proportion of 25%. Fatalities and seriously injured of ages of more than 35 keep maintaining their initial percentages without much variations.

**Figure 19.** Distribution regarding the total number of fatalities and ser. inj. on mopeds on roads 1998-2005



Source: DGT. National Observatory for Road Safety

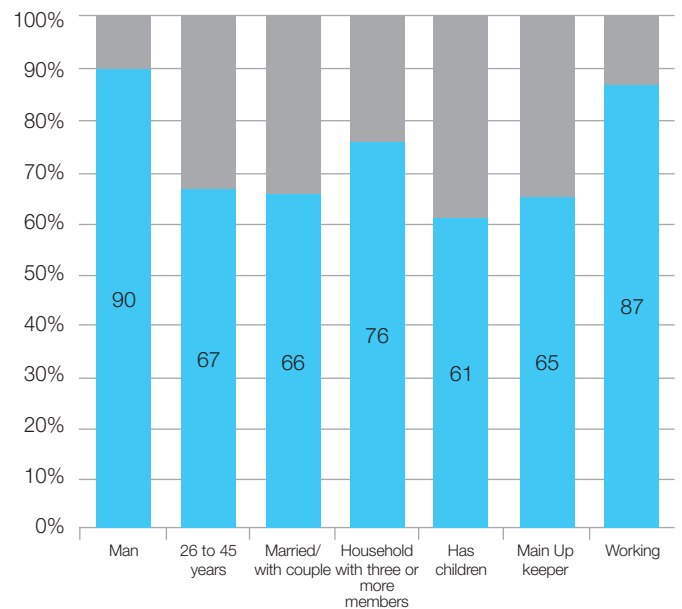
When accidents occur on roads, it is also the youngest segment of ages (15-24 years) that which represents more than 50% of fatalities and of the seriously injured. Here it can be observed that another group having a relevant weight is that of persons being older than 55 year which as a whole comprises 15% of all accidents.

**Psychosocial profile of motorcycle users**

*Psychosocial profile of motor bikers. Main Results. RANDOM, Estudios de Opinión, Marketing y Socioeconómicos, S.A.*

Motorcycle drivers make up a group that differs from the former one. In accordance with a survey carried out by Random on a universe of 1,000 motorcycle drivers, when observing the regional indexes of the fleet and the proportions of the cylinder capacities which they are composed of, it can be found that 90% of motorcycle drivers are male and in 67% are of an age comprised between 26 and 45 years.

**Figura 20.** Summary of motor-bikers' profiles: principal sociodemographic characteristics



Source: RANDOM, Estudios de Opinión, Marketing y Socioeconómicos, S.A.

- When considering that the difference in quotas between men and women is significant, the standard motor biker may be defined as follows: 26 to 45 years old adult male, working, living married or with his partner and being the main supporter of his present household comprised of three or more members.

- According to the survey, several clearly-defined segments of motorcycle users may be found.
  - Motorcycle professionals, i.e. delivery persons or messengers. These users use motorcycles of low cylinder capacities as a working tool, doing so mainly within cities and usually being young persons. Accidents suffered by this kind of users are labour accidents and usually occur within the timeframe of 06:00h to 20:00h.
  - The segment of users using a motorcycle for going to work. They suffer “in-itinere” accidents that are characterized in that they occur in urban areas during the week and early in the morning or late in the afternoon.
  - Pseudo-sportive users i.e. drivers using motorcycles on roads, mainly with more than 500 cc, on weekends, making routes and driving their motorcycles in a similar manner to racing drivers on circuits. They suffer the most serious accidents due to running off the road.
  - The segment that includes all multi-recidivist motorcycle drivers who are systematically putting in danger the road safety of the other users.
  - Finally, there are those users who use their motorcycles in a correct and correct manner both for professional and personal use to go to work, occasionally and frequently as a means for leisure.
- Among the main reasons for using a motorcycle, the pleasure of driving it is outstanding widely compared to other more practical reasons. These practical reasons are pre-

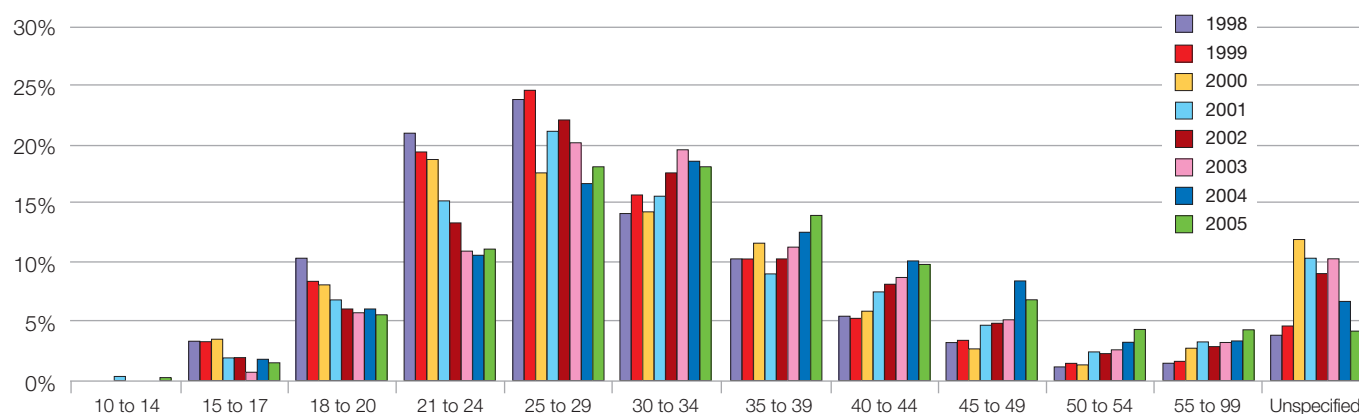
dominant among users of motorcycles with low cylinder capacities, women and inhabitants of large cities, whilst emotional reasons may be found within the segment of driver of motorcycles with high cylinder capacities.

Among older males living in smaller municipalities and owning motorcycles with high cylinder capacities, the motorbike is more an object of leisure than a transport means. It may be pointed out that more than 88% of all motor bikers (using the motor bikers as an object of leisure) in addition own a car.

- 66% of motorcycle drivers have suffered some kind of accident. The groups of users having suffered most accidents are travellers, regular users for practical reasons and young people. According to the opinion of the drivers, in 67.8% of all cases nothing could have avoided the accident, and in a modest proportion conducts of paying more attention on their parts could have avoided them.

Due to the increasing acceptance of motorcycles as transport means within the group of persons of medium age, it is difficult to carry out an analysis of the most relevant group in urban areas when taking into account that the quotas are especially important within the group of those being between 21 and 44 years old. However, it should not be forgotten that the trend of the serious casualties is increasing among those being more than 45 years old. The groups suffering the largest increase in fatalities and serious injuries are those comprised of 30 to 50 years old persons.

**Figura 21.** % distribution regarding the total number of fatalities and ser. inj. on motorcycles urban 1998-2005

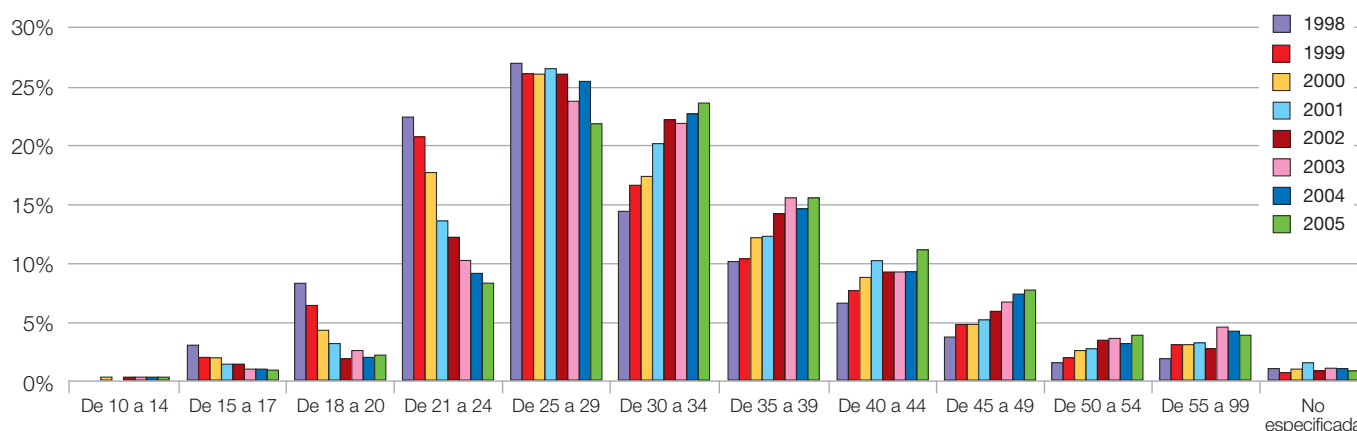


Source: DGT. National Observatory for Road Safety

The same as in the preceding analysis, the groups most affected by accidents with fatalities and serious injuries on roads, are those of ages comprised between 25 and 50 years. It is to be emphasized that since 1998, the percentage of fatalities and of the seriously injured has been con-

tinuously decreasing among 15 to 24 years old young people. This trend is just the opposite to the groups of ages comprised between 30 and 50 years in absolute as well as in relative terms, whilst those being older than 50 years are showing a more stable behaviour.

**Figura 22.** % distribution regarding the total number of fatalities and ser. inj. on motorcycles road 1998-2005



Source: DGT. National Observatory for Road Safety

## 2.4 Accident characterization and analysis

This section has been carried out using the database of accidents that involve at least one motor biker and who has become a casualty as the main but not only information source. The results of the analysis show when and how these accidents are taking place, which are the vehicles involved, where they occur and which other factors affect both the accident rate and the harmfulness of the accident. The study has been carried out in each of the areas. The data as analyzed has been segmented into three groups: slightly injured persons, seriously injured persons and fatalities – seriously injured persons and fatalities only – and fatalities only.

A harmfulness index reflecting the impact of certain factors or characteristics on the seriousness of the accident has been devised as a methodological tool. This means that this index will tell us, depending on if it is positive or negative, the importance of a factor or characteristic in respect of the harmfulness of an accident. For instance, in urban areas 29.7% of all accidents involving motorcycle or moped casualties occur on weekends, whilst when considering fatalities only, this per-

centage rises to 41.5%. In this case, the harmfulness index is positive (39.83%) which points at thinking that accidents on motorcycles or mopeds on weekends in urban areas are more harmful than within the rest of the week.

With regard to:

- When accidents are taking place:
  - 30% of all casualties in urban areas are caused on weekends. However, this percentage rises up to 42% when taking into account only the fatalities caused in these areas on weekends. It can be said that weekends in urban areas are much more harmful than the rest of the week.
  - On roads the trend is the opposite. Only when taking into account fatalities, we find the same proportion on roads during the week as on weekends..
  - When examining the time spans in urban areas, the harmfulness index rises within the time span from 00:00h to 6:00h, passing from 7% when including all casualties to 17% when talking about fatalities only.
  - On roads, the largest percentage of casualties is caused within the time span from 6:00 to 20:00h.

- Vehicles being involved in accidents:
  - 81% of the accidents with casualties involving at least a two-wheeled vehicle and other vehicles occur in urban areas. However the fatality index shows that the seriousness of the accidents slightly increases when only motor bikes are involved in the accident
  - On roads, we find that there is about the same percentage of accidents with casualties in which only motor bikes are involved as when there are several vehicles. The harmfulness index change very little when several vehicles are involved on motorways or on dual carriageways, but this is not so on conventional carriageways where the seriousness rises when several vehicles are involved in accidents with motor bikes.
  - Collisions between two-wheeled vehicles and other vehicles constitute 70% of the accidents. According to the most recent report prepared by Intrac in cooperation with Línea Directa (2007), in urban areas, three out of each four accidents with a motorcycle or moped involve a collision with other vehicles.
  - Last year, collisions between motorcycles and cars have risen by 20%. According to the said report, the profiles of drivers involved in the collisions are very similar with regard to motorized two-wheeled vehicles and cars. It may be emphasized that the figure of female motorcycle and moped drivers involved in collisions with cars in cities triplicates those involved on roads (10% in cities and 3.5% on roads).
- In respect of how they occur, 5 different aspect are taken into consideration: existing traffic, state of the surface, atmospheric factor, human factor and kind of accident:
  - In urban areas, the harmfulness index increases by 31% when talking about fluid traffic. This means the 97% of fatalities are caused when traffic is fluid. The same analysis is applicable when talking about a clean and dry driving surface
  - Regarding atmospheric factors, 95% of accident casualties are caused when weather is good. This might be due to that motor bikers do not use the motorcycle/moped when atmospheric factors are adverse.
  - Something similar occurs on roads where the percentages are very similar. The slight increase of harmfulness when there is good weather may be emphasized.
  - In collisions between cars and two-wheeled vehicles, the most frequent situation is when the car is turning and collides with the motor biker (19%).
  - Despite the fact that the available information sources do not include the adherence to and the maintenance of the road as a concurring factor in motorbike accidents, the percentage of accidents where the driving surface was not clean and dry was in no case higher than 10% neither in urban areas nor on roads.
- The human factor:
  - In urban areas, alcohol, drugs and speed increase the harmfulness of an accident by 170% and by 370%, respectively.
  - On roads, the seriousness of accidents increases in relative terms when alcohol and bad conditions of the vehicles are present in the accidents.
- It is estimated that in almost a third of those accidents involving motorbikes and four-wheeled vehicles, the motorcycle was not seen by the other driver.
- Taking into account the kind of accident:
  - In urban areas, the harmfulness index increases when the collision is a frontal one. However, this index decreases when the collision is frontolateral, lateral or due to rear-end collisions. It may be emphasized that 40% of the accidents with casualties in urban areas occur due to frontolateral collisions.
  - On roads, there occurs the same as in urban areas – harmfulness increases when the collision is a frontal one. 24% of the accidents with casualties occur due to frontolateral collisions.
- Where they occur:
  - When considering all casualties, 76% are caused in urban areas, whilst when considering only fatalities, this percentage reaches 72% on roads. The harmfulness index is negative thus allowing to state that, from a statistical viewpoint, the seriousness of an accident on a road is much higher than that of an accident in an urban area.
  - 55% of all fatalities caused in accidents of two-wheeled vehicles take place on conventional roads, 28% on slip roads and only 7% on motorways and double carriageways.
  - 80% of the collisions between motorcycles and cars take place in cities. In accordance with the most recent INTRAS-survey for Línea Directa, is proven however that half of the collisions on conventional roads have serious or fatal consequences. Thus, the number of fatal collisions is six times higher on conventional roads than those occurring in urban areas.
  - Regarding the configuration of the lanes, the largest percentage of fatalities is caused in urban areas on intersections (between 2001 and 2005, 61% of all collisions between two-wheeled vehicles and cars), whilst the opposite occurs on roads, away from intersections.

- The kinds of intersections counting for most collisions are T or Y on roads, and X or + in urban areas.
  - Despite there not being any detailed surveys on SACs (Sections with Accident Concentration) nor on urban risk areas regarding two-wheeled vehicles, it is nevertheless possible to identify some sections with high concentrations of accidents in each province. Thus, for instance, according to EuroRAP in the Community of Madrid there are the 10 sections with the highest accident rates of motorbikes in Spain, and 50% of fatal and serious motorcycle and moped accidents on the State Road Network (SRN) are localized on 12% of the network of the same province. Everything appears to point towards that it makes sense talk about SACs of twowheeled vehicles. The most detailed analysis existing at present on SACs is that developed by EuroRAP.
  - A large portion of serious motor biker accidents are caused in the areas of pseudo-sportive driving on roads. These are areas in the mountains or mountain passes with curves having short radiuses and conventional roads, which are being used by motor bikers to drive motorcycles with high cylinder capacities who imitate professional racing drivers.
  - Regarding geographic areas, motorbikes suffer a larger number of accidents in the coastal areas of Spain, mainly in the Mediterranean area, on the islands and in Madrid. From January to July 2007, about 61% of the fatalities in motorcycle accidents have been caused in 13 provinces: Cádiz, Huelva, Malaga, Iles Baleares, Murcia, Alicante, Valencia, Las Palmas, Tenerife, A Coruña, Pontevedra, Ourense and Madrid.
- Finally, a number of factors having an influence on both the occurrence and the harmfulness of the accidents may be emphasized :
    - Experience: In urban areas it can be determined that the larger the experience is, the higher is the harmfulness index. This may be due to an excess of confidence which involves a larger number of lapses of concentration. It may be emphasized that on roads the major percentage of casualties caused is when the driver has more than 3 years experience (approximately 70%).
    - There is a high number of collisions between cars and motorized two-wheeled vehicles occurring due to traffic offenses by the driver if the car (70%).
    - There are two clear indications showing that in more than half of the fatal accidents the motor biker was driving at an excessive or inadequate speed.
    - Helmet: In accordance with the most recent report prepared by the DGT, not using the helmet increases serious cranial injuries by 40% and reduces the probability of staying unharmed by more than 20%. The data show that 97% of the motor bikers are wearing the helmet when suffering the accident, a percentage that rises to 99% when analyzing only accidents recorded in motorways/double carriageways. When the motor biker drives with a pillion rider, use of the helmet decreases slightly. The data on the use of the helmet are encouraging but they must increase especially in those regions of the geography where there are large groups of users who do not use the helmet (mainly coastal areas).
    - Safety systems on the vehicles: A significant proportion of motorbike accidents occur due to a loss of control of the vehicle by the driver in an emergency-braking situation. In accordance with the most recent survey published in Spain by INTRAS for Línea Directa on collisions between two-wheeled vehicles and cars within the period 2001-2005, 30% of the accidents could be avoided if the entire braking capacity of the motorcycles were used, and an integral braking system and ABS would contribute very positively to optimizing the braking of twowheeled vehicles..
    - Protection systems for motor bikers (PSMs): These systems are officially-approved technical devices that reduce the risk of injuries that any user of two-wheeled vehicles may suffer in the case of an impact against a safety fence. Motorbike accidents occurring on roads due to offthe-road goings and collisions against safety fences have serious or lethal consequences. The Plan for the Adaptation of Containment Systems in CO [Circular Order] 18/2004 that will replace the present containment systems by PSMs on 1,500 km of the State Road Network (SRN) is already in operation. There are no surveys on the percentage by which fatal and serious accidents will be reduced by this kind of devices, but it is certain that the harmfulness thereof will be reduced very significantly.
    - Vertical signposting: urban furniture and vertical signposting worsen the harmfulness of accidents of two-wheeled vehicles in urban areas. A detailed analysis of the effects of these systems on motorbike accidents would show us the harmfulness thereof.



