M05.02 – Executive summary

The road accident trend in Brescia has always been monitored thanks to the availability of data coming from ISTAT (National institute of statistics) yearly updated. Information contained in the ISTAT database are considerable: for every single road accident occurred in Brescia it's possible to know, for example, the venue, the involved vehicles, the circumstances, etc. the storage of data is carried out inserting manually data into the computer.

The construction of a GIS platform has been made in years thanks to the close collaboration between the Mobility and Traffic Department of the Municipality of Brescia and the University of Brescia.

The University of Brescia from 1991 to 2002 realized at the beginning the GIS platform, then it kept data updated, integrating ISTAT data with the information coming from the Municipal Police, in order to geo-reference them. Such actions allowed the administration to have a considerable historical data series on which basing the road safety policies.

Since 2003 the contract with the University hasn't been renewed, therefore the activities done by the Municipality were reduced only to the ISTAT data collection (restricted to punctual situations and aiming at funding) and the integration of the information with Municipal Police data was no more implemented.

In this context, the measure developed the following two main aspects:

- A Road Safety Monitoring Centre;
- A Road Safety Urban Plan (PSSU) to be developed in the city of Brescia.

Concerning the Road Safety Monitoring Centre, a new web platform has been realised at the Local Police Station for the road accident relief enhancement. The main activities consisted in developing the software, purchasing palm devices and training the local municipal police on the use of the palm devices during the relief operations.

On the other hand, the PSSU – designed according to the National low requirements – identified black-spots, priority areas of intervention, and road maintenance needs. It can be considered a technical instrument that helps administration political choices regarding road safety.

The activities implemented by the measure allowed the city to manage the road safety problems using a new systemic approach, namely through planning and programming the activities related to road safety. This innovative methodological approach allowed integrated planning actions among different Municipal Departments (mainly Road Department, Public Works Department and Police Department).

It's important to bear in mind that the measure is characterized by activities not having visible impacts on road safety statistics in the short period. In Brescia the number of road accidents increased from 2009 to 2010, while at national level the opposite trend is observed (-1,8%). At the same time in Brescia the crash severity decreased (the number of deaths goes from 14 in 2009 to 6 in 2010), which means that more accidents occurred but they were less serious.

Another important consideration regards data availability. The more complete and official road accidents data came from the Italian National Institute of Statistics (ISTAT), but their late delivery made the most recent year data collection not possible. For this reason, the partial data coming from the Municipal Police were considered. Observing both the partial data coming from the Municipal Police and the ISTAT ones, road accidents increased at the intersections and at the same time

decreased along the roads, which means that interventions made on a site likely produced a local accident reduction, but an increase elsewhere, in this case at intersections.

Even if the scarce availability of data (2-3 years) didn't allow to make significant statistical considerations, in general the number of pedestrians and cyclists dead or injured on roads slightly decreased or registered a stable trend.

Finally, in general terms, there is a lack of awareness about the importance of the dissemination of the Urban Road Safety Plan, which is seen by the Local Administration as an internal act, not made to be spread among citizens. This consideration is confirmed by the data collected for indicator n. 8 "Awareness level" about the PSSU, which decreases from 24% (2010) to 8% (2012).

A. Introduction

A1 Objectives

The measure objectives are:

(Y) High level / longer term:

- To develope safe and secure roads and infrastructures and means of travels.

(Z) Strategic level:

- To reduce the number of victims in road accidents according to Road Safety urban plan (PSSU);
- To share the information on Road safety (i.e. GIS) among the different Municipality offices.

(AA) Measure level:

(1) To improve the existing road accident database in order to have the localization of road accidents in a GIS;

(2) To elaborate the Road Safety urban plan (PSSU) in order to give administrators a local tool to face road safety and in order to reduce road accident by about 13% during the validity period of the plan (2 years);

(3) To improve road accident reporting through GPS technology;

(4) To develop the monitoring centre: it allows to have an automatic system for accident database updating/reporting/analysis based on GPS technology and on GIS software.

A2 Description

The measure consisted mainly in implementing two different topics:

- A Road Safety Monitoring Center; the Road Safety Monitoring Center consisted in realizing a new web platform at the Local Police Station for the road accident relief enhancement: the main activities consisted in realizing the SW, in purchasing palm devices and in training the local municipal police for the use of the palm devices during the relief operations.

- A Road Safety Urban Plan (PSSU) to be developed in the city of Brescia; the PSSU - designed according to the National low requirements - identified black spots, priority areas of intervention, and road maintenance needs. It is a technical instrument that helps political choices of the administration about road safety.

The activities implemented by the measure allowed the city to manage the road safety problems using a new systemic approach, namely through planning and programming the activities related to road safety. This innovative methodological apprach allowed integrated planning actions among differnet Municipal Departments (mainly Road Department, Public Works Department and Poilice Department) that in time could lead to a significant road safety improvement in the city of Brescia.

B. Measure implementation

B1 Innovative aspects

- New organisational arrangements or relationships
- New policy instrument
- New conceptual approach
- Use of new technology/ITS

The innovative aspects of the measure are:

- **Innovative aspect 1 (New organisational arrangements or relationships)** – The Monitoring center aimed at creating an information system which could be easily shared by all the involved sectors of the administration, in order to make more exhaustive analysis using a transversal approach.

- **Innovative aspect 2 (New policy instrument)** – The road safety issues have been faced in the past but not through the use of a tool such as the Urban Road Safety Plan (PSSU).

- **Innovative aspect 3 (New conceptual approach in PSSU development)** – The Road Safety Plan (PSSU) provides technical and objective criteria in order to help the public administration in choosing the most suitable solutions in relation to road safety problems (blackspots). This PSSU is the first plan (developed in Brescia) strictly dedicated to road safety and it is based on the new conceptual approach foresaw in the National Road Safety Plan introduced in Italy in 2002.

- **Innovative aspect 4 (Use of new technology/ITS)** –The road accident database has been managed by the University of Brescia from 1991 to 2003. It's update after 2003 was carried out autonomously by CBS and thanks to the new Monitoring Center it was possible to implement an automatic system for the road accident database updating/reporting/analysis based on GPS technology and on GIS software.
  The main target of the Monitoring Centre was a web platform for the Local Police road accident database management. The new system, based on the purchase of palm devices, was implemented to help the Local Police officers during their road accident reliefs making operations more fast, accurate and complete. The new system easily allowed to include non common information on road accidents, such as the accident localization by absolute GPS coordinates.

B2 Research and Technology Development

The RTD activities related to the measure implementation consisted in developing the Monitoring Center and in elaborating the PSSU for Brescia.

The RTD activity related to the design of the Monitoring Center was the creation of a web platform for the Local Police road accident relief management.
The research activities consisted in developing a Software able to manage the following:
- ISTAT (i.e. Istituto Nazionale di Statistica, national Statistical Institute) schedule (that is the standard info to be provided at national level on road accidents);

- photos of the accident (useful to implement road safety scenario);
- standard minutes to be modified on site (useful to speed up reporting actions)
- location of accidents using GPS (useful to implement road safety actions, reducing mistakes in road accident localisation activity).
- real time transferring of infos and database implementation;
- non refined mapping action;
The SW needed to be used also on palm devices.

