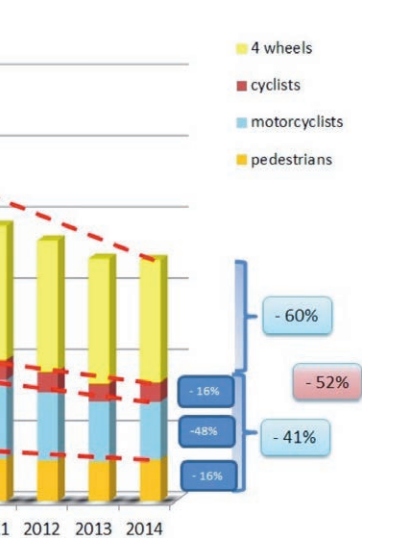

Technical Papers
Centro Studi FIAB

Riccardo Gallimbeni

8

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Edoardo Galatola

Road Safety and Non-motorized Road Users Mobility

english version

In memory of Riccardo Gallimbeni

We dedicate the series “Technical Papers” for the development of cycling in all its forms to Riccardo Gallimbeni, who devoted his time and intelligence to this theme. The “Technical Papers” are intended to provide specific information to technicians, planners, environmentalists and militant cyclists.

Claudio Pedroni

FIAB
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Amici della Bicicletta
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Edoardo Galatola

Road Safety and Non-motorized Road Users Mobility

1 Introduction

Road safety is currently one of the major challenges for our society and not the niche topic of a decade ago, is finally perceived as a political, social and economic priority.

Road safety is closely linked to the policies of transport and mobility in general; it is conditioned by them, but is in its own turn, an influence on them and therefore should be studied, recognized and tackled.

High accident rates are not inevitable: they are an emergency that can be defeated.

According to the project "Vision Zero"[1] even one victim is unacceptable.

Today we share the momentum generated by this vision, and, while aware that zero risk does not exist, we know that we can quantify and reduce it in a technologically and socially planned manner.

This is all the more true and essential for vulnerable road users and in particular for non-motorized road users, to whom this publication is specifically addressed.

The development of more sustainable travel (for the environment, for people and for society) is so influenced by, and influences, the safety of traveling.

The topic will be addressed starting with a comprehensive analysis of accident rates in the world, in Europe and in Italy and then look in depth at the aspects particular to Italy.

We will analyze policy options in order of effectiveness, without avoiding the more thorny issues.

Finally we will describe the regulatory pathways being put in place, and speculate on our future, trying to counter once and for all the non possumus that has too often led to fatalism about the possibility of effective self-determination in our country.

On the contrary, we can and we must, take action for environmental and social improvement, in which a healthy and sustainable mobility as an important part.

1 Vision Zero is a multi-national road traffic safety project which aims to achieve a highway system with no fatalities or serious injuries in road traffic. It started in Sweden and was approved by their parliament in October 1997. The project then spread into other European countries, such as the United Kingdom and Switzerland.

2 The progression of accidents rates in Italy and Europe

2.1 Road accident rates worldwide

The deaths and injuries from road traffic accidents are a "worldwide epidemic"[2]. **(Figure 1)**

The World Health Organization estimated that in 2002, worldwide, **about 1.2 million people died in road accidents** and about 50 million were injured.

It should be noted that 85% of deaths and injuries from road traffic accidents occur in low- or middle-income countries and for these developing economies this represents a significant cost, estimated at between 64.5 and 100 billion dollars (as a term of reference for comparison, bilateral aid in 2005 was $ 106.5 billion).

Figure 1 – 2002 Road traffic injury mortality rates (per 100 000 population), 2002

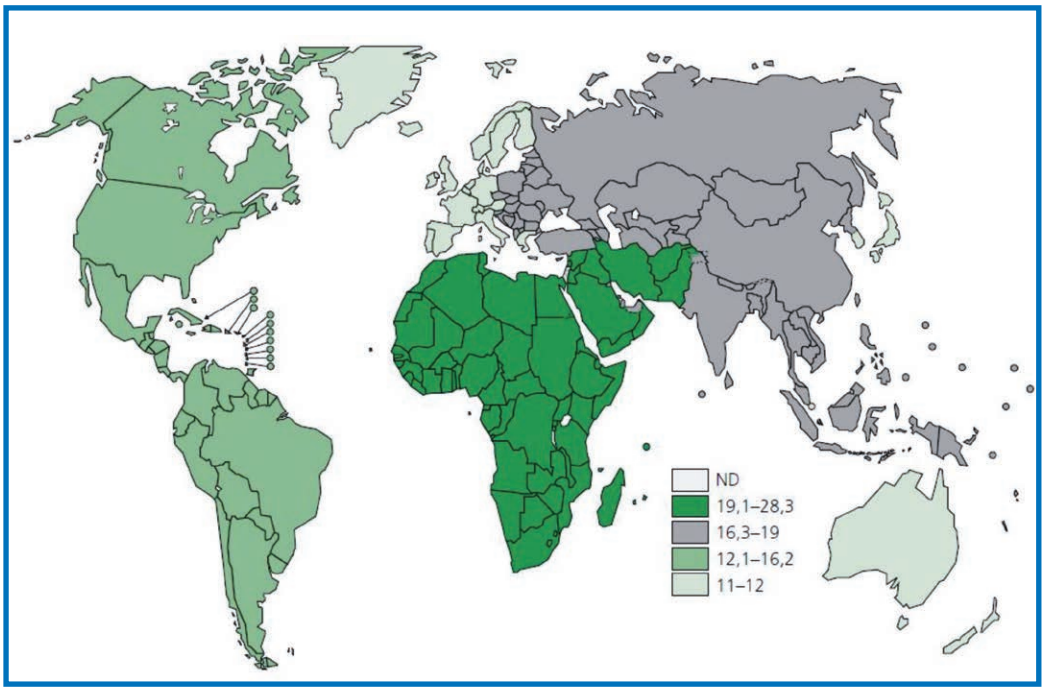


Table 1: death rate from traffic accidents by region WHO

Who region countries	Low and middle income countries	High income countries
Africa	28,3	-
Americas	16,2	14,8
South East Asia	18,6	-
Europe	17,4	11,0
Eastern Mediterranean	26,4	19,0
Western Pacific	18,5	12,0

Source: World Report on road traffic injury prevention, 2004

It is evident that Europe - particularly the "15" - has a lower accident rate than the rest of the world (including the United States that are wrongly imagined as excellence from the point of view of safety policies).

2 MAKE ROADS SAFE, A DECADE OF ACTION FOR ROAD SAFETY - Commission for Global Road Safety, ISBN-13: 978-0-9561403-2-6

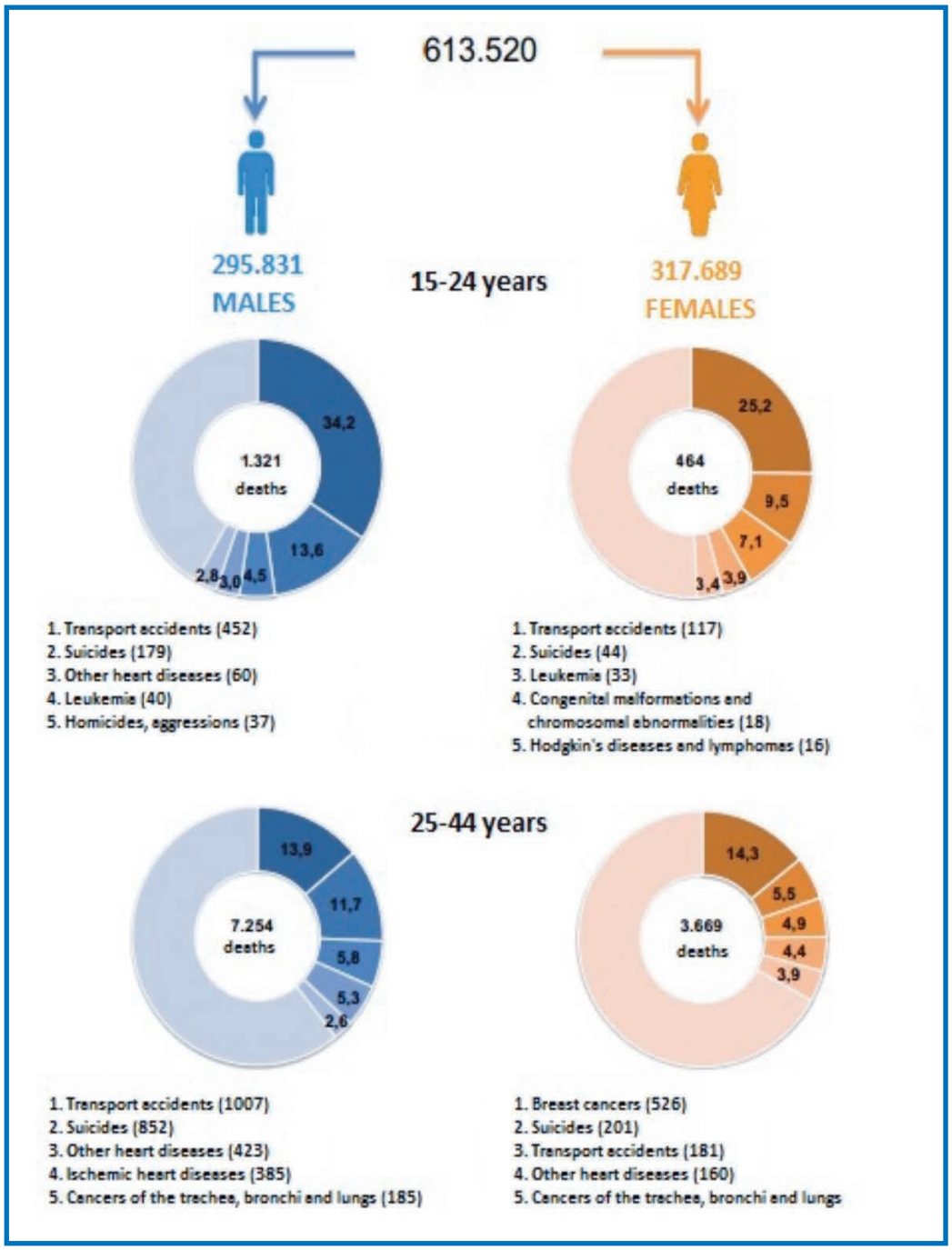
Despite this - or perhaps because of it - in Europe we continue to question how to reduce this real social evil.

We must point out that road accidents are in fact the number one cause of death for young people between 15 and 24 years, both males (452 deaths, accounting for 34% of the total) and females (117 deaths, 25% of the total).

And they are still the leading cause of death for the young-adult male segment of the population identified in the age group between 25 and 44 years (1,007 deaths or 14% of total)[3]

In **Figure 2** the percentage of each case is shown in the graphs, the number of deaths in parentheses next to each item in the list.

Figure 2 – The most frequent causes of death by gender and age group in Italy in 2012.



3 2012, MAIN DEATH CAUSES IN ITALY, I.S.T.A.T. Statistical Reports, 3/12/2014

2.2 Road accident rates in Europe and Italy

These considerations have led the European Union to focus on policies for the reduction in road accidents.

The effects of these interventions can be displayed statistically in the pattern of incidents over time, especially with regard to deaths and injuries.[4] **(Figures 3 and 4)**

Figure 3 – Comparison of the historical evolution of mortality in Europe (EU15) and in Italy

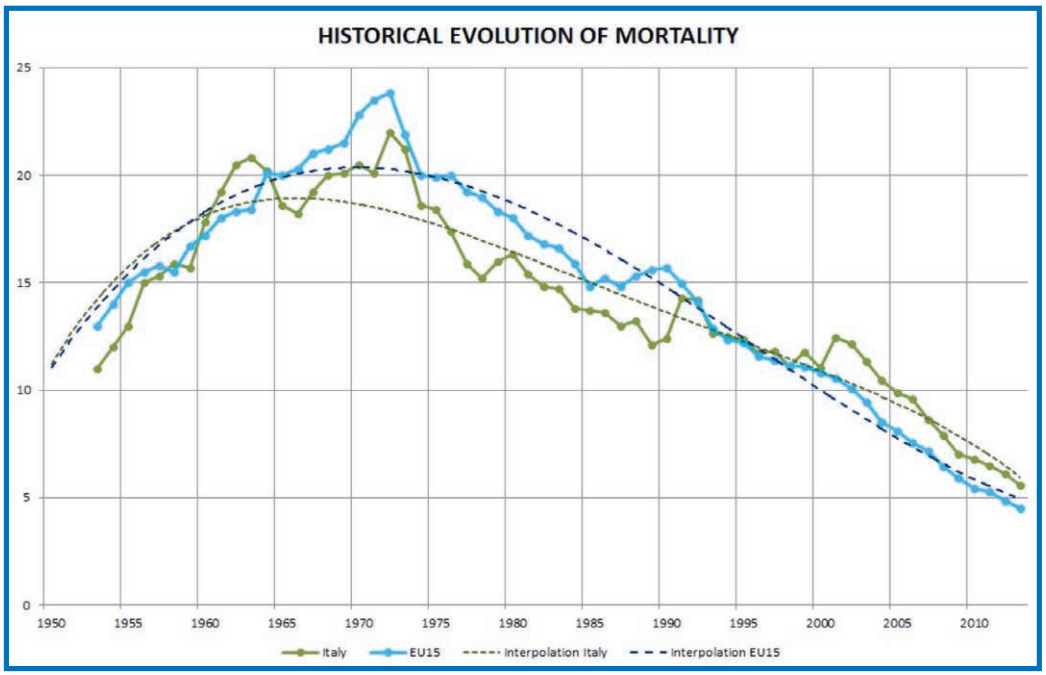
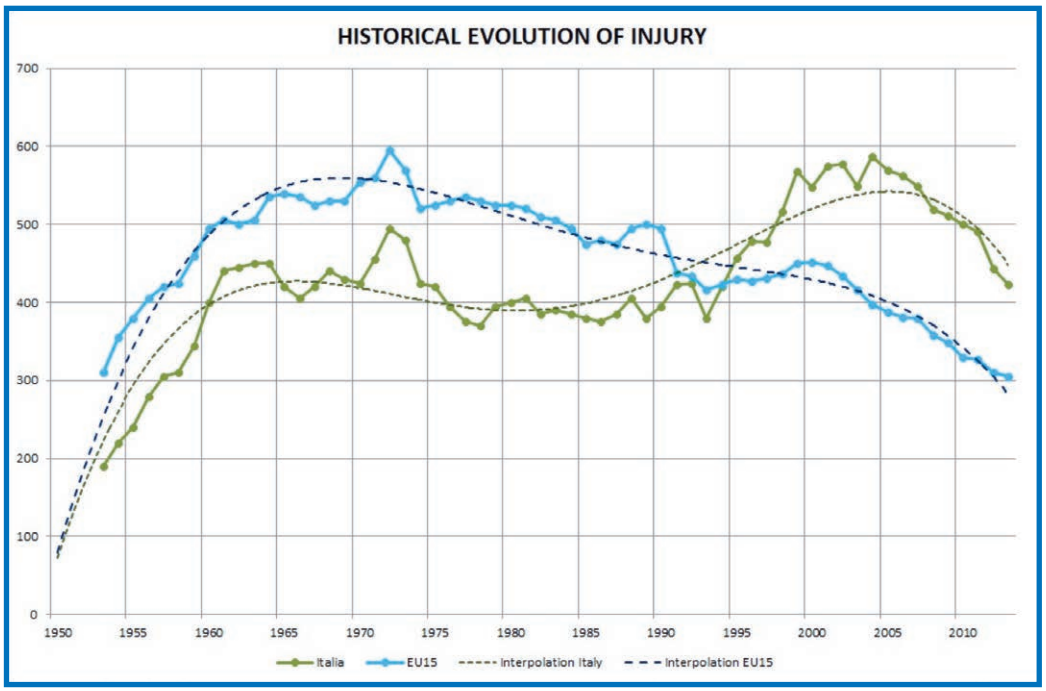


Figure 4 – Comparison of the historical evolution of injury in Europe (EU15) and in Italy



Note that road accident rates, though they vary from state to state as a function of the economic conditions and the policies adopted, keep **a common trend in almost all European countries** which derives from the evolution of the road network; the transport system, the territorial organization and the capacity to affect road safety through regulatory action.

4 Processing by http://ec.europa.eu/transport/road_safety/specialist/statistics/index_en.htm integrated with the time series of "State and evolution of road safety according to the new Istat series, Technical Secretariat of the National Road Safety Council (Consulta Nazionale Sicurezza Stradale), March 2008. "

2.3 Analysis of accident rates in Europe

In the curve of mortality it is possible to distinguish 4 phases:[5]:

- Growth in the number of victims (50s and 60s)
- The first phase of reduction (70s and 80s)
- Stagnation in the early 90s
- New phase of reduction (from the mid-90s to today)

Phase 1, the growth in the number of victims (50s and 60s)

In all countries of the EU 15 the number of victims grows in this twenty years due to the increase in number and amplitude of the movements of people and goods but, above all, to the gradual transition from the **collective carrier** (train, bus, etc.) to the **individual carrier** and the consequent increase in traffic. In addition, changes in the volume and characteristics of road traffic in all countries impacts on a pre-war a road network, totally inadequate for the new situation and the presence of a growing majority of non-professional drivers. The result was a **doubling of the number of deaths and injuries in less than twenty years**.

Phase 2, the first phase of reduction (70s and 80s)

In the '60s major programs of **expansion and improvement of the road network** were launched and the automotive industry began to treat the **safety factor** of the vehicle in a more systematic and effective manner.

Sometimes the real goal was not safety as such, but a **reduction in travel time** and **increased driving comfort** (less twisting road layouts, formation of the first motorway networks, more powerful, faster vehicles), but the initial situation was such that even actions not targeted at road safety resulted in a substantial improvement in the latter.

In the late '60s and early' 70s these processes begin to determine a **generalized turnaround**: with an extraordinary harmony, between 1970 and 1973 the growth in the victims of fatal road accidents dwindles in all 15 EU countries and is then reversed, with the number of dead and injured beginning to decline rapidly.

Phase 3, the stagnation of the early 90s

The second phase of development of road safety lasted throughout the '70s and' 80s, but it tends to run out on the threshold of the '90s, when the **improvements in vehicles and infrastructure do not seem sufficient** to ensure a continued reduction in the number of accidents and deaths.