Once the main data on the concurring factors that affect motorcycle and moped accidents, one occurrence pattern may be established for roads and another for urban areas.

- In urban areas, accidents occur on intersection, especially on those that are regulated by traffic lights, on crossings and roundabouts; direct merging onto lanes from parking lots causes a large number thereof, the same as filtering in from both a moving and a standing situation; pavement with obstacles on roads, slippery surfaces and an irregular driving surface are usual concurring factors.
- On roads, the vast majority of accidents occur due to overtaking on double carriageways and on conventional roads, due to off-the-road goings, merging onto lanes, due to one-level intersections regulated by vertical stop and give-way signs, and due to the condition of the pavement: obstacles, irregularities in the driving surface and slippery surfaces. Areas where pseudo-sportive driving is practiced and where a large number of accidents, fatal in their majority, occur due to off-the-road goings, deserve special attention.



## 2.5 Operators involved

### 2.5.1. General classification of operators intervening in the phenomenon

#### A. General Administration of the State

- Ministry of the Interior. Traffic General Directorate.
- Ministry of Industry, Tourism and Commerce.
- Ministry of Public Works. General Directorate for Roads.
- Ministry for the Environment.
- Ministry of Health.

#### B. Autonomous Communities

- Servei Català de Trànsit. Generalitat de Catalunya [Catalonian Traffic Service of the Catalonian Government].

#### C. Local Entities

- City Council of San Sebastián. Directorate for Mobility.
- City Council of Barcelona. City Department for Security and Mobility.
- City Council of Barbate (Cádiz). 22000 inhabitants. 5000 mopeds.
- City Council of A Coruña. Area for Sustainability and Urban Mobility.
- City Council of Madrid. Government Area for Security and Services to the Community. General Coordination for Services to the Community. Directorate General for Mobility.
- City Council of Toledo. City Department for Traffic.

#### D. Associations of users of two-wheeled vehicles

- Moped Associations.
- Plataforma Moteros Unidos por la Vida [Platform United Motor Bikers for Life].
- AMM – Asociación Mutua Motera [Mutual Motor Bikers' Association].
- AMVER – Asociación de Usuarios de la Moto Verde [Association of Users of the Green Motorbike].
- Messenger on motorbikes and pizzerias.
- Lucha Motera [Motorbike Struggle].

#### E. State Security Forces

- Local Police.
- Guardia Civil. Agrupación de Tráfico de la Guardia Civil (ATGC) [Traffic Group of the Guardia Civil].

#### F. Professional, financial and social organization related to Traffic and Road Safety

- AEC – Asociación Española de la Carretera [Spanish Road Association].

- Real Automóvil Club de España (RACE) [Royal Automobile Club of Spain].
- Real Automóvil Club de Cataluña (RACC) [Royal Automobile Club of Catalonia].
- Cruz Roja Española [Spanish Red Cross].

#### G. Driver checkup centres

- ASECEMP - Asociación Española de Centros Médico-Psicotécnicos [Spanish Association of Medical and Psychotechnical Centres].
- Asociación Española de CRC\_online [Spanish CRC\_online Association]. Medical specialists who are experts in Road Safety may be consulted..

#### H. Motor vehicle insurance companies

- UNESPA - Unión Española de Entidades Aseguradoras y Reaseguradoras [Spanish Union of Insuring and Reinsuring Entities].
- AMV Seguros – Specialist in insurances for motorbikes.
- Línea Directa.
- Mutua Madrileña Automovilista.
- MAPFRE.
- Reale Seguros.
- Caser Seguros.

#### I. Companies dedicated to Road Preservation

- ACEX – Asociación de empresas de Conservación y Explotación de Infraestructuras [Association of Preservation and Infrastructure Exploiting Companies].

#### J. Companies specializing on traffic signposting, control and management

- Abengoa, S.A. – Engineering, construction and preservation of electrical, mechanical and instrumentation infrastructures for the transport sector.
- Cintra – Toll-motorway and car lot market.
- DIELSE, S.L. – Engineering consultants specializing on projects for traffic, signposting, traffic guidance equipment and road safety on urban and interurban traffic roads. It provides software solutions applied to traffic engineering.
- Indra Sistemas S.A. – Management, control and signposting for motorway tolls, and management of transport operations.
- Sainco, S.A. – Integration of control systems, information systems and private telecommunications networks for the transport market.

#### K. Road Assistance Entities

#### L. Driving Schools

- Confederación Nacional de Autoescuelas [National Confederation of Driving Schools].

#### M. Non-profit organizations having an especial interest in education or Road Safety

- Fundación José Pons [José Pons Foundation] – Initiatives linked to road safety education and implementation of traffic education in schools and Universities.
- P(A)T - Asociación para la Prevención de Accidentes de Tráfico [Association for the Prevention of Traffic Accidents].
- RACC – Non-profit entity that pursues stimulating all kind of cultural, promotional and dissemination activities regarding the motor culture, with the final aim of promoting a mobility that is rational and respectful with the environment.
- STOP ACCIDENTES – Help and guidance for persons affected by traffic accidents. Prevention thereof.
- Sociedad Técnica de Automoción – Fosters automobile technology and impels the progress of the automobile.
- Insurance Institute for Highway Safety (IIHS) - The Insurance Institute for Highway Safety is an independent, non-profit, scientific and educational organization dedicated to reducing the losses – deaths, injuries, and damage to property— from crashes on the nation's highways.

#### N. Research Centres, Universities and consultants specializing on mobility, traffic, transport, road safety and transport infrastructures

- AEPO, S.A. – Civil engineering company for road activities.
- APIA XXI, S.A. –Consultants for projects and studies related to civil engineering.
- Constructora Hispánica, S.A.
- DOYMO.
- INECO –Surveys referring to traffic, road safety, profitability and exploitation for the concession and privatization of motorways, for traffic management systems by means of intelligent systems, and to terrains.
- SEITT – Sociedad Estatal de Infraestructuras del Transporte Terrestre [State Society for Infrastructures for Terrestrial Transport].
- APPLUS+IDIADA - Instituto de Investigación Aplicada del Automóvil [Institute for Applied Automobile Research].
- IEA – Instituto de Estudios de Automoción [Institute for Automotive Studies].
- CENTRO ZARAGOZA. Instituto de investigación sobre reparación de vehículos, S.A. [Institute for research on automobile repairs].
- Fundación para la Investigación y Desarrollo en Transporte y Energía, Fundación CIDAUT [Foundation for Research and Development in Transport and Energy, CIDAUT Foundation].

- University of Alcalá de Henares (Madrid). Since November 2005 it has a Chair for Road Safety. The aim thereof is developing surveys on the traffic in the Community of Madrid, education of trainers in this field and promoting road safety.
- University of Cantabria. Higher Technical School for Civil Engineers – Department of Transports and Projecting and Processing Technology..
- University of Zaragoza. Road Safety Group of the University of Zaragoza.
- Polytechnic University of Madrid.
- INSIA – Instituto Universitario de Investigación del Automóvil [University Institute for Automobile Research]. The INSIA is a centre of the Polytechnic University of Madrid that was created following a proposal by the Higher Technical School for Civil Engineers and registered within the institutional framework thereof.
- ETSI industriales [Higher Technical School for Civil Engineers]. Research group – Safety and environmental impact of vehicles and transports.
- The Fundación UPC [UPC Foundation] (belonging to the Polytechnic University of Barcelona) organizes, with the support of the National Association of Companies of the Two-Wheelers Sector (ANESDOR) the first postgraduate course in motorcycle technology. The course will start on February 1, 2007 next, at the Campus of the UPC in Terrassa, and shall finish at the end of June.
- University of Valencia. Institute for Traffic and Road Safety. Scientific and applied research, development and innovation, training and consultancy in respect of traffic accidents and safety.
- CIDAUT - Foundation for Research and Development in Transport and Energy.
- Federación Nacional Empresarial de Alquiler de Vehículos. FENEVAL [National Business Association for Car Rentals].
- Asociación Española de Profesionales de Automoción ASEPA [Spanish Associations of Professionals in the Automotive Sector].

#### *Dealers*

- FACONAUTO - Federación de Asociaciones de Concesionarios de Automóviles [Federation of the Associations of Automobile Dealers].
- Motorrad. The leading network of motorbike shops in Spain.

#### *Sparepart Distributors*

- ANCERA – National Association of dealers of equipment, spare parts and accessories for the automotive sector. Ancera is a non-profit organization that is made up of provincial and sectorial associations and purchase groups, that represents almost the whole of the independent sector of the distribution of automotive spare parts in Spain, comprising about 7,000 sales points and providing employment to approximately 50,000 workers.
- Motogruppo Europa.

#### *Automobile manufacturers*

- Asociación Española de Fabricantes de Automóviles y Camiones (ANFAC) [Spanish Association of Automobile and Truck Manufacturers].
- Asociación Europea de Fabricantes e Importadores de Motocicletas y Ciclomotores (ACEM) [European Association of Motorcycle and Moped Manufacturers and Importers].
- Asociación Mundial de Fabricantes de Motocicletas. IMMA [World Association of Motorcycle Manufacturers].
- APRILIA WORLD SERVICE B.V.
- BETA – TRUEBA S.L.
- BMW IBERICA S.A.
- DERBI NACIONAL MOTOR, S.A.U.
- GAS GAS MOTOR, S.A.
- PIAGGIO ESPAÑA, S.A.U.
- KYMCO MOTO ESPAÑA, S.A.
- MONTESA HONDA, S.A.
- SUZUKI MOTOR ESPAÑA, S.A.
- YAMAHA MOTOR ESPAÑA, S.A.

#### *Manufacturers of automotive equipment and components*

- Observatorio Industrial de Fabricantes de equipos y componentes para automoción [Industrial Observatory of Manufacturers of automotive equipment and components]. It is made up by Sernauto, the Ministries of Industry and Labour, the Spanish Federation of Innovation and Technology Entities (Fedit) and the trade unions UGT and CCOO.

### **O. Industry of the two-wheelers sector**

- Asociación de Empresas del sector de Dos Ruedas. ANESDOR [Association of Companies of the Two-Wheelers Sector].
- Asociación Española de Renting de Vehículos [Spanish Vehicle Renting Association].
- Asociación Nacional de Importadores de Automóviles, Camiones, Autobuses y Motocicletas. ANIACAM [National Association of Importers of Cars, Lorries, Coaches and Motorcycles].
- Asociación Nacional de Vendedores de Vehículos a Motor, Reparación y Recambios. GANVAM [National Association of Motor Vehicle Seller, Repair and Spareparts].
- Federación Catalana de vendedores de vehículos a motor. FECAVEM [Catalonian Federation of Motor Vehicle Sellers].

- Sernauto – Asociación Española de Fabricantes de equipos y componentes para automoción [Spanish Association of manufacturers of automotive equipment and components]..

#### **P. International institutions related to road safety and to motorbikes**

- International Association for accidents and traffic medicine.
- World Association for Safety on Roads.
- ASIRT – Association for International Road Safety.
- CEA – European Automobile Commissariat.
- ERSO – European Road Safety Observatory.
- European Federations of Traffic Accident Victims.
- FEMA - Federation of European Motorcyclists Associations.
- FIA – International Automobile Federation.
- IRSA – International Road Safety Association.
- IRTAD - International Road Traffic and Accident Database.
- IRU – International Road Transport Union.
- ITC – Institute for Traffic Care.
- WHO – World Health Organization.
- World Road Safety Network. The initial organizations are as follows: ITC- Netherlands, IRTE – India, Road Safe- United Kingdom, Centrex BRAMSHILL – United Kingdom, TRL – United Kingdom, Intrafpol - Spain.
- ITARDA.
- TISPOL – European Traffic Police Network.
- ECMT - The European Conference of Ministers of Transport.
- EARPA - European Automotive Research Partners Association.
- TRB - Transportation Research Board, a Northern American institution linked to the National Academy of Sciences and the National Academy of Engineering..
- TSC – Traffic Safety Centre. University of California Berkeley.

#### **2.5.2. Members of the Working Group “Motorcycles and Road Safety”**

- Ministry of the Interior. Traffic General Directorate.
- Ministry of Industry, Tourism and Commerce.
- Ministry of Public Works. Directorate General for Roads.
- City Council of Barcelona. City Department for Security and Mobility.
- City Council of Madrid. Government Area for Security and Services to the Community. General Coordination for Services to the Community. Directorate General for Mobility.
- AMM – Mutual Motor Bikers’ Association.

- Guardia Civil. Traffic Group.
- Real Automóvil Club de Cataluña (RACC) [Royal Automobile Club of Catalonia].
- Real Automóvil Club de España (RACE) [Royal Automobile Club of Spain].
- UNESPA - Unión Española de Entidades Aseguradoras y Reaseguradoras [Spanish Union of insurance and reinsurance entities].
- Asociación de Empresas del sector de Dos Ruedas. ANESDOR [Association of Companies of the Two-Wheeler Sector]..
- Asociación Nacional de Vendedores de Vehículos a Motor, Reparación y Recambios. GANVAM [National Association of Motor Vehicle Seller, Repair and Spareparts].
- Federació Catalana de venedores de vehicles a motor. FECAVEM [Catalonian Federation of Motor Vehicle Sellers].

#### **2.5.3. Outline of the interviews held with the key operators to diagnose their opinions and concerns**

- General opinion on the data and trend of the accident rate of motorcycles and mopeds.
- Determination of the factors affecting the accident rate of motor bikers.
- Arrangement of said factors in accordance with the impact thereof.
- Opinion on the previously determined key factors:
  - Preparing motor biker for safe driving
    - Modifying the access tests
    - Progression regarding the access
    - Road safety training
  - Minimizing high-accident-rate scenarios
    - Traffic management
    - Adapting infrastructures
    - Equipment and characteristics of the motorbikes
  - Fighting risk driving
    - Awareness-raising
    - Preventive actions on driver segments in accordance with risk driving
    - Detecting and sanctioning risk driving
  - Adopting mitigating measures
    - Infrastructures
    - Assistance
    - Motor biker equipment
- Measures addressing the improvement of road safety that the operator would implement or is implementing on its own.
- Operator’s vision on the existing cooperation between the operators of the sector.
- Measure that the operator would undertake to promote and improve the existing level of cooperation.

#### 2.5.4. Stance of the operators on the phenomenon

The carrying out of the interviews of the key operators has shown that there is a broad consensus on the importance of the phenomenon of the accident rate, and on the need to put into operation measures aimed at reducing the accident rate and mitigating the consequences produced by the accident rate. Hereafter, those aspects on which each operator put the greatest focus or emphasis:

- Ministry of Public Works. Directorate General for Roads.
  - The installation of protection systems for motor bikers (PSMs) that has already started on the whole of the State Road Network will be a key issue at all points with high accident rates (black points). The adaptation plan will be carried out within 4 years.
  - Road safety audits, a project that has started as well but which as yet has not shown results, will be a decisive factor for adapting roads for the safety for motor bikers, when they are being designed or under construction (modifications that involve less recourses) o which are already in operation.
  - The present methodology for identifying and analysing SACs [Sections with Accident Concentration] must be adapted to motorized two-wheeled vehicles.
  - Traffic segregation that would allow motor bikers driving on the verge may be even more dangerous as driving would be nearer to the safety fences and barriers.
- City Council of Barcelona. City Department for Security and Mobility.
  - The first essential step for improving road safety in cities is identifying SACs in urban areas.
  - Bollards/bitts that are installed to avoid parking in prohibited areas are causing several casualties each year that would become reduced if they were of another material instead of steel or wrought iron.
  - For making schedules for itinerant training being efficient and able to comply their aims in an efficacious manner, the complete cooperation of all municipalities must be counted on. Moreover, they must be sufficiently attractive to make user access them voluntarily.
  - A standard for minimum equipment for motor bikers must be established in addition to providing advice on the safe transport of luggage and other packages on the vehicles.
  - Creating an efficacious reporting system on infrastructure deficiencies is a necessary tool for making municipalities improve road safety.
  - Involving city councils in the development of a Strategic Road Safety Plan for motorcycles and mopeds is a key issue for achieve success.
- City Council of Madrid. Government Area for Security and Services to the Community. General Coordination for Services to the Community. Directorate General for Mobility.
  - Se The vulnerability of the motor biker must be emphasized by trying to avoid the non-visibility of two-wheeled vehicles.
  - As a segregation measure in urban areas, the use of the bus lane by motorcycles and mopeds will avoid the problem of merging between cars thereof.
  - Helmets should bear a message such as “in case of accident, do not take off my helmet”, and users should not be forced to wear a reflective vest but they should only be recommended to do so.
  - Traffic education must be the main tool for raising the awareness of young people.
  - The in-depth analysis of the traffic distribution on the road network must be carried out by additionally taking into account the accident rates. In Madrid, 80% of the traffic concentrates on 20% of the road network, so that it would be representative to analyze if this pattern is also reproduced in the accident rate.
  - A key aspect for the success of any kind of Plan is involving all competent administrations.
  - A user’s recidivism and participation in many accidents are aspects that contribute to establishing the relationship that exists between certain conducts and the probability of an accident.
- AMM – Mutual Motor Bikers’ Association.
  - Road safety on roads for motor bikers is achieved, among other measures, by installing PSMs on all sections of the road network where any safety fence has been installed.
  - This must be reinforced by creating a stable group that carries out road safety audits.
  - Planning travelling road safety courses in coordination with all municipalities, and privately incentivized, will achieve to train drivers in respect of good driving practices and their training in respect of hazard situations.
  - Incorporating a larger number of hours on traffic education into primary and secondary education will achieve to reduce the number of casualties within the segment of moped drivers or potential moped drivers by means of a greater awareness in respect of safety.
  - Creating a centralized database collecting the complaints as made by citizens and officers of the security forces regarding road infrastructures will achieve a greater efficaciousness in adopting measure to remedy defects.