The PSSU is the local planning instrument designed to reduce road accidents and it is was instituted in Italy in 2001.
The RTD activities related to the first PSSU implemetnation in Brescia were:

- analysis of existing national guidelines on road safety and of the national Road safety plan
- deepening of international good practices on road safety transport plan (for example: Local Transport Plan in UK – Gloucester experience; Plan de Securidad Vial in Spain – madrid experience)
- analysis of already existing national expiriences at local level (Ravenna, Roma, Bologna)

From the technological point of view the Municipality already uses a GIS SW.
The GIS was set as following:
- Georeferred data using certified ISTAT schedules (historical data series is avealiable since mid '90, logn term data collected)
- Data related to traffic (magnetic detectors and modelling actions)
- Georeferred data using data collected by police a local level - now coming from the Monitorig Centre – (data info available up to 3 years)– short term data collected

The database is used in order to reach a clear mapping of blackspots with evidence of critical sites - road sections or crossroads - where priority actions are needed.
Short term data are particularly useful to calcule road accident rate for road sections.

B3 Situation before CIVITAS

The road accident trend in Brescia has always been monitored thanks to the availability of data coming from ISTAT (National institute of statistics) yearly updated. Information contained in the ISTAT database are considerable: for every single road accident occured in Brescia it's possible to know, for example, the venue, the involved vehicles, the circumstances, etc. the storage of data is carried out inserting manually data into the computer.

The construction of a GIS platform has been made in years thanks to the close collaboration between the Mobility and Traffic Department of the Municipality of Brescia and the University of Brescia.
The University of Brescia from 1991 to 2002 realized at the beginning the GIS platform, then it kept data updated, integrating ISTAT data with the information coming from the Municipalal Police, in order to georeference them. Such actions allowed the administration to have a considerable historical data series on which basing the road safety policies.
Since 2003 the contract with the University hasn't been renewed, therefore the activities done by the Municipality were reduced only to the ISTAT data collection (restricted to punctual situations and aiming at funding) and the integration of the information with Municipal Police data was no more implemented.

No PSSU was available to manage road safety problems. Decisions were made following political issues based on specific requests coming from the population or according to decision-maker sensitivity.

B4 Actual implementation of the measure

The measure was implemented in the following stages:

Stage 1: Design and implementation of the monitoring center *(from October 2008 to December 2010) – This stage is dedicated to the monitoring center implemented by Telecom.*

Monitoring center developed by "Telecom"(who won the tender) was composed by:
- a web platform to manage the road accident reporting (Fig. 11 Home page of the WEB platform),
- SW to manage real time data transferring and integrate webplatform with palm devices,
- 4 GPS palm PDA devices,
- 4 printers.
The palm devices were given to the Municipal Police patrols in charge of accidents reliefs. The involved staff was trained for the use of the new system.
The most relevant part of the Telecom project consisted in implementing the information system.
The following scheme (Fig. 10 Main functions implemented into the first version of the system, for both the web platform and the PDA devices) illustrates the main functions implemented into the system, for both the web platform and the PDA devices.

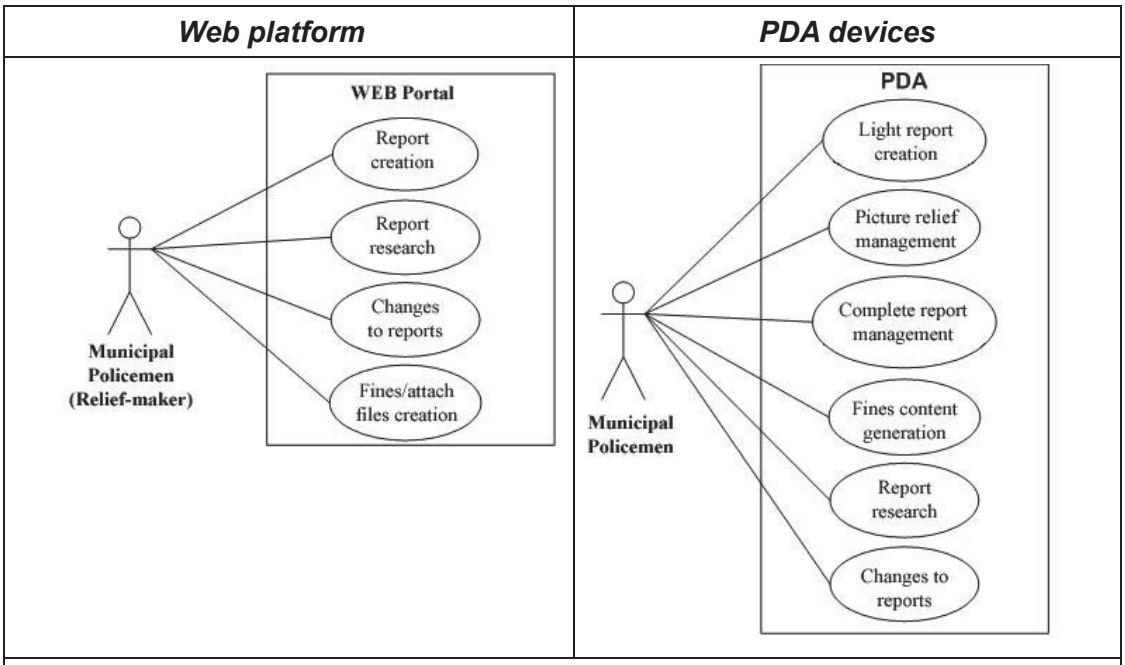


Fig. 1) Main functions implemented into the first version of the system, for both the web platform and the PDA devices

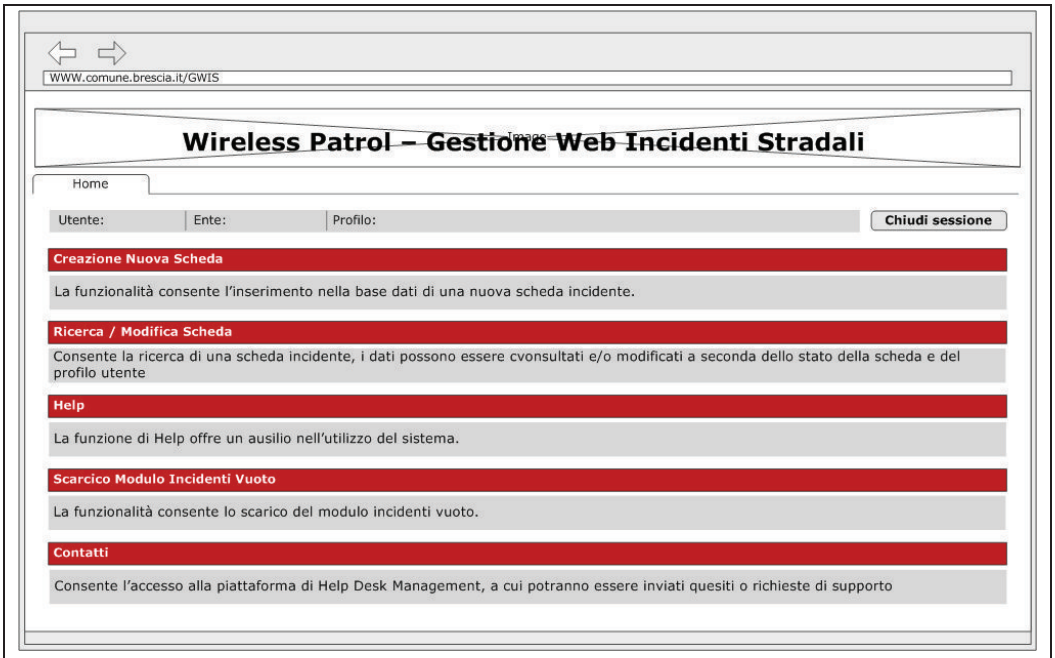


Fig.2) Home page of the WEB platform (Telecom solution)

Telecom accomplished the most part of the agreed technical solutions.