The growth in vehicle numbers and traffic volumes, and changes in patterns of travel, the increased speed of vehicles, the widespread access to driving and other phenomena of minor relevance lead to a halt, of varying duration, in the reduction of accidents in all 15 EU countries. It is at this stage that we see the beginning of serious reflection on the reasons for what is happening, and on the possibility of developing appropriate enforcement actions and also on the necessity to define tools and structures dedicated to governing, in an effective manner, such enforcement actions.

The results of the efforts in this regard by the UNECE, OECD, ECMT, the European Commission and the national governments of some European countries translate into a new range of measures which, for the first time, are dedicated specifically to improving road safety.

In the more sensitive countries, and environments, an awareness begins to develop that road safety is not mechanically determined by infrastructure or by vehicles which are well designed, built and maintained, but that to reduce the number of accidents and deaths it is not enough to ask citizens to drive cautiously and to respect the rules, that road accidents are not inevitable, but the result of choices in infrastructure and transport, and that, therefore, you can reduce the number of victims through appropriate road safety policies. The focus of attention thus shifts from driving behavior to policies at EU, national and local level, determining the start of a kind of Copernican revolution that begins to change the choices and priorities of many international organizations and some governments.

The results come quickly: **in less than ten years the phase of stagnation ends** in most countries and a new phase of improving road safety begins.

Phase 4: The new phase of reduction (from the mid-90s to today)

In the early 90s the first overall strategies began to emerge to improve road safety and we again see a progressive reduction in the number of victims. The element of great interest that characterizes this phase is the specific nature and intensity of the improvement process.

5 White book, synthesis, Safety status, Technical Secretariat of the National Road Safety Council, April 2007"

Having embarked in the direction of **planning and programming road safety**, a comprehensive strategy was identified and shared by all the EU member stating and setting out the goal of reducing casualties with quantitative definition and constant monitoring. Thus indicating the improvement of road safety as an EU priority, this led to almost all member countries taking action on road safety.

Between 2000 and 2004 almost all EU countries - and even European countries that had chosen not to be part of the union, such as Norway, Switzerland, Iceland, etc. - have put in place instruments for the planning and programming of road safety.

2.4 Analysis of accident rates in Italy

Also in Italy it is possible to divide the evolution of accident rates into four stages.

Phase 1

In the 50s and 60s the number of victims in our country grows at a pace similar to that of the 15 countries that form the EU, but with mortality rates consistently lower than average. The all time historic maximum in the number of deaths is reached in the early 70s.

Phase 2

In the 70s and 80s Italy starts a phase of reduction in the number of victims, which return to the mortality rates of the mid-'50s, thus aligning itself with most other EU15 countries (except in this period Greece, Spain, Portugal and Ireland where the phase of intense expansion of "mass motorization" and individual mobility which had characterized other European countries in the two previous decades is taking place). Also in this case, however, our country follows a downward path parallel to Europe, but with consistently lower values.

In the second half of the 80s however, the rate of decline in mortality rates in Italy begins to fade, while it remains substantially constant in the rest of the 15 EU countries.

Phase 3

In the 90s the trend in accident rates undergoes a phase of stagnation also in Italy, the number of victims remains substantially constant and then rises slightly towards the end of the decade. In consequence the Italian mortality rate moves above the European average and the country falls from 4th to 8th position in the ranking of European road safety. In these years the trend in Italy was in sharp contrast to the European average.

Phase 4

The last phase began in 2003, with the introduction of the penalty points system and a strong recovery in the reduction in the number of victims. This effect is exhausted within 12 months, but more specific initiatives - such as the Tutor speed control system on the motorways and the improved passive safety of motorized vehicles has strengthened the curve downward.

Comparing the Italian data with that from Europe can produce some observations. Italian mortality rates have reduced significantly in recent years (5.6 deaths per 100,000 inhabitants in 2013).They however remain slightly higher than the European average, that is; in the 28 EU countries (5.2), and the comparison is much worse if one compares them with the 15 EU countries average (4.5) and that of the "virtuous" countries (NL, S, DK, UK, CH, N which have a value of about 3)[6].

This data would seem to be due to the delay, with respect to the rest of Europe, with which Italy adopted measures to reduce its accident rate between 1995 and 2003. In fact these measures initiated the first significant reductions. The process of improvement is slower than the European average; while the opposite took place up to 1995 (see Figure 3). In fact, as we shall see later, this fact seems to derive more from individual behavior than from the infrastructure policies.

With regard to injury the difference is even more striking, given that between 1993 and 2004 the rate of injury did not decrease, but increased by 50%, and then begins to decline markedly.

The rate of injury is closely linked to the infrastructure and mobility policies implemented, these affect the severity of accidents, as shown by the data, from the numerical point of view the rate of injury in Italy (424 injuries per 100,000 inhabitants in 2013) is 30% higher than the average for the 15 EU countries (311).

It should be noted that, contrary to the mortality rate, that of injury in the EU 15 is higher than the EU 28 (284), as it reflects the lower volume of traffic in the countries of recent acquisition.

6 Road Safety evolution in Europe, Source Care, March 2014

3 The EU's Action Programs

3.1 The Third RSAP 2001 - 2010

With the third European action programme for road safety (RSAP) 2001-2010, adopted on 2 june 2003, the European Union urged the governments of the Member States to promote actions and policies to halve the number of victims in a decade, a goal reached only patchily.

Tabella 2: Results achieved (in order of reduction) against the requirements of the 3rd RSAP 2001-2010

Rank	Country	Reduct. % 2001-2010	Rank	Country	Reduct. % 2001-2010
1	Latvia	-61%	13	Slovakia	-44%
2	Estonia	-61%	14	Belgium	-43%
3	Spain	-55%	15	Media Eu 15	-43%
4	Luxembourg	-54%	16	Austria	-42%
5	France	-51%	17	Italy	-42%
6	Slovenia	-50%	18	Netherlands	-41%
7	Sweden	-50%	19	Hungary	-40%
8	Portugal	-49%	20	Czech Rep	-40%
9	Ireland	-48%	21	Cyprus	-39%
10	Media EU 15	-48%	22	Denmark	-39%
11	Germany	-48%	23	Finland	-38%
12	United Kingdom	-46%	24	Greece	-32%
			25	Poland	-29%

In particular in Italy, the reduction was 42%: which is significant but does not meet the target. It should however be noted that the disaggregated data provide a different and worse picture. **(Figure 5)**

In fact the 50% reduction was reached for the users of motorized four-wheel vehicles (-52%), while for vulnerable users (motorcycle, bicycle, pedestrian) the reduction was 29%, which therefore resulted in a marked failure to achieve the objective.

Figure 5 – Reduction in mortality from 2001 to 2010 in Italy

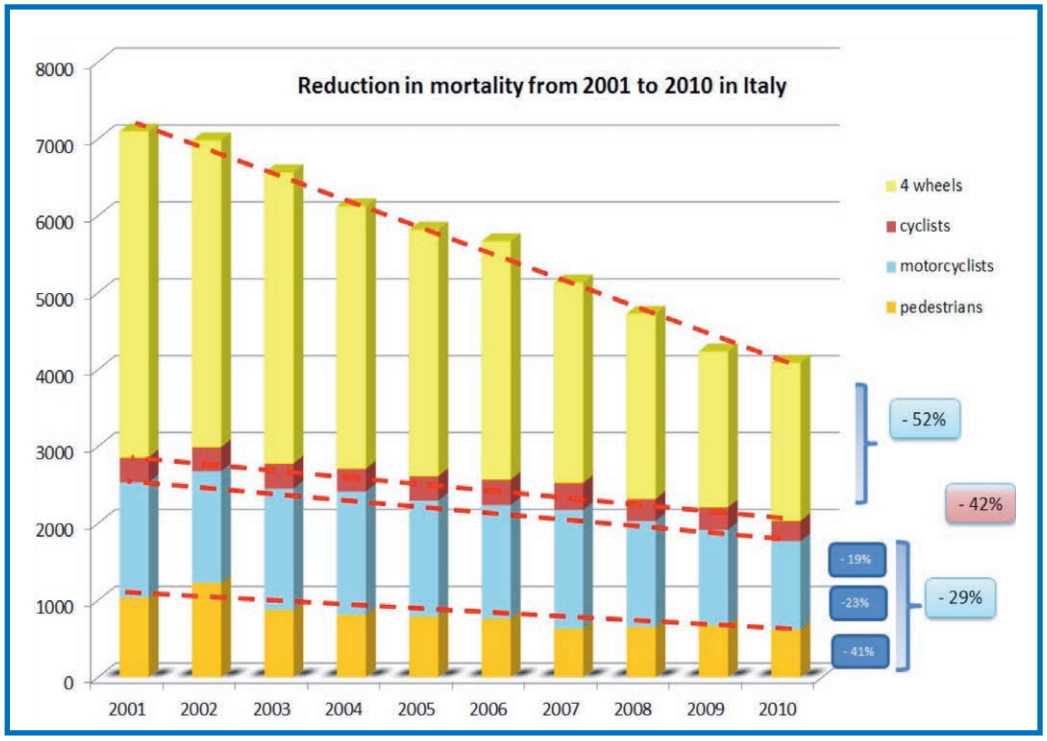
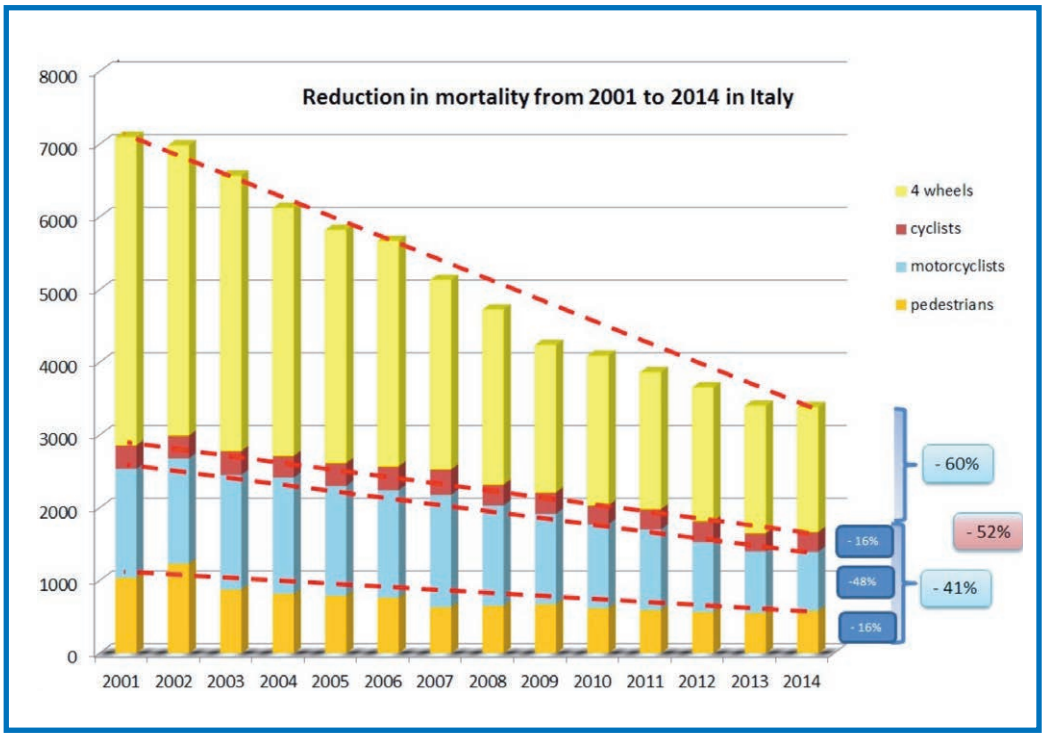


Figure 6 – Reduced mortality in Italy from 2001 to 2014.



This aspect is even more evident in 2014, when the number of victims is halved. **(Figure 6)**

Given that serious injury to vulnerable users appears to be 50% of the total, it is evident that further significant reductions cannot be achieved unless henceforth the safety of this category of users is given priority.

3.2 The Fourth RSAP 2011 - 2020

Meanwhile the 4th RSAP was presented "**COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE AND THE COMMITTEE OF THE REGIONS - Towards a European road safety area: policy orientations on road safety 2011-2020 ".**

Unlike the 3rd program, which promoted passive protection, the 4th program urges member states to take active protection, through the following principles:

- Striving for the highest road safety standards throughout Europe
- An integrated approach to road safety
- Subsidiarity, proportionality and shared responsibility

Specifically it identifies seven strategic objectives:

1. Improve education and training of road users
2. Increase enforcement of road rules
3. Safer road infrastructure
4. Safer vehicles
5. Promote the use of modern technology to increase road safety
6. Improve emergency and post-injuries services
7. **Protect vulnerable road users**

As one can see, among the primary objectives the protection of the vulnerable road user is recognized, and expanded as follows:

Powered-two-wheelers (PTWs)

- Improving **awareness** of PTW riders by other road users.
- Encouraging research and technical developments aimed at increasing **PTW's safety** and reducing the consequences of accidents, such as standards for personal protective equipment, airbags, the use

of relevant ITS applications (e.g. eCall) and progressive installation of advanced braking systems, appropriate anti-tampering measures, etc. The Commission will propose to extend to PTWs the existing EU legislation concerning roadworthiness testing. Finally, on-going efforts to better **adapt road infrastructure to PTWs** (e.g. safer guardrails) should also be continued.

- Encouraging Member States to focus enforcement on **speed**, **drink** and driving, helmet use, tampering and riding without a proper PTW licence.

Pedestrians, cyclists

- In 2008, cyclists and pedestrians represented 27% of road deaths (**47% in urban areas**). For many potential cyclists, real or perceived road safety risks remain a decisive obstacle. National and local governments are increasingly involved in promoting cycling and walking, which will require that more and more attention is paid to road safety issues.
- Since 2003, legislation has been introduced at EU level to **reduce injury risks** (e.g. energy absorbing car-front structures, advanced braking systems, blind-spot mirrors, etc.). Further actions will need to be examined (e.g. improved **visibility**, **speed management**, adequate **infrastructure** for non-motorised transport, **separation** of dangerous mixed traffic, etc). Since the problem is mainly related to urban management, most of the actions will have to be carried out at local level, in accordance with the Commission's Action Plan on Urban Mobility. Given the significant environmental, climate, congestion and public health **benefits of cycling**, it merits reflection whether more could not be done in this area.

Elderly people and people with disabilities

- Elderly people represented 20% of road fatalities (40% as pedestrians) in 2008. Ageing of the population is putting an urgent emphasis on the need to assess older people's vulnerability in traffic. Also, persons with disabilities are at a significant risk. Knowledge is still very limited in this field and focused research efforts are needed, including on medical criteria for the assessment of fitness-to-drive.

Among the actions planned, the Commission will make appropriate proposals in order to:

1. Monitoring and further developing technical standards for the protection of vulnerable road users.
2. Including powered-two wheelers in vehicle inspections.
3. **Increasing the safety of cycling and other vulnerable road users, e.g. by encouraging the establishment of adequate infrastructures.**

As well as guidelines requiring greater commitment from all interested parties through stronger governance to:

- - Give priority to the implementation of the EU legislation in the field of road safety
- - Establish a framework for open cooperation between the member states and the Commission
- - Improve monitoring by collecting and analyzing data
- - Increase understanding of accidents and the associated risks

4 The Characteristics of road safety in Italy

4.1 Urban Accidents

From the perspective of accident rates Italian roads have a peculiarity in respect to the rest of Europe, if we observe that in 2014, for example, 75% of the total accidents occurred on urban roads, that is 72% of the wounded and the **45% of deaths**.

If it is normal that the majority of accidents occur in cities, it is much less so that there are half of the deaths, as we can assume a lower speed than on non-urban roads and highways.

In Europe (EU15) the average number of road deaths in the city is 33% (2013), with peaks below 25% in many countries. **(Figures 7 and 8)**

There is only one explanation: our city roads are less safe than the corresponding roads in the other EU countries. It is not surprising therefore that in urban areas 50% of the fatalities are either pedestrians or cyclists, a percentage that rises to 84% if we include motorcyclists.