- Guardia Civil. Traffic Group.
  - Dissuasive controls regarding risk driving on this kind of vehicles must be increased.
  - Overtaking at intersections on conventional roads must be prohibited because these are high-accident-rate areas for motorcycles overtaking other vehicles..
  - Regarding sanctions, those relating to the “intention to elude monitoring systems”, to overtaking on the right verge and merging between vehicles, should be increased..
  - It is not considered that pavements in bad conditions are the main cause of the accident rate of motorized two-wheeled vehicles, whilst they however identify stains of oil and gravel as high-accident-rate scenarios.
  - It would be very favourable to include manoeuvres of motorcycles and mopeds as a subject for the B-license. This would lead to becoming more aware of these vehicles and to reduce the vulnerability thereof.
- Royal Automobile Club of Catalonia (RACC).
  - They focus on the training of drivers by means of voluntary albeit duly incentivized courses.
  - The phenomenon of professional motorbike drivers (delivery services, messengers, ...) must be adequately regulated focussing on training and traffic education.
  - Introducing a greater progressivity regarding the access is considered to be necessary, as well as setting up a remittal program for sanctions by training, to be duly included in the existing traffic re-education system (recovery of points).
  - It is very important that the drivers of four-wheeled vehicles are made aware that motor bikers contribute to traffic mobility.
  - Remittal of sanctions by training should be duly integrated into the existing system for the recovery of points.
- Royal Automobile Club of Spain (RACE).
  - Training must be compulsory for professional drivers and voluntary for the rest of the users, and duly incentivized.
  - The Plans for the Prevention of Labour Risks must incorporate traffic accidents on motorized two-wheeled vehicles.
  - R&D on additional clothing and equipment that increase the motor bikers' safety should be fostered and financially aided.
  - The incorporation of PSMs at high-impact locations is considered especially important for the users of motorcycles and mopeds.
  - Planning schedules of using circuits including Grand Prix events and Promotion Cup events of the manufacturers will foster the avoidance of pseudo-sportive driving in the areas where this kind of driving is a usual practice.
- Association of Companies of the Two-Wheeler Sector. ANESDOR.
  - The incorporation of the FEMP (Spanish Federation of Municipalities and Provinces) is highly recommendable for enforcing the measures.
  - Using the helmet efficaciously is comprised of three steps: its official approval, its use and its correct fastening.
  - Establishing a deontological advertising code also including print media, so as to raise safety awareness.
  - A stronger focus must be put on raising the awareness of the drivers of 4-wheeled vehicles on the vulnerability of motorcyclists, by means of education campaigns.
  - The sanctioning regulations should not be amended, but preventive control should be increased.
  - Users accessing motorcycles by means of the B-license should take a compulsory training course.
- National Association of Motor Vehicle Seller, Repair and Spare parts. GANVAM.
  - They consider the revision of the caducity and official approval of helmets to be necessary.
  - Moreover, control of the souping-up of motorcycles and mopeds should be expanded by a strict schedule of ITVs [Technical Vehicle Inspections].
  - Imposing the obligation of the use of the reflective vest on motorbikes may be an inhibitor of the use thereof.
  - They consider that it is necessary to develop a policy similar to the Prever Plan [Vehicle Renewal Scheme] for motorcycles and mopeds so as to guarantee the safety of this kind of vehicles.
- Catalanian Federation of Motor Vehicle Sellers. FECAVEM.
  - Expanding the offer of circuits will reduce the use of certain road sections in a “pseudosportive” manner.
  - The progressivity must be associated to the seniority of the driving license.
  - La Introducing the ITV for mopeds will reduce souping-up practices to a minimum and improve the condition of these vehicles in respect of safety.
  - Incentivizing voluntary training course is a key issue to achieve the success in the assistance to different programs.
  - Dirty verges and the presence of slippery substances on the driving surface are causing a large number of road accidents.

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## 3 Targets of the Plan

761 motor bikers were killed and 5,591 were seriously injured in 2004. Since then, the total number of motor bikers killed and seriously injured has increased up to reaching 789 fatalities and 6,334 seriously injured in 2006.

The growth rates of the absolute number of motor-biker-related casualties are low but, as shown in the preceding sections, they are in contrast to the marked decreasing trend of the absolute number regarding car-related casualties.

However, this contrast has eased considerably when taking into account that the motorbike fleet has grown at much higher rates than that of cars. Thus, when considering the number of casualties per million vehicles, growth rates decrease in the case of cars whilst they keep stable at about 250 fatalities in the case of motorcycles (please note that in this latter case reference is made only to motorcycles without including mopeds).

The general targets of the strategic plan are two that are complementary to each other, and aimed at the pattern of the accident rate of motorbikes becoming progressively similar to that of cars:

- Reversing the rising trend of the number of deaths and serious injuries among motorbike users on our roads and in our villages and cities.
- Achieving that the number of deaths per each hundred thousand motorcycles initiates a timesustained decrease.



The plan is thus aimed at reducing the number of seriously injured and killed motor bikers, and, among its targets, it does not envisage the number of slightly injured casualties.

Furthermore, the plan is ambitious in respect of its targets inasmuch it echoes both absolute variables (number of fatalities and serious injured) and relative ones (number of fatalities per million vehicles of the fleet).

In what respect the follow-up of the plan, this will be carried out, the same as it has been the case of its preparation, within the framework of the Working Group "Motorcycles and Road Safety". The followup system and the thereto associated indicators will be described in a subsequent section of this document.

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# 4 Methodology

It has been wished to base the preparation of the plan on a “shared vision” among all operators intervening in the phenomenon of the accident rate regarding motorcycles and mopeds. This has meant the joint work to be developed within three fields: a common understanding of the problem.

The plan has been prepared within the working group “Motorcycles and Road Safety”. This group is comprised of 12 entities, all of which are outstanding actors in respect of the phenomenon of the accident rate of motorcycles and mopeds. They are the following:

- Traffic Group of the Guardia Civil (ATGC)
- Association of Companies of the Two-Wheeler Sector (ANESDOR)
- Mutual Motor Bikers’ Association (AMM)
- City Council of Barcelona. City Department for Security and Mobility
- City Council of Madrid. Government Area for Security and Services to the Community. General Coordination for Services to the Community. Directorate General for Mobility
- Ministry of the Interior. High Council for Traffic and Road Safety. Directorate General for Traffic (DGT).
- Ministry of Industry, Tourism and Commerce.
- Catalan Federation of Motor Vehicle Sellers (FECAVEM)
- National Association of Motor Vehicle Seller, Repair and Spare parts (GANVAM)
- Ministry of Public Works. Directorate General for Roads
- RACC
- RACE
- Spanish Union of Insuring and Re-insuring Entities (UNESPA)



The development of the plan has at all times counted on an active participation of the said actors, both in the analysis of the problem and in the definition of the solutions, whereby a individual and collective meeting were continuously held with all members until achieving a high level of consensus.

The activities of the working group have been complemented with specific studies and an analysis of international experiences, so to thereby be able to count on all information as necessary for taking decisions.

Once the organization of the project had been defined, the preparation of the Strategic Plan took place in three steps:

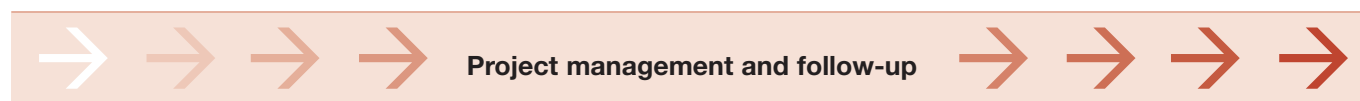
- a step of formulating the shared vision, wherein the problem was defined and analyzed,
- a step of analyzing the solution, wherein all possible measures that might have become a part of the Strategic Plan were selected, and
- a step of programming and preparing the plan, wherein the measures were prioritized and programmed, and the final version of the plan was drafted.



Organization of the project	Formulation of the shared vision	Analysis of the la solution	Scheduling and preparing the Plan
Launching the project	Dissemination + raising sensitivity	Preparing tree of solutions	Multicriterion Analysis
Organizing the project	Analysing and assessing data	Discussing within the Working Group	Scheduling
Constituting a Working Group	Launching the Working Group	Estimating feasibility and efficiency	Drafting action sheets
	Researching, tuning and validating	Assessing running measures	Preparing and distributing the Plan
		Analyzing best practices	Presentation to the Working Group
		Adjusting targets	Tuning and validating
		Presentation of the results	

January 2007

December 2007



## 4.1 Step 1: Organization of the project

### Targets

The project counts on an integral working group that has clear-cut responsibilities and shares common targets, a common approach and a common project plan.

### Activities

**Launching the project:** esThis activity consisted in a formal meeting to which representative o the DGT and of the contractor assisted, and where the approach was discussed and tuned, and the communications matrix was prepared.

**Organizing the project:** The composition of the Follow-up Committee and of the Working Group was agreed. Furthermore, the suitable way of approaching the members of the Working Group was agreed. The organizers of the project undertook the preparation of a quality plan and of a follow-up system for the plan.

**Constituting the Working Group:** This activity comprised the presentation of the project team to the director of the project and to other DGT professionals. Further, a working session was held so as to share the targets, approach, methodology and the working plan for the project with the whole team.

### Milestone

Holding a launching meeting.



## 4.2 Step 2: Formulation of a “Shared Vision”

### Targets

Since its beginnings, the plan comprises a global target for a certain period of time that is in turn materialized in a series of specific targets, and all of the members of the Working Group have a common understanding of the nature and dimension of the problem of road safety in respect of mopeds and motorcycles, and of the key elements having effects thereon.

### Activities

**Dissemination and raising sensitivity:** All of the members who were intended to become part of the Working Group were contacted in person so as to assess their participation in the project, and they were encouraged to ensure their active participation.

**Analysing and assessing data:** As an input for this task, on the one hand, the statistical data on motor bikes and on the accident-rate pattern were taken and, on the other, the broadest assessments thereof which were formulated as a result of these former ones. A systematic “examination” of all available data and of the assessment thereof was made, with a view on obtaining a shared understanding on road safety regarding motorcycles and mopeds being common to all members of the Working Group.

**Launching the Working Group:** The Working Group held its first joint meeting on the occasion of which the appropriate internal works were carried out so as to tune the shared vision. The shared vision became permanently enriched up to the completion of the project.

### Milestones

Launch of the Working Group.  
Paper concerning the “Shared Vision”.



### 4.3 Step 3: Analysis of the solution

#### Targets

Generating a long list of actions the enforcement of which may accomplish the targets of the plan.

#### Activities

**Preparing the tree of solutions:** The tree of solutions is a methodological tool that pursues the formulation of the largest possible number of solutions to a problem and which allows identifying “non-conventional” solutions. The project team prepared a draft of the tree of solutions that was used to dynamize the subsequent task of the Working Group.

**Discussing within the Working Group:** Two bilateral rounds between the project team and the members of the group were held in addition to a plenary session of the group.

**Estimating the feasibility and efficiency of the measure:** In-depth analysis and ad-hoc studies. Once a consensus on the tree had been reached, the project team characterized all solutions as identified on a high level, and carried out a first filtration based on the results of the individual meetings.

**Assessing measures as already running or implemented:** In parallel to the before-indicated task, the project team identified a range of actions that had been already running or been implemented so as to assess or the incorporation thereof into the tree of solution or the impact thereof on one or several of the pre-defined measures.

**Analysis of international best practices and inclusion thereof into the tree of solutions:** The Working Group identified actions that had been carried out in other countries but which had not been taken into account, and that might enrich the work. Two in-person missions to the United Kingdom and France were performed.

**Presentation of the results:** A third meeting with the Working Group was held where the results were presented and discussed.

#### Milestones

Tree of solutions reached by consensus.  
Long list of action sheets.

#### 4.4 Step 4: Schedule and preparation of the Plan

##### Targets

Preparing, publishing and presenting the Strategic Plan.

##### Activities

**Designing and applying the multicriterion analysis:** The use of the multicriterion analysis allowed prioritizing and filtering the long list of selected actions. Due to that fact that the results were not predictable by the members of the Working Group, it minimized the possible biases and it legitimized the results to a certain extent. This task was carried out in three steps. First, a consensus on the criteria that were the basis for assessing the actions (efficiency, impact on the public opinion, level of recourses needed, etc.) was accomplished. Then, a consensus on the weights or considerations of each criterion was accomplished. Finally, an assessment was made.

**Scheduling:** The multicriterion analysis resulted in the establishment of priorities among certain measures. This task consisted in the revision and manual adjustment of the said priorities and of the chronogram thereof, i.e. the determination of the expected starting and ending date thereof. Moreover, those measures that were considered by the members of the group to be prioritarian were taken into account when establishing the schedule.

**Drafting the short list of action sheets:** Each action sheet was completed by the project group. All sheets were put at the disposal of the members of the group who made comments as appropriate.

**Preparing, distributing and presenting the plan:** The working team drafted the plan, distributed it among the members of the Working Group and prepared a presentation thereof.

**Tuning and validation:** The version of the plan that included the comments of the Directing Committee was obtained.

##### Milestones

Prioritized listing of the measures on stake.  
Strategic Plan drafted and validated.

### 4.5 The Plan’s Virtual Office

The virtual office of the Strategic Plan (PVO) is an environment of virtual cooperation that facilitates and supports the management and follow-up of the plan. The PVO contributes to the generation of a culture of co-responsibility among all parties as involved in the project, and it fosters an active participation of all operators.

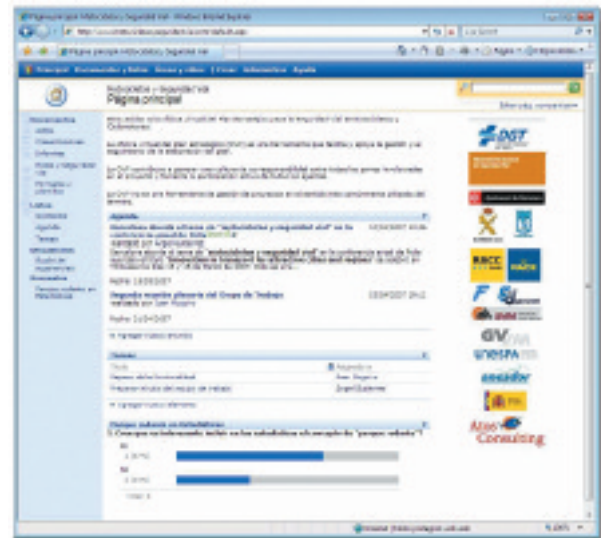
From a technical viewpoint, the Plan’s Virtual Office is an Internet portal to which all of the members of the Committee of Directors had access by means of a user-name and a password.

The Virtual Office has the following sections:

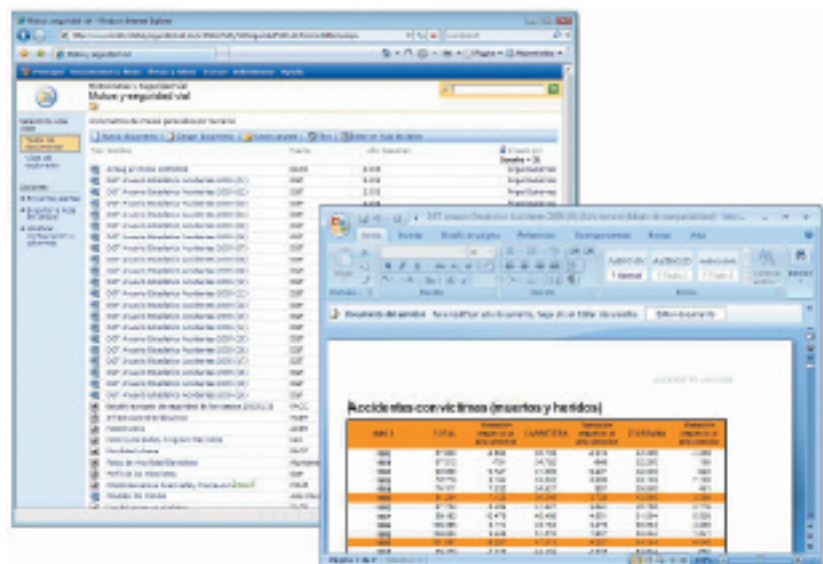
- A section for “Documents”, that is in turn structured according to the following subsections:
  - Minutes
  - Presentations and Reports
  - Virtual library on motorbikes and road safety
  - Formats and templates
- A section for “Contacts” where there appear the names and contact data of the members of the Working Group and the project group.
- A section for “Topics” placed on the principal page of the portal, which contains today’s news being relevant for the project.
- A “Suggestions Box”.
- A section “Polls” for remotely gauging the opinions of the members of the committee in respect of various issues.

Two views of the Plan’s Virtual Office are shown hereunder.

View of a model of the starting page of the Virtual Office showing the main section thereof



Example of a document download from the Virtual Library



## 4.6 The methodology for prioritizing the measures contained in the Strategic Plan

The proposed methodology that has been described in previous sections of this document, was designed to make the project be capable of identifying and dimensioning the largest possible number of measure that might have contributed to reducing the accident rate of motor bikers.