It developed up to 2 versions of the platform,, in order to solve some technical problems emerged during the first operational period (2009).The secon version of the platform was started up at the beginning of 2010. Local Police was trained in order to use the new SW and HW.

This platform was operational for about one year. At the end of December 2010 the Local Police Department decided to abandon the Telecom product and to adopt another system better integrated with the other enforcement agencies.

This choice was supported by:

- *several technical problems occurred in managing the SW developed by Telecom (the main provele was related to real time data trasmission and toon site printing – ref. Modulo incidenti Telecom Web Patrol - Test del 30/12/2010)*
- *the growing necessity of the Local Police Department to share information with other enforcement agencies.*

The new system was developed by "Verbatel – Servizi informatici e telematici" and it is described in the following "Stage 1bis: Design and implementation of the monitoring center – outside the DOW timeplan".

Stage 1bis: Design and implementation of the monitoring center – outside the DOW timeplan *(from December 2010 to October 2012) – This stage started with the tender for a new system able to manage the same information of the previus platform deveoped by Telecom and to interface with other enforcement agencies. The new tender was won by the company "Verbatel – Servizi informatici e telematici", - the same who manages the SW/HW system for Carabionieri - which provided a road acc\idents management system based on an integrated platform characterized by other functions (according to the tender requirements).*
Such new platform allowed the managment of all the activities usually undertaken by the Operative Center of the Municipal Police of Brescia:

The SW is organised in the following modules:

-"Vtrak" module - that subdivided the city in zones of interventions according to competencies of the enforcing agencies;
-"Gestinc" module – to manage road accidents (more info are provided below).
- "Integra" module – to support the "Investigative" and "Excise and revenue" managed by Local Municipal Police;
-"Registra" module – to manage activities related to notifications, objects findings, documents inspections and verifications;
- "Rimozioni" module - to manage removed vehicles registering. A specific interface allowed to classify the vehicles basing on vehicle type and model, place of removal, time, date, place of deposit, etc..

In particular, the"Gestinc" module dedicated to road accidents management was structured as following:

- data management (uploading and managing of all the data) These kind of data can be uploaded either manually in the Police Departement or on the accident site and transmitted to the DB through the use of palms, smartphones and notebooks (Fig. 12). (The SW developed by Telecom allowed data management only trough palms).

Fig. 3) Smartphones and PC tablets used in the new Verbatel system

- graphic function: GPS localization of accidents and CAD mapping.
- standardised accident reporting:. the accident report is automatically edited basing on few and simple information provided by the policeman.
- data transferring to ISTAT: the SW allowed the automatic transmission of collected data to ISTAT DB. The system tracked back the data transfers to avoid duplication.
- first "rough" automatic elaboration: the system provides several automatic elaborations such as graphs, it allaw also to integrate info such as accident causes in relarion to weather conditions.
The new system has been in force since January 2012 and the policemen were trained in February 2012.

Stage 2: Elaboration of the first PSSU, Submission of PSSU to City Council and approval of the scheme *(from October 2008 to January 2010) – The activities consisted in elaborating the methodology to develop the Urban Road Safety Plan (PSSU) in Brescia. The most important purpose of a PSSU is to make lists of critic sites (road segments, intersections or whole roads) in terms of road safety, where interventions are urgent.*

In the case of Brescia, depending on the road safety problems emerged from the aggregate analysis and on the strategies chosen to solve them, different techniques have been used.

The road safety data used for the elaborations present in the PSSU of Brescia come from the ISTAT (National Institute of Statistics). Aiming at detecting the black spots, data had been geo-referenced through a GIS software. Besides, the Municipality of Brescia could count also on the availability of traffic data , that allowed the application of a particular procedure for the pinpointing of critic road segments.

In order to face particular road accident causes, such as for example the red light infractions or the pedestrian knocking down, the methodology used in the PSSU of Brescia consisted in isolating from the road accidents database the only events concerning that particular cause and the respective list of critic sites where to intervene with priority were obtained counting the number of road accidents occurred for each site in the last three years and listing them in descending order.

Fig. 4 Map of the city of Brescia that shows the only accidents due to the red light infractions.

To fight against the road safety problems extensively on the municipal territory through punctual engineering actions (which can include infrastructural interventions or more general mobility management measures), two different methodologies were used for the detection of the critic intersections or road segments.

As regard the critic intersections, the selected criterion were to count the number of road accidents that in the last three years occurred in each crossroad. The priority list that was elaborated was therefore based on the high frequency of road accidents in terms of absolute value, reporting as dangerous the road junctions where more than two road accidents per year occurred on the average in the time period taken as reference.

Fig. 5 Extract of the map showing the dangerousness of the road intersection based on the count of the number of accidents occurred in the reference period. The more the colors are dark and the more the intersections are dangerous.

The method adopted for the PSSU of Brescia foresaw the comparison between the road accident rate calculated (that is considered an indicator able to express the dangerousness of a site, because it puts into relation the number of accidents, the road segment length and the amount of traffic) for each homogeneous road segment and the average rate calculated for the road functional class to which the road segment belongs (Maternini, 2000). The most dangerous road segments, placed at the top of the priority lists, are characterized by high road accident rates.

Fig.6 Extract of the map showing the dangerousness of the district road segments basing on the road accident rate value. The more the colors are dark and the more the segments are dangerous.

Lists of priorities and thematic maps where critical trunks or crossroads are displayed were produced (The methodology was applied to the "district roads", to "inter-district roads" and "inter-zonal roads").