Figure 7 – Distribution of accident by road type (2014)

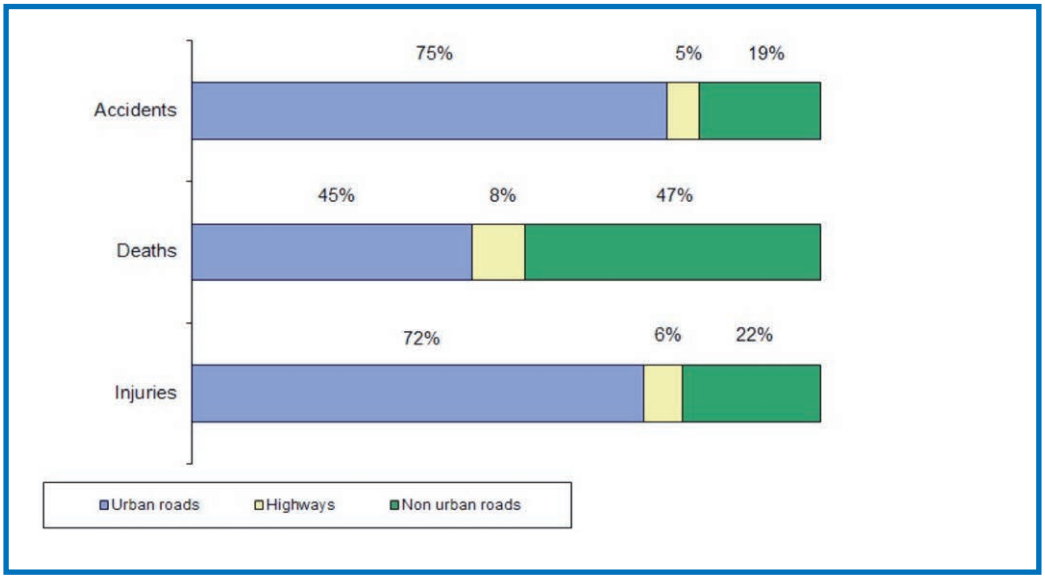
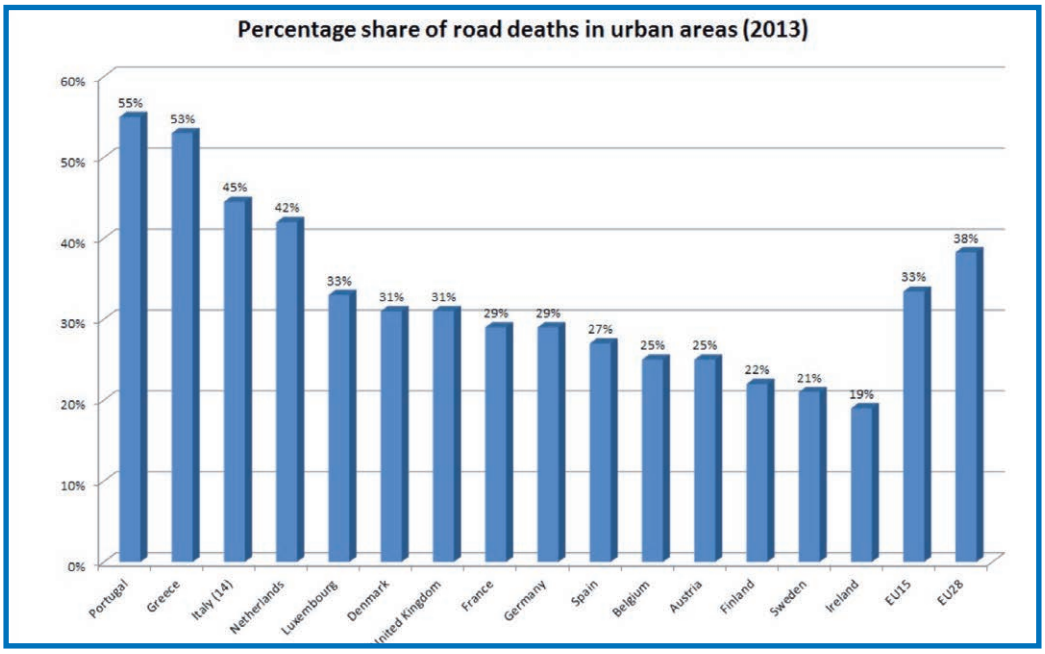


Figure 8 – Percentage share of road deaths in urban areas (2013)



Note in particular that the percentage of non-motorized users affected has grown not in absolute terms, as has already been said, but because the reduction in accident rates was lower than those of motorized four-wheel users, whose incidence is now minimal in urban areas[7]. **(Figures 9 and 10)**

Figure 9 – Percentage of deaths of non-motorized road users in urban areas (% of total)

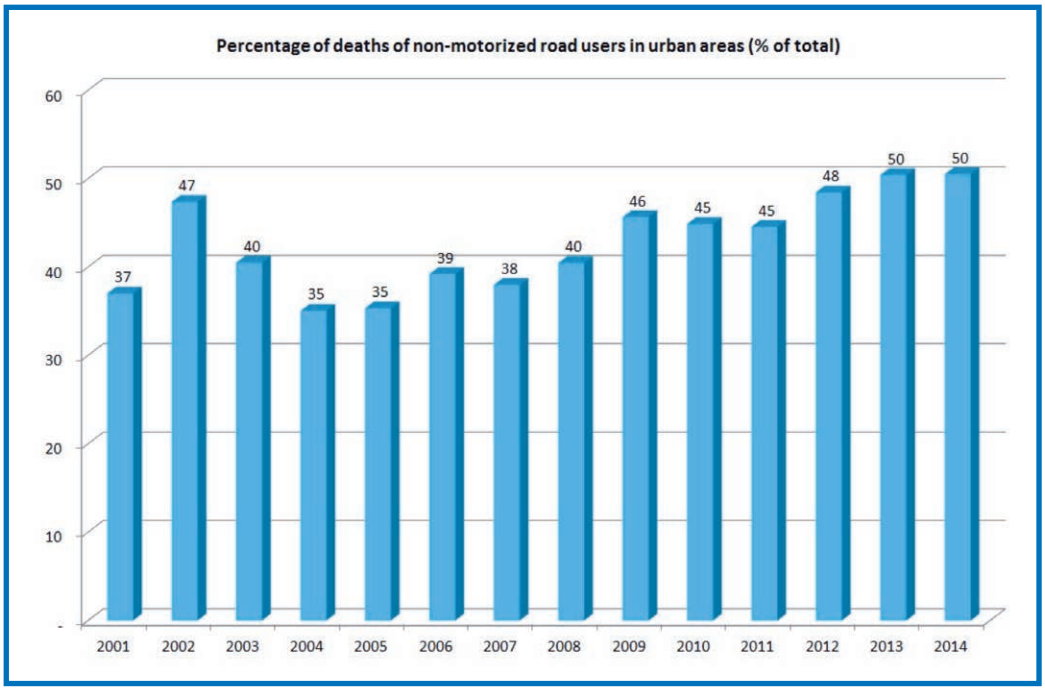
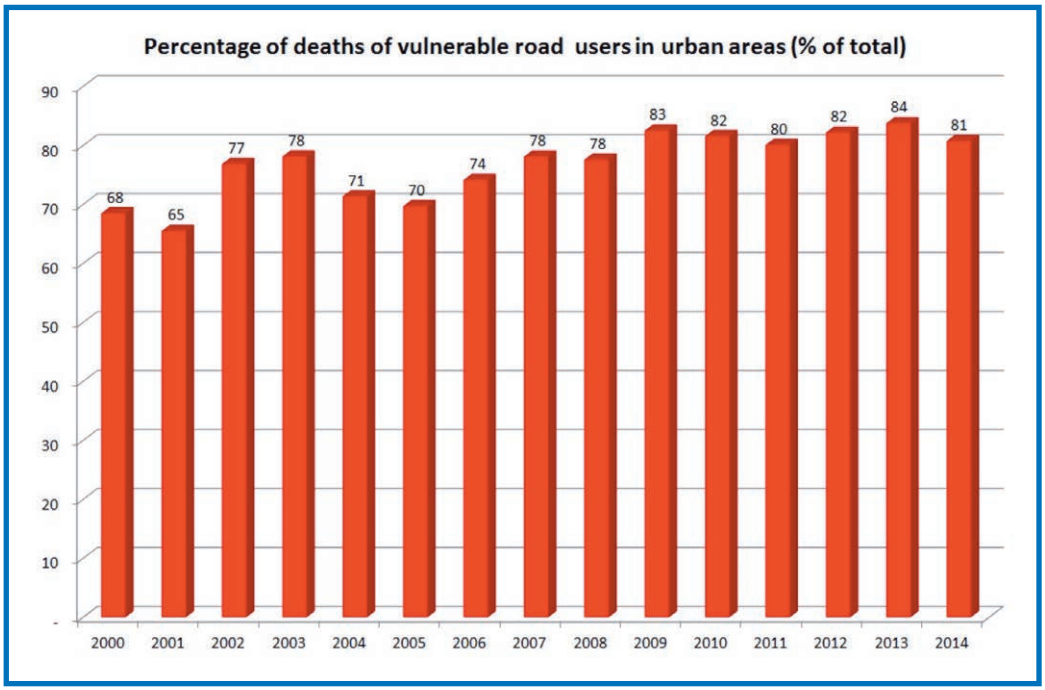


Figure 10 – Percentage of deaths of vulnerable road users in urban areas (% of total)



In 2013 and 2012 **the reduction of accidents and deaths were recorded on urban streets**, as well as in suburban areas and on the motorway (primarily for the four-wheel vehicles and, in part, for the motor-bikes); The number of deaths in the city has reduced, in Italy from 45% of the total (2011) to 42% (2013), but growth again to 45% in 2014.

Obviously, however, the comparison with other European countries is heavily unbalanced and that, without policies to protect the safety of cyclists, pedestrians and motorcyclists, this gap cannot be bridged.

7 To calculate this distribution, we hypothesized that 2/3 of fatalities among cyclists and motorcyclists and the whole fatalities among pedestrians happens in urban roads

4.2 Regional variation in Italy

Particularly critical is the situation in large urban areas where the average mortality rate is equal to 3.25[8] (Turin 4.62, Milan 2.01, Verona 3.12, Venice 0.76, Trieste 4.43, Genoa 2.71, Bologna 1.83, Florence 3.50, Rome 3.67, Naples 3.18, Bari 4.72, Palermo 2.40, Messina 2.06, Catania 6.27) compared with a rate of 2 in major European capitals (Vienna, Madrid, Berlin, Paris) and even 1 for the most virtuous (Oslo, Stockholm, Bern).

Another element worthy of attention is the lack of uniformity of accident data within the country, reflecting the fact that coercive tools are needed, not only voluntary monitoring, for the achievement of common goals. **Consequently, improvement in road safety must start from urban centers with priority intervention for the protection of the vulnerable road users.**

4.3 Accidents involving non-motorized road users

It is useful to start with the numbers: Italy, amongst the European countries, has the highest rates of accidents of vulnerable road users - pedestrians, cyclists, motorcyclists, young and old. Moreover, the number of victims among vulnerable road users is equal to that of those in four-wheeled motor vehicles despite a modal split still heavily biased toward the car.

Table 3: Distribution of mortality amongst vulnerable road users in Europe

Country	Year	Vulnerable users	Motorized 4 wheels
Poland	2013	1761	1596
Italy	2014[9]	1667	1714
Germany	2013	1556	1783
France	2013	1429	1839
Romania	2013	978	883
United Kingdom	2013	859	911
Spain	2013	799	881
Greece	2012	508	480
Czech Republic	2013	308	346
Portugal	2013	302	335
Hungary	2013	297	294
Belgium	2013	287	436
Bulgaria	2009	280	621
Austria	2013	236	219
Netherlands	2013	233	243
Slovakia	2010	180	191
Croatia	2013	155	213
Sweden	2013	99	161
Latvia	2013	96	83
Denmark	2013	92	98
Finland	2013	83	175
Ireland	2012	56	106
Slovenia	2012	52	78
Estonia	2009	35	63
Cyprus	2013	25	19
Luxembourg	2013	13	32

8 Road safety evolution in Europe, source Care, March 2014

9 The italian values refer to 2014

If we compare the rate per 100,000 population (see **Table 4**), the figure is slightly higher than the European average. Table 4 shows the 2013 data for the purpose of comparison. For completeness the data updated to 2014 for Italy is equal to 0.95 for pedestrians, 0.45 for cyclists and 1.34 for motorcyclists

Table 4: Ranking the mortality rate (deaths per 100,000 pop.) between vulnerable road users in Europe (2013 figures)

rank	Pedestrians		Cyclists		Motorcyclists	
1	Netherlands	0,30	Luxembourg	0,00	Estonia	0,38
2	Sweden	0,43	Sweden	0,14	Ireland	0,41
3	Denmark	0,58	Spain	0,15	Netherlands	0,41
4	Finland	0,62	Ireland	0,17	Sweden	0,44
5	United Kingdom	0,63	United Kingdom	0,17	Romania	0,46
6	Ireland	0,63	Greece	0,19	Denmark	0,46
7	Germany	0,69	France	0,22	Slovakia	0,50
8	France	0,70	Cyprus	0,24	United Kingdom	0,53
9	Spain	0,80	Portugal	0,28	Finland	0,53
10	Belgium	0,88	Finland	0,37	Latvia	0,65
11	Luxembourg	0,89	EU28	0,40	Czech Republic	0,68
12	**Italy**	0,90	EU15	0,40	Bulgaria	0,74
13	Slovenia	0,92	Bulgaria	0,40	Spain	0,77
14	Cyprus	0,94	**Italy**	0,41	Germany	0,79
15	Austria	0,96	Germany	0,44	Poland	0,83
16	EU28	1,13	Slovakia	0,50	Hungary	0,83
17	EU15	1,14	Estonia	0,53	EU28	0,91
18	Portugal	1,39	Croatia	0,54	EU15	0,94
19	Hungary	1,49	Slovenia	0,58	Slovenia	1,02
20	Czech Republic	1,54	Denmark	0,58	Belgium	1,02
21	Greece	1,57	Austria	0,61	Austria	1,19
22	Croatia	1,63	Belgium	0,65	France	1,23
23	Estonia	1,75	Latvia	0,65	Portugal	1,24
24	Slovakia	2,32	Netherlands	0,66	**Italy**	1,40
25	Bulgaria	2,75	Hungary	0,69	Luxembourg	1,42
26	Poland	3,00	Czech Republic	0,70	Croatia	1,49

It is useful to analyze in more detail the trends in accident rates in recent years. The distribution of casualties among pedestrians and cyclists is shown in **Figure 11** and **Figure 12**.

Despite the steady growth of cycling, a reduction can now be seen in the mortality of cyclists (- 6% in comparison with 2012), despite an increase compared to 2013.

This confirms that along with an increase in the number of cyclists has come greater safety when traveling and not the alternative (Safety in numbers). Even more convincing is that the accident rate per kilometer has decreased. The case has been similar in recent years for motorcyclists, but less so for pedestrians.

The number of cyclists injured, in steadily increase in past years, has also stabilized for the first time. **(Figure 13)**

The increase in less grave road accidents, in recent years, it is certainly connected to the larger number of cyclists, but also to a greater awareness that increases the reporting of incidents.

Also from this point of view the adjustment is to be read in a positive way.

Figure 11 – Evolution in cycling mortality

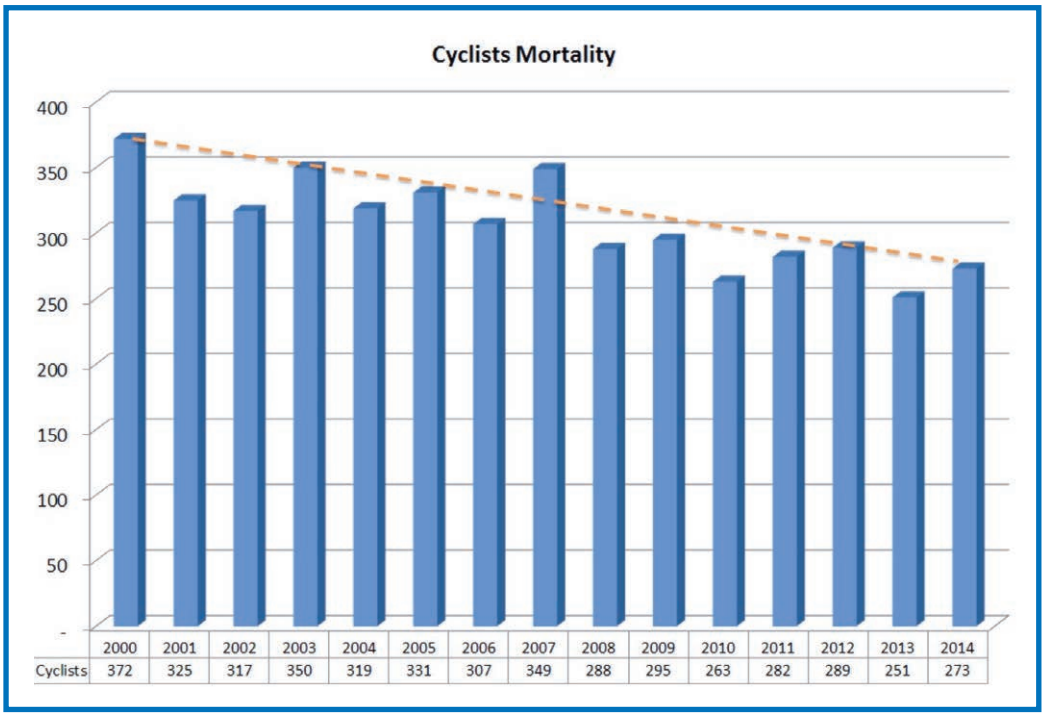
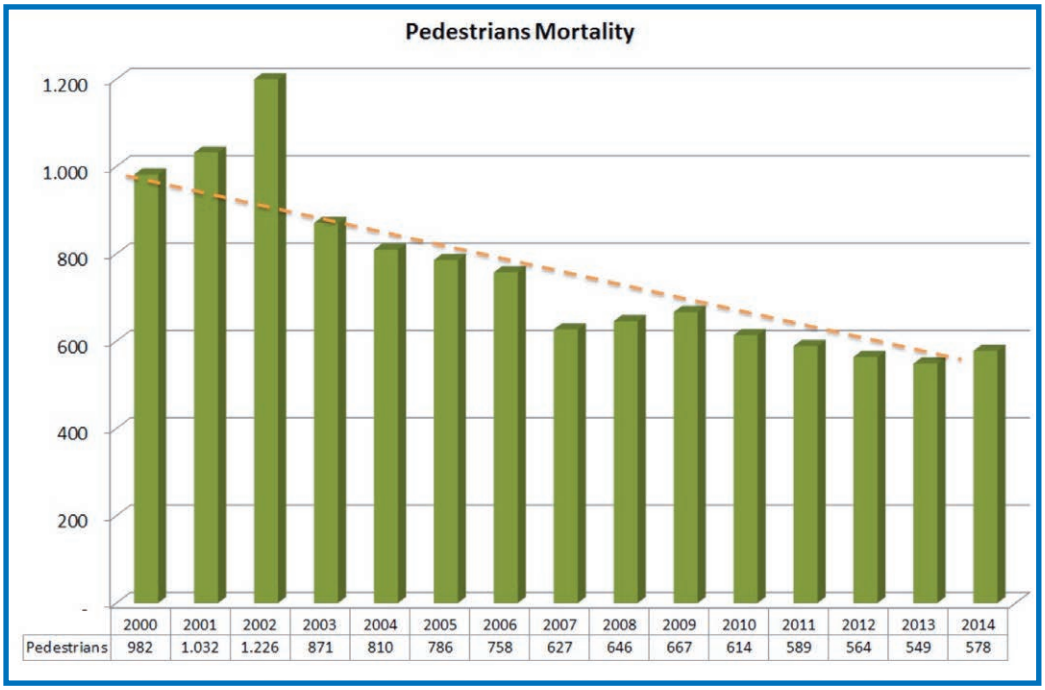


Figure 12 – Evolution of pedestrian mortality.



4.4 Types of accident

The analysis of types of accident helps better understanding of the phenomenon.

The following was obtained from the analysis of **disaggregated ISTAT** (National Statistics Institute) **data** (2009 statistics), produced by the author in his capacity as Chairman of the Technical Committee of "Osservatorio Utenze Deboli" (Surveillance of vulnerable road users) [10].