Once the measure had been identified, assessed and structured, priorities were established. The methodology for the priorities as set forth is based in a multi-criterion analysis. The methodological sequence is as follows:

1.- Definition of the criteria for assessment of the measures:

- Impact on the targets
- Feasibility of the measure
- Recourse involved in the execution thereof
- Level of consensus

2.- Weighting. A weighting in respect of a total of 100% was assigned to each of the criteria.

3.- Arranging all measures in respect of each of the four criteria. Four different lists were prepared, each of which contained 37 measures arranged as per their impacts, feasibilities, recourses involved and consensus found.

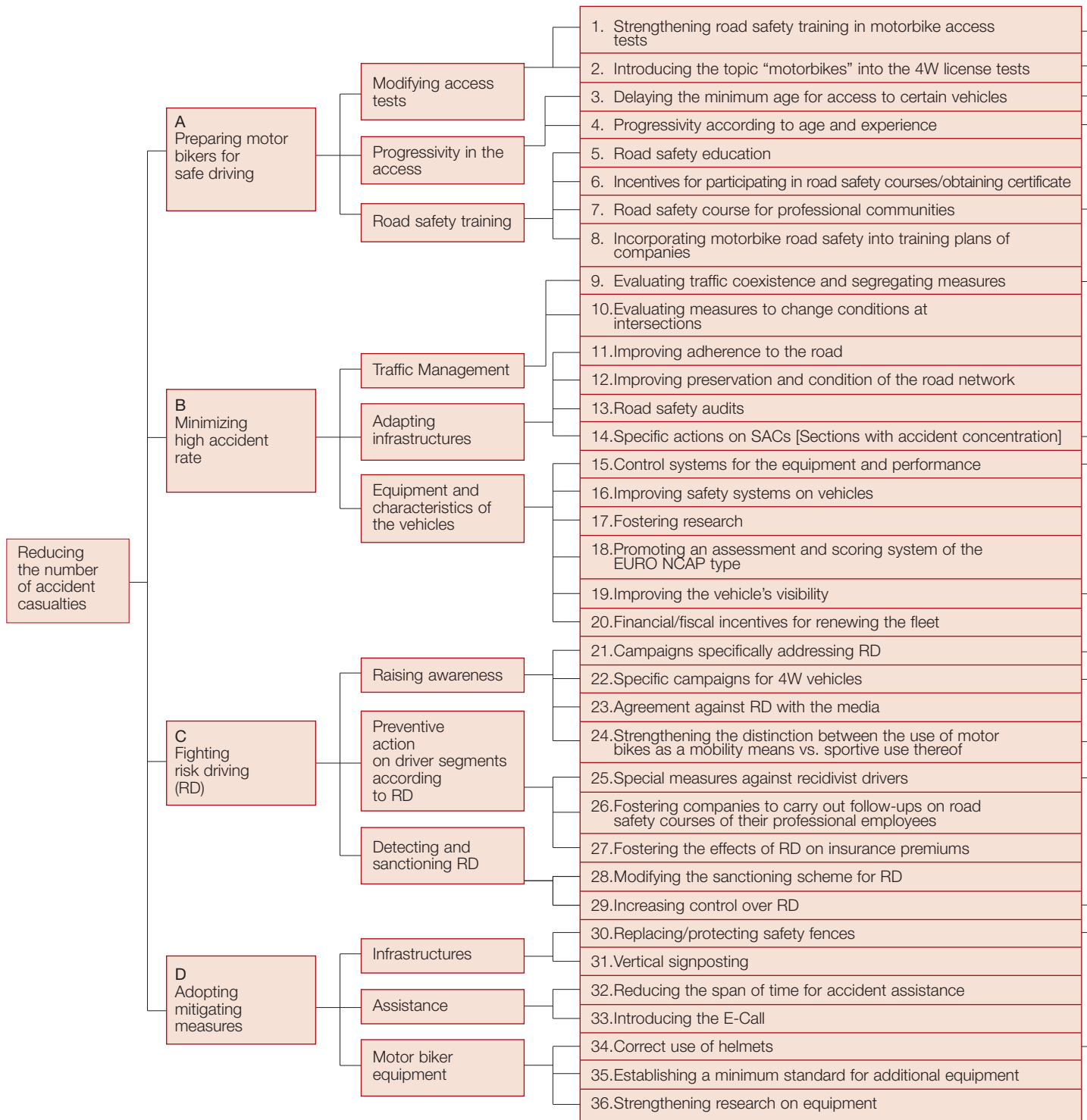
4.- Obtaining the final ranking of the measures. Each measure contains a final position in the ranking that is a function of its position in the four listings and the weight as assigned to each criterion.

5.- Harmonization. The 16 measures best-assessed measures being capable of providing a suitable equilibrium between the 4 key perspectives were selected:

- Roads and urban areas
- Final addressee of the measure: motor biker or others
- Number of operators involved in the deployment: one or several
- Management model: consensus, coordination or co-responsibility



# 5 Tree of solutions and description





# of the measures of the Plan

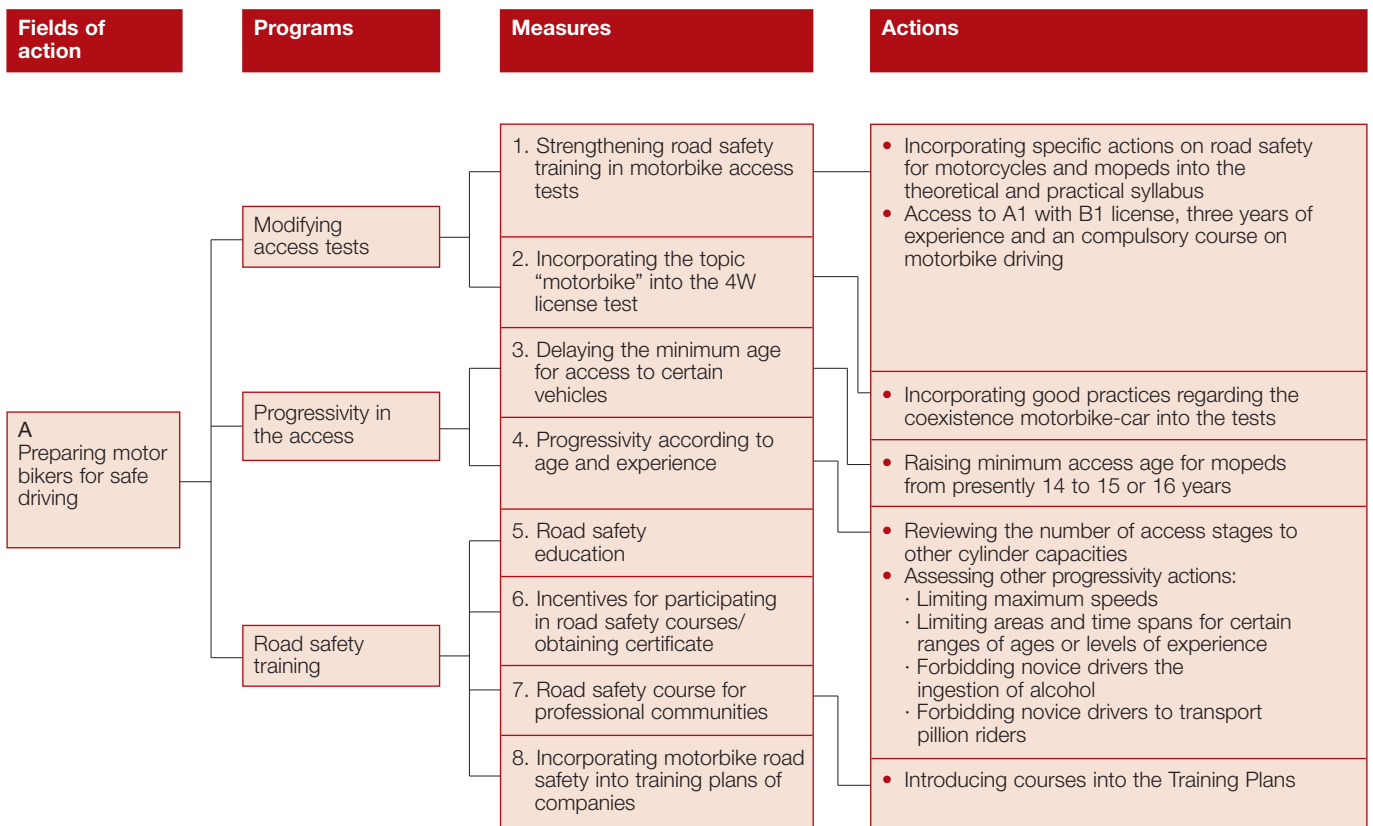
- Reinforcing the practical training in order to achieve the present A1 licence and the new A2 licence with traffic tests in open roads.
  - Obligation to make the behaviour test in a close circuit for the new mopeds licence.
  - Compulsory theoretical and practical test for accessing the driving of motorcycles up to 125 cc for holders of the B license and having three years of experience.
- Introducing good practices regarding the coexistence car- motorbike into the tests
- Raising minimum access age for mopeds from presently 14 to 15 or 16 years
- Reviewing the number of access stages to other cylinder capacities
  - Assessment of other progressive access performances:
    - Maximum speed limits
    - Time zone limits for certain age sections and experience levels
    - Prohibition of alcohol consumption to novice drivers
    - Prohibition of transport pillion riders to novice drivers
- Introducing issues of road safety of motorcycles and mopeds into the education system
- Possibility of using the bus lane; specific lanes for motorbikes
  - Wider lanes in urban areas combined with advanced halting areas for motorbikes in traffic lights
  - Authorization to merge in using the lateral area of a lane
  - Use of verges in roads with high density of traffic
  - Positive discrimination through the adaptation from the traffic rules to the specifications of motorbike driving
- Defining a specific and standard methodology for SACs
- Moving controls of the manipulation of mopeds and power limiting devices with maximum speed and power measuring devices
  - Moving controls of the manipulation of motorcycles and power limiting devices with maximum speed and power measuring devices
  - Moving controls of the conditions of the tyres
- Obligation to use reflective vests/straps in certain conditions (campaigns sponsors of manufacturers that give them as a gift)
  - Panoramic driving mirrors on all 4w-vehicles, especially on heavy vehicles
  - Reflective adhesive materials on motorcycles (equipped as standard by the manufacturer)
- Specific campaigns on crossing red traffic lights; on positioning luggage on motorbikes; on the danger of reckless practices (e.g. "wheelies", pseudo-sportive driving,...), on points of risk in urban areas, etc.
- Campaigns showing the dangers involved in not facilitating the car-motorbike coexistence
- Campaigns sponsored by professional racing drivers so as strengthen this concept
  - Placing at the disposal of motorists one or several learning circuits and sport driving training techniques
- Compulsory re-education and awareness alerts
  - Increasing the threshold for sanctions due to recidivism
  - Processing acceleration of sanction procedures
  - Sending files to the Prosecutor's Office to be criminal processed
- Positioning radars considering motorbike accident rates
  - Implementing red-photos at urban points with high accident rates
  - Coordinated campaigns to locate vehicles that obviously intend to evade monitoring systems
  - Monitoring actions on reckless-driving areas
  - Coordinated campaigns regarding "zero tolerance" to risk driving
- Incorporating protective PVC/plastic elements onto the posts of security
  - Expanding the Plan for Adjusting Containment Systems (O.C. 18/2004)
  - Agreement between the DGT and the Provincial Deputations and Councils, on installing PSM on roads where they are competent for. 50%-50% co-financing.
- Eliminating the remaining groups of users who do not wear the helmet by means of specific campaigns
  - Immobilizing the vehicles of drivers who have been reported for driving without helmet
  - Defining clear criteria for official approval (e.g. no official approval for "fine-remover" helmets)
  - Forcing the correct use of the helmet (well-fastened)

The tree of solutions is the result of the third step of the project, and it comprises all measures on which a consensus was reached by the working group on the solutions as necessary to improve road safety for the users of motorized two-wheeled vehicles.

It is structured into:

- 4 fields of action
- 12 programmes
- 36 measure including different actions

Structure of the tree of solutions. Sample.



So as to achieve the target of the Plan i.e. to reduce the number of casualties regarding motorcycles and mopeds, four fields of action must be attacked, which are factors being that are independent from each other and the presence of which trigger the occurrence of an accident and the degree of harmfulness thereof. These are:

- A Preparing motor bikers for safe driving
- B Minimizing high-accident-rate scenarios (HAS)
- C Fighting risk driving (RD)
- D Adopting mitigating measures

Each of the fields comprises 3 programs, a total of 12, in turn containing the 36 measures of the Plan and the there-to-corresponding actions.

An additional cross concept scope that deals with “information and Knowledge” needs to be added to the 4 scopes of direct intervention. This will, on one hand, allow more and better related information to be provided with regards to road safety for 2 wheeled vehicles and on the other hand, systematically transform the knowledge base to which it contributes, whether directly or indirectly, in order to achieve the objectives of the plan.

## Field of action A. Preparing motor bikers for safe driving

This first field of action includes 3 programs and 8 measures relating to the modification of the access tests for driving licenses, the increase of the present scheme of progressivity in obtaining administrative driving authorizations, and road-safety training and education.

### 5.1 Modifying access tests

#### Measure 1. Strengthening road safety training in motorbike access tests

##### Target and description

Road safety must be very present in the access tests for any vehicle and especially in those for motor bikers due to their condition as vulnerable road users. Theoretical training will focus especially on defensive driving, emphasizing those manoeuvres of 4-wheeled vehicles that are a serious risk for motor bikers. These new theoretical contents shall have their due counterpart in the knowledge control tests for all administrative authorizations for driving motorized two-wheeled vehicles.

The practical training for obtaining the present A1 and A2 licenses that will be described in connection with a later measure of the plan will be reinforced with a requirement for behavioural tests on a closed circuit and passing driving tests on roads that are open to the general traffic under the direction of a road training teacher. With regard to the future driving license for mopeds, the obligatory nature of passing theoretical as well as practical behavioural tests on a closed circuit will be introduced.

Finally, attendance to a voluntary course of a duration of three to six hours will be promoted with regard to those holders of a more than three years old B license who wish to drive motorcycles up to 125 cc. This voluntary course shall be made up of three components: knowledge on the vehicle, motorbike driving risks and driving practices.

##### Deployment

Taking into account that it will involve a modification of the General Drivers' Regulations, the deployment of this measure will be carried out according to the DGT's usual practice. This modification is already being carried out.

- **Theoretical tests:**

Identification of the general and specific knowledge on road safety for each type of administrative authorization including risk driving practices performed by drivers of 4W ad 2W vehicles and highrisk scenarios in urban areas and on roads.

- **Practical tests on roads that are open to traffic:**

Design and diffusion of a guide of recommendations for autoschool teachers, as a reinforcing measure.

#### Measure 2. Introducing the topic "motorbikes" into the 4-wheeler license test

##### Target and description

Collisions between two-wheeled vehicles and other vehicles represent 70% of all motorcycle and moped accidents. In urban areas, in 3 of each 4 motorbike accidents there is a collision with another kind of vehicle. In 2006, collisions between motorcycles and cars have increase by 20%.

Access tests for the driving license fro 4-wheeled vehicles (B, B+E, C1, C1+E, C, C+E, D1, D1+E, D y D+E) will have to contribute to that the drivers of these vehicles become acquainted with and sensitive to the behaviour and practices of other road users, moreover when these are vulnerable users such as motor bikers.

This measure contemplates preparing a specific road-safety training program for making 4W drivers to become acquainted with, aware of and sensitive to vulnerable users in general and, particularly, to motor bikes.

##### Deployment

- Revision of the contents of the program on vulnerable users that is at present being developed by the DGT, to be given to young persons who will be participating in the initiative "Driving license for 1 € a day", in view of the results of the identification of the knowledge, practice and high-risk scenarios carried out within the framework "Strengthening road safety training in the motorcycle and moped access tests.
- If appropriate, preparing proposals to improve and to promote the introduction thereof.

## 5.2 Progressivity in the access to driving motorbikes

### Measure 3. Delaying the minimum age for the access to certain vehicles

#### Target and description

There is a generalized consensus in that it is positive that drivers are given access to vehicle having higher performance according to the increase in their driving experience. It is also considered that driving certain kinds of vehicles requires a minimum personal maturity that is independent from experience. Lacking any better indicator, an individual's age is usually taken for the evaluation of this maturity.

This field of action contemplates increasing the minimum access age to mopeds. In fact, it is considered in accordance with what is being felt in the vast majority of our neighbouring countries, that the minimum age for driving a moped should be raised from 14 years at present to 15 years. Notwithstanding this, a period of one year starting from the approval of the regulations will be established, during which it will be possible to obtain the new AM permit that replaces the present moped license from 14 years onwards.

#### Deployment

- The deployment of this measure is limited to the modification of the General Drivers' Regulations which is expected to become effective in 2008.

### Measure 4. Progressivity according to age an experience

#### Target and description

The progression regarding the access pursues that the performance of a vehicle develops in parallel with the experience of its driver.

It is intended to introduce a new kind of "intermediate" license between the present A1 and A licenses that will be named A2. The new A2 license will allow persons being older than 18 year to drive motorcycles up to 400 cc. So as to be able to access the A license, it will be indispensable to have held the A2 for at least tow years.

Other actions for fostering progressive access, such as a limitation of the maximum speed, limitation of areas and time slots within which driving is allowed at certain spans of age or levels of experience, a prohibition for novice driv-

ers to ingest alcohol, and the obligation of driving with a companion on the vehicle during the initial period of holding the license will be assessed within the framework of this field of action.