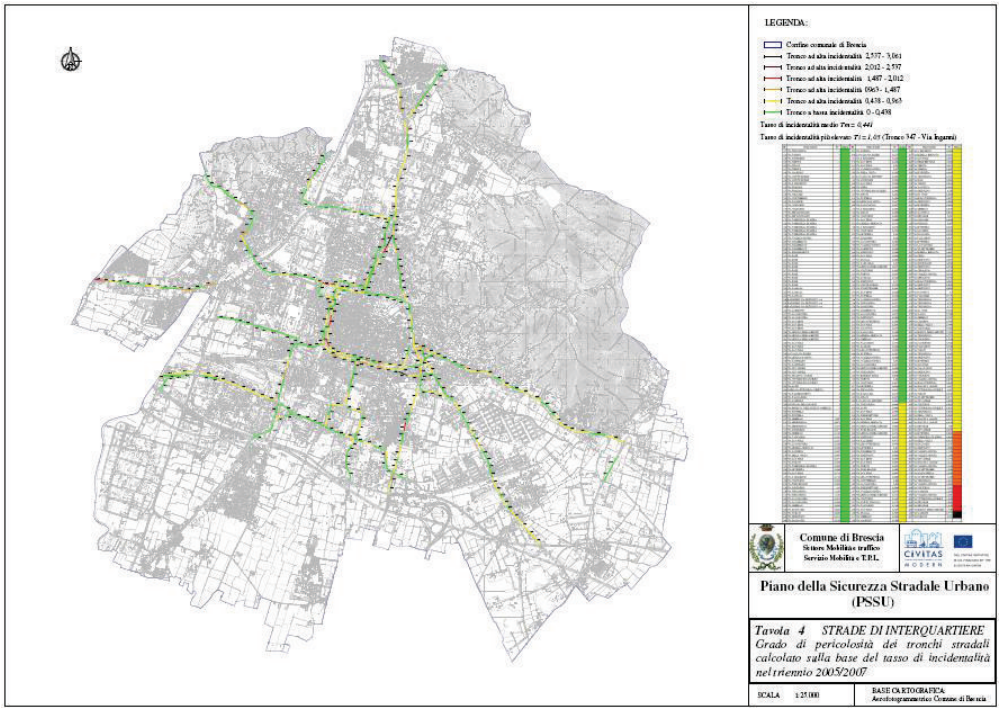


Fig. 7) Mapping of the critical road trunks for the inter-district roads based on the calculation of the road accident rate

For each area of intervention the PSSU foresaw in the "lists of priorities" a detailed analysis is required (disaggregate and / or safety reviews analysis) in order to identify the main causal factors that provoke the high levels of dangerousness of a site.

The completion of the Plan was accomplished at the end of January 2010 (project-month 15 as scheduled in the timetable).

It's important to say that the formal approval of the plan and its operative launch required more time than the scheduled, because more than one Department of the Public Administration was involved in the formal approval procedure.

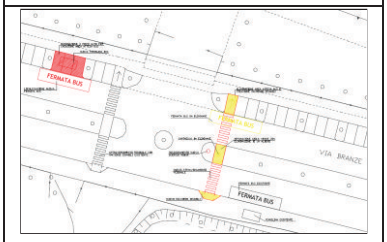
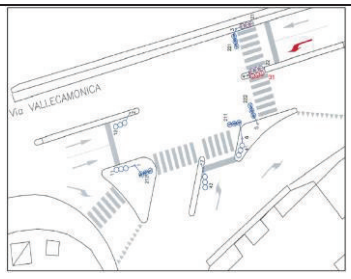
Stage 3: Operational launch of the measure + System running *(from February 2010 to October 2012)*

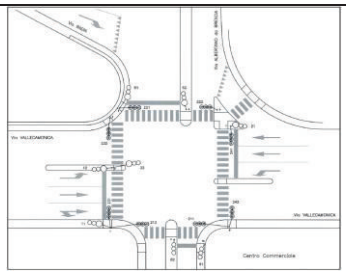
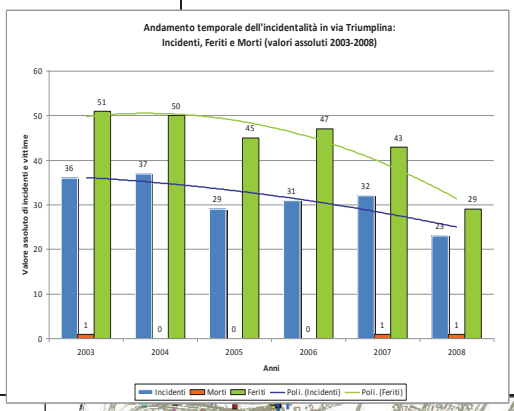
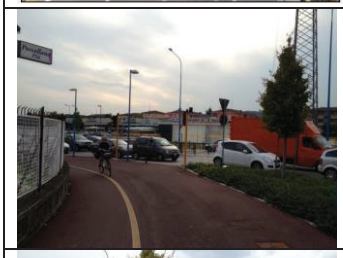
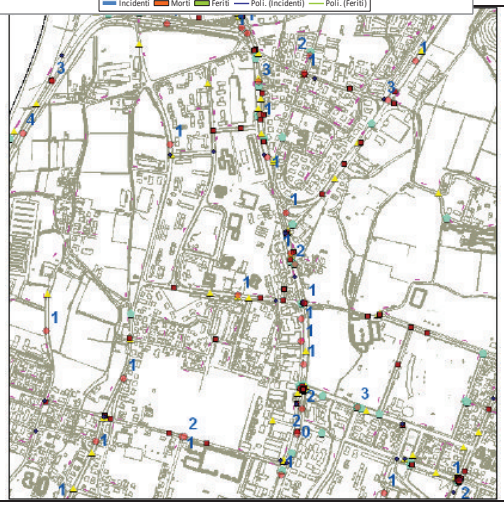
The OP of the measure coincided with the approval of the first PSSU and in its implementation. This stage included also the updating of the road accident mapping (yearly) and of the PSSU itself (every two years).

The PSSU of Brescia foresaw the main following activities:
- intervention on infrastructures, such as intersections, crossings, junctions, new technical solutions on traffic lights, speed checks, etc. ;
- road safety campaigns
- enforcement activities.

During Civitas the following interventions on infrastructures were carried out among the most dangerous black spots pointed out in PSSU.

Street	Problem description	Solution / Type of intervention	Photo
New technical solution and enforcement activities			

Street	Problem description	Solution / Type of intervention	Photo
Via Volturno	*High speed*	*Speed Checks*	
New technical solution and intervention at pedestrian crossing			
Via Manara – Via Volturno	*Accidents involving pedestrians crossing the road*	*Traffic light timing, pedestrian island*	 
Intervention at pedestrian crossing			
Via Branze (Faculty of Engineering of the University of Brescia)	*Accidents involving pedestrians crossing the road,* *as the zebra crossings were not placed in relation to pedestrian corssing needs.* *Extremely dangerous situation due to the high pedestrian traffic flow.*	*Pedestrian crossings were placed where they were really needed.*	 
Intervention at junction			
Via Vallecamonica – Via Violino	*Dangerous junction with Via Violino. The hazard stemmed from vehicles making left turns since the traffic light phases did not provide for this manoeuvre.*	*In particular, at the junction with via Violino, a new traffic light was installed with a "left turn arrow", reserving a lane especially for this type of manoeuvre.*	

Street	Problem description	Solution / Type of intervention	Photo
New technical solution on traffic lights			
Via Vallecamonica – Via Albertano da Brescia	*Dangerous junction with Via Albertano da Brescia: conflicts between vehicles coming from Via Albertano da Brescia and vehicles coming out of the shopping centre car park (simultaneously green of traffic light).*	*Intervention was carried out adjusting the traffic lights so that is now possible for vehicles to "request" green traffic light for exiting the shopping centre. An exclusive time interval within the cycle of the traffic lights is given to carry out the manoeuvre.*	
Road renewal			
Via Triumplina	*Road with a high flow of traffic with many crossroads*	*Renewal of the road to improve VRUs safery, upgrade road junctions* *- new roundabouts* *- pedestrian paths* *- cycle lanes* *-pedestrian crossings*	
			
			
			

B5 Inter-relationships with other measures

The measure is related to measure M05.03 “Development of bicycle safety”, as it is focused on a particular road users category (cyclists). The indicator used by the latter are collected in PSSU database.