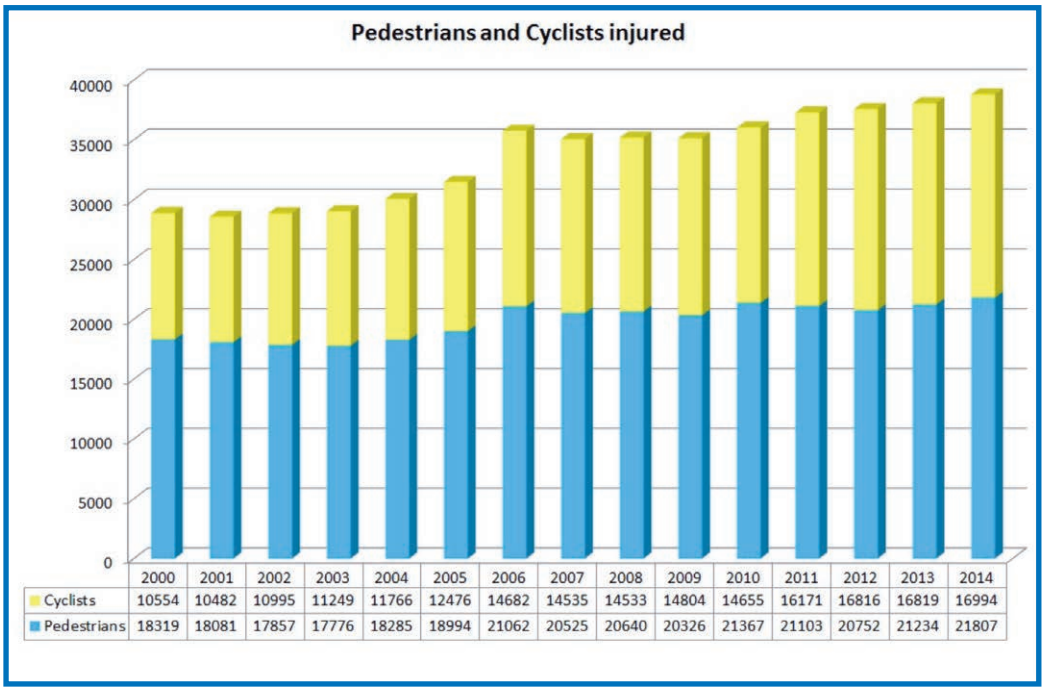
Systematic access to this archive is critical for the assessment of the phenomenon over time.

A peculiarity of the hazardousness of cycling is that **90% of accidents occur in urban areas**.

In particular, in cities, 60% of accidents occur in the vicinity of intersections and road junctions.

10 www.osservatorioutenzedeboli.it

Figure 13 – Evolution in the number of non-motorized road users injured.



	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Cyclists	10554	10482	10995	11249	11766	12476	14682	14535	14533	14804	14655	16171	16816	16819	16994
Pedestrians	18319	18081	17857	17776	18285	18994	21062	20525	20640	20326	21367	21103	20752	21234	21807

Ride good for health?

So far we have talked about the risks involved in cycling due to motor traffic. These risks are unacceptable and must be reduced. But even under the current conditions cycling has health benefits that far outweigh the disadvantages.

An estimate of the health effects obtained by replacing the car with the bike for short trips was carried out, taking into account all the health hazards, traffic accidents and ingestion of fine dust and it is estimated that the gain in life expectancy due to the physical exercise can be quantified as 3 to 14 months per capita, while it is possible to estimate from 1 to 40 days lost (again in terms of life expectancy) due to exposure to fine particles and from 5 to 9 days lost due to fatal road accidents.

Other studies indicate that the relationship between days of life gained and lost is 20:1. The benefits to society (National Health Service) are still higher than those to the individual cyclists"[1]. It follows that even under current conditions cycling is always worth it (just think that the days of illness of those who go to the office by bicycle are half of those who go there by car)[2].

1 Do The Health Benefits Of Cycling Outweigh The Risks? Jeroen Johan de Hartog, Hanna Boogaard, Hans Nijland, Gerard Hoek doi: 10.1289/ehp.0901747 (http://dx.doi.org/)

2 See also the deepening "Cycling is healthy" by Germana Prencipe http://fiab-onlus.it/bici/bici-in-citta/ciclisti-urbani/perche-in-bicicletta/item/991-bici-salute.html from where you can download a brochure summary

In non-urban areas the opposite is true: only 10% occur at intersections.

Furthermore in urban areas, it is interesting to note, that about half the accidents occur at intersections with traffic signals and the remaining half at those without traffic signals.

The protection from traffic signals at an intersection (i.e. traffic lights) is in fact lower the expected.

On the contrary in 30 km/h zones (20 mph) where signaled intersections are less frequent, the number of serious accidents becomes minimal thanks to the reduction in the maximum speed of travel.

Analysis of the mandatory wearing of helmets

Often the mandatory helmet is considered - especially by those who do not ride a bike - the first measure to protect cyclists, by analogy with what has been done for motorcyclists. In order to deliberate thoughtfully one must make some simple assessments. The first concerns utility. The helmet is useful. It is an additional protection for the head that is definitely vulnerable in a fall. We support the wearing of helmets and the incentivizing of their use.

The situation is different regarding the efficacy: unlike the helmet for the motor bike, the helmet for the cyclist must permit adequate air flow. Therefore it is lighter (materials of lesser quality), it does not protect the chin and is therefore certified for **impacts up to 23-25 km/h** with energy releases of about 100 joules. Above these speeds (typical of cyclist falling without being impacted) it is not guaranteed.

The helmet is therefore irrelevant in impacts with motorized vehicles. Since these represent almost all of the serious and fatal accidents, it follows that the **helmet helps** (in minor accidents) **but does not save** (in serious ones). Evaluating whether it is appropriate to make the wearing of helmets mandatory is a sensitive issue that involves a **cost- risk-benefit assessment**. It would certainly protect the unfortunate (and rare) faller from impact of the head against the kerb, but in that case it would be necessary to prescribe mandatory use also for pedestrians (the risk is the same).

At the social level, however, the consequences of obligation would be devastating. Mandatory introduction has resulted in reducing the number of cyclists in every country where it has occurred. On the other hand all studies confirm that the most important factor in the safety of cyclists is the presence of a high number of cyclists in the traffic.

The consequence of the measure is therefore paradoxically that making the helmet compulsory would increase the risk to the cyclists who remain. And as for the children? Children are the most vulnerable in theory. Again it should be noted that speaking in general of children of less than 14 years means dealing with a heterogeneous group. There is a big difference between a child of under 11 years and one that goes to middle school.

The statistics also say that fatal accidents in the under 14s represent less than 3% of all cases (compared to over 50% for those over 60) and amongst these the wearing of a helmet would not be decisive. Other evidence tells us that all countries with a high level of cycling do not make the helmet mandatory and that there is no detectable correlation between mandatory helmet use (where applied), and reduction in accidents per km (in the US the rate of utilization is about 40%, but the accident rate per km is double that in Italy, in the Netherlands the accident rate is a third of Italy`s without mandatory helmet use).

As a result the position, on the helmet, of FIAB, common to all ECF associations, is the support of its use but against obligation.

Less than 15% of recorded accidents happen to cyclists alone (not involving any third party)[11], of these 90% are in urban areas and only 8% result in death.

The scarce relevance of severe accidents involving lone cyclists is particularly important on the evaluation of the usefulness of the mandatory use of helmets, the principal effect of which is exactly the greater protection from falls when alone.

A quota of 80% of accidents involving cyclists and 70% of those which prove lethal are caused by passenger cars.

Almost 90% of accidents happen with the vehicle in gear and of these 80% are side or front-side impact.

This factor should be taken into consideration when discussing roads signed one-way except bicycles, since frontal crashes represent an insignificant fraction of the total.

In the distribution of accidents by age, there is a clear dominance of the 25-50 year age group.

Serious accidents (fatal) mostly involve the elderly, over seventy, and cases under 13 years are rare.

Distribution by gender sees much higher accident rates for men: twice as many as for women for minor incidents, four times as many for fatal accidents.

Finally, as regards the alleged incompatibility between pedestrians and cyclists, also in this case statistical analysis can be useful to redirect the problem towards a reality, a long way from the polemic (frequent colorful accounts of spats between vulnerable road users in news reports).

11 With this definition we mean the accidents which occur to the cyclist without active intervention of other means, ie falling, spilling from the roadway or impacting against an stationary obstacle.

Contraflow cycling and road safety

The **contraflow cycle lane** is provided across Europe to improve the traffic flow and at the same time increase safety (Double sens cyclable, Contraflow cycling, Radfhren gegen die Einbahnstrasse, Beperkt eerichtingsverkeer, just to cite how it is termed in the highway code of different countries).

From the point of view of safety it should be noted that, in Italy, among collisions where cyclists are run over, only 8% are frontal. Of these the fraction that take place in the 30 zones is insignificant. In contrast, 60% of accidents involving cyclists in the city take place at intersections and of these as many as half at intersections with traffic signals.

In fact **it is not the traffic light which protects the cyclist, but reduced speed and improved visibility. The contraflow lane, where the speed is below 30 km/h, enhances both of these aspects**. A specific analysis was conducted on the subject in Brussels in 2011 where 85% of the one-way streets in the city - equivalent to 400 km - have the "contraflow path".

According to a study done over a three year period, 95% of accidents involving cyclists occurred on roads with no "contraflow path" and only 5% on roads that provide for "one-way except bikes" (which account for 25% of the total). Of this 5%, in addition, only half were cycling "contraflow".

It is also confirmed that the major visible presence of cyclists persuades motorists not to exceed the speed limit. From this whole series of considerations we can say that the provision of contraflow lanes where the speed is limited, not only **improves circulation**, but **helps to reduce accidents**.

The alleged incompatibility between cyclists and pedestrians

Often disputes between cyclists and pedestrians, especially on the joint use of pavements, shift attention from the real issue of the common hazard; that of four wheeled traffic (cars and trucks cause respectively, 92% of the deaths among cyclists and 86% among pedestrians).

In countries with a high frequency of cyclists shared use it is more common. In fact the fraction of pedestrians in accidents attributable to cyclists is 1.3%; and deaths represent 0.3%, from the statistical point of view the problem is minimal.

From the point of view of pleasant relations it is certainly possible and desirable to work on the rules of coexistence and communication.

5 Policies to reduce accident rates among non-motorized road users

5.1 Increasing the use of the bicycle

The **first intervention** in order of effectiveness may seem paradoxical, but it starts from verifiable facts. If cyclists are often victims, they are also one of the solutions to the problem!

There is, in fact, a **correlation between an increase in cycling and a reduction in accidents**, which in turn leads to a further increase in cyclists.

Comparing mortality statistics per unit of displacement in different countries (deaths per billion km traveled) and those of the modal composition of movements (i.e. percentage of the total displacements which takes place cycling), it can be noted that **the greater the number of cyclists, the higher the security of the cyclists themselves.** (Figure 14)

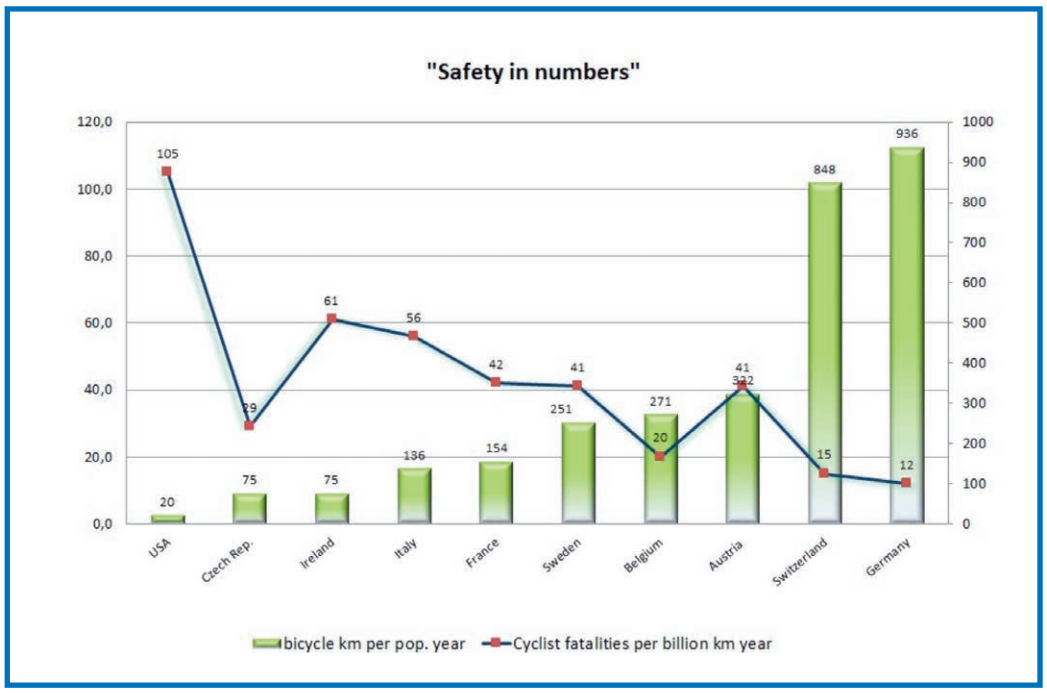


Figure 14 – The correlation between the use of bicycles and the safety of cyclists.

This correlation is even more surprising if it is compared, as well as with the data referring to cyclists, with those of all users of the road.

Reaching the so-called "transition" zone - about 15% of the modal composition of movements by bicycle – there will also be a decrease in the fatal accidents of motorized users. (Figure 15)

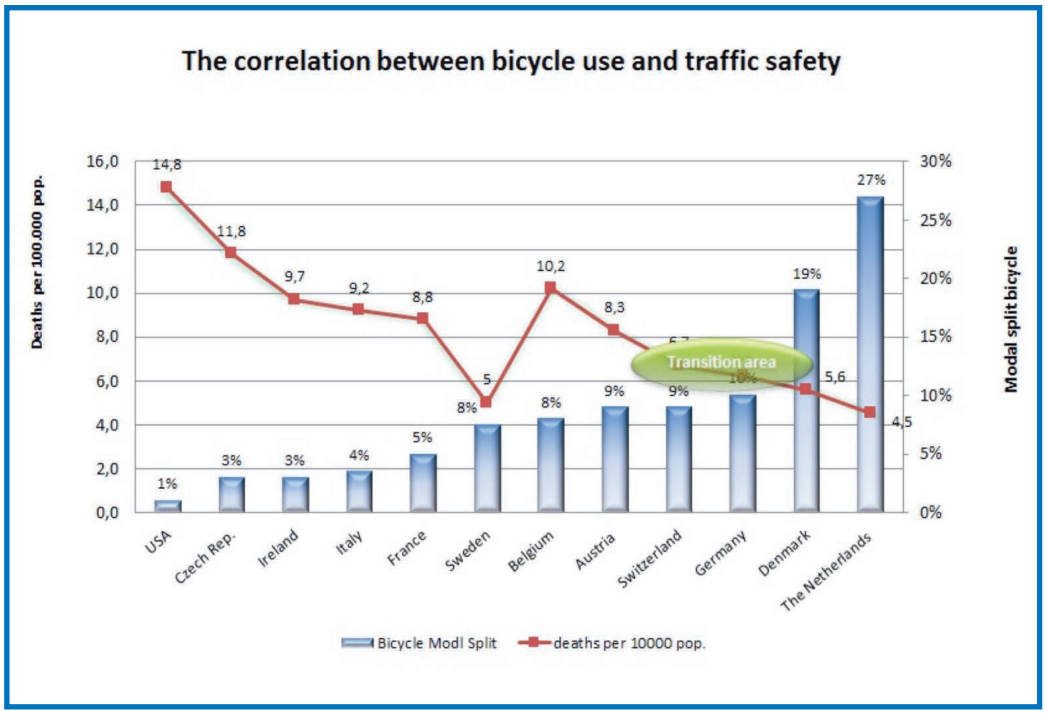
There are several technical publications

Jacobsen[12], has calculated that by **doubling the number of cyclists the risk per km is reduced by 34%** while if they are halved the risk is increased by 52%.

Obviously what has been said for cyclists is applicable, although in a less marked manner, for pedestrians

12 Jacobsen PL. Safety in numbers: more walkers and bicyclists, safer walking and bicycling. Inj Prev 2003; 9: 205-9. http://ip.bmjjournals.com/cgi/content/full/9/3/205

Figure 15 – The correlation between bicycle use and traffic safety

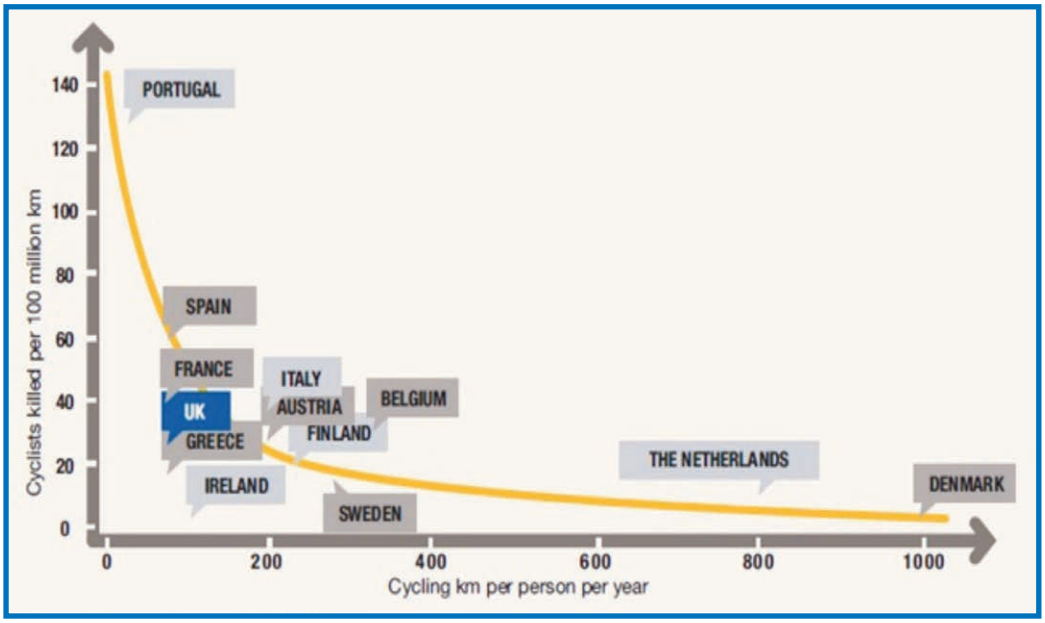


CTC[13] in addition to coining the slogan "Safety in numbers" has launched a campaign with the British Ministry of Transportation asserting among other things that:

1) When cyclists increase drivers of motorized vehicles pay more attention to their presence and try to anticipate their behavior
2) drivers are more likely to be cyclists themselves and will be more likely to understand how their behavior can affect that of other road users
3) more cyclists will also have more weight in the selection of policies aimed at improving the conditions of the cyclists themselves

Figure 16 is taken from the cited publication.