#### Deployment

- In what respects the introduction of the A2 license, the deployment will be carried out by means of the transposition of the European Directive on Driving Licenses.
- Regarding additional actions to promote the progressivity, it is considered to make a previous analysis of initiatives taken in the rest of the world, assessment thereof and, if appropriate, an adaptation thereof and a proposal thereon to the "Motorcycles and Road Safety" Working Group.

## 5.3 Road safety training

### Measure 5. Road safety education

#### Target and description

Road safety must be present in the education of the driver along all stages of his/her life, starting with the education at school up to voluntary training when the individual is an adult and even specialized within a professional group (e.g. municipal police or teachers).

Road safety education at school is, if not the best, one of the best ways to reduce traffic accidents. Young people, who are from 15 to 25 years old, represent 10% of the driver census, but count for 20% of the fatalities and 26% of the seriously injured. Motorcycles and mopeds are a very popular transport means among young people. In fact, a significant percentage of the casualties belong to this range. Thus, in 2005 64% of the fatalities or seriously injured in moped accidents in urban areas were between 14 and 25 years old.

The LOE (Organic Law on Education) has incorporated traffic education as a compulsory syllabus by setting forth that the target of primary education is "to foster traffic education and attitudes of respect having an impact on the prevention of traffic accidents". The regulation establishes that the new educational area will be given in a course during Primary Education and two courses during the ESO (Compulsory Secondary Education). In Primary Education, the subject that frames road safety will comprise 50 teaching hours and in the ESO it will comprise 35 hours.

Within the framework of this measure, the introduction of road safety into the educational system will be promoted and provided by carrying out tasks of raising awareness of and technical advising to Autonomous Communities, publishing houses and education professionals, so as make

road safety to be considered a transversal subject that can be “subsumed” within the lessons that are being given on other subjects

Regarding non-regulated education as there are mainly the optional road safety courses for primary and secondary school teachers (e.g. UNED [=National Distance Education University]), the special courses for persons with psychosocial problems, and road safety training through the Internet, the didactic materials must include a number of good and bad practices in driving mopeds and motorcycles, and emphasize the special vulnerability of the drivers of two-wheeled vehicles.

Road safety education will be present at the points of sale by means of the distribution of a book with practical advice and basic techniques for driving safely, at all dealers and at shops specializing on the supply and equipment of motorcycles and mopeds (e.g. Basic driving techniques on Honda motorcycles).

### Deployment

- The deployment of this measure will take into account the competences of the Autonomous Communities in respect of education, in view that they are in charge of authorizing and supervising programs, textbooks and thereto corresponding curricular materials in accordance with their respective own systems.
- Launching this measure will comprise:
  - A diagnose of the present system and the perspective in primary and secondary education in the Autonomous Communities and among the members of ANELE (National Association of Books and Educational Materials).
  - A proposal regarding the scheme of cooperation between the Autonomous Communities and ANELE, providing in detail possible scopes (advice in drafting the texts, revision thereof, carrying out working sessions with technicians of the Autonomous Communities, etc.).
  - Putting into operation a scheme of cooperation for primary and secondary education.
  - Expanding the scheme towards new actions and new fields (pre-school and higher education):
    - Specific annual courses in cooperation with user associations and road safety training centres.
    - Elective subjects in secondary education.
    - Elective subjects and specific temporary courses in certain road safety areas (e.g.: driving motorcycles under adverse conditions) at Universities.
    - Specific training courses for road safety education (e.g. UNED [National University for Distance Education]).

## Measure 6. Incentives for participating in courses and obtaining certificates

### Target and description

Setting up a scheme of voluntary and incentivized road safety courses for motor bikers having an impact on a significant proportion of the universe of drivers and which strengthen three aspects: avoiding risk driving, training the driver in respect of hazardous situations, and adopting good practices regarding driving and equipment. The course will have a short duration (one or two sessions) and the contents thereof will be predominantly practical, allowing, where appropriate, to obtain a certificate. The use of driving simulators when giving the courses will be assessed.

Incentives for fostering the attendance may be established by two ways:

- Redemption of sanctions with guidance for risk drivers (e.g. the city council of London cancels certain sanctions, 3 points and 60 pounds, in exchange for the driver assisting to a one-day training course for 72 pounds).
- Obtaining direct incentives such as discounts on insurance premiums or monetary or non-monetary contributions of insurance companies, fuel coupons, discounts on security equipment for motorbikes, etc.

### Deployment

- Defining the specific conditions for official approval of the minimum requirements for the courses, through a group of experts..
- Identifying a list of entities that cooperate in the courses and defining the scope of their participation.
- Designing a scheme in respect of the ratio: sanction-penalty points-training costs.
- Launching a pilot experience and assessing the results as obtained.
- Communication campaign.
- Launching the network of courses.



## Measure 7. Road safety courses for professional communities

### Target and description

It is esteemed that about 110,000 professionals (including those contracted or subcontracted by private companies, the security forces and bodies of the three administrative levels and other public employees) are using motorcycles or mopeds as a working tool. This measure pursues the inclusion of road safety courses into the training plans of all these public and private bodies. The course will focus on the avoidance of risk driving, training the driver in respect of hazardous situations, and adopting good practices in respect of driving and equipment.

The courses will have a duration of two to five sessions, and their contents will be predominantly practical. The contents thereof will be revised by the employers as well as by the entities that have been authorized to give the courses. At the end of each course, an evaluation of the knowledge as acquired will be made. Companies will oblige themselves to maintain an updated registry of those attending or having attended the courses, and to promote attendance among their employees and subcontractors.

### Deployment

- Defining the specific conditions for official approval of the minimum requirements for the courses, through a group of experts.
- Establishing the scope of application of the measure within the targeted business sectors.
- Identifying a list of entities that cooperate in the courses.
- Launching a pilot test.
- Massively applying the measure.



## Measure 8. Incorporating motorbike road safety into training plans of companies

### Target and description

The high number of “in-itinere” professional accidents (about 11% of all deaths in traffic accidents in Spain) makes it advisable to introduce road safety into the training plans of companies, organisms and public as well as private institutions of any kind.

Determining the most adequate ways and contents for introducing road safety into the training plans will be carried out within the framework of this measure, although it is possible to advance the following aspects:

- Use of the new technologies so as to make the training as individualized and close to reality as possible (e.g. customized itinerary for each pupil coinciding with his/her usual route for going to work, using driving simulators).
- Focusing on the use of protection equipment (use and preservation of safe helmets and adequate clothing as, for example, reflective vests, gloves, boots without laces, etc.).
- Training in defensive driving techniques (e.g. to avoid driving on the area of the right lane being closest to the sidewalk).

This measure also contemplates reports on accidents to include information in respect of the reason for travelling of the two-wheeled vehicle, so as to improve statistic information on “in-itinere” accidents.

### Deployment

- Constituting a working group for preparing a report on recommendations for a suitable incorporation of road safety into educational plans.
- Assigning roles and responsibilities to the members of the group.
- Segmenting the universe of targeted companies and institutions.
- Diagnosing the situation within a representative sample.
- Preparing reports on recommendations: specific ones and generic ones.
- Promotion and dissemination.
- Follow-up and assessment.

## Field of Action B. Minimizing high-accident-rate scenarios (HARS)

This field of action includes 3 programs and 12 measures relating to traffic management policies, adaptation of infrastructures and equipment, and to the characteristics of two- and four-wheeled vehicles.

### 5.4 Traffic management

#### Measure 9. Evaluation of traffic coexistence and segregating measures between 4-wheeled vehicles and motorcycles and mopeds

##### Target and description

At present, there is no consensus on a common scenario that would allow reaching coordinated solutions regarding segregation and coexistence in traffic among 4-wheeled vehicles and motorcycles and mopeds.

There is a consensus, for example, in that the use of a segregation measure in urban areas such as the use of the bus lane by motor bikers is positive provided that the density of the traffic of motorbikes does not exceed a certain threshold (this measure is advisable in Madrid where there are 20 motorcycles per each 1000 inhabitants, but not in Barcelona where there are 167 motorcycles and mopeds per each 1000 inhabitants). In respect of other types of measure of segregation and coexistence as there may be the use of verges in road areas with a high traffic density, and advanced halting zones in urban areas, there is no agreement at all.

The target to reduce the accident rate by establishing rules, infrastructures and mobility mechanisms in urban areas as well as on roads, that could contribute to differentiating traffic flows between 4-wheeled vehicles and motorcycles and mopeds. Among these measures, the following could be mentioned:

- Setting up specific lanes for motorcycles on roads with jammed traffic.
- Combined use of bus lanes together with adaptation thereof for use by motorcycles.
- Broader lanes on certain urban roads combined with stopping areas in advanced positions.
- Regulation of the incorporation manoeuvres on broad lanes / verges.

- Actions of positive discrimination by adapting the traffic regulations to the specific characteristics of the driving motorbikes. For example, introducing a measure that is similar to the existing regulations allowing 4-wheeled vehicles to overtake on certain road sections where heavy vehicles are not allowed to do so.

##### Deployment

- At present, there is a collection of possible measure that are to be tested by means of putting into operation the pilot experiences that in the future may constitute a catalogue of good practices to be used by the traffic managing bodies and the bodies that are responsible for the road infrastructures.
- For this purpose, it is necessary to create a scheme for the cooperation between the entities that are responsible for the management of traffic and infrastructures allowing to identify the catalogue of the measures to be tested, to establish the methodology of the analysis of the pilot experiences and to create the mechanisms for extending the results after the pilot assessments have been completed.

#### Measure 10. Evaluating measures to change conditions at intersections

##### Target and description

Intersections in urban areas clearly are very points of risk to the extent that between 2001 and 2005, 61% of all collisions between two-wheeled vehicles and cars occurred on intersections.

The target of this measure is to adapt the conditions of infrastructures and traffic management mechanisms at certain intersections so as to reduce the number of accidents. In principle, the following specific measures are being envisaged:

- Adapting the traffic-light phases to the characteristics of motorbikes (extending the clearing phase, modifying the yellow phase, etc.).
- Improving signposting conditions.
- Improving the lighting and visibility conditions at intersections.
- Installing red-photos, i.e. cameras for automatically detecting failures in respecting traffic-light discipline.

##### Deployment

- As in the case of segregation and coexistence, it is necessary to put pilot experiences into operation that in the future may constitute a catalogue of good practices for use thereof by the traffic managing bodies and the bodies responsible for road infrastructures.

- For this purpose, it is necessary to create a scheme for the cooperation between the entities that are responsible for the management of traffic and infrastructures allowing to identify the catalogue of the measures to be tested, to establish the methodology of the analysis of the pilot experiences and to create the mechanisms for extending the results after the pilot assessments have been completed.
- For the remaining actions which will be majority, the process to be followed will be the following:
  - 1.- Carrying out pilot tests.
  - 2.- Follow-up and assessment in accordance with the methodology of the analysis of pilot experiences of the plan.
  - 3.- Selecting the mechanisms for extending the results.

## 5.5 Adapting infrastructures

### Measure 11. Improving adherence to the road

#### Target and description

In general terms, the presently-available sources of statistical information do not concede to the road the importance that it deserves as a concurrent factor in motorbike accidents both in urban areas and on roads. In accordance with these sources, the percentage of motorbike accidents on the occasion of which the pavement was not clean and dry is in no case higher than 10%. The strategic plan nevertheless knows that a high percentage of motor bike accidents occur due to a loss of control over the vehicle when braking in an emergency situation or due to the presence of dirt or spills on the road. This risk increases when the tire is in contact with painted surfaces or when the pavement is wet.

This measure addresses urban areas and roads, and it contemplates actions addressing the improvement of the adherence on our roads on various complementary front-lines, focusing on certain intersections in urban areas which are clear scenarios of high accident rates:

- Minimizing the use and size of horizontal road markings in those areas where it is possible to do so and considered to be critical (e.g. completely painted crosswalks).
- Use of antiskid paint for marking horizontal road signs in those areas where a strong deceleration of the vehicle is probable or necessary.
- Adjusting, levelling and coating metal manholes with adherent material.
- Using high-adherence pavement at points of risk.

#### Deployment

It is proposed to put this measure into operation by means of two differentiated methods, i.e.:

- For actions that do not need to be tested and can be applied directly as, for example, using discontinuous stripes at crosswalks at crossing that are regulated by traffic lights, in urban areas will be directly included into the catalogue of good practices of the strategic plan after an estimation of costs.

### Measure 12. Improving preservation and condition of the road network

#### Target and description

Preservation and maintenance of the road network affects road safety in general and, very especially, that of motor bikers. Elements such as potholes in roads, bulging of the pavement, slippery spills, fine gravel, failures in fountains at roundabouts spilling onto the pavement and obstacles of any kind, much too often shape highaccident-rate scenarios involving deaths and serious injuries in urban areas but, above all, on roads.

The strategic plan proposes two fields of action related to the improvement of the preservation of the road network:

- Coordination with the already running initiative of the DGT which is in charge of a Civic Cooperation System on Road Safety, the target of which is to assess and to consider the great importance the preservation of the network has for the drivers of two-wheeled vehicles.
- Preparing and supporting, on the part of the competent administrations, the implementation of a proposal in respect of a minimum preservation standard for the networks and application thereof by means of a service level agreement (SLA).

#### Deployment

The coordination of the system for civic cooperation of the Sub directorate General for Traffic Management and Mobility will be articulated by means of the participation of a coordinator for this measure on the occasion of the follow-up measures of the project.

For defining the minimum standard:

- First, the present practices for preserving the road network of the Ministry of Public Works and of a representative sample of that of the Autonomous Communities will be analyzed.
- Thereafter best practices will be inventoried and documented so as to define the recommended minimum standard on the grounds of that document containing the basis for the “maxima”.
- Finally, the adequate mechanism for including, in practice, the said standard into the maintenance contracts.



### Measure 13. Road safety audits

#### Target and description

Road safety audits are periodic inspections of the safety conditions of an infrastructure that may be carried out in infrastructures that are in operation, or within the design or construction period thereof. They are preventive road safety actions which will progressively be introduced into the permanent policies of the public administrations. Thus, in its road safety action plan 2002-2010, the European Union recognizes the need for systemizing the carrying out of road safety audits for new roads as well as for roads that are in operation.

This field of action has a double target: that road safety audits that are already a practice, as for example that which has been recently launched by the Ministry of Public Works for the whole of the roads it is competent for, take into account the special features of motor bikers, and that specific road safety audits for motor bikers are carried out in municipalities and on certain road sections where this kind of action is not being made at present.

#### Deployment

The deployment of this measure comprises the following steps:

- Analysis of the best practices (“Safety Audit Policy and Procedures” (2004)) of Australia, “Guidelines for the Safety Audit of Highways” and Great Britain, Catalan Road Safety Plan, etc.
- Preparing standard methodologies for carrying out the audits distinguishing between urban areas and roads and between the design, construction and operation phases. This methodology will clearly distinguish the case where audits are already being carried out (need to integrate the perspective of the motorbike) and where audits are pioneer.
- Training a small team for making the pilot audits.
- Assessment in accordance with the methodology of the strategic plan, and, if appropriate, including the initiative into the plan’s catalogue of good practices.



### Measure 14. Specific actions on SACs [Sections with Accident Concentration] and on points of risk

#### Target and description

From a statistical viewpoint and the same as it is occurring in connection with cars, motor bike accidents with deaths and serious injuries tend to concentrate in certain geographical areas named SACs if located on roads, and points of risk when they are in urban areas. Thus, for instance, according to EuroRAP, the province of Madrid has three the ten stretches with the highest motorbike accident rate in Spain, and 50% of the fatal and serious motorcycle and moped accidents on the State Road Network (SRN) are localized on 12% thereof.

This measure proposes to first identify and to thereafter analyze in detail these points and sections with a view on designing and putting into practice improvement actions. The final target being pursued is to reduce motorcycle and moped accidents on sections where high accident rate scenarios are often coincident with risk driving (e.g. inadequate generic speed for the road on a one-lane road section with at-grade intersections).

#### Deployment

- Selecting of one of the various methodologies that are being used at present for identifying SACs (e.g.: Ministry of Public Works, EuroRAP).
- Preparing and testing a specific methodology for localizing points of risks through a working group of town polices.
- Selecting a sample of test stretches and points for a detailed accident analysis.
- Contracting the detailed analysis.
- Analysis and conclusions.

## 5.6 Equipment and characteristics of motorbikes

### Measure 15: Control systems for equipment and performance of mopeds and motorcycles

#### Target and description

A widely extended risk driving practice consisting in the manipulation [souping-up] of mopeds and motorcycles, is fought against. As a matter of construction, mopeds are limited in respect of their maximum speed to 45 km/h and in respect of their cylinder capacity to 50 cc. Once altered, their maximum speed can reach more than 80 km/h. In the case of motorcycles, the manipulation cancels the vehicle's power limitation (the driving license authorizes its holder to drive motorcycle up to a certain maximum power but the regulations provides that the license holder may acquire of a higher power provided that this power has been duly limited).

This measure will promote furnishing certain units of officers of the authority with portable devices being capable of measuring the maximum speed of mopeds and the power of motorcycles. By virtue of Article 70 of the Traffic Law, a detection of these practices will involve the immobilization of the vehicles.

Campaigns that will be made will moreover emphasize the control of other elements affecting the vehicle's safety (mainly tires, braking systems, lighting and suspensions).

#### Deployment

The implementation of this measure will involve:

- A detailed evaluation of the pilot test with mopeds which is being carried out by the Mossos d'Esquadra [Police of the Catalanian Autonomous Community] in Catalonia.
- Acquiring or renting a limited number of speed cameras and power test stands, and putting them to the disposal of interested administrations during a certain period of time.
- Follow-up and evaluation of the results.

### Measure 16. Improving safety systems on vehicles

#### Target and description

A significant proportion of motorbike accidents take place due to a loss of control over the vehicle by the driver in an emergency situation when braking or due to the presence of fuel spills proceeding from heavy vehicles. The data of the most recent study published in Spain on collisions between two-wheeled vehicles and cars between 2001 and 2005 reflect some trends.