C. Evaluation – methodology and results

From the evaluation point of view the main objective of the measure consisted on the one hand in the Road Safety Monitoring Center and on the other in elaborating the Road Safety Urban Plan (PSSU) to offer a local planning tool to face road safety.

C1 Measurement methodology

The indicators were divided into two macro categories: main indicators and complementary indicators.

Main indicators were able to evaluate measure efficiency in terms of objectives achievement.

"Awareness level" was foreseen as complementary indicator.

It's important to remark that the indicators were set in order to monitor the impact of the PSSU, as for the monitoring centre no tangible output was foreseen except the realization itself[18].

Regarding the indicator on "Transport safety" foresaw to monitor the PSSU it must be underlined that they were calculated using data coming from ISTAT integrated up to 2011 using data provided by the monitoring centre.

The after data collection (in order to monitor the indicators in itinere and ex post) were foreseen once a year for those indicators that were calculated using data coming from ISTAT, according to the annual delivery of the data.

The administration of the questionnaires (in order to measure the awareness level) was scheduled three times during the whole Civitas project.

All the indicators (except ind. 8 – "Awareness level") were used to make interesting considerations in relation to the BaU and the up scaling construction.

C1.1 Impacts and Indicators

Table C1.1: Indicators.

No.	Impact	Indicator	Data used	Comments
1	Transport safety	% of accidents on crossroads/ total number of accidents	ISTAT road accident data; Local Police and a Regional database	Main Indicator First data collection after the OP: year 2010
2	Transport safety	% of accidents on roads/on total number of accidents	ISTAT road accident data; Local Police and a Regional database	Main Indicator First data collection after the OP: year 2010
3	Transport safety	Death index	ISTAT road accident data; Local Police and a Regional database	Main Indicator First data collection after the OP: year 2010

[18] Before December 2010 several data on "Telecom platform" were collected by the Local Policy Department.

4	Transport safety	Pedestrian death/total Vulnerable road Users (VRUs) involved in road accidents	ISTAT road accident data; Local Police and a Regional database	Main Indicator First data collection after the OP: year 2010
5	Transport safety	Pedestrian injured/total Vulnerable road Users (VRUs) involved in road accidents	ISTAT road accident data; Local Police and a Regional database	Main Indicator First data collection after the OP: year 2010
6	Transport safety	Cyclist death/total Vulnerable road Users (VRUs) involved in road accidents	ISTAT road accident data; Local Police and a Regional database	Main Indicator First data collection after the OP: year 2010
7	Transport safety	Cyclist injured/total Vulnerable road Users (VRUs)involved in road accident	ISTAT road accident data; Local Police and a Regional database	Main Indicator First data collection after the OP: year 2010
8	Awareness	Awareness level	Data collected by questionnaires	Complementary indicator First data collection after the OP: April 2011

Detailed description of the indicator methodologies:

- **Indicator 1** (*PERCENTAGE OF ACCIDENTS ON CROSSROADS OVER TOTAL NUMBER OF ACCIDENTS*) - Using data coming from ISTAT, it's possible to extract data concerning the only accidents occurred on crossroads. For the ex ante calculation we used ISTAT data referred to years 2005 – 2009. This indicator can be calculated for every year, when the new road accidents data arrive. It's important to notice that the operative phase has been set at the beginning of 2010. Therefore, the ex post data situation will be monitored using Istat data referred to 2010 or data coming from Local Police and a Regional database that collect data that are transferred to ISTAT for validation. This solution can solve the problem of the late arrival of 2010/2011 data from Istat (available in December 2012, after the end of the Civitas project). The timings described above are valid for all the indicator built using data coming from Istat, namely indicators from 1 to 7). More details are reported in Annex 2.

- **Indicator 2** (*PERCENTAGE OF ACCIDENTS ON ROADS OVER TOTAL NUMBER OF ACCIDENTS*) - Using data coming from ISTAT, it's possible to extract data concerning the only accidents occurred on roads. With regard to the methodology adopted, the calculation frequency and the data reliability, see the specifications reported above for the indicator n.1.

- **Indicator 3** (*DEATH INDEX*) - Using data coming from ISTAT, this indicator is calculated with the following formula: (M/I)*100 where M = total death I = total road accidents occurred in the period under consideration. With regard to the methodology adopted, the calculation frequency and the data reliability, see the specifications reported above for the indicator n.1.

- **Indicator 4** (*RATIO BETWEEN THE NUMBER OF PEDESTRIAN DEATHS AND THE TOTAL VRUS INVOLVED IN ROAD ACCIDENTS*) - Using data coming from ISTAT, it's possible to extract data concerning the only accidents involving dead pedestrians and total involved VRUs. It's necessary to make the point that VRUs (Vulnerable road Users)= sum of Cyclists and

Pedestrians. With regard to the methodology adopted, the calculation frequency and the data reliability, see the specifications reported above for the indicator n.1.

- **Indicator 5** (*RATIO BETWEEN THE NUMBER OF PEDESTRIAN INJURED AND THE TOTAL VRUS INVOLVED IN ROAD ACCIDENTS*) - Using data coming from ISTAT, it's possible to extract data concerning the only accidents involving injured pedestrians and total involved VRUs (Vulnerable road Users). With regard to the methodology adopted, the calculation frequency and the data reliability, see the specifications reported above for the indicator n.1.

- **Indicator 6** (*RATIO BETWEEN THE NUMBER OF CYCLIST DEATHS AND THE TOTAL VRUS* (Vulnerable road Users) *INVOLVED IN ROAD ACCIDENTS*) - Using data coming from ISTAT, it's possible to extract data concerning the only accidents involving dead cyclists and total involved VRUs (Vulnerable road Users). This indicator was also scheduled for the measure 05.03 ("Development of bycicle safety in Brescia"). With regard to the methodology adopted, the calculation frequency and the data reliability, see the specifications reported above for the indicator n.1.

- **Indicator 7** (*RATIO BETWEEN THE NUMBER OF CYCLIST INJURED AND THE TOTAL VRUS INVOLVED IN ROAD ACCIDENTS*) - Using data coming from ISTAT, it's possible to extract data concerning the only accidents involving injured cyclists and total involved VRUs (Vulnerable road Users). This indicator was also scheduled for the measure 05.03 ("Development of bycicle safety in Brescia"). With regard to the methodology adopted, the calculation frequency and the data reliability, see the specifications reported above for the indicator n.1.