Figure 16 – The correlation between the use of the bicycle and the safety of traffic.



13 CTC, English ECF member, has launched a campaign with the slogan "Safety in numbers" and has published numerous papers on the subject. www.ctc.org.uk

In the light of this the accident data presented in the previous paragraph can be examined in detail.

Analyzing for example, the data published in the report ISTAT 2014 (data 2013), you may notice that the number of serious accidents to cyclists (especially deaths) is inversely proportional to the modal composition of the traffic (**more cyclists, fewer deaths**, according to the principle of safety in numbers), while the total number of accidents involving cyclists is a function of the **effectiveness of the sustainable mobility policies** implemented (e.g. .: the organization of urban traffic with measures to reduced traffic and the speed of the car, introduced forms of shared zones, enhanced public transport, a protected bike lane network).

From this point of view, since the reduction in the number of cyclist fatalities takes place despite the number of cyclists involved in accidents remaining constant and equal to 5% of all accidents, it can be argued that we are facing a predominantly self-induced effect and not the result of structural policies or infrastructure.

For example, analyzing the data provided by large municipalities it can be observed that:

- In Milan bicycles involved in accidents are 1,176 out of 17,748, nationwide (6.7%) while the victims are 5 out of 251 (1.9%), truly a high accident rate (due to lack of appropriate policies for sustainable mobility in the face an increase in cyclists) but low danger (due to the increase in the number of these same cyclists)
- In Rome, where cycling is definitely less usual, accidents to cyclists are only 1.3% of the national total, but fatalities are as high as 8%; .i.e. in this case we are faced with a low rate but of very serious accidents.
- In Bologna, characterized by much higher cycling rates and more advanced policies of sustainable mobility, accidents, compared to the population, were half those of Milan, while the death rate is the same (2 deaths in 2013); thus low accident rates and low danger.

5.2 Reducing differences in velocity

The **second intervention** in order of importance is the **reduction in speed differences**.

There is a direct correlation between the speed of impact and mortality[14].

When there is an accident, the difference in the potential consequences is all in the difference of a few kilometers per hour impact velocity!

The graph, Figure 17, permits a better understanding the mechanism.

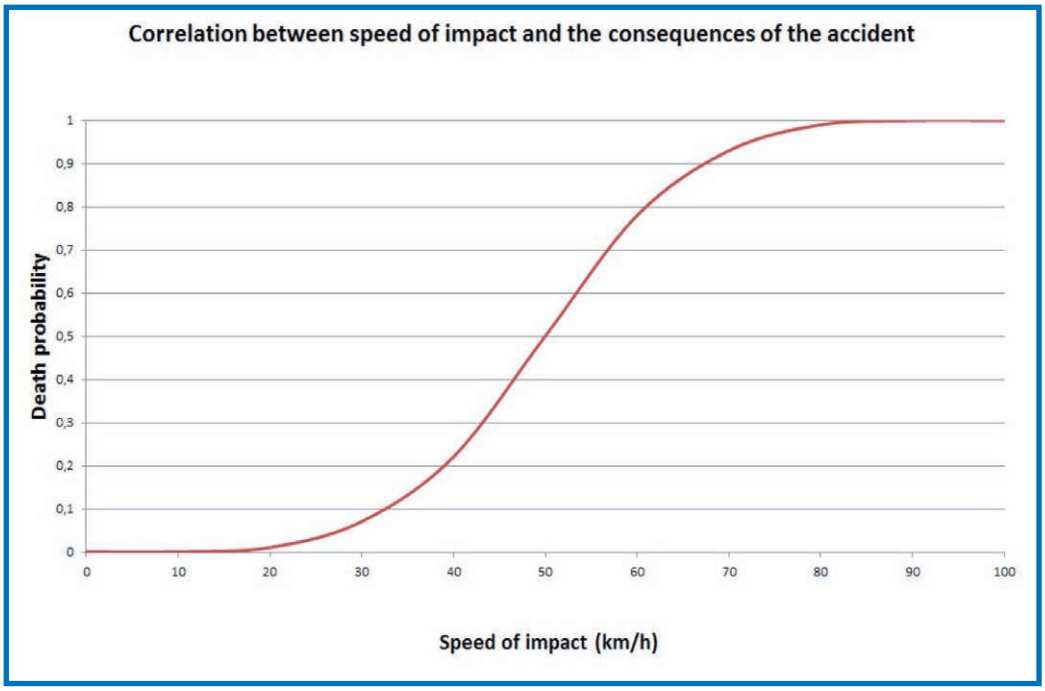


Figure 17 – Correlation between speed of impact and the consequences of the accident.

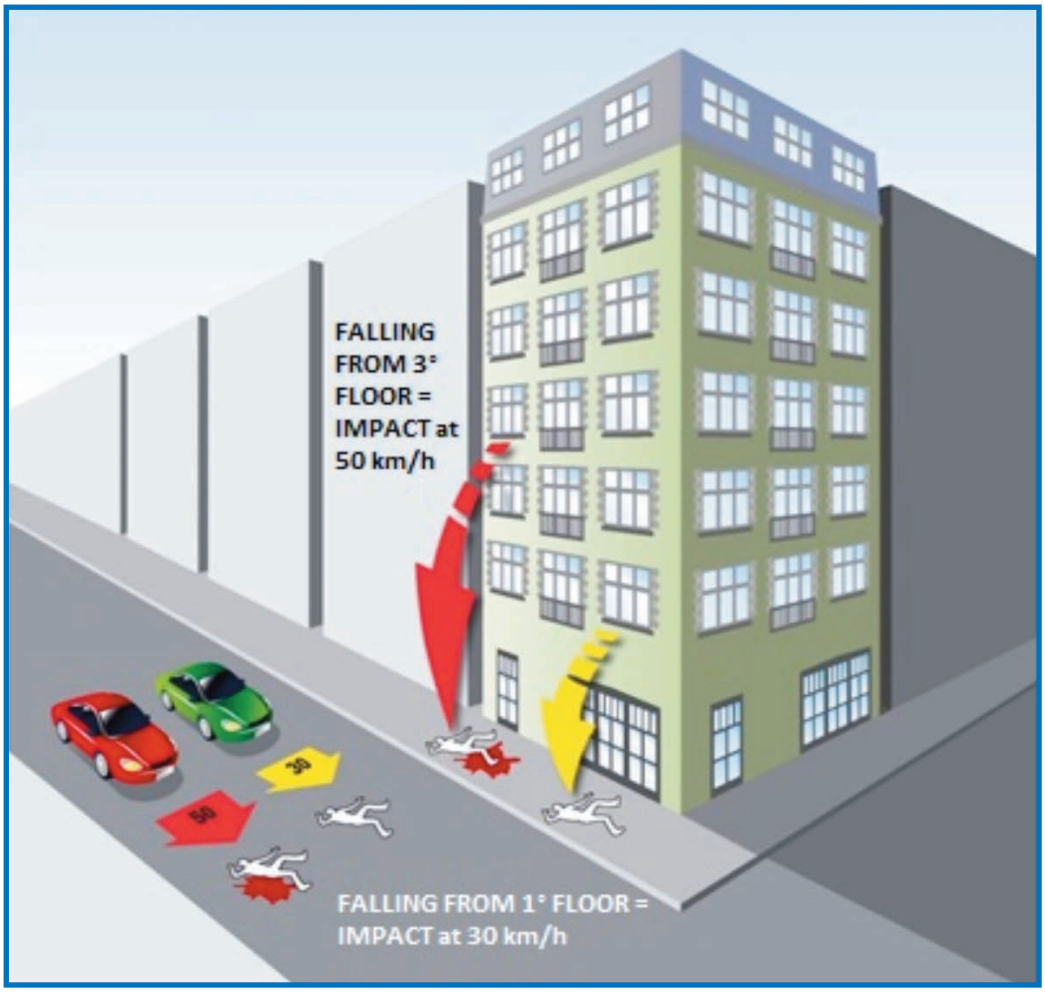
14 Look at the EC pubblication "kid's on the move": http://ec.europa.eu/environment/archives/youth/original/air/kids_on_the_move_it.pdf

Often we wonder why we talk about reducing the speed to 30 km/h (20 mph) and what difference this regulation of speed makes.

In reality the factors are multiple and the first, as can be seen from the above graph, it is precisely the **speed of impact**.

An impact at 50 km / h has a 50% chance of fatal consequences and is equivalent to falling from the third floor of a house, 70 km / h is virtually assured of death, like falling from the fifth floor, while if the impact takes place at a speed of up to 30 km / h the consequences are negligible (equivalent to a fall from the first floor). **(Figure 18)**

Figure 18 – Correlation between impact speed and falls from height



The second factor to consider is the **stopping distance**.

At 30 km / h, the distance can be calculated as about 13 m and at 50 km / h as about 28 m. on dry asphalt, while the length increases in the wet braking.

In **Figure 19** we see how a difference in stopping distance affects the severity of injury to the pedestrian.

The stopping distance depends in turn of two elements: **reaction time and the braking distance**. Both are related to the speed.

To sum up:

Table 5: Correlation between speed of impact and effects

An Impact at	Is equivalent to falling from	Death Probability	Stopping distance/ time (dry soil)		Stopping distance/ time (wet soil)	
30 km/h	1° floor	<10%	13 m	2,4 s	17 m	3,1 s
50 km/h	3° floor	50%	28 m	3,4 s	38 m	4,5 s
70 km/h	5° floor	>90%	51 m	4,3 s	68 m	6,0 s

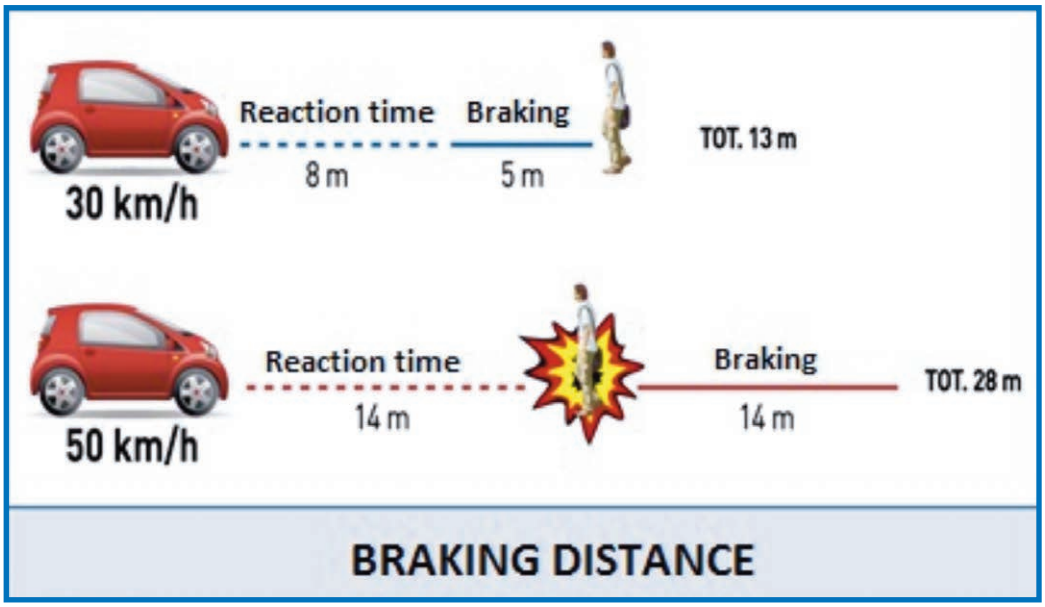


Figure 19 – Calculation of the stopping distance as a function of reaction time and the braking distance

Last in order of utterance, but not in importance, is the **viewing angle**.

Besides the biological component (it is much wider in the female than the male) it depends significantly on the speed of movement.

In the example in the picture in **Figure 20**, proceeding at 30 km / h it is possible to see the child emerging from behind the parked car, while at 50 km / h it is completely lost from sight and it is not even possible to start braking.

From this set of considerations the **importance of the 30 km/h zones** (20 mph) is evident; it should be the rule and not the exception, of even greater priority than cycle tracks.

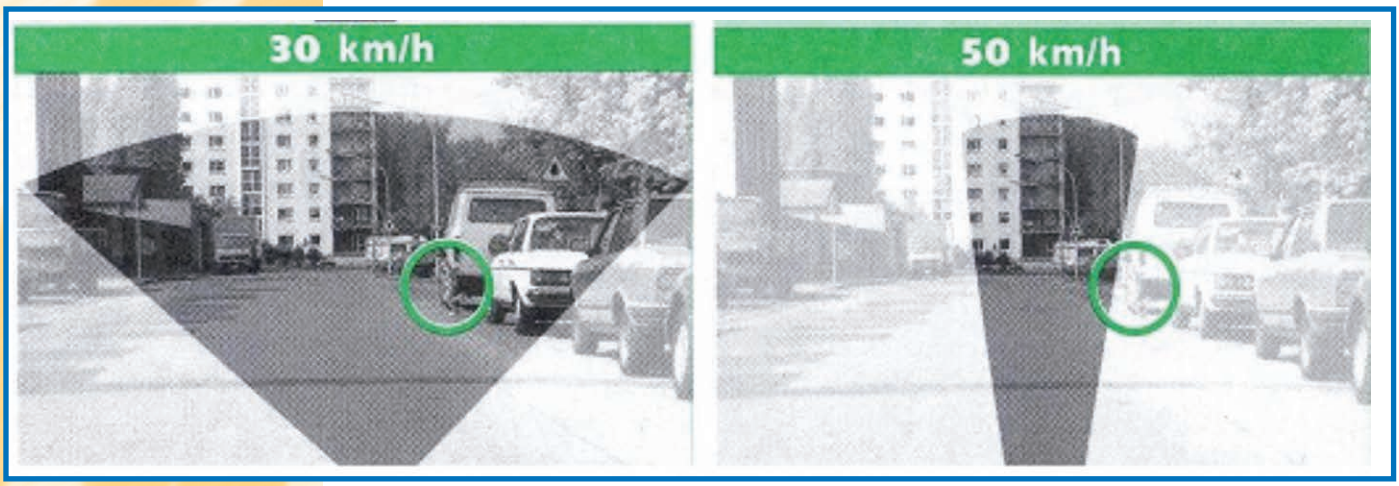


Figure 20 – Viewing Angle as a function of the speed of travel.

It should be guaranteed that 50 km / h is not exceeded in the city , in compliance with the obligation -little respected – in the Highway Code.

The city arteries should therefore be divided into traffic crossing the city (maximum speed 50 km / h) and local traffic (max 30 km / h).

This solution would also allow a **reduction in traffic light intersections** and improve the **flow of traffic**, with an **average speeds higher** than currently (often nailed to about 15 km / h) and total **compatibility between motorized and non-motorized traffic**.

One possible model of urban development can be summarized by the following scheme proposed by the author, a scheme named the bull's eye, meaning, literally, the target for darts, where the radial and ring roads are marked red indicating a limit of 50 km / h, while the remaining urban connective tissue, is green, indicating a limit of 30 km / h. **(Figure 21)**

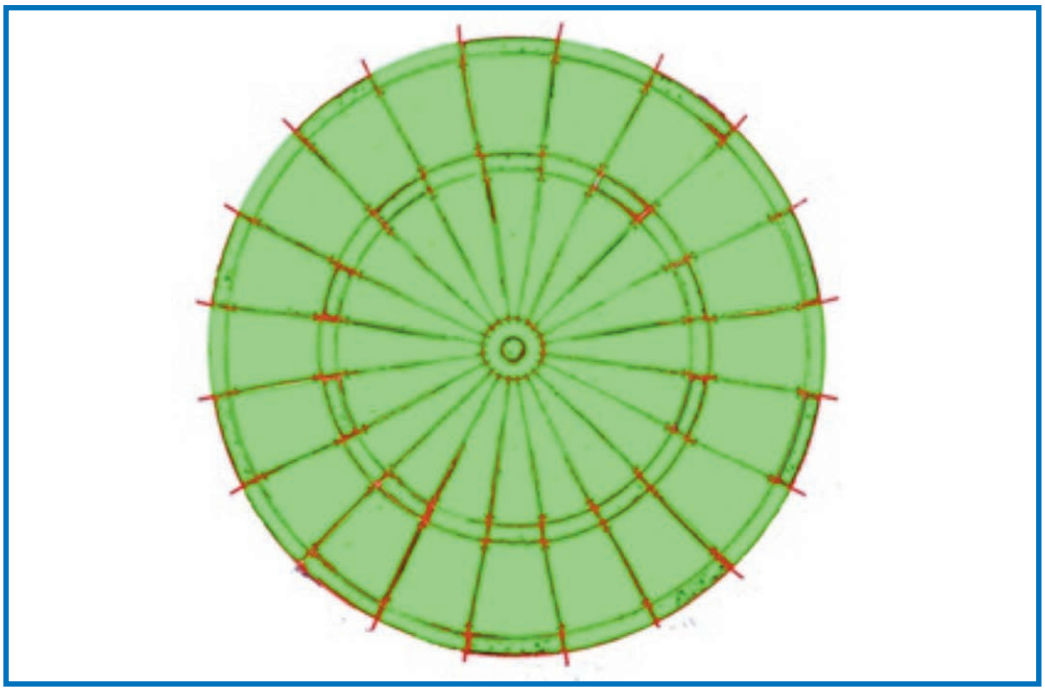


Figure 21 – Possible model of urban development, the Bull's Eye.

There are numerous instances and movements that demanded an imaginative or "off the wall" solution. The cost of the project is much more contained than interventions that modify the road infrastructure.

The best presentation of the effectiveness of this 30 km/h zone was produced by a British studio[15] (see box), which analyzed its effectiveness.

Effects on road safety of the 20 mph zones (30 km/h)

Fundamental research was published (10/12/09) in the UK , in the British Medical Journal, entitled "Effect of 20 mph traffic speed zones on road injuries in London, 1986-2006: controlled interrupted time series analysis" in which the associated reduction in the number of collisions, deaths and injuries on the roads of London is quantified.