- 30% of the accidents could be avoided if the whole of the motorcycle's braking capacity were used.
- 46% of the accidents would be eliminated or be less serious when assuming a more efficient braking behaviour.
- On the other hand integral braking (distribution of braking among the front and rear wheel) and ABS would contribute very positively to optimizing the braking of two-wheeled vehicles.

In Europe, the market offers motorbikes with integral braking and ABS but only within the high end range and still at a rather high cost.

Industry has signed an agreement by which it obliges itself to progressively introduce advanced braking systems into its models, such that in 2010 the majority thereof will have them incorporated. 27% of the models manufactured and marketed in Spain in 2006 included an advanced braking system as standard or optional equipment. This measure intends to contribute by different means to that, in 2010, practically all vehicles being marketed, and not only those manufactured, in Europe will incorporate the advanced braking system.

Moreover, the influence on the accident rate, of water curtains produced by heavy vehicles will be analyzed within the framework of this measure and, if appropriate, mechanisms for fostering the installation of fairings or antispill mudguards on heavy vehicles.

#### Deployment

It is proposed that this measure be headed by ANESDOR and that, at least initially, the launching thereof should focus on preparing a business plan for designing, building and distributing advanced braking systems for the European industry.

The business plan will set forth several possible business scenarios (creation of a joint company for manufacturing the systems, manufacture of the systems by a single man-

manufacturer that will act as a supplier for others, subcontracting the manufacture with a supplier that is located outside the EU, etc.) that will in turn determine cost scenarios. Analysis of the demand will, on its part, estimate the size of the market and analyze the utility the system will yield to the consumers so as to, starting from here, define a marketing plan.

### Measure 17. Fostering research in the field of motorbikes and road safety

#### Target and description

In Spain, manufacturers of mopeds and motorcycles directly employ more than 2,200 people. When adding thereto the employment generated by the remaining links of the value chain (components manufacturers, distributors, wholesalers, repair shops, etc.), it is probable that the two-wheeler industry is sustaining a volume of direct and indirect employment of more than 30,000 professionals. Spain has a concentration of bodies and institutions which are leading in research, development and innovation (R+D+i) in the two-wheeler field, such as there are APP+IDIADA, CENTRO ZARAGOZA, the CIDAUT Foundation, the University of Alcalá de Henares, the Road Safety Group of the University of Zaragoza, INSIA, the UPC Foundation and INTRAS.

This measure pursues fostering these R+D+i activities to move towards the road safety of motorists to make this knowledge and technology benefit the competitiveness of the industries dedicated to manufacturing components and two-wheeled vehicles. For this purpose the public administrations' aids and incentives addressing the promotion of R+D+i will be fostered to consider road safety as an area to be developed as a matter of priority.

A clear example of action within this measure is the identification of safety problems of the registrations of enduro and trial motorcycles. The designs of these two-wheeled vehicles is becoming more and more slender, whereby one resorts to fuel tanks and mudguards of reduced widths, so that the present registration plates protrude notably. This circumstance gives rise to the plates getting damaged frequently due to brushing against small obstacles or cuts with the ends of the plates. As the result of an investigation carried out by ANESDOR, Annex XVIII of the General Vehicle Regulations has been modified so as to authorize these motorcycles to bear smaller registrations plate sized 132x96 mm.

#### Deployment

The following activities will be carried out:

- High-level diagnosis of the present participation of the two-wheeler sector in R+D+i activities as financed with public funds (Autonomous Communities, AGE, EU).
- Identification of target lines and programs (PROFIT, VII Framework Program, Councils, Local Development Agencies, National Plan for R+D+i, CDTI, etc.).
- Designing and implementing a global innovation strategy for the sector (actors and roles, areas, cofinancing model, etc.).

### Measure 18. Promoting an assessment and scoring system of the Euro NCAP type

#### Target and description

An assessment of the EuroNCAP type provides an independent and realistic vision of the safety performance of those 4-wheeled vehicles which are the most-sold in Europe.

Introducing a similar system for all motorcycle and moped models would make the purchasing decision easier for many users who value safety as a priority issue when deciding what to buy, in addition to producing positive synergies in the field of safety among manufacturers.

The target of this measure is the analysis of the feasibility and, if appropriate, to provide aid and support to the subsequent launch of a EuroNCAP-type assessment system for motorcycles.

#### Deployment

Deployment of this measure will be made through a working group that will:

- Analyze the methodology and operation mode of the EuroNCAP system for 4W vehicles.
- Look for support and financing by the system's present participants and by new participants (Department for Transport, FIA, Sécurité Routière, Government of Catalonia, etc.).
- Draft an action plan and coordinate the carrying out thereof.

## Measure 19. Improving the vehicle's visibility

### Target and description

It has been estimated that a third part of accidents in which motorbikes and four wheeled vehicles are involved, the motorbike is not being seen by the driver of the other vehicle. Cars turning at crossings, motorbikes overtaking cars and cars accessing other roads are the situations where accidents wherein visibility is a concurrent factor, take place most frequently.

The target of this measure is to improve the visibility of motorbikes and suggests the following specific action:

- Promoting the use of reflective vests or straps by motor bikers.
- Using panoramic rear-view mirrors in cars.
- Using reflective materials on motor bikes.
- Analyzing the effect that the obligation for cars to use lights at daytime would have on motor bikers' safety.
- Transposition of the European Directive on the retrofitting of mirrors to heavy goods vehicles registered in the Community.

### Deployment

It is necessary to put into operation pilot experiences which in the future may constitute a catalogue of good practices.

For this purpose, it is necessary to create a scheme of cooperation between the Ministry of Industry, the DGT, associations of motorists and research centres, allowing to identify a catalogue of measures to be tested, establish a methodology for analyzing pilot experiences and to create mechanisms for extending the results upon completion of the pilot evaluations.

## Measure 20. Financial/fiscal incentives for renewing the fleet and for safety equipment

### Target and description

The increase in road safety and the defence and protection of the environment are the pillars on which the Prever Plan on modernization of the fleet of automotive vehicles (cars and light industrial vehicles) has been based since 2000. The program articulates itself in certain fiscal benefits that are applied on the occasion of the acquisition of cars and light industrial vehicles both new and second-hand ones, provided that an equivalent vehicle of a certain age and characteristics is deregistered for scrapping. In the 7 years since it was approved, the program has com-

plied with its targets, and the fleet of cars has been renewed in respect of safety and pollution. Nevertheless, vehicles must still become more ecological and safe. RDL [Royal Law Decree] 13/2006 closed the present Prever Plan and set 2007 as the term for redefining the criteria for the environmental restructuring of the Plan, whereby it does not set a date for the new Prever Program to start. This Plan should produce the same benefits within the motorized two-wheeler field, i.e. it should improve safety and acoustic as well as environmental pollution.

On the other hand, the reduced rate (7%) of the Value Added Tax could be applied to elements of passive safety for the motor biker, such as helmets, back protectors, elbow pads, etc., because the purchase of said articles would be incentivized and the safety of users would be improved. The prices of these products on the market are usually rather high thus acting as purchasing inhibitors for many users, especially those of a lower cylinder capacities who are already possessing a vehicle but not the basic elements of a safe equipment.

### Deployment

- Preliminary poll at competent departments for the purpose of analyzing the feasibility of the measure.
- Analysis of similar and related initiatives.
- Identifying and approaching key actors.
- Preparing an action plan.
- The corresponding communication plan will be put into operation.



## Field of action C. Fighting risk driving (RD)

This field includes 3 programs and 9 preventive measures related to raising the awareness, preventing, detecting and sanctioning the most common risk driving practices committed by the drivers of two- and fourwheeled vehicles and having an impact on the accident rate of motorcycles and mopeds.

### 5.7 Raising awareness

#### Measure 21. Campaigns specifically addressing risk driving

##### Target and description

By making specific campaigns aimed at fighting the most common risk-driving practices that are carried out by motor bikers, they will be informed and made aware on the dangers being inherent in this type of attitudes.

It is being envisaged to launch a number of periodic and thematic campaigns dedicated to the most common and dangerous practices: lack of respect for the traffic-light discipline, overtaking cars by the right side in urban areas, driving on lanes with double-parked vehicles and braking making use first of the rear brake.

Campaigns that have already been broadcasted by other European countries with which there has been a close flow of information, will be used as a support.

##### Deployment

- The DGT will be in charge of the deployment of this action and will look for the prior consensus of the group in respect of the target RD practices and the key message that are to be transmitted.
- The subsequent follow-up will be carried out by the DGT through the National Road Safety Observatory by comparing the data before and after each campaign.

#### Measure 22. Specific campaigns for 4-wheeled vehicles

##### Target and description

This measure suggest launching communication campaigns addressing the drivers of four-wheeled vehicles, and which tackle three key themes jointly and separately: vulnerability of motor bikers, benefits for and challenges to

the coexistence of any kinds of vehicles on roads, and the most common accident scenarios regarding car-motor bike collisions.

This kind of communication campaigns has been successfully deployed in France, the United Kingdom and Australia. The experience regarding coexistence campaigns that have been made in Spain will also be taken into account.

##### Deployment

- The DGT will be in charge of the deployment of this action, and it will consult the Working Group in respect of the target topics and key messages which are to be transmitted.
- The subsequent follow-up will be carried out by the DGT through the National Road Safety Observatory by comparing the data before and after each campaign.

#### Measure 23. Agreements against risk driving with the media

##### Target and description

The target is to avoid that the mass media include contents that promote or banalize risk driving (inadequate speed, skidding, driving on one wheel, acceleration, etc.). The need to avoid the use of graphic materials or contents which associate the use of motor bikes with the said risk driving, including both reports and contents of advertising, will be strengthened.

The agreement must involve the mass media in general (daily press, journals, radio, television), specialized media of the motor world, advertising agencies, manufacturers and dealers.

The measure will furthermore include awareness-raising and sensitizing actions addressed to communications' professional, among which launching a portal being similar to "thinkroadsafety" of the British government will be included.

##### Deployment

- As a first step it will be necessary to create a working group that is to prepare the guide in contents and practices. A consensus with the media and other entities as involved will have to be reached in respect of this guide.
- For the measure to be successful, it will be essential to define follow-up mechanisms allowing to assess its degree of application along the time and to propose correcting measures.

## Measure 24. Strengthening the distinction between the use of a motor bike as mobility means versus sportive use thereof

### Target and description

The accident rate figures for motorcycles since early 2007 referring exclusively to interurban roads are worrying. From January to October 379 motor bikers died, 33% more than within the same period of the previous year, and in August only, 105 motor bikers died on the road network. A high percentage of the drivers correspond to the profile of a young driver with a vehicle with a high cylinder capacity (88% of motorcycles of more than 500 cc) driving on week-ends in so-called pseudo-sportive driving areas.

The target of this measure is to avoid reckless sportive driving behaviours on roads by making users of high cylinder capacity motorcycles aware of the difference between using two-wheeled vehicles as transport means and the sportive use thereof.

Two kinds of actions must be set up for this purpose:

- Communication campaigns and messages that emphasize this distinction. The participation of professional riders would be important in this respect.
- Favouring the use of sportive circuits in advantageous conditions so as to strengthen this distinction. In this respect, it is envisaged to offer motor bikers one or more circuits for learning and training sportive driving techniques on two-wheeled vehicles.

### Deployment

- The measure may be headed by the DGT and carried out locally in cooperation with the Autonomous Communities and city councils.
- The deployment of this measure will be suitably coordinated with the preceding measure.
- Actions aimed at favouring the use of the circuits in advantageous conditions will be directed first towards determining the leisure capacity of the presently existing offer so as, should there be any, to determine possible actions from the demand side.
- Further, the possibility of building a circuit or using an existing one as a pilot test is suggested. The coordination of the deployment of this action will ideally involve the Autonomous Community as corresponding, the Provincial Council and the Ministry of the Interior.

## 5.8 Preventive actions on driver segments according to risk driving practices

### Measure 25. Special measures against recidivist drivers

#### Target and description

The DGT has recently started to focus on multi-recidivist offenders. The penalty point driving license and the reform of the Penal Code that is presently taking place are accompanied by other measures that intend to remove a group of drivers who systematically endanger road safety from traffic.

The target of this measure is to adopt direct action on recidivist two-wheeler drivers so as to reduce the accident rate in this segment and to amend their conducts. Among the actions composing this measure, there are the following:

- Designing and putting into operation specific compulsory courses for re-educating recidivist drivers.
- Increasing the scales of fines for recidivism.
- Direct awareness-raising communications.
- Expediting the procedures for sanctioning files.
- Maximum scaling of sanctions.
- Sending the files to the Public Prosecutor for penal treatment thereof.

#### Deployment

- First it will be necessary to analyze multi-recidivist conducts within this motorist population so as, starting from there and if appropriate, to carry out a segmentation by profiles of the drivers and to set up the scales for recidivism.
- The deployment of this measure will focus on that the measures that are presently in operation or foreseen to be launched by the DGT, include the special features of recidivism on two wheels in the case that these special features should require a differentiated treatment.

### Measure 26. Fostering companies to carry out follow-ups on risk driving and road safety courses by their employees

#### Target and description

The target of this measure is to achieve that companies employing professional motorcycle and moped drivers carry out efficient follow-ups on measures that foster road safety as set forth by the strategic plan addressing these professionals, by:

- Introducing road-safety courses into their training plans.
- Effectively realizing these courses by employees and subcontractors.
- Assessing the courses in view of a steady improvement thereof.

#### Deployment

The implementation of this measure will require the execution of a cooperation agreement between organizations employing motor bikers, the public administration and other institutions having an interest in road safety.

### Measure 27. Fostering the effects of risk driving on insurance premiums

#### Target and description

The target is that there should be a direct relationship being clearly perceived by the users, between risk driving and an increase in the price of insurance policies, i.e. of the premiums. For this it is necessary to link risk driving to sanctions, and sanctions to the increase in the price of premiums. The RD-Sanction relationship is rather straightforward as, albeit not all, most of risk driving practices are open to sanctions. The relationship between sanctions and premiums is not so open thereto because only some sanctions are related to risk of such accidents to occur (speeding for example, is related to a driver's risk profile whilst sanctions for parking offenses are not).

This measure will intend to define and implement into practice, any mechanisms that convey a lack of respect to the rules to the prices for insurance, so as to thereby make the rise in prices a deterrent element against committing offenses.

#### Deployment

The deployment of this measure includes:

- Preparing a catalogue of sanctions associated to risk driving practices and defining an impact model therefor on the premiums.
- Establishing contractual conditions relating to the obligation to communicate sanctions. Loss of points.
- Adapting the conditions in the policies and launching the new products onto the market.

## 5.9 Detecting and sanctioning risk driving

### Measure 28. Modifying the sanctioning scheme for risk driving

#### Target and description

The target is to toughen the sanctioning scheme associated to risk driving on motorcycles and mopeds. In principle, this includes the following:

- Transporting packages and luggage on two-wheeled vehicles.
- Classifying the sanctioning scheme with regard to infiltration manoeuvres.
- Toughening sanctions for reckless practices.
- Practices on four-wheeled vehicles for those who put motorcycles and mopeds on risk.

#### Deployment

- As a first step it will be necessary to create a specific working group which is to prepare and assess a catalogue of possible measures with the participation of the DGT, the ATGC and a representative group of municipal polices.
- This catalogue will serve as a basis for a subsequent discussion with the remaining operators of the sector.

### Measure 29. Increasing monitoring risk driving

#### Target and description

The target is to make the control over and sanctioning of risk driving on motorcycles and mopeds more efficient by launching or strengthening the following actions:

- Positioning radars taking into account the accident rates of motor bikes.
- Implementing red-photos that enforce traffic-light discipline at points of risk within urban areas.
- Coordinated campaigns for tracing vehicles that are obviously intended to elude monitoring systems.



- Monitoring actions on areas with reckless or pseudo-sportive driving.
- Coordinated “zero tolerance” campaigns against risk driving.
- Revision of the present control and monitoring plans in respect of Grand Prix motorcycle events.

### Deployment

Applying this measure requires coordinating the DGT, Autonomous Communities and city councils so as to set up plans of coordinated action that are efficient on a nationwide level and which generate among users a large perception of severity in respect of sanctions for risk driving.

The deployment of action related to monitoring and controlling the three large Grand Prix motorcycle events must further count on the participation of other institutions as involved, including the organizers of the events, sponsors and the media.

## Field of action D. Adopting mitigating measures

This last field of action includes 3 programmes and 7 measures aimed at minimizing the consequences of motorcycle and moped accidents once they have taken place.

### 5.10 Infrastructures

#### Measure 30. Replacing and protecting safety fences

##### Target and description

The Ministry of Public Works has put into operation a Plan for the Adaptation of Containment System in respect of CO [Circular Order] 18/2004, a plan to replace the present containment systems by protection systems for motor bikers (PSMs) on 1,500 km of the State Road Network before 2009, and to which 43 million Euros have been assigned.

The Strategic Plan is aware that a significant portion of motorcycle accidents on roads involving the vehicle going off the road occurs on roads with many curves. Therefore, the plan envisages the installation of protective systems for motor bikers on the single carriageways being owned by the Provincial Commissions and town councils. For this purpose, bilateral agreements will be signed between the DGT and the local administrations. The estimated three-year budget is 30 million €.

This measure also includes establishing a coordinated action framework for installing PSMs on the national road network. This action framework will include the carrying out of a permanent work on observing new solutions and technologies that are susceptible of being adopted.

##### Deployment

Putting this measure into operation will comprise:

- Articulating a working group including the presence of the owners of the networks.
- Preparing a standard agreement that includes the criteria for locating the PSMs.
- Defining an action plan.
- Following-up and assessing the implementation of the plan.