- **Indicator 8** (*AWARENESS LEVEL*) **–** This indicator was collected through the administration of questionnaire about road safety perception in Brescia. The target area is extended to the whole urban area of Brescia. The representative sample was chosen among the resident population and the sample size, of 600 filled in questionnaires, was selected among the personal data of the Municipality (this allows a statistical significancy of more than the 90%). The key questions were the following:

  Do you consider road accidents a priority problem? (Yes/No); What is the priority level that you would give to road accident problem? (High, Medium, Low);

  Do you know any initiatives, informative campaigns or measures recently undertaken by the municipality of Brescia that deal with safety on roads? (Yes/No) If yes, which ones and where?;

  The specific questions that was used to express the awareness level are the following:

  The Municipality of Brescia is involved in an European project called "Civitas Plus Modern". Have you ever heard about this project? (Yes/No);

  Do you know that, within that project, the Municipality of Brescia is realizing projects dealing with the road safety (For example a Urban Road Safety Plan)? (Yes /No);

C1.2 Establishing a Baseline

The Baseline was formulated, on the one hand, considering the kind of available database and its management; on the other, bearing in mind the decisional approach followed for the realization of intervention addressed to the road safety improvement.
Before Civitas the road accident database was regularly georeferenced until 2002, seldom since 2003; any road safety planning tool was elaborated and interventions were based on discretionary criteria.
The Urban Road Safety Plan (PSSU) was elaborated in 2009 and can be considered operative since 2010. Therefore, the year which was taken as reference for the baseline was 2009, ecxcept for indicator n. 8 (Awareness level), which was collected for the first time in March 2010.

Indicators	BASELINE (2009)
1) % of accidents on crossroads/ total number of accidents	42,2 %
2) % of accidents on roads/on total number of accidents	57,8%
3) "Death index"	1,44
4) Pedestrian death/total VRUs involved in road accidents	0,0186
5) Pedestrian injured/total VRUs involved in road accidents	0,51
6) Cyclist death/total VRUs involved in road accidents	0,004
7) Cyclist injured/total VRUs involved in road accidents	0,47
8) Awareness level (questionnaire March 2010)	About CIVITAS: 16% About PSSU:24%
Table 1) Baseline values	

C1.3 Building the Business-as-Usual scenario

Considering the Baseline situation illustrated above, without the Civitas contribution, probably the localization/mapping of the road accidents would have been done occasionally or would even have been stopped, as the collaboration with the University of Brescia wasn't renewed through specific agreements. Choices at the base of the road safety interventions would have been made following subjective criteria, without the help of an organic planning tool.
Thanks to the historical data series available about the road accidents, the BaU scenario was calculated projecting the historical data trend curve for almost all the indicators, except the n. 8 (awareness level about the Civitas project and the elaboration of the PSSU in Brescia) which has no BaU.

BaU calculation projecting the historical data series for ind. 1 "% of accidents on crossroads/ total number of accidents"

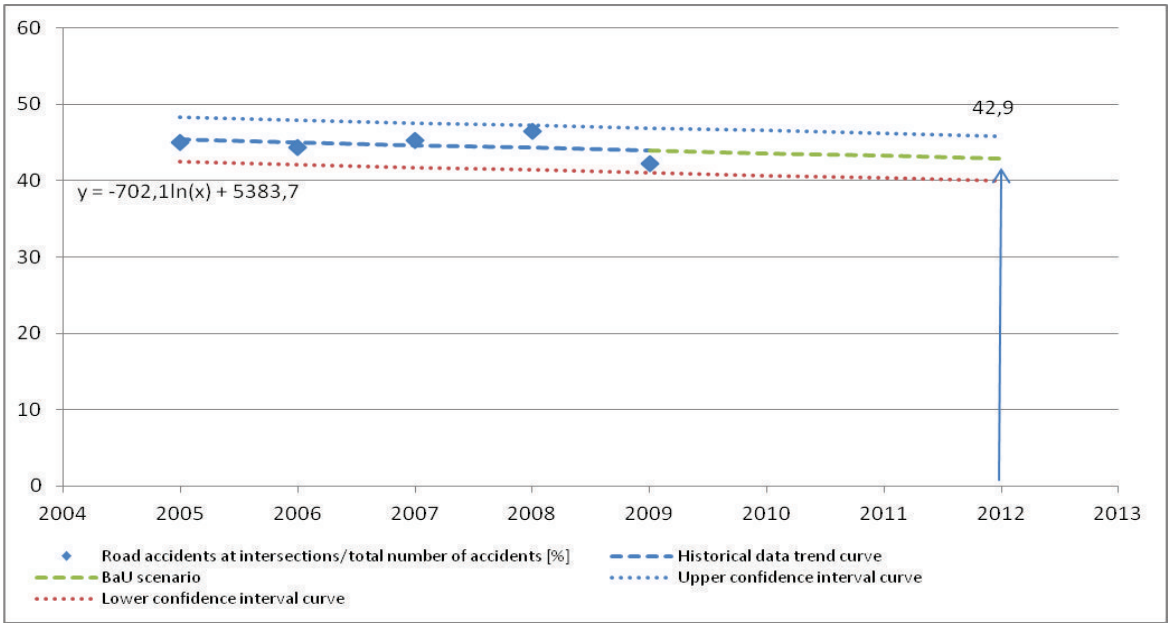


Fig. 9) BaU calculation projecting the historical data series for ind. 1 "% of accidents on crossroads/ total number of

accidents"

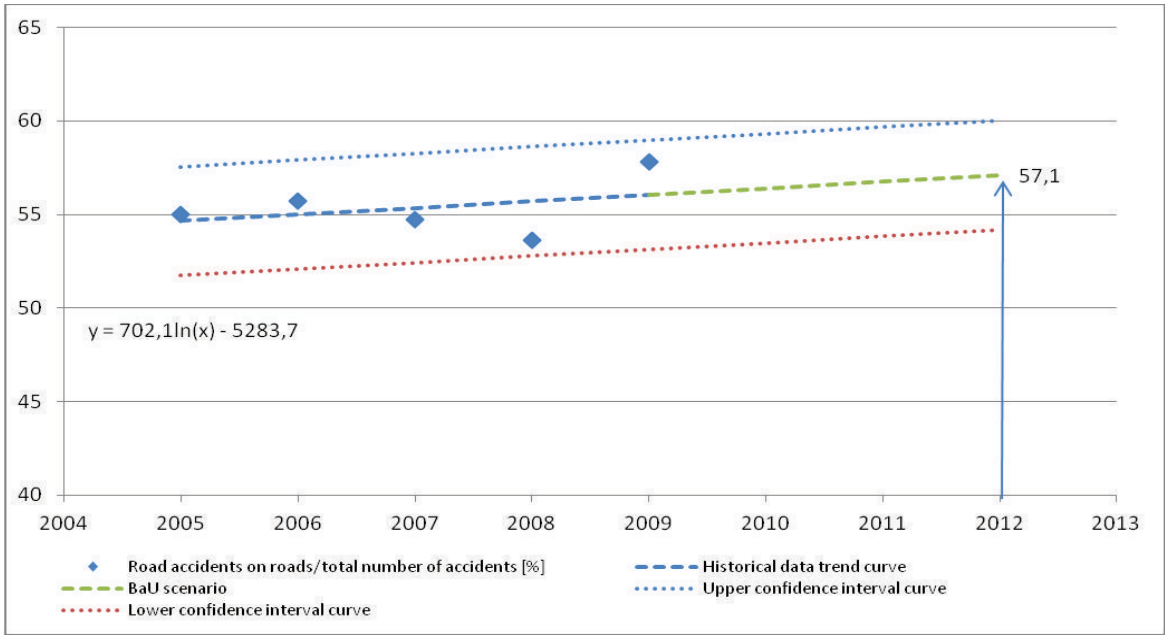


Fig. 10) BaU calculation projecting the historical data series for ind. 2 "% of accidents on roads/on total number of accidents".