The study, based on the **analysis of 20 years** of data collected by the traffic police (1986-2006), has connected 900,000 accidents of which 6200 were fatal with120,000 of the 300,000 road segments into which London was divided. They analyzed three types of roads: within the 20 mph zones, outside the 20 mph zones but within 150 m of the perimeter and the remaining roads. Thanks to the 20 mph zones **accidents and collisions decreased by 40%**; a similar reduction is observed for deaths and serious injuries for all road users and, in particular, deaths decreased by 32% for pedestrians, by 38% for cyclists, and 39% for motorcyclists. For those under 15 years the reduction was as much as 46%. The research therefore demonstrates incontrovertibly that the introduction of the 20 mph zones leads to the **halving of mortality** for vulnerable road users with tangible benefits for the entire traffic system.

The FIAB has been fighting for years to get the 30 zones in the towns. In the photo Luigi Riccardi, president of FIAB from 1995 to 2007, today deceased, during a demonstration in Milan.

15 Effect of 20 mph traffic speed zones on road injuries in London, 1986-2006: controlled interrupted time series analysis, Chris Grundy,et al., Published 10 December 2009, doi:10.1136/bmj.b4469, BMJ 2009;339:b4469

5.3 Monitoring the modal composition of journeys.

One of the main problems in Italy, when it comes to the developing a program, is the absence of a solid and widespread data base, because without good records it is not possible to analyze, verify trends or achieve objectives.

An example for everyone: the **Charter of Brussels**,**16**, a commitment that city governments throughout Europe have taken on, sets the aim of reaching 15% of total movements being by bicycle by 2020.

The signatories of the Charter of Brussels are, to date, 78 cities in 21 countries. **(Figure 22)**

Note: 78 cities in 21 different countries, including 30 in Italy alone, which is almost 40% of the total.

In terms of commitment it is a record, although no one in Italy systematically measures the trends in mobility.

It is difficult to understand how 15% of modal split **can be reached without measurement**.

To date the only body engaged in collecting data on mobility is ISFORT[17], whose latest publication - the 11th Report on mobility, published in May 2014 - however contains some inconsistencies, particularly with regard to cycling and pedestrians.

The surveys are based, in fact, on 15,000 interviews per year nationwide, for budgetary reasons reduced to 7500 from 2012, i.e. less than five hundred interviews per region and 75 in a province.

From these findings it appears that in 2012 the modal composition of journeys by bicycle fell to 2.1% (3.6% in 2008) to climb to 3.1% in 2013.

Figure 22 – Charter of Brussels, participating municipalities

16 http://www.ecf.com/about-us/manifesto/charter-of-brussels/

17 Istituto Superiore di Formazione e Ricerca per i Trasporti (Institute of Higher Educatione and Research for Transport) - www.isfort.it

In another report[18] it is said that the use of bicycles has increased from 2.6% in 2012 to 4.3% in 2013.

In the section outlining the comparison with other European countries it states that 13% of Italians use the bicycle daily, 13% a couple of times a week and 14% a couple per month; with 2.7 trips per capita (in December 2013). A decidedly higher usage would follow.

Finally, in the publication Audimob n. 19, mobility and the crisis, what has changed in the choices of Italians, it says that 56% of respondents intend to use the car less for journeys of under 5 km, 41% intend to use the bicycle more and 26% confirm that they have already done so.

The data are conflicting. Of course, this is not intended as a criticism of ISFORT, one of the few who scientific bodies who have taken to heart the monitoring data on mobility, but there is a paucity of resources made available at national level. A **serious policy needs data collected in a widespread, systematic and consistent manner** and this burden cannot fall on the shoulders of volunteers (associations) or researchers who are granted such scarce funds.

5.4 The collection of local accident data

In addition to the modal split, to evaluate the effectiveness of local policies, it is necessary to monitor local trends in accident rates for the various means of transport, especially for vulnerable and non-motorized road users.

To date information is available only at the aggregate level: some regions (e.g. Lombardy[19] and Emilia) have started to publish **statistics at the provincial level**, however, they lacks a targeted analysis with which to assess the effectiveness of local policies from the point of view of accident distribution.

In particular, the analysis should be disaggregated, developed in such a way as allow the analysis of incidents by type, it should be available at municipal level and thus allow the identification and evaluation of recurring situations and critical points.

18 Audimob, Observatory on the mobility behavior of the Italians (2000-2013). To be precise this data appears only reported to the free time, but since it cites an increase of 815,000 movements, we infer that it refers to the total of displacements

19 Http://www.protezionecivile.regione.lombardia.it

5.5 Introducing risk analysis to reduce risk on the road.

Risk analysis permits complex issues to be addressed, by gathering together the critical elements and identifying priorities and the means of intervention. Thanks to the systematic application of these techniques we can say that significant results have been achieved in the field of industrial risk (Seveso Directive). The same cannot be said for the problem of road risk that is definitely one of the most important issues of the times in which we live, in the face of a growing demand for mobility.

The application of the technique of risk analysis is well suited to analyze road accident risk, defining what level of tolerance can be identified and describing in what way it would be possible to utilize this methodological approach.[20] [21]

The continuing difficulty of reducing the damage evenly throughout the country and of following the trajectory set as a requirement by Community Directives demonstrates the ineffectiveness of the deterministic approach followed so far. This approach is based on the assumption that the measures of harm reduction are already known and only their correct application is needed for the achievement of the desired results.

In addressing the issue of industrial risk a different approach has been followed, which for simplicity can be defined as **probabilistic**; this approach is based on the assumption that zero risk does not exist, but that in order to reduce the risk one should first know and quantify it, then you can take action on issues of major importance and then, step by step, on those of less significance probabilistically.

It is therefore proposed to establish a **tolerability threshold for risk on the road** which local governments would be obliged remain below by risk reduction and to quantify the results.

In this regard the ACI (Automobile Club Italiano, Italian Car Club) have already calculated specific indices of danger and risk for a set stretch of road, but as the assessment at this stage is effectuated by orders of magnitude, it is possible to consider a national average of the number of deaths divided by the total km of operational road.

A first reference indicator is the number of deaths occurring annually for every 100 kilometers of road. Overall, in the 2013 data, this amounts to 0.5 deaths per year per 100 km.

Table 6 - Deaths and injuries by category of road, 2013

Roads	Extension (km)	Fatalities	Deaths/100km	Incidents	Incidents/km
Urbans	170000	1421	0,8	136438	0,8
Non-urbans	486757	1964	0,4	44789	0,1
Total	656757	3385	0,5	181227	0,3

Source: processing by ACI-ISTAT 2013 data

The limit of tolerability can be assumed to be equal to one tenth of the current risk, so it is possible to classify specifically the extra-urban roads as:

Table 7 - Classes of risk (thresholds) on non-urban roads (deaths / 100 km)

Classes of risk on non-urban roads	Deaths / 100 km
Maximum risk	5
High risk	2,5
Intermediate risk	1
Average national value	0,5
Tolerability treshold	0,05

20 22-23/11/05, Rome, 3ASI- National Head of Firemen, Edoardo Galatola - Risk analysis as a tool for decision support application of analysis techniques of industrial risk to road safety: a methodological and operational proposal

21 http://www.sindar.it/wp-content/uploads/2014/03/analisi_rischio_stradale.pdf

It should be noted that this criterion, though valid on a national scale and on extensive tracts of road, it is difficult to apply at the local level, as the number of dead is not statistically significant.

To proceed to a more reliable classification criterion therefore parameters are needed on accident rates per road section. Overall this amounts to 0.3 accidents per km year.

In this specific context an intermediate value of 0.2 accidents per km year is assumed. The limit of tolerability can, also in this case, be assumed to be equal to one tenth of the current risk, so it is possible to classify the roads as:

Table 8 - Classes of risk (thresholds) of roads (accidents / km)

Classes of risk on non-urban roads	Deaths per km
Maximum risk	3
High risk	1
Intermediate risk	0,5
Average national value	0,2
Tolerability treshold	0,02

In function of the threshold value it can be predicted to require:

- To bring forward the implementation of **RIA** (Legislative Decree no. 35/2011, national implementation of 2008/96/EC Directive) and to extend its scope also into urban areas
- Provide an **obligatory reconnaissance** of accident rates to assess the need for interventions (eg. Cycle lanes) as a priority
- Draw up **a plan of action**
- Apply analysis to new roads according to **Local Safety Plans**[22] made mandatory for provincial and metropolitan administrations.

Another key element for risk reduction according to the stated objectives is the control of that which takes place. Always borrowing terminology from the control of industrial risks, you can highlight the importance of a Supervisory body which analyzes the study outcomes and verifies the achievement of objectives.

22 "Action 7.1.5: Incorporate road safety into sustainable urban mobility plans." Spain, Road Safety Strategy 2011-2020, Appendix I

RIA[1] (Road safety Impact Assessment)

Directive 2008/96/EC, implemented by Legislative Decree no. 35/2011, is intended to indicate actions targeting the improvement of safety: from project planning, to the management of road infrastructure. The application of the directive addresses roads which are part of the trans-European network, whether they are at the design stage, under construction or already open to traffic. Member States may also apply the provisions of the Directive, as a set of good practices, for the national road infrastructure not included in the trans-European road network, built with funding or part funding from the Community. The tools identified in the Directive 2008/96 / EC to improve road safety are as follows:

- In the planning stage, the procedure requires the evaluation of the road safety impact of the infrastructure projected, defined internationally as **Road Safety Impact Assessment** (**RIA**). This is the procedure for approval of projects for new roads or for work on existing roads taking account of the impact in terms of security for any work to be carried out;
- In the design stage, the carrying out of safety audits is expected for infrastructure projects (**RSA**, **Road Safety Audit**). These controls translate into the analysis of the preventive security of a project in order to identify possible critical issues before construction and provide recommendations aimed at mitigating the difficulties themselves;
- In the management of the project, two practices are required: 1) classification and management of safety of the road network open to traffic (Network Safety Management); 2) safety inspections on the existing roads (Road Safety Review). The procedure of Network Safety Management is useful in order to identify measures that can enhance the potential reduction of accidents at the network level, intervening, for example, on parts of the network at high risk. Safety inspections on public roads open to traffic are used to determine safety related defects present in elements of the road network with the aim of intervening to prevent accidents.

This is reflected in the lines of action identified in the most recent National Plan for road safety, and also in the forthcoming one, in which priority is given to '' identification of interurban road sections with the greatest concentration of victims of road accidents, analysis of the risk factors, identification of the range of effective interventions, evaluation of alternatives and choice of the most satisfactory option. "

To this end, the management bodies must adopt methodological tools to support more effective strategies for safety. To this end, the engineers involved in various capacities in the areas of design, maintenance and management of roads, must base their work not only on the reference standards, but also on criteria acquired through knowledge in the field of study of accidents and analysis of road safety, in that, on these arguments are based the two different approaches that can be adopted for optimal safety management:

- **Reactive approach**: based on analysis of historical data on the accidents for the identification of tracts and / or road junctions with high risk, with the objective of determining the sites of intervention;
- **Pro-active approach**: based on analysis of all the elements that characterize the road infrastructure be it in the planning phase or in operation (preventive analysis of safety), in order to identify current and future security issues and to prepare interventions and actions to mitigate the danger level.

The analysis of accident rates. The processing of data relating to accidents occurring in a given time interval is the first step to identify dangerous sites. The accuracy of the information on casualties and the level of detail significantly affect the outcome of this process.

The analysis of road accidents can be conducted in the following two ways characterized by different methodological procedures:

– Aggregated analysis;
– Disaggregated analysis.

In aggregated analysis information is provided which is useful in identifying the places at higher risk of accidents; this method provides, that is, analytical reports at a macroscopic level, for example, an entire road network (municipal, provincial, regional, etc.) and / or a single route (motorway, country road, urban street, etc.).

The subsequent step, to the identification of sites with a high accident rate, is to disaggregated analyze of accident data to identify the

Table 9 proposes a legend for the translation of the terminology between the two sectors identified

Table 9 - correspondence in terminologies between types of risk analysis.

Industrial risk	road safety	
Risk analysis extender and controlled body	Establishment (Operator)	Province/Municipality
Risk analysis	Safety Report	Urban Safety Plan/RSIA
Competent Authority and Examination Responsible	Regional Technical Committee among Regional Firemen Direction	?

elements typical of the site (geometry, signs, traffic flow, etc.) that may represent risk factors, and the identification of infrastructural and traffic management interventions to eliminate or mitigate these factors.

The instrument which is entrusted with the task of assessing performance, in terms of road infrastructure safety, is the technique of safety analyzes (Road Safety Analysis). These analyzes can be performed both in the planning phase of a new project (Road Safety Audit), in order to proactively identify potential risks for users, and, in case of existing infrastructure (Road Safety Review), in order to identify dangerous aspects associated with the various elements of this same infrastructure. The aim, in both cases, is to propose appropriate recommendations for the preparation of interventions and work to improve the overall level of safety. In Italy, the operational guidelines for the execution of analysis of road safety are detailed in the Circular of the Ministry of Public Works No. 3699 of 8 June 2001 in the "Guidelines for the analysis of road safety"; in this Circular the objectives, the benefits and the procedures for proceeding with projected interventions and work on roads in operation are laid out with details of the roles and responsibilities of the different actors in the process.

The new aspect proposed here is the extension of the methodology systematically throughout the country and therefore also at the urban level.

[1]Road Safety management tools: traditional procedures and new trends, Natalia Distefano, Salvatore Leonardi, Sicurezza Studi e Ricerche, http://www.stradelandia.it/pubdown/90.pdf

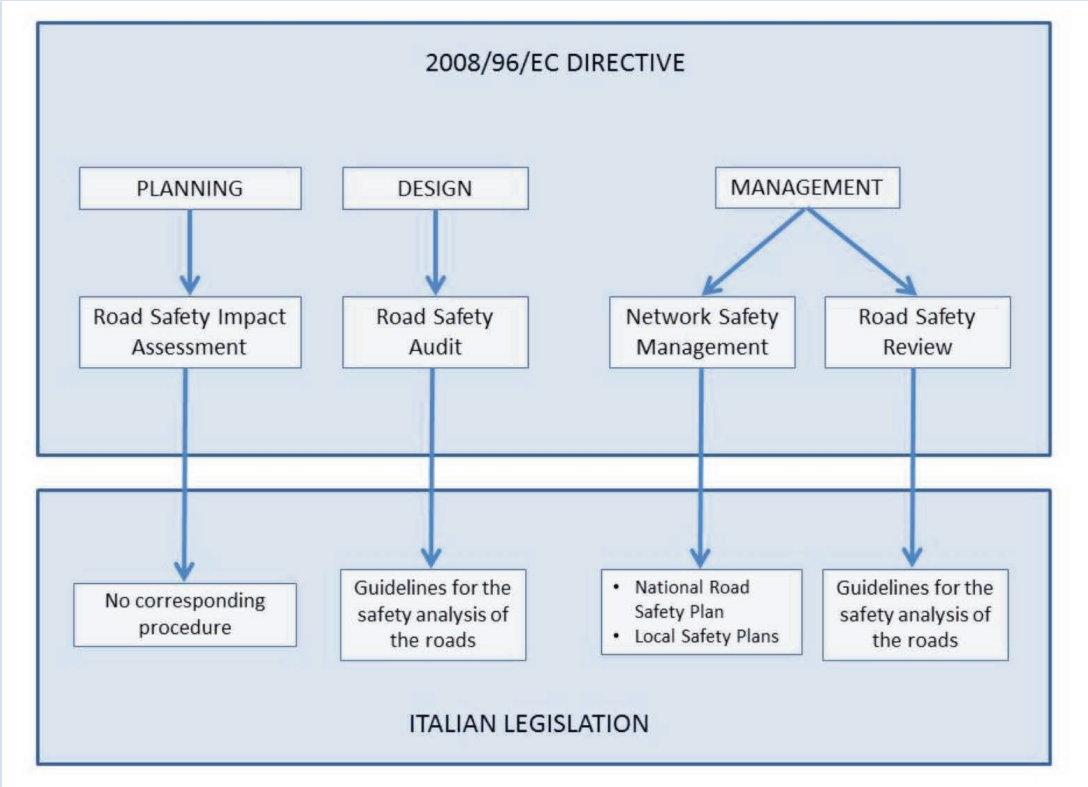


Figure 23 – RIA and other instruments provided by 2008/96/EC Directive

5.6 Introducing ISA (Intelligent Speed Adaptation) techniques

The acronym **ISA (Intelligent Speed Adaptation)** indicates a device capable of transmitting to a vehicle information on the speed limit in force on the stretch of road on which it is traveling, thus enabling the adaption of its speed either automatically, or through the intervention the driver.

The idea of the ISA was conceived in Sweden in the early '90s, together with that of "Vision Zero", and wasthen developed through studies and research conducted in other European countries (Denmark, the Netherlands and Great Britain).

The first studies were strongly influenced by existing technologies; particularly they predicted (UK, 1997) the need to build a very dense network of transmitters (beacons) along the roads, these would send the necessary information to a receiver mounted on the car.

Despite this all the studies recognized the effectiveness of ISA and its introduction has therefore always been recommended.

Currently available technologies have, in practice, canceled all the difficulties both technical and economic then existing; the car is fitted as standard with satellite navigation systems and mechanisms of electronic speed control so to prepare them for ISA now means only having to 'tie a thread' between the two devices.

On the other hand all the studies have highlighted **the device's ability to significantly reduce the accident rate** on the roads and reduce their severity equally significantly.

An ISA system is characterized in the first place with reference to the ways in which information about the speed limits is used.

There are essentially three methods:

- **Informative**: a simple display reminds the driver of the current limit to be observed. A more 'effective' version also includes an audible (buzzer) which sounds when the limit is exceeded;
- **Voluntary**: the device automatically limits the speed of the vehicle within the limits allowed, but can be switched on or off by the driver;
- Obligatory: the device is always on and cannot be switched off (except in emergencies). A variant of this system allows momentary and contingent 'slippages' of the limit (for example, to hasten the conclusion of overtaking maneuvers).

Other possible variations relate to the types of limits in question.

These can be:

- Fixed, that is associated only a certain category of road (highway, suburban, urban);
- Variable, that take into account that the local reductions in the limits (bends, junctions etc.).
- Dynamic, which can be modified according to particular circumstances such as weather conditions, emergencies, smog, dense traffic, etc.