### Measure 31. Vertical signposting

#### Target and description

The target of this measure is to minimize the impact of vertical signposting and street furniture in general, on accidents of motor bikers. The measure contemplates three major areas of action:

- Analyzing the effects of street furniture and vertical signposting in motorbike accidents in urban areas as well as on conventional roads.
- Action addressing a new infrastructure (e.g. recommendations regarding instructions for vertical signposting on the state road network or installation of bits / bollards in urban areas that are made of little harmful materials such as fibre or PVC, after having carried out due analysis and assessments.
- Action addressing the existing infrastructure (e.g. protecting metal bollards by covering them with protective materials).

#### Deployment

It is recommended that this measure be headed by a big city and start with an impact analysis the results of which will be submitted to a Working Group and will extrapolated to vertical signposting on conventional roads.

## 5.11 Assistance

### Measure 32. Reducing the span of time for accident assistance

#### Target and description

It is possible to reduce the number of those killed in accidents if the time for accident assistance were reduced in a significant manner. The key lies in an efficacious assistance during the first 15 minutes following the accident. An adequate equilibrium between medical efficiency and economy of the service is to be reached. Among the possible fields of action, there are the coordination of the acting protocols of the various emergency bodies, medical specialization on emergency care or specific civic training in respect of care in cases of motorcycle accidents and the manner to treat injuries thereof before the arrival of the emergency services.

The first and main target of this measure is to reduce the span of time for providing assistance on road sections with high concentrations of motor biker accidents. Carrying out the following action is envisaged:

- Reinforcing the emergency services in areas with high motor biker accident rates.
- Assessment of the possibility to put into operation itinerant ad-hoc care services (e.g. on weekends in certain areas).
- Carrying out tests and specific training so as to improve the care provided to motorcycle drivers by the emergency services.

#### Deployment

- The appropriate emergency services will be involved in the design and in the carrying out of the tests.
- The location of the target times and stretches where to carry out the assistance will be obtained as a result of the measure “Specific actions on SACs” included in this Strategic Plan.
- The recommendations obtained as results of the test will be extended to the other areas with high concentrations of motor-biker accidents.

### Measure 33. Introducing the eCall

#### Target and description

The target of the research on the installation of the eCall device in 2-wheeled vehicles is to achieve to reduce the response time of the emergency services in the case of traffic accidents.

The eCall is activated manually or automatically in case of serious accidents, and it transmits a direct call (112) to the nearest emergency services providing the exact location of the vehicle.

The European Union has marked 2010 as the target term for the deployment of the system in cars, although that project appears to be piling up a considerable delay. The system requires a strong investment in modernizing the points of response for the emergency calls, but the intended savings are substantially higher. In a pilot test carried out with cars in Finland, a 5-10% reduction of fatalities was obtained.

This measure proposes to carry out a test of the system with motorized two-wheeled vehicles showing its efficiency in those vehicles, followed by an estimation of the benefits the system would entail for motor bikers in the European Union. It is thereby intended to contribute to measures being taken to speed up the deployment of the eCall system in the Union.

#### Deployment

Carrying out this measure will start with the creation of a European consortium in which the organizations that have

been involved in the eCall will be participating. This consortium will have to achieve the financing for carrying out the project. Some possible sources of financing are:

- Insurance companies.
- Research and development financing lines (VII Framework Program, national ones, DG Transports, etc.).
- Freight and traveller transport companies, and logistics companies.
- Telecommunications operators.

## 5.12 Motor biker equipment

### Measure 34. Correct use of helmets

#### Target and description

According to the latest survey carried out by the General Directorate for Traffic, not using the helmet increases cranial injuries by 40% and reduces the probability of remaining unharmed by 20%. The use thereof in an accident at 50 km/h or higher speeds sets the difference between life and death.

The correct use of the helmet comprises three frontlines for action:

- Removing user groups who do not yet use the helmet.
- Correct fastening thereof, and.
- Clearly defining the criteria for certification and official approval and the implications thereof (e.g. helmets commonly called “fine removers”).
- Informing users on the helmet (caducity, consequences of impacts, implications on official approvals and certifications, etc.).

The measure will back an effective immobilization of the vehicles of drivers reported for driving without helmets.

#### Deployment

- Monitoring in respect of the use thereof will be increased in those areas where major percentages of non-use have been detected: coastal areas and rural areas.
- Adhesion of the city councils in monitoring campaigns in respect of the use of the helmet through the local polices will be fostered.
- The correct fastening thereof will be controlled.
- Clear and specific criteria for official approval of the helmets will be defined.
- Informative campaigns providing information on how to fasten it will be launched in the media.

### Measure 35. Establishing a minimum standard for additional equipment

#### Target and description

Establishing compulsory minimum equipment for motor bikers (jacket and trousers or overall with plastic protectors on elbows, shoulders and knees when driving on roads, and gloves and suitable footwear within the cities) is very important for minimizing the consequences of accidents both on roads and in the cities.

#### Deployment

- The minimum levels of equipment that 2W users must wear in addition to the helmet will be determined, whereby a clear distinction will be made between road and city.
- The use thereof will be promoted through distributor centres and dealers.
- If appropriate, the relevant mechanism for introducing a regulation will be analyzed.
- The deployment of this measure will be coordinated with the research on the equipment.

### Measure 36. Strengthening research on equipment

#### Target and description

There is a field of research with good perspectives and related to the development of safer equipment for motor bikers. The size of the market for safety equipment and systems is growing at a similar rate to that of motorbike manufacturing industry in general, such that the traditional problem linked to a lack of a critical mass of a demand being sufficient to justify investments in research and development is fading away. Moreover, the new technologies reinforce this former trend allowing equipment to become cheaper (vests with airbags and the neck-break are two good examples).

Testing and making trials with this kind of equipment is expensive and requires a high degree of specialization, moreover when aspiring to that the said equipment be officially approved and introduced into the market. This measure intends to carry out actions aimed at strengthening the development and presence on the market of this kind of equipment at affordable prices for a large group of consumers.

#### Deployment

The implementation of this measure will start with an analysis of the present situation in terms of identifying inhibitors (market size, price, technology, knowledge, financing, etc.) so as, starting from that point, define a schedule of specific actions.

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# 6 Management and follow-up system

## 6.1 Managing bodies

The Plan is furnished with bodies for management and follow-up:

- The Working Group “Motorcycles and Road Safety” that has been created for preparing the plan and presided by the Director General for Traffic, will be maintained within the Council for Road Safety as a group for following up and carrying out the plan by means of holding 1 or 2 yearly meetings.
- The Managing Office for the Plan which is in charge of the global coordination and following-up the measures of the plan, and of working as an intermediary with external and internal operators.

## 6.2 Management models

The plan has also been provided with three management models aimed at allowing to put the measures into operation and strengthening the cooperation between the entities as involved both on a private and on a public level.

Each of the measures will be put into operation by means of one of the three management models. So as to determine the model that suits most to each measure, various factors have been considered: the number of intervening operators, the origin of the recourses needed for the carrying out thereof, the expected duration of the measure and the nature thereof.

The management models that will facilitate the deployment of the plan are named “Consensus”, “Coordination” and “Co-responsibility”.

- **Consensus**

This is the simplest management system because there is only one entity for enforcing and supervising the measure.

Nevertheless, this entity must look for and find a broad consensus within the Working Group in respect of the measure in question. This consensus may affect time peri-

ods, material and human resources, participating entities, the scope and, in general, any aspect that is considered to be relevant. The enforcing entity will periodically inform the Working Group on the status of the progress made in the deployment of the measure.

The model thus requires little starting time and has the advantage of achieving the involvement in the definition and follow-up of measures, of entities that would otherwise be completely alien thereto.

*Example: Delaying the minimum age for the access to certain vehicles.*

- **Coordination**

The coordination model will be used for the deployment of those measures that, due to their nature, require several operators.

The measure will be enforced by various entities in an autonomous manner, but mechanisms for joint coordination and follow-up of the developments in the individual plans will be established beforehand. Thus, each of the operators will manage its own resources and will independently schedule the deployment of the measure within its own field of competence, but it will do so coordinated together with the other operators.

This model is especially useful when the measure requires joining forces with several Autonomous Communities or local administrations, or entities of similar natures that are used to compete on the market (manufacturers of vehicles, or components, dealers, etc.).

The coordination model allows deploying the measures in a non-centralized manner and at different paces, thereby facilitating the use of the best practices and experiences that have been previously used by others.

*Example: Traffic education at school (territorial competences) or improving the vehicle's visibility (competition among manufacturers).*

• **Co-responsibility**

Co-responsibility is the most complex management system. The entities undertake to enforce the measure jointly and independently, whereby each entity assumes certain roles, resources and actions within a shared management scheme.

The aspect that differentiates this model is the independence that exists between the participating entities, such that

enforcement may become even impossible if one of the operators does not comply with the duties as assumed. In this manner, a series of synergies are generated both positive when joining resources, experiences and knowledge and negative if one of the entities does not respond adequately.

*Example: Fostering the effects of risk driving on insurance premiums.*

The following is a list of all measures of the strategic plan where the management model as assigned to each measure is stated.

Measure	Modelo de Gestión
Strengthening road safety training in motorbike access tests	Consensus
Introducing the topic “motorbikes” into the 4W license tests	Consensus
Delaying the minimum age for access to certain vehicles	Consensus
Progressiveness according to age and experience	Consensus
Road safety education at school	Coordination
Incentives for participating in road safety courses/obtaining certificate	Co-responsibility
Road safety course for professional communities	Co-responsibility
Incorporating motorbike road safety into training plans of companies	Co-responsibility
Evaluating traffic coexistence and segregating measures	Coordination
Evaluating measures to change conditions at intersections	Coordination
Improving adherence to the road	Coordination
Improving preservation and condition of the road network	Coordination
Road safety audits	Coordination
Specific actions on SACs [Sections with accident concentration]	Coordination
Control systems for the equipment and performance	Co-responsibility
Improving safety systems on vehicles	Coordination
Fostering research	Co-responsibility
Promoting an assessment and scoring system of the EURO NCAP type	Co-responsibility
Improving the vehicle’s visibility	Coordination
Financial/fiscal incentives for renewing the fleet	Consensus
Campaigns specifically addressing risk driving	Consensus
Specific campaigns for 4W vehicles	Consensus
Agreement against risk driving with the media	Co-responsibility
Strengthening the distinction between the use of motor bikes as a mobility means vs. sportive use thereof	Coordination
Special measures against recidivist drivers	Consensus
Fostering companies to carry out follow-ups on road safety courses of their professional employees	Co-responsibility
Fostering the effects of RD on insurance premiums	Co-responsibility
Modifying the sanctioning scheme for RD	Consensus
Increasing control over risk driving	Consensus
Replacing/protecting safety fences	Coordination
Vertical signposting	Coordination
Reducing the span of time for accident assistance	Co-responsibility
Introducing the E-Call	Coordination
Correct use of helmets	Consensus
Establishing a minimum standard for additional equipment	Consensus
Strengthening research on equipment	Co-responsibility

### 6.3 Follow-up system

The follow-up of the implementation of the strategic plan will be carried out within the framework of the “Motorcycles and Road Safety” Working Group.

The Plan’s Management Office will be in charge of preparing the appropriate technical reports allowing to assess the developments in the plan and, if appropriate, to propose corrective actions. The materials presented by the Working Group on the occasion of the annual meetings will be included among the reports.

The plan contemplates two kinds of indicators: result indicators and activity indicators.

- Those directly related to the two targets of the plan, i.e. the reduction of fatalities and seriously injured compared to the preceding year and of the number of fatalities on motorcycle per million vehicles of the fleet.

- Those related to the specific results achieved by the enforcement measures. Launching of each measure will in fact entail fixing one or more targets and the preparation of a specific associated action plan.

There are also two kinds of activity indicators:

- A first kind of “macro” indicator referring to the number of measures of the plan that are being enforced.
- A second kind referring to the degree of the progress of the measures. Please note that there are measures that have a beginning but no end, as for instance carrying out road safety audits. In these cases, temporary milestones allowing to assess the degree of progress thereof will be defined.

The following are the follow-up indicators as well as the recurrence and calculation method thereof.

Name of the indicator	Kind of indicator	Recurrence	Information sources
1. Total number of fatalities and seriously injured, with a distinction between roads and urban areas	Results	Yearly	National Observatory for Road Safety
2. Number of fatalities on motorcycles per million vehicles of the fleet	Results	Yearly	National Observatory for Road Safety
3. Total number of fatalities on motorcycles, with a distinction between roads and urban areas	Results	Yearly	National Observatory for Road Safety
4. Degree of achievement of the results of the measure as being enforced	Results	Half-yearly	Management Office of the Plan
5. Number of measures of the plan that are being enforced	Activity	Quarterly	Management Office of the Plan
6. Degree of the progress of the measures that are being enforced	Activity	Quarterly	Management Office of the Plan

# 7 Deployment strategy and action plan

The plan comprises 36 measures and has an initial duration of four years. The major portion of these measures is called to become perpetual in time once they have been launched. Knowing that, the deployment strategy for the plan does not correspond to a traditional chronogram that stipulates which measures will be launched and when, but the strategy that is more a tactic than a strategy, consists in launching the measures taking into account the maturity reached by its management model and the cohesion shown by the entities participating in the implementation thereof.

This means that if, for instance, the Coordination model for measure involving the Provincial Councils proves to be especially efficacious, the plan will promote launching other measures as corresponding to the same model and where the Provincial Councils are especially prominent, whilst the means for making other models with other operators reach a similar degree of maturity and efficaciousness will be furnished in parallel.

In view of the foregoing, the plan has selected 16 measures to be launched within the plan's first year of effectiveness. These measures should comply with a threefold requirement: be priority; correspond to the three management models as defined; and provide a suitable equilibrium regarding the 4 key perspectives:

- Roads and urban areas
- Final addressee of the measure: motor biker or others
- Number of operators involved in the deployment: one or several
- Management model: consensus, coordination or co-responsibility

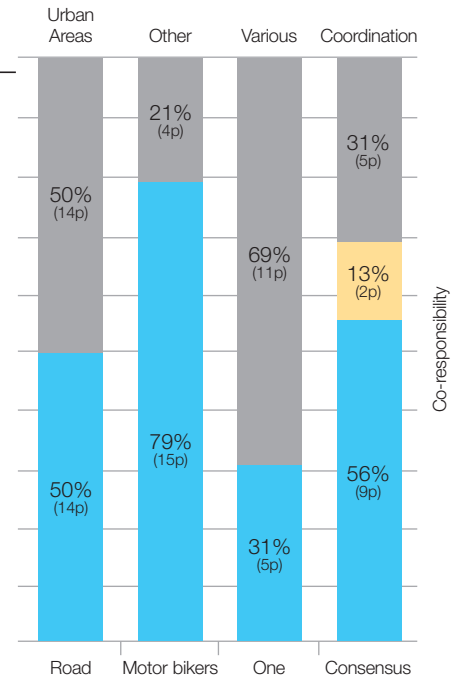
The following table shows the results of the enforcement according to priority:

	Impact ( 30% )	Feasibility (30%)
-10	Progressivity Use of the helmet Driver's minimum age Road Sfty. in motorb. test Traffic segregation	RD Campaigns 4W Campaigns Driver's minimum age Progressivity Road Sfty. in motorb. test
-5	SACs Motorb. in 4W license Better road preservation Motorbike visibility Fostering research	Motorbike in 4W license Road safety education Use of the helmet Monitoring RD Courses for professional
-1	Courses for professionals Intersection Safety systems Incentives in courses Road safety audits	Motorbike visibility Labour risk plan Recidivist drivers Control of equipment Sanctioning scheme
+1	Time for assistance Mobility vs. sports Better adherence to road Insurance premiums Control of equipment	Safety fences Mobility vs. sports SACs Incentives for courses Better adherence to road
+5	Campaigns 4W Recidivist drivers Road safety education Monitoring RD Sanctioning scheme	Road Safety Audits Intersections Traffic segregation Insurance premiums Better road preservation
+10	Labour risk plans RD campaigns Safety fences EuroNCAP for motorbikes Vertical signposting Course follow-up	Safety systems Fostering research EuroNCAP for motorbikes Media Course follow-up Vertical signposting
	Prever Plan Additional equipment Media E-Call Research on equipment	Time for assistance E-Call Additional equipment Research on equipment Prever Plan