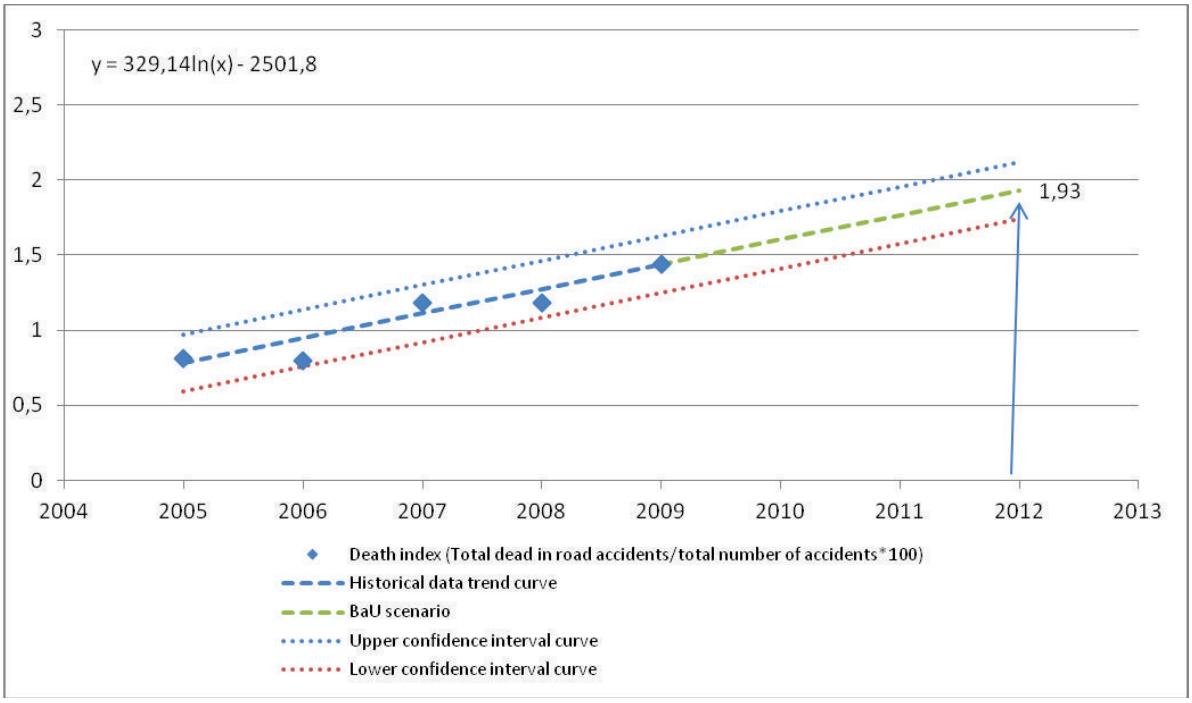


*Fig. 11) BaU calculation projecting the historical data series for ind. 3 "Death index" = (Total death/total road accidents)*100"*

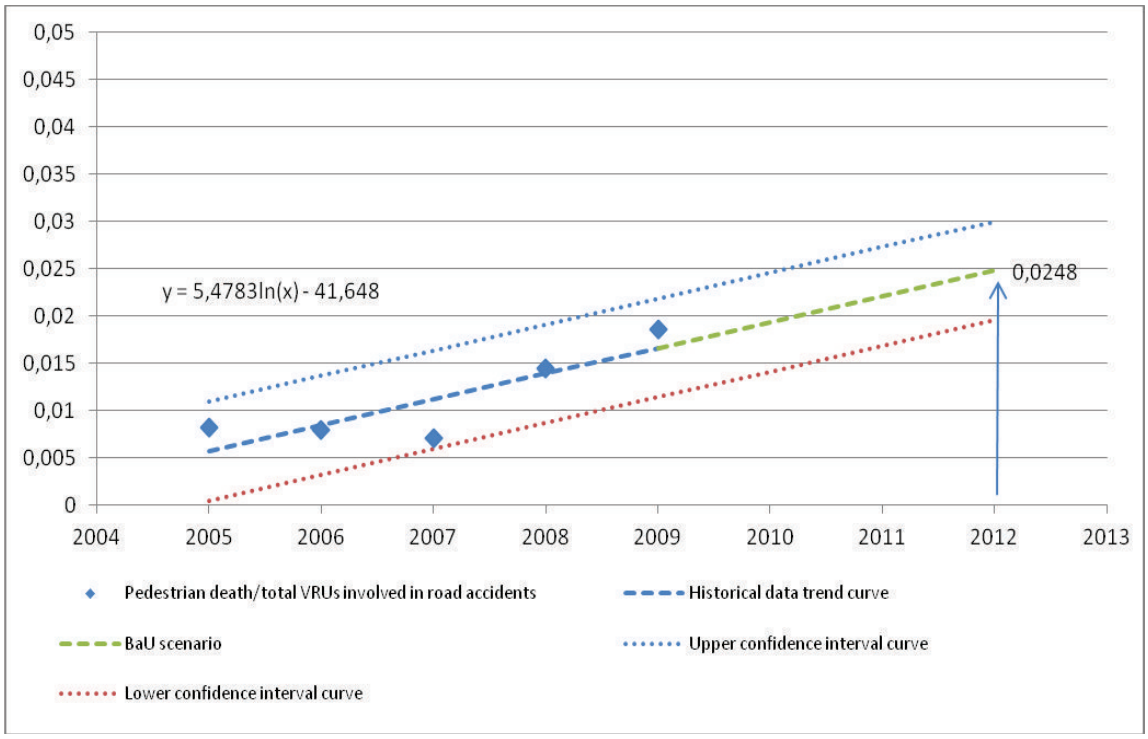


Fig. 12) BaU calculation projecting the historical data series for ind. 4 "Pedestrian death/total VRUs involved in road accidents"