A group of experts in the field of mobility working in this sector of the profession, from universities and environmentalism, have chosen to explore the ISA system. They have recognized the potential and decided to promote an initiative to convince the government and Parliament to commit to its adoption.

On the website "**Un Filo di sicurezza**"[23] (A Security Thread) is an appeal to the Government and the Italian Parliament for the introduction of automatic speed limitation on motor vehicles (intelligent speed adaptation)

5.7 Promoting certification according to the standard UNI ISO 39001: 2012

The standard UNI ISO 39001:2012 "Road traffic safety (RTS)" was recently issued and is aimed at all organizations that wish to eliminate the deaths and serious injuries caused by road accidents[24]

It is applied on a voluntary basis, by public and private bodies that are involved with road traffic safety.

The interested organizations are varied: organizations with employees who habitually drive company vehicles, transport and logistics companies, companies carrying out roadworks, companies for the design, construction, management and maintenance of roads, companies for the production, maintenance and control of vehicles, trade associations, public bodies, etc.

A broad adherence is hoped for to a standard which combines the saving of human lives with a reduction in insurance costs and all the expenses which are incurred due to road accidents.

23 http://www.unfilodisicurezza.it/

24 See the guidelines for the certification of road safety (RTS) according to ISO 39001: 2012, Certiquality, 2015, www.certiquality.it. The author participated to their draft.

6 Self-protection for Cyclists

6.1 Tips for self-protection

To meet the EU targets for reducing accident rates and especially those of vulnerable road users, as previously mentioned the main measures must be traffic calming, since cyclists and pedestrians are definitely more vulnerable than four wheeled motor vehicles.

In particular, as described in the preceding paragraph, there is a need to adopt all the technical measures of prevention (30 Zones, traffic calming, etc.), the means and actions of collective protection (signage, physical separation, control of offenses), the automatic control of the velocity of vehicles (automatic speed limiter, anti-collision detectors, etc.) as well as measures to reorganize the road space so that the risk is minimized, adopting a constant reference to the "best practices" or to the best knowledge and experience.

This approach, reinforced by appropriate educational activities, both for young people and for adults (e.g. driving schools), must be carefully monitored and supported in the early stages of the project, as in the management and maintenance of roads.

Active participation on the part of the cyclist is necessary; they must assume self-protective behavior to reduce the risk further. Focusing all the attention on these aspects, as has often been felt to be over simplifying and is certainly misleading, but it becomes important if this behavior is complementary to the earlier discussed initiatives.

It is said that the main risk for cyclists is that of impact with a motor vehicle.

To summarize to the maximum the advice on self-protection, the rider must make himself visible and anticipate the moves of other road users. In particular, the cyclist must:

- **Make himself SEEN**: lights and reflectors are not optional but are essential and required for the safety of the rider and must always be present and in good working order. Suitable clothing further enhances visibility as well as being required at night and in tunnels.
- **Make himself HEARD:** the bell is also mandatory, but those on the market are often poor; therefore you should make a careful choice
- **Respect the RULES**: know and respect the rules and signs (Highway Code) is a way to consciously participate in one`s own security
- **Be CAUTIOUS**: prudence and common sense help to prevent accidents and in the anticipation of the mistakes of others

It is to be remembered that the failure to respect the obligations of visibility for cyclists is a punishable offence and it would be desirable that the requirement be enforced.

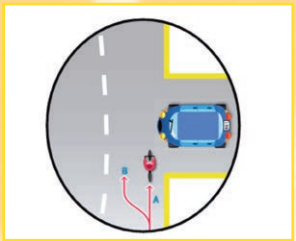
To these basic tips can be added those desirable but not obligatory for protection, such as:

- **Use a helmet** if possible and get children to use one too as it is an item of both protection and visibility.
- Avoid, if possible, **busy streets**, and, when possible, choose routes with bike lanes.
- Strive for **eye contact** with motorists; it is very useful to look at the face the driver to know if he has seen you or is distracted. In all events, his attention is important for both of you!
- **Make hand signals** to indicate the intention to turn right / left or to move to the center of the road, this allows other road users to understand where one is going so they can act accordingly.

6.2 Handbook on risk reduction

There are several handbooks detailing the principal dangerous situations for cyclists and the behavior to follow. Here we refer to those developed by the municipalities of Reggio Emilia[25] and Milano[26]. Both refer to material contained in the website http://www.bicyclesafe.com, whose original author is Michael Bluejay.

Below are the principal case studies identified and some suggestions for self-protection[27]:



RIGHTHAND JUNCTIONS

A motorist emerging from a side road, a parking lot or a driveway on the right does not always pay attention to who is arriving by bicycle. Slow down, make yourself visible and move slightly to the left.

THE DOOR OPENING

The door of a parked car is suddenly opened right in front of a cyclist. If the distance is reduced and reflexes not ready, impact is likely. Keep an eye on parked cars, move slightly towards the center of the road.

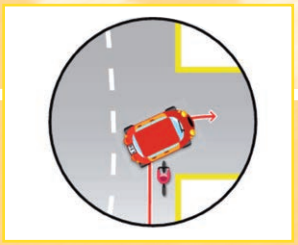
25 Safety Tips for those who ride a bike, www.comune.re.it/nuoveideeincircolazione, Urp - Informacittà, via Farini, 2/1 – Reggio Emilia

26 Safety Tips for those who ride a bike, Assessorato Mobilità, Ambiente, Arredo Urbano e Verde Comune di Milano Via Beccaria 19 – Milano, Segreteria.assessoremaran@comune.milano.it

27 The following notes refer to countries with right-hand drive. To left-hand drive countries specular notes should apply

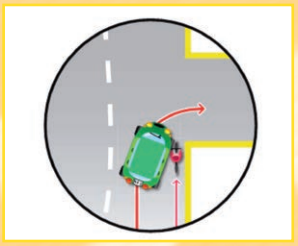
THE RED TRAFFIC LIGHT

When you stop at a red light (or at a stop sign) immediately to the inside of a car in the same lane, if the car is to turn right and the cyclist to go straight on, this may present a hazard if the motorist does not see the cyclist. The situation is even more dangerous when stopped next to a bus or a truck. Stop at a point where you are clearly visible, you should not rely on all motorists always using the correct indicator lights when turning, care is needed when passing vehicles stopped near traffic lights.



RIGHT TURNS (1)

When a car passes a cyclist near a junction, it may be going to turn to the right, cutting off the rider. This type of accident is difficult to avoid because we do not realize what is happening until the last moment. Move slightly to the left and look to check for vehicles behind you.

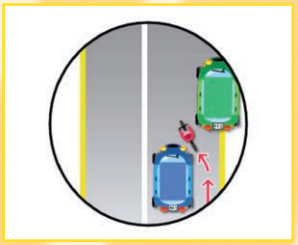


RIGHT TURNS (2)

When a car is moving slowly the cyclist may be tempted to overtake on the right, but during the overtaking maneuver the car may turn right into a side street, a parking lot, or a driveway and collide with the rider. Hence avoid where possible overtaking on the inside.

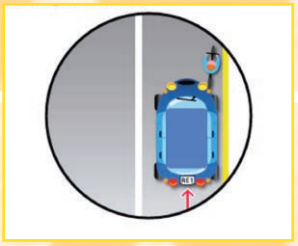
LEFTHAND JUNCTIONS

When a car is coming from the opposite direction, intending to make a left turn it could hit a cyclist if the driver has not noticed his presence. Make yourself visible and slowdown.



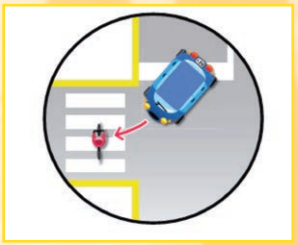
REAR IMPACT (1)

A cyclist can happen to veer slightly to the left, to avoid a parked car or other obstacle on the road, and thus risk being hit by a car that comes up behind him. NEVER move out without first turning to look behind you.



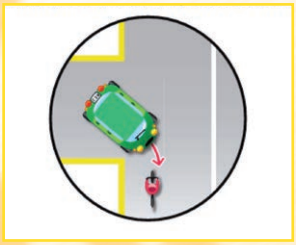
REAR IMPACT (2)

This type of accident is much feared by cyclists, but it is not very common. It is also one of the most difficult types of collisions to avoid, because when pedaling, cyclists do not generally look behind. It is best to always be visible and select the route with care.



CYCLING ON PEDESTRIAN CROSSINGS

Motorists do not expect to find bicycles on pedestrian crossing, so when you cross on the pedestrian crossing between two sidewalks pay attention to turning cars. Remember that the Highway Code expects one to dismount for crossings not dedicated to cyclists.



THE FRONTAL COLISSION AGAINST THE FLOW OF THE TRAFFIC

Riding against the flow of the traffic on the left side of the road one runs many risks: motorist turning right out of a side street, a driveway or car park will usually only check for traffic coming from the left and may not see anyone coming from the right. Furthermore those using the road in the designated direction do not expect to find a bicycle going in the opposite direction and may have slower reaction times. Ride in the direction of traffic and NOT against traffic (the situation is very different when on one-way city streets where stricter speed limits are in force, see box).

COLLISSIONS ON A ROUNDABOUT

The danger arises when at a roundabout cars and bicycles are not taking the same exit: if the bike has to continue around the roundabout and the car must exit, the cyclist runs the risk of having his path cut by the car. Use the cycle crossings lanes (where they exist) and let cars pass on your left.

THE BLIND SPOT OF A TRUCK

The blind spot (the blind spot is a space located around a vehicle, which is not visible from the driving seat). There are many blind spots: front, sides, rear and above the vehicle. In these spaces of no visibility of the driver cannot see other road users and this has the effect of substantially increasing the risk of accidents. Predicting the “blind spots” is a first step to prevent accidents, and even fatalities. (In addition of course to implementation of the Community directives that oblige trucks to be equipped with specific tools to reduce or cancel their blind spots).

7 Priorities for action on national Highway Code

7.1 Recent regulatory developments

Attention to road safety and sustainable mobility in particular has certainly grown over time and is certainly considered a priority today.

Despite this, regulatory adjustments and related investments have remained scarce. Often the justification has been given in order of absence, as the lack of funds, lack of priority, and often, the lack of political will even at a national level.

This inertia clashes sharply with the actual **cost to society of road accidents**. Calculating just the social damage, the cost for 2013, even given the reduction in accidents achieved in recent years, is still **24 billion euro** a year (equivalent to € 400 / person or € 800 / car)[28]; this is without taking into account the costs of pollution due to vehicular traffic estimated at around 70 billion euro per year. In total: € 1500 / person or € 3000 / car.

Given the amounts involved, **the paucity of the investments** made available for road safety by all recent governments, is, in the face of the possible savings, definitely much more than short-sighted, it is masochistic. The savings in human lives speak for themselves, but also at the economic level any improvement pays for itself!

It should also be noted that the **National Council on Road Safety** started in 2000, after various vicissitudes was finally closed in 2000, while the PNSS (**National Plan for Road Safety**), completed in the decade 2001-2010, has not yet been updated to 2015 despite the fact that the horizon of the fourth Community framework program is the decade from 2011 to 2020. Hopefully it will be a diligent publication[29].

At the legislative level in the previous legislature (XVI) a strong lobbying action produced results of relatively little significance. Concerning cycling, for example, it has been made a requirement to wear high visibility jackets at night in suburban area and in tunnels and little else.

The Law proposals have been numerous but the only result we can mention are the sub-amendments pertaining to the modification of the Highway Code containing proposals for the promotion and protection of sustainable mobility presented at the meetings of 30 June and 1 July 2009, not adopted at the meeting on 7 July 2009 due to the chairman's belief that this will fall within an overarching reform of the rules of the road, for which rewritten according to orders of the day as duties of the government and particularly 0/44 and ga. / IX / 5. Carmen Motta, Alessandro Bratti (Pd), welcomed by the government, and 0/44 ga. / IX / 6. Alessandro Bratti, Carmen Motta (Pd), incorporated as recommendation.

28 The calculation of the social damage is carried out with the criteria established by the National Road Safety Plan, whose Italian acronym is PNSS (Piano Nazionale per la Sicurezza Stradale). The Plan was established by Law n. 144 of 1999, which implemented the communication to the European Commission n. 131 of 1997 "Promoting road safety in the EU: the program for 1997-2001"

29 Currently available in draft form at http://www.mit.gov.it/mit/site.php?p=cm&o=vd&id=3433

7.2 The principles to be followed for modifying the Highway Code.

It is desirable to provide a standard framework that protects and incentivizes cycling and walking, in addition to the Local Public Transport (LPT). A significant revision of the Highway Code is anticipated. The changes should provide for: greater harmonization of the component rules, a substantial simplification, and above all increased functionality in order to meet the Community requirements for reducing road accidents.

The **guiding principles** of the Code must be the starting point. In fact, art. 1 paragraph 2, is key to understanding the entire Code, it provides that "**The rules and measures implementation embody the principles of road safety, pursuing the aims of reducing the economic, social and environmental impact resulting from vehicular traffic, to improve the quality of life of citizens through the rational use of land; to improve traffic flow**."

This means that all the interventions aimed towards the goal of sustainable mobility are already laid down in Article 1 (which is precisely the guiding principles of the code) and thus the economic and social costs and the environmental issues are to be attributed to vehicular traffic, while all other modes of travel (collective - bus, train-or vehicular - bicycle or feet) are to be promoted by the Code.

A clarification is predicted of the fact that the Code supports the principles of sustainable mobility, and any measures of change should fulfill the requirements of empowering non-motorized road users (if it encourages and favors this sector, it naturally reduces the occupation of the street by motorized vehicles and so aids traffic flow) and integrating the different sectors of road users in order to make them compatible and to ensure that the safety of road users is the primary criterion.

Among the general principles of the Code mechanisms should be included **to ensure that local authorities recognize the aim of reducing accident rates, setting out the measures to achieve this objective and put in place the tools to verify achievement**s.

Among the specific topics that will require revision in the Code we can mention:

- Classification of roads
- Contraflow circulation
- Obligation use of bike lanes
- Crossings (signs for start and end of the track, raised crossings, signed crossings)
- Traffic light intersections (traffic light lamps, abutting cycle lanes, advanced stop lines)
- Colored Paving
- Bicycles in bus lanes
- Bicycles in pedestrian areas
- Intervention with the maneuver of the right turn
- Definition of roads and road traffic
- Definition of vehicles

- Vertical and horizontal signage
- Complementary signals
- Integration of bicycles - on local public transport
- Speed limits
- Roundabouts (Precedence)
- Overtaking

7.3 The developments in progress

The seventeenth legislature is proceeding with a fundamental revision of that part of the law for the reform of the Highway Code and which will hopefully result in incisive action at last.

A brief report on the main points, of what could be a significant change to the body of the regulations, as they appear in the provisional act.

Increase the sharing of space

An increase in the sharing of space is needed, to provide for the coexistence of pedestrians and cyclists, reduced separation between the traffic flows in the presence of a reduction in the maximum speed of travel, a lesser number of traffic lights.

Reorganize the urban traffic

Extension of the concept of environmental islands to 20 km/h zones (15 mph) with its relative standards, review of the concept of residential areas, make the 30 km/h zones (20 mph) the standard urban design, with the exception of the major/arterial routes and not vice versa, to ensure continuity of the network of pedestrian/cycle tracks.

Propose functional road classification

With reference to article 1 paragraph 2, it is possible to introduce a functional division of the streets as follows:

a) roads for the exclusive use in motor vehicles (excluding vulnerable users)

b) roads for predominantly motor vehicular use (compatible flows and vulnerable vehicular users, but the motor vehicle is predominant; for each of these roads a corresponding pedestrian route is foreseen)

c) Roads with the prevalence for vulnerable users (compatible flows and vulnerable vehicular users, but vulnerable users take precedence, so the motor vehicle user must adjust his behavior so as not to cause danger; typically they are likely to be zone 30)

d) roads for the exclusive use vulnerable users

In this regard, in category a) are foreseen A -motorways and B - major rural roads; in b) are foreseen C - suburban secondary roads and D – Urban arterial roads ;

in c) are foreseen E - Urban neighborhoods and F - Local Roads; under item d) are due F- local roads, Pedestrian/cycle routes and Historic Centers.

Introduce contraflow for the bicycle

Limiting its application to the 30 zones

Carry out a survey of accidents in suburban areas

Extend the application of RSIA (2008/96/EC Directive)

Regulate amateur cycling separately

Review the obligatory use of cycling infrastructure for recreational cyclists

Monitor the accident rates for vulnerable road users

Use the data to assess the effectiveness of policies and action plans

Figure 24 – Bicitalia routes

Additional obligations when overtaking

Include an obligation to keep a minimum distance of 1.5 meters for a motor vehicle overtaking a bicycle, as expected in France, (the obligation is imposed through road signs)

Monitor the modal composition of traffic

Invest in data collection as required by the Fourth Framework Program

Establish a unified signage for cycle lanes (and pedestrian areas)

Making up for a lack of a Code. Enhancing the area and promoting sustainable tourism

Establish a National Cycle Network

The national cycle track network must have visibility and national importance. The cycle network should develop into a network of routes of varied status according to importance at national, regional and local levels. Unify the nomenclature. Bicitalia (part of Eurovelo) may form the backbone of the network. **(Figure 24)**

Promote cycle/pedestrian mobility

The slogan 20-20-20 (understood as modal composition to reach for bikes, pedestrians and local public transport) has been proposed in the "Stati Generali di Reggio Emilia" (General Council of Reggio Emilia)[30] .

Promote Local Public Transport

Abolish deregulation, provide finance and support for local public transport.

Set up a national publicity campaign

Set up a nationwide advertising campaign to support sustainable mobility.

Review pedestrian crossings

Revise the design of pedestrian crossings both from the point of view of penalties for non-compliance, and from the technical point of view, to ensure that vehicles slowdown.

Cut red tape for the use of non-standard bicycles

Separate the concept of the bicycle from the velocipede, entering atypical vehicles in a updated and less rigid list than is the case today.

Take action on the problem of bicycle theft

Introduce measures to combat theft and recycling of bicycles.

Box 7 is a study on the subject of accidents which occur when traveling to or from work, not included in the revision of the Highway code, but equally important in encouraging more sustainable mobility.