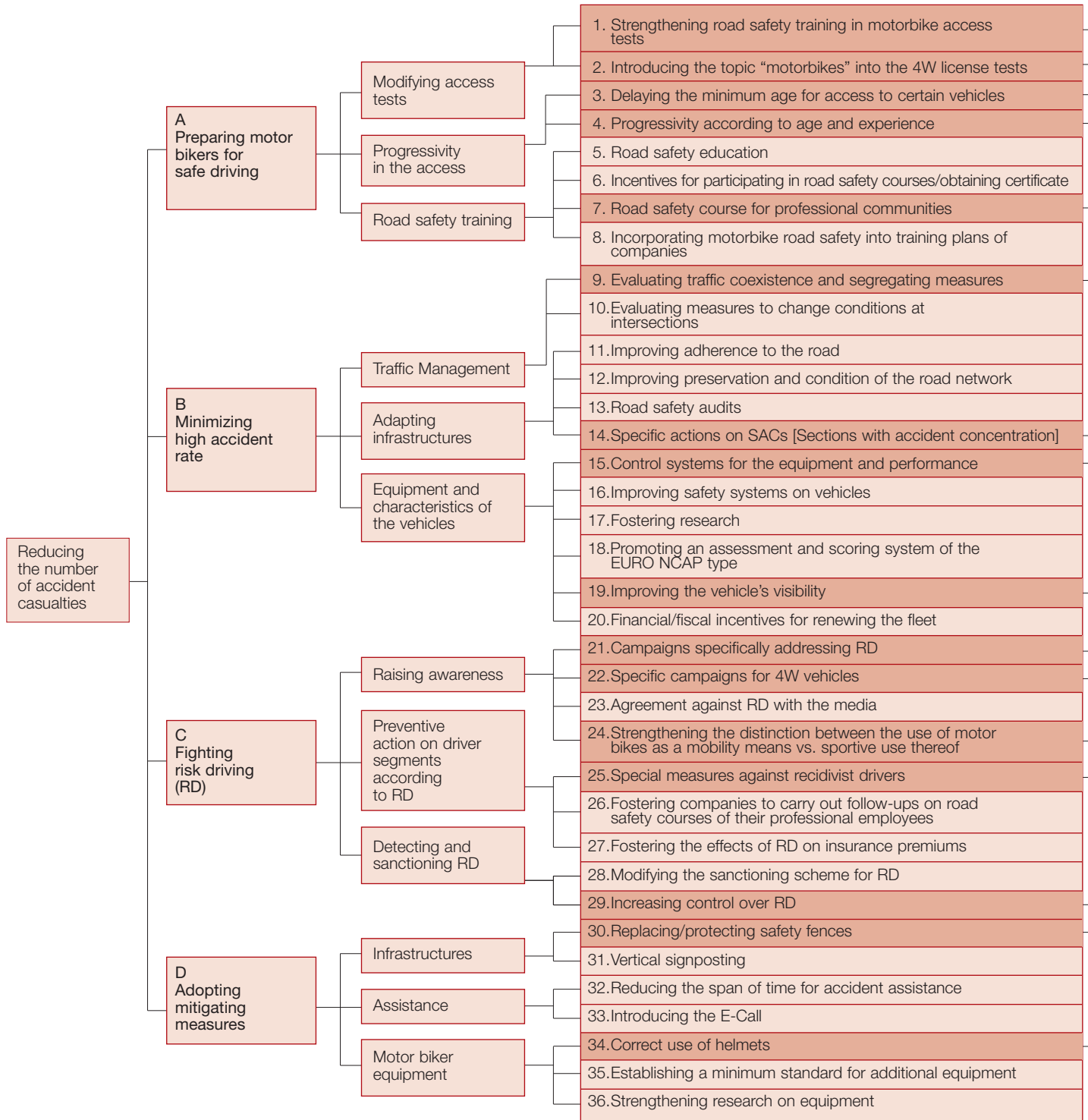
Recourses (20%)	Consensus (20%)	Global ranking	Position
Driver's minimum age Progressivity Sanctioning scheme Road Sfty. motorb. test Motorbike in 4W license	Motorbike in 4W license Better adherence to road Safety fences Better road preservation Road Sfty. in motorb. test	Road Sfty. in motorb. test Progressivity Motorbike in 4W license Driver's minimum age Use of the helmet	1 2 3 4 5
Recidivist drivers Media Use of the helmet Mobility vs. sports Monitoring RD	Intersections Control of equipment RD Campaigns 4W campaigns Recidivist drivers	4W campaigns Courses for professionals RD campaigns Recidivist drivers Control of equipment	6 7 8 9 10
RD campaigns 4W campaigns Course follow-up Courses for professionals Insurance premiums	Insurance premiums Use of the helmet Progressivity Incentives for courses Courses for professionals	Monitoring RD Motorbike visibility Mobility vs. sports Safety fences Traffic segregation	11 12 13 14 15
Safety fences Additional equipment Labour risk plans Road safety audits Control of equipment	Labour risk plans Traffic segregation Road safety audits SACs Media	SACs	16
Safety systems Road safety education Fostering research EuroNCAP for motorbikes Incentives for courses	Monitoring RD Driver's minimum age Road safety education Mobility vs. sports Course follow-up	Incentives for courses Better road preservation Better adherence to road Sanctioning scheme	17 18 19 20
Motorbike visibility Traffic segregation E-Call Research on equipment Better adherence to road Vertical signposting	Sanctioning scheme Motorbike visibility Time for assistance E-Call Additional equipment Research on equipment	Road safety education Insurance premiums Labour risk plan Intersections Road safety audits	21 22 23 24 25
Time for assistance SACs Intersections Better road preservation Prever Plan	Safety systems Fostering research EuroCNAP for motorbikes Vertical signposting Prever Plan	Safety systems Fostering research Media Course follow-up Time for assistance	26 27 28 29 30
		EuroNCAP for motorbikes Additional equipment Vertical signposting E-Call Research on equipment Prever Plan	31 32 33 34 35 36

If we select the 16 measures, we obtain the following distribution, depending on the following perspectives:

- Road or urban area.
- Motor bikers or others.
- One or more operators involved in the deployment.
- Management model: Consensus, Coordination or Co-responsibility.



And, hereafter, the 16 priority measures and the actions corresponding thereto as a result of the prioritization are highlighted in the tree of solutions:





	<ul style="list-style-type: none"> <li>• Reinforcing practical training for obtaining the present A1 and the new A2 license with driving tests on open roads</li> <li>• Obligation to pass conduct tests in a closed circuit for the new moped permit</li> <li>• Compulsory theoretical and practical test for accessing the driving of motorcycles up to 125cc for holders of the B license and having three years of experience</li> </ul>
	<ul style="list-style-type: none"> <li>• Introducing good practices regarding the coexistence car-motorbike into the tests</li> </ul>
	<ul style="list-style-type: none"> <li>• Raising minimum access age for mopeds from presently 14 to 15 or 16 years</li> </ul>
	<ul style="list-style-type: none"> <li>• Reviewing the number of access stages to other cylinder capacities</li> <li>• Assessing other progressivity actions:             <ul style="list-style-type: none"> <li>· Limiting maximum speeds</li> <li>· Limiting areas and time spans for certain ranges of ages or levels of experience</li> <li>· Forbidding novice drivers the ingestion of alcohol</li> <li>· Forbidding novice drivers to transport pillion riders</li> </ul> </li> </ul>
	<ul style="list-style-type: none"> <li>• Introducing Training Plans</li> </ul>
	<ul style="list-style-type: none"> <li>• Possibility of using the bus lane; specific lanes for motorbikes;</li> <li>• Wider lanes in urban areas combined with areas of advanced halting for motor bikes at traffic lights</li> <li>• Authorization to merge using the lateral area of a lane</li> <li>• Use of the verges on roads with high traffic densities</li> <li>• Positive discrimination by adapting the traffic regulations to the specific features of motorbike driving</li> </ul>
	<ul style="list-style-type: none"> <li>• Defining a specific and standard methodology on SACs and points of risk</li> </ul>
	<ul style="list-style-type: none"> <li>• Providing certain police units with portable devices for evaluating the souping-up of mopeds</li> <li>• Providing certain police units with portable devices for measuring the engine power of motorcycles</li> <li>• Itinerant control of the status of the tyres</li> </ul>
	<ul style="list-style-type: none"> <li>• Obligation to use reflective vests/straps in certain conditions (campaigns sponsors of manufacturers that give them as a gift)</li> <li>• Panoramic driving mirrors on all 4W-vehicles, especially on heavy vehicles</li> <li>• Reflective adhesive materials on motorcycles (equipped as standard by the manufacturer)</li> </ul>
	<ul style="list-style-type: none"> <li>• Specific campaigns on crossing red traffic lights; on positioning luggage on motorbikes; on the danger of reckless practices (e.g. "wheelies", pseudo-sportive driving, ...), on points of risk in urban areas, etc.)</li> </ul>
	<ul style="list-style-type: none"> <li>• Campaigns aimed at raising the awareness of 4W drivers on the vulnerability of motorcycles and mopeds</li> </ul>
	<ul style="list-style-type: none"> <li>• Campaigns sponsored by professional racing drivers so as strengthen this distinction</li> <li>• Making available to motor bikers one or several learner circuits and training in sportive driving</li> </ul>
	<ul style="list-style-type: none"> <li>• Compulsory specific re-education courses for divers</li> <li>• Increasing the threshold for sanction in case of recidivism</li> <li>• Accelerating the proceedings regarding sanctions</li> <li>• Transmitting files to the public prosecutor for penal treatment</li> </ul>
	<ul style="list-style-type: none"> <li>• Positioning radars considering motorbike accident rates</li> <li>• Implementing red-photos at urban points with high accident rates</li> <li>• Coordinated campaigns to locate vehicles that obviously intend to evade monitoring systems</li> <li>• Monitoring actions on reckless-driving areas</li> <li>• Coordinated campaigns regarding "zero tolerance" to risk driving</li> </ul>
	<ul style="list-style-type: none"> <li>• Incorporating protective PVC/plastic elements onto the posts of security fences (including official approval prior to the installation of any provisional measures)</li> <li>• Expanding the Plan for Adjusting Containment Systems (O.C. 18/2004)</li> <li>• Agreement between the DGT and the Provincial Deputations and Councils, on installing PSMs on roads where they are competent for. 50%-50% co-financing.</li> </ul>
	<ul style="list-style-type: none"> <li>• Eliminating the remaining groups of users who do not wear the helmet by means of specific campaigns</li> <li>• Immobilizing the vehicles of drivers who have been reported for driving without helmet</li> <li>• Defining clear criteria for official approval (e.g. no official approval for "fine-remover" helmets)</li> <li>• Forcing the correct use of the helmet (well-fastened)</li> </ul>

During the first year of implementation of the Plan, foreseen in 2008, the 16 priority measures out of the 36 measures it comprised will be deployed. The implementation of some thereof will be completed within the first year whilst other will last for longer periods of time.

Years			
Year 1	Year 2	Year 3	Year 4
Strengthening road safety training in motorbike access tests			
Progressivity in accordance with age and experience			
Incorporating the topic "motorbike" into the test for the 4W license			
Delaying the minimum access age to certain vehicles			
Use of the helmet			
Specific campaigns for 4-wheeled vehicles			
Road safety courses for professional groups			
Specific campaigns addressing risk practices			
Special measures against recidivist drivers			
Control systems for equipment and performance			
Increasing the monitoring of risk driving practices			
Improving the motorbike visibility			
Strengthening the distinction between using the motorcycle as mobility element vs. sportive use			
Replacing/protecting safety fences			
Assessing measure for traffic segregation and coexistence			
Specific actions on SACs			

The other measures will be implemented within the following three years.

Years		
Year 2	Year 3	Year 4
Incentives for participating in course/obtaining certificates		
Improving the preservation and the condition of the road network		
Improving adherence to the road		
Modifying the sanctioning scheme regarding risk driving		
Traffic education at school		
Strengthening the impact of risk driving practices in insurance premiums		
Incorporating the motorbike into the training plans of companies		
Assessing the measure for modifying the conditions at intersections		
Road safety audits		
	Improving safety systems of the vehicles	
	Fostering research	
	Agreement with the media against risk driving practices	
	Fostering that companies make a follow-up of road safety course of their professional employees	
	Reducing the time for assistance on the occasion of accidents	
		Impelling an assessment and scoring system of the EuroNCAP type
		Establishing a minimum standard for additional equipment
		Vertical signposting
		Introducing the E-Call
		Fostering research on equipment
		Fiscal-financial incentives for renewing the fleet and safe equipment

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# Annex. Information sources and references

## 1. General information resources

- Traffic General Directorate - [www.dgt.es](http://www.dgt.es)
- Journal of Traffic and Road Safety - [www.dgt.es/revista](http://www.dgt.es/revista)
- Ministry of Industry - [www.mityc.es](http://www.mityc.es)
- General Directorate for Roads [www.fomento.es/mfom/lang\\_castellano/direcciones\\_generales/carreteras/](http://www.fomento.es/mfom/lang_castellano/direcciones_generales/carreteras/)
- The motorcycle industry in Europe – ACEM - [www.acembike.org/html/start.htm](http://www.acembike.org/html/start.htm)
- National Association of Companies of the Two-Wheelers Sector - [www.anesdor.com](http://www.anesdor.com)
- Traffic Group of the Guardia Civil - [www.guardiacivil.org/quesomos/organizacion/operaciones/trafico](http://www.guardiacivil.org/quesomos/organizacion/operaciones/trafico)
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- Royal Automobile Club of Spain - [www.racc.es](http://www.racc.es)
- Mutual Motor Bikers' Association - [www.mutuamotorista.com](http://www.mutuamotorista.com)
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- Platform “Yes to motor bikes” for the defence of the motor biker - [www.sialamoto.org](http://www.sialamoto.org)
- Stop accidentes”, an association that provide help and advice to those affected by traffic accidents” - [www.stopaccidentes.org](http://www.stopaccidentes.org)
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- Department of Transports of the United Kingdom - [www.dft.gov.uk](http://www.dft.gov.uk)
- Transport for London - [www.tfl.gov.uk](http://www.tfl.gov.uk)
- Bikesafe program in the United Kingdom - [www.bikesafe.co.uk](http://www.bikesafe.co.uk)
- Belgian institute for road safety - [www.ibsr.be](http://www.ibsr.be)
- Transport research centre. OCDE - [www.cemt.org/jtrc/workinggroups/roadsafety/performance.htm](http://www.cemt.org/jtrc/workinggroups/roadsafety/performance.htm)
- Road safety web - [www.roadsafetyweb.net](http://www.roadsafetyweb.net)
- European road assessment programme safer roads save lives - euroRAP - [www.eurorap.org](http://www.eurorap.org)
- Institute for traffic care - [www.itctrffic.com](http://www.itctrffic.com)
- Roads and traffic authority. Australia - [www.rta.nsw.gov.au/roadsafety/motorcyclesafety/motorcycle\\_icm.html](http://www.rta.nsw.gov.au/roadsafety/motorcyclesafety/motorcycle_icm.html)
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- Traffic safety center. Berkeley University- [www.tsc.berkeley.edu/html/home.html](http://www.tsc.berkeley.edu/html/home.html)
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- Spanish portal for resources for civil engineering and construction - [www.civileng.com](http://www.civileng.com)
- Association of Companies Preserving and Exploiting Infrastructures - [www.acex.ws/es/index.asp](http://www.acex.ws/es/index.asp)
- Signposting consultants - [www.dielse.es/index1.html](http://www.dielse.es/index1.html)
- Network of motorbike shops in Spain - [www.motorrad.es/motorrad.htm](http://www.motorrad.es/motorrad.htm)
- National association of motor vehicle sellers, repair, and spare parts – [www.ganvam.es](http://www.ganvam.es)
- Spanish Association of Manufacturers of Automotive Equipment and Components - [www.sernauto.es](http://www.sernauto.es)
- Spanish Road Association - [www.aecarretera.com](http://www.aecarretera.com)
- Spanish Lubricant Association - [www.aselube.com](http://www.aselube.com)
- Association for the Prevention of Traffic Accidents - [www.pat-apat.org](http://www.pat-apat.org)
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- Institute for automotive studies - [www.ideauto.com](http://www.ideauto.com)
- Institute recognized by the UNO as international advising body regarding road safety - [www.itctrffic.com](http://www.itctrffic.com)
- Portal dedicated to the motor world - [www.ifemamotor.ifema.es](http://www.ifemamotor.ifema.es)
- European Conference of the Minsters of Transport - [www.cemt.org/about.htm](http://www.cemt.org/about.htm)

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2. Introducing the topic "motor bikes" into the 4-wheeler license test"
  - Drive Safe, Cycle Safe. Department for Transport. United Kingdom. [www.dft.gov.uk/pgr/roadsafety/drs\\_cyclingandmotorcycling/drivesafecyclesafe](http://www.dft.gov.uk/pgr/roadsafety/drs_cyclingandmotorcycling/drivesafecyclesafe)
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- AETEC (Asociación de Estudios de la Tecnología para Equipamiento de Carreteras) [Association for Technology Studies on Road Equipment] - [www.aetec.com](http://www.aetec.com)
- AFASEMETRA (Asociación Española de Fabricantes de Señales Metálicas) [Spanish Association of Manufacturers of Metal Signposts] - [www.afasemetra.com](http://www.afasemetra.com)
- AIMPE (Asociación de Ingenieros Municipales y Provinciales de España) [Association of Provincial and Municipal Engineers]
- AMEC URBIS (Asociación Española de Equipamiento Urbano) [Spanish Association for Urban Equipment] - [www.amec.es/urbis](http://www.amec.es/urbis)
- ANFAC (Asociación Nacional de Fabricantes de Automóviles y Camiones) [National Car and Truck Association] - [www.anfac.com](http://www.anfac.com)
- ANFALUM (Asociación Nacional de Fabricantes de Luminarias) [National Association of Lighting Manufacturers] - [www.anfalum.com](http://www.anfalum.com)
- ASEFACOL (Asociación Española de Fabricantes de Báculos y Columnas de Alumbrado) [Spanish Association of Manufacturers of Lighting Supports and Columns]
- ASETA (Asociación de Sociedades Españolas Concesionarias de Autopistas, Túneles, Puentes y Vías de Peaje) [Association of Spanish Concessionaires of Toll Motorways, Tunnels, Bridges and Roads] - [www.aseta.es](http://www.aseta.es)
- ATC (Asociación Técnica de Carreteras) [Technical Road Associations] - [www.atc-piarc.com](http://www.atc-piarc.com)
- PEMTRA (Patronal de Empresas de Tráfico) [Employers’ Association of Traffic Companies]
- SIMEPROVI (Asociación Española de Fabricantes de Sistemas Metálicos de Protección Vial) [Spanish Association of Manufacturers of Metal Road Protection Systems] - [www.simeprovi.com](http://www.simeprovi.com)



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## Management and coordination

National Road Safety Observatory of Traffic Directorate-General

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Asociación Mutua Motera – AMM (Motorbike Association)

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Mobility Directorate-General)

Federación Catalana de vendedores de vehículos a motor – FECAVEM (Catalonian Federation  
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Guardia Civil. Agrupación de Tráfico (Civil Guard. Traffic Department)

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Ministerio de Fomento. Dirección General de Carreteras (Ministry of Transport. Road Directorate-General)

Real Automóvil de Cataluña (RACC) (Catalonian Royal Automobile Club)

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Informe final



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