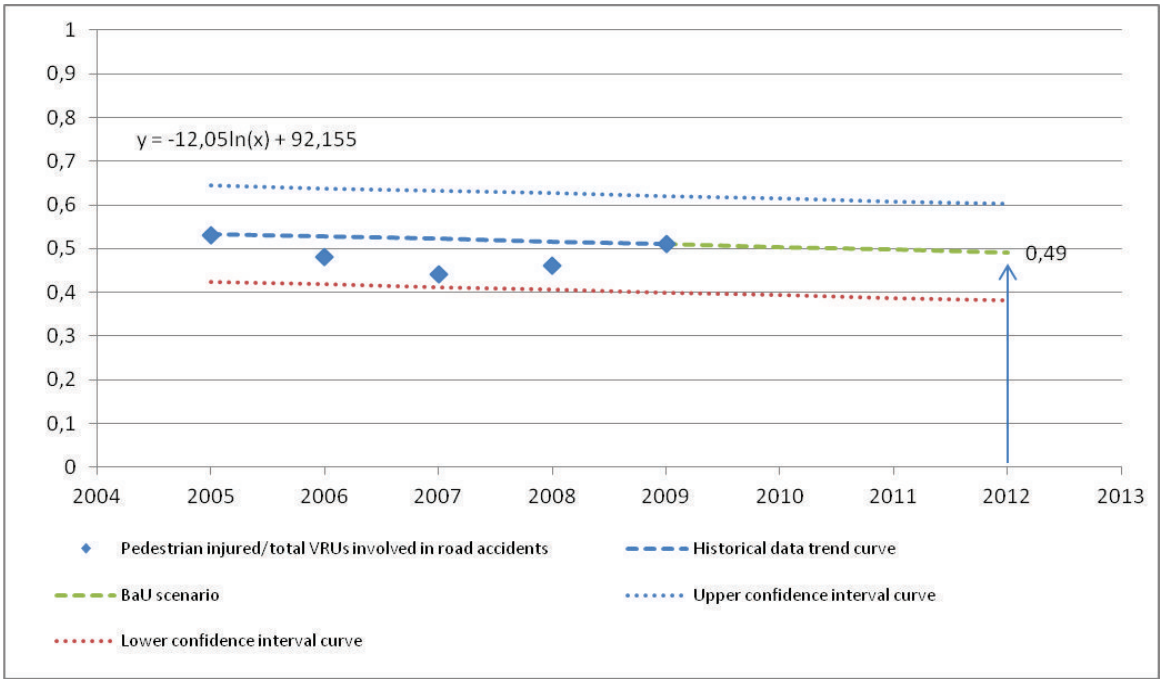


Fig. 13) BaU calculation projecting the historical data series for ind. 5 "Pedestrian injured/total VRUs involved in road accidents"

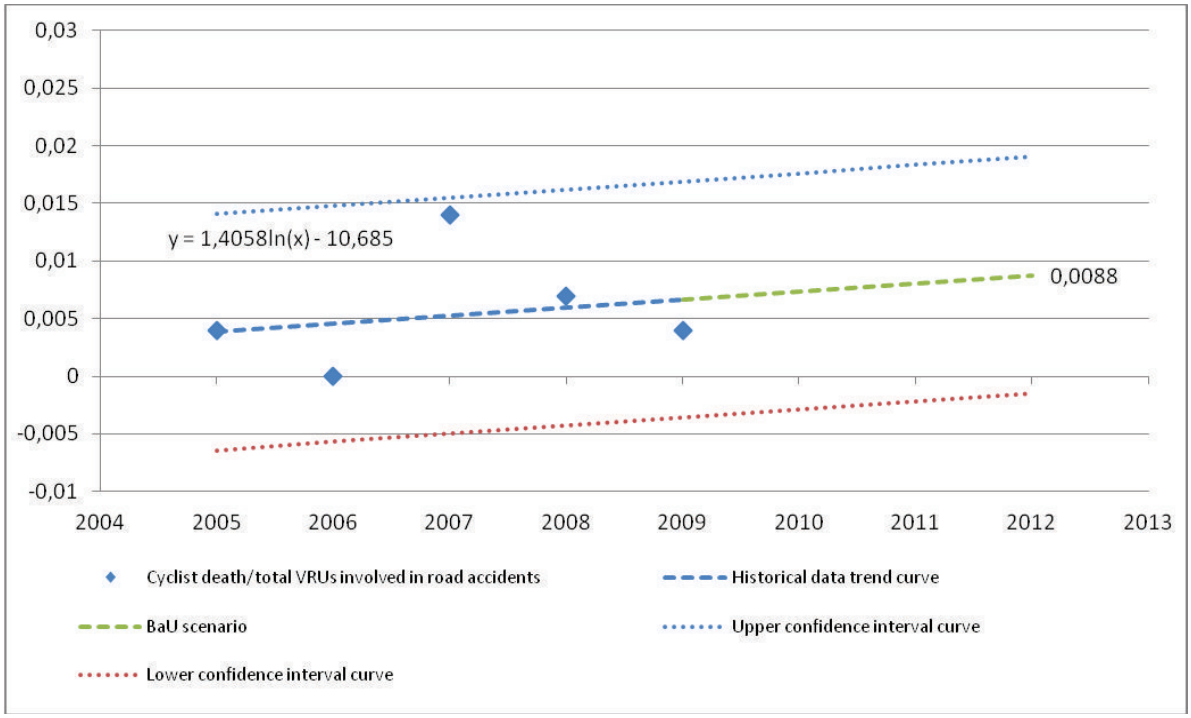


Fig. 14) BaU calculation projecting the historical data series for ind. 6 "Cyclist death/total VRUs involved in road accidents"

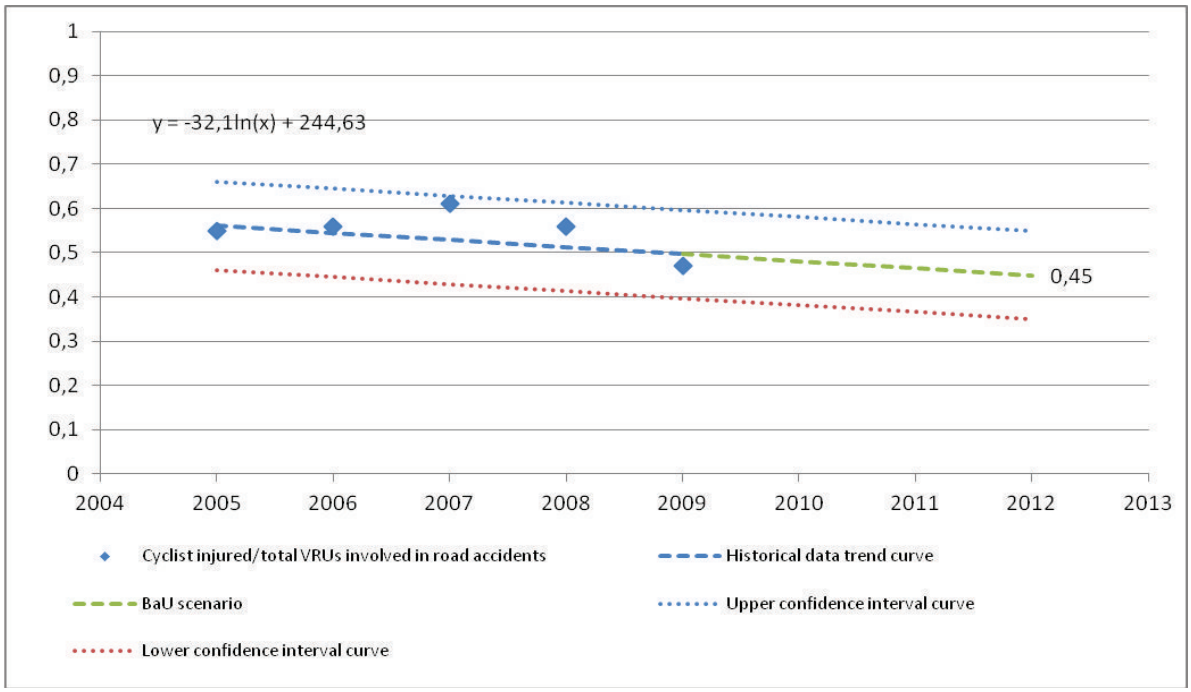


Fig. 15) BaU calculation projecting the historical data series for ind. 7 "Cyclist injured/total VRUs involved in road accidents"

Indicators	BaU (2012)
1) % of accidents on crossroads/ total number of accidents	42,9 %
2) % of accidents on roads/on total number of accidents	57,1%
3) “