30 http://fiab-onlus.it/bici/attivita/corsi-convegni-e-formazione/item/198-stati-generali-litalia-cambia-strada-serve-una-svolta.html

http://www.comune.re.it/retecivica/urp/pes.nsf/web/PnrbndllmbltNvdncrclzn?opendocument

A success story: the campaign for recognition of injury on going to or from the place of work by bicycle[1]

Italian law requires insurance protection for those who suffer an accident at work. Further cover is expected for the accident on the way to work: l'**infortunio in itinere** (going to or from the place of work)

With Article 12 of Legislative Decree 38/2000, the result of extensive case law, insurance cover for injuries suffered by insured workers was introduced to cover:

- The usual journey to and back from home to the workplace (accidents occurring within the home, including outbuildings and communal areas are not included in the protection);

- During the regular route that the employee must take to go from one place of work to another, in the case of multiple working places;
- During the usual route for the consumption of the meals if there is no canteen.

The bicycle was considered a private means of transport like all the others (car, motorbike etc.). Inail (Istituto Nazionale Assicurazione Infortuni sul Lavoro, National Insurance Institute of Injuries in Workplace) insurance coverage on the way to and from work is scheduled only if it demonstrates that its use is "needed", namely the lack of a public transport service or the incompatibility of timetables. Many workers, who use bicycles instead of public transport, are thus disallowed by Inail accident cover because they could use public transport.

Following an exchange of correspondence between Inail and Fiab itself, there is a new factor: an injured cyclist is indemnified, despite the possibility of using public transport; if however, the accident occurs on a cycle path or in an area closed to traffic.

INAIL is a public body and should therefore be limited to applying the law. It can obviously give an interpretation, more or less extensive. The problem is the current legislation and it is therefore the legislature that, as proposed by FIAB, should make changes; equating the use of bicycles to that of public transport or to going on foot, recognizing the use of bicycles, as a sustainable and environmentally friendly mode of mobility that should be encouraged and protected.

FIAB in 2007 **drafted a bill** to seek insurance protection for those who suffer an injury while on a bicycle journey between home and work. For this motive 12,000 signatures were collected and delivered to the Parliamentary Group of Friends of the Bicycle in the XVI legislature.

The proposal. As part of policies to promote sustainable mobility and, in particular, of boosting the use of the bicycle, in art. 12 of Legislative Decree n. 38 of 23.02.2000, after the phrase "The insurance operates also in the case of use of private transport, as long as it is needed" is added as following: "**The use of the bicycle is however covered by the insurance, even for short journeys or when use of public transport is possible**"

More generally, FIAB believes that, in the policies in support of sustainable mobility encouragement of cycling should be fully endorsed and that, therefore, it is necessary to enable, by every possible legislative and administrative measure the aim of promoting cycling and protecting the cyclist. The introduction of **insurance protection for travelling to work by bicycle**, on one side constitutes concrete support, the "reinforcement" of vulnerable users of the road, to which the cyclist belongs, of the other side it leads to a widespread awareness of the problem of the safety of these users, including by public insurance companies, who, as has been noted, are now institutionally responsible not only to pay damages but above all to prevent accidents at work.

At last, on 22 december 2015, the norm has been approved that recognizes the insurance protection for travelling to work by bicycle (always, because of its environmental benefits), to culmination of the decennial campaign undertaken by FIAB.

IN ITINERE

[1] http://www.bici-initinere.info

8 Lines of development in forthcoming mobility policies

8.1 Governing change

As mentioned in the introduction, Europe has the lowest road accident rate in the world and is promoting policies to reduce it further. The number of accidents in Italy is also decreasing, though for now, more among four-wheeled motor vehicles than among vulnerable road users.

All this in the face of increased demand for healthy and safe mobility, respectful of the environment and this even in an economic crisis that has made many think again about the inefficiency of our transport system and of mobility.

How has the netherlands become a country with a high rate of cycling

from Fabio Alemagna, "Come fa l'Olanda ad avere tante biciclette", www.informarexresistere.fr

The Netherlands is foremost in the ranking of countries for cycling and road safety and is therefore often used as a reference when addressing these issues.

This has not always the case. Indeed, it was previously quite the contrary, as told by a movie that recounts the progressive changes in mobility in the Netherlands[1].

After World War II, the Dutch had to rebuild the country and average incomes rose by 44%, between 1948 and 1962 reaching 222% in 1970. The number of cars in circulation increased considerably, in cities which are mostly historic and certainly not designed for cars. So many buildings were demolished to make room for cars, even some old cycling infrastructure was removed, the squares were turned into car parks and new urban settlements were served by wide roads suitable for motor traffic[2].

The average daily distance traveled increased from 3.9km in 1957 to 23.2km in 1975. In this "progress" the use of bicycles was forgotten, decreasing at the rate of 6% per year, while in 1971 alone there were 3300 road deaths. More than 400 of the victims were children under 14 years.

The massacre of children brought people onto the streets to protest. The movement "Stop the killing of children" demanded safer roads for children, pedestrians and cyclists. Their request was heard.

Especially when the first oil crisis in 1973 brought the country to a halt.

The then Dutch prime minister told the people that the crisis would change their lives; they had to change their habits, to be less dependent on energy, but that this was not possible without reducing the quality of life.

The policies to stimulate the use of the bike fitted perfectly in this framework. The Sundays on foot to save fuel reminded people what the city looked like without cars on the road.

At that time the first town centers were permanently pedestrianized and the protests continued. Impressive public bike rides took place in all Dutch cities, and also smaller protests in support of cycling; they created an awareness that eventually changed the way of thinking about transport.

This road has had its bicycle lane.

In the mid-70s they began the first experiments with complete and safe bicycle lanes, separated from automobile traffic. Thanks to funds from the national government the first bike lanes were created from scratch in Tilburg and Den Haag. In hindsight, this could be seen as the beginning of modern cycle policies in the country.

The use of bicycles grew dramatically - in Den Haag by 30-60%

On the one hand, therefore, there is the need that the **next road safety policies relate to the urban centers** (our cities are even more unsafe than their European counterparts where they have taken more decisive policies) and **in particular vulnerable road users**; on the other hand one feels very strongly the need to encourage private non-motorized mobility in conjunction with **development of LPT**.

The crisis must be the driver of systemic changes, as indeed happened in the Netherlands (see box) where cycling has not always been so popular, it gained a new impetus and expanded just after the 1973 oil crisis and we should learn from this.

For the first time we are facing a convergence of interests from various actors, given that attention to road safety and sustainable mobility has grown over time and is certainly considered a priority today.

This propitious moment should be grasped to put in place a schedule that allows this process to develop. The shortage of resources can be a stimulus and should not be an excuse for not proceeding, as the examples of many of the countries near to us demonstrate.

It is therefore necessary to reorganize the city, even without extensive structural change.

This painted bicycle lane became a permanent cycle path and the motor traffic in this area has been completely forbidden. Today the place is well-known for the logo "I Amsterdam", where a famous protest took place.

This bridge has not maintained its cycle passage, but today it has its separate cycle lane

and 75% in Tilburg. "Construct them and cyclists arrive" proved to be a successful policy in the Netherlands.

The solution was therefore found through political will at a local and national level, both among those who had to make the decisions and those who had to implement them, moving away from policies that focus on the use of the automobile and encouraging alternative forms of transport, such as cycling. Cycling is now an integral part of transport policies. In the Netherlands they made organization out of an emergency.

1 http://www.youtube.com/watch?v=dpgc8czh-cs

2 http://www.informarexresistere.fr/2012/02/27/come-fa-lolanda-ad-avere-tante-biciclette/. Fabio Alemagna.

8.2 Priority Activities

You can summarize the activities listed so far in a number of crucial points:

Identify the goals.

Without quantified objectives results cannot be achieved. 20-20-20 can be an easily memorable target of strong symbolic value.

Measure results

Without data the objectives are never attained. There needs to be measurement, as seen for data on mobility, accident rates and local policies

Planning actions

Planning is the basis for action. Planning is necessary for transport policies, security and mobility.

Investing in communication

Sustainable mobility is a necessity and an opportunity. Also communication cannot be subject of deregulation.

Take decisive action

There are no neutral policies: either you act in favor of sustainable mobility, or hinder it.

Identify resources

Without resources no project can be realized, but the resources come only from attainable savings and thus they pay for themselves

Investing in infrastructure.

Obviously, in the interests of sustainable mobility. Particularly important are: junctions, reconnaissance, signage (Unified cycle/ pedestrian signs) and maintenance.

In the picture, a good example of communication: the informative totem of a 30 zone in which the advantages are introduced

8.3 What future?

Cycling is one of the key elements of a different mobility, which is innovative and smart, in accordance with and ally to other modes of “non-motorized” travel and with an equally innovative public transport system.

The bicycle is not only a means of sustainable transport. It is a fast way to get around every day in one`s town or city and to arrive directly to places where other means cannot take you; it gives you travel autonomy, at the same time socializing the city, permitting living it and seeing it in a different way. Not only can we replace the car but can add something to our daily journeys: a different sight, exercise and wellbeing, while saving time and money.

A different way to move, allowing you to know and understand not only the city, but also the surrounding area, the landscape, the environment in which we live.

More cycling, more walking and more local public transport are the keys to reaching the twin objectives of greater security of movement and the greater livability of our cities.

Better mobility also means a better quality of life; a drastic reduction in pollution, and a boost to tourism, and the economy.

Appendix
Current rules of the road for cyclists[31]

Equipment

Bicycles must be equipped with:

- tires
- brakes, one for each wheel
- bell
- lights, white or yellow front, red rear
- red rear reflectors
- Yellow reflectors on the pedals and sides (on the wheels) to ensure side visibility

(Article 68 of the Highway Code)

The Regulations set out the number, the color, the characteristics and mode of application of visual signaling devices, braking devices, sound signaling devices (Article 69 of the Highway Code and Articles. 223 and 224 of the Regulations)

Traffic regulations

General behavior

- Hands and arms should be free, you must hold the handlebar grips with at least one hand, you must always be able to see straight ahead and sideways (art. 182, para 2).
- It is forbidden to zigzag or via suddenly (Art. 377, paragraph 1 of the Regulations).
- Use your arm to signal your intention to make a turn. To indicate you are stopping lift the arm (Art. 377, paragraph 3 of the Regulation).
- You can cycle side by side in no more than 2 and only if traffic conditions allow.

Outside built up areas cyclists must be in single file

- An exception is made in the case of children under 10 years, in which case the adult cycles to the outside of the child (art. 182, para 1).

Traffic lights and intersections

- When on the road the cyclists is expected to behave in a manner comparable to any other vehicle: with one exception, at traffic lights when the lights change to green motor vehicles must give way to cyclists, compatibly with the chosen direction (art. 41, para 9). For example, if the cyclist is going straight on and the motorist turning right, the rider takes precedence.
- If you are in a bicycle lane or track and there is a traffic light for bicycles (a coloured bicycle on a black background, the colors are red, yellow and green - art. 41, paragraph 6), the rider must respect these signals and not other traffic lights (for cars or pedestrians).
- If a set of traffic lights does not have a traffic light for bikes, the rider must follow the same behavior as the pedestrians. That is you should respect the traffic lights for pedestrians (art. 41, paras 15:05).
- If the traffic lights for bicycles (or the one for pedestrians) is off or malfunctioning, cyclists are required to use caution while crossing the intersection (art. 41, para 13).

Dangerous intersections

- Get off the bike and walk across (Art. 377, paragraph 2 of the Regulations).

Relations with pedestrians

- If, due to traffic conditions, the cyclist is in the way of, or a danger to, pedestrians, he must push the bike by hand and behave as a pedestrian (Art. 182, paragraph 4).

31 See also Carlo Favot, In bicicletta con il Codice (By bicycle with the Highway Code), Ediciclo editore

Transporting children

- It is forbidden to carry other people. You can only carry a child up to eight years old with suitable equipment (Art. 182, paragraph 5, art.68, ART.225 the Regulations).
- Children of up to 15 kg can be carried on a front mounted child seat (Art. 377, fifth paragraph of the Regulations).
- The rear mounted child seat is for children up to 8 years of any weight (art. 377, paragraph 5b of the Regulations).

Trailers

- It is forbidden to tow other vehicles. Trailers are permitted only if the total length of trailer and bicycle together does not exceed 3 m. The maximum width of the total trailer must be no greater than 75 cm and the maximum height, including the load, must not be greater than 1 m. The transportable mass must not exceed 50 kg. For travelling at night the trailer must be equipped with visual signaling devices back and side the same as those required for bicycles (art. 182, paragraph 3 of the Highway Code and Art. 225, paragraph 7 of the Regulations).

Things and animals

- It is only possible to transport objects if: they are firmly secured, do not protrude more than 50 cm, and do not restrict visibility (art.182, paragraph 8 and art. 170, paragraph 5)
- It is possible to transport animals only if kept in special cages and even so the limits set out above (art. 182, paragraph 8) must be complied with.

Cycling at night or in poorly lit areas

- Out of town (the town does not always coincide with the municipal boundary), the rider must wear a high visibility reflective jacket or safety vest/ waistcoat, from a half hour after sunset to half an hour before sunrise.
- A reflective jacket or vest must be worn, in or out of the town if at any time you go through a tunnel (art. 182, paragraph 9-bis).
- Both at night, as defined above, and by day in poor lighting, bicycles without lights must be conducted by hand (art. 377, paragraph 4 of the Regulations).

Use of cycle lanes

- If there is a cycle lane or track alongside the roadway, the cyclist is obliged to use it, unless otherwise indicated (Art. 182, paragraph 9).

Dedicated bicycle crossings and other crossings.

- On crossing for bicycles the cyclists has precedence (art. 40, para 11).
- In the case where the bike track or lane ends at a road, the rider must give way to other vehicles.
- The difference between the two cases is ‘that the first will present the appropriate markings indicating the continuity of the cycle path. In the latter, there will be a vertical indication of the end of the bike path (a bicycle on a blue background with a diagonal bar).
- Pedestrian crossings are not also bicycle crossings. Cyclists can make use of them only by getting off the bicycle and walking the bicycle across.

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Edoardo Galatola is in charge of the FIAB road safety and legislative matters office. He has been following the parliamentary work on safety and cycling and has been consulted several times during preparatory works of parliamentary Committees. He was a member of the National Road Safety Council and co-founder of the OUD (Osservatorio Utenza Debole - Vulnerable Road Users Observatory). He is member of the ECF Road safety group. He founded and has been managing Sindar Ltd., a consulting firm in the field of major industrial hazards, risk assessment of transport, safety at work and environmental management systems. Author of papers in Italian and international congresses and magazines, he collaborated on the guidelines for ISO 39001 of Certiquality.

What is FIAB

Since 1998 FIAB (Federazione Italiana Amici della Bicicletta) has been a non-profit environmental organization of **more than 140 local associations throughout Italy**.

FIAB encourages **cycling as environmentally friendly and sustainable means of transport**. FIAB designs operations in urban and suburban environment reclassification contexts.

FIAB subscribes to the European Cycling Federation (ECF) and **is approved by the Ministry of Environment** as environmental protection association, **by the Ministry of Infrastructure and Transport** as association of proven experience in the field of prevention and road safety.

FIAB **is member** of the National Road Safety Council, of the National Workgroup for Sustainable and Cycling Mobility, of the Association Consultation Committee at Trenitalia.

Activities by FIAB

- Cycling events, **lobbying activity** for cycling safety and quality life interventions and measures (cycle paths, traffic calming areas, combined transport, etc.)
- **Cycling together** (excursions, weekend trips, cycling tours, gatherings). www.andiamoinbici.it
- Cycling routes **publishing**.
- Proposals for **Bicitalia®** cycling itineraries project: published on the website www.bicitalia.org, it will be a web covering the entire peninsula, a more than 18,000 kilometers network of cycle routes, the longest of which is **"the Sun Cycleway"**, connecting Brenner to Sicily.
- Proposals and projects of **educational activities** on cycling in general, to and fro cycling to school, road safety etc. www.fiab-scuola.org
- **BC, a monthly magazine** about cycling as environmentally friendly and sustainable lifestyle. www.rivistabc.com
- Cycling maps, guides, **technical publishing**; organization of **cultural activities** (conferences and debates, seminars and study tours).
- **Collaboration** with Ministries, Regions and Local Authorities for the conduct of **research, feasibility studies, projects** in the field of cycling. www.fiab-areatecnica.it
- Update of the site, www.fiab-onlus.it, connected to the sites of the member associations, to make immediately available to users an abundance of information on the issues of sustainable mobility and the promotion of cycling.
- Establishment of the service **Albergabici®** (Cycling hotels), in order to network information, otherwise difficult to find, about the cycling friendly accommodation. Around 1000 registered accommodation in all Italian regions. Address: www.albergabici.it

National events organized by FIAB

- **BIMBIMBICI®** (Children by bike). On a Sunday of May children under 11 and their families gather to cycling safe and secure in the streets of their city; in the larger part of the cases, the event is preceded by educational activities in schools. The event involves every year more than 200 cities throughout Italy, has received international acclaim and is recognized by the European organization www.bimbimbici.it
- **CICLORADUNO** (FIAB Gathering). Once a year the FIAB associations meet to pedal all together in the national gathering, organized by one of the local associations, which generally lasts four days and takes place on roads with little traffic. It is an opportunity to see and learn more about Italy, by bike, in a convivial atmosphere and with local guides.
- **BICISTAFFETTA** (Cycling Relay). At the beginning of autumn the Bicistaffetta takes place along the network Bicitalia®. The itinerary is different every year and has the scope of make the authorities aware about the need of a cycling mobility policy and apply for funding to the Government and the Parliament in order to encourage this policy.
- **European Week Of Sustainable Mobility.** From 16 to 22 September each year, thousands of events take place all over Italy (www.settimanaeuropea.it/), under the aegis of the FIAB and the patronage of the Ministry of the Environment, to promote the sustainable mobility and safety.

How to join

If you want to join FIAB, subscribe to the **closest local association or on line** (www.fiab-onlus.it). Cycle-ecologist, cultural, environmentalist associations, sports and recreation groups that promote cycling, especially as a daily means of transport, of traffic calming, aiming the protection of pedestrians and cyclists and the promotion of cultural initiatives or cycling diffusion policies are welcome to FIAB. See more information on FIAB website (www.fiab-onlus.it).

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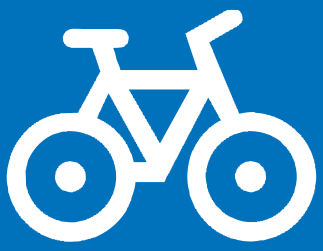

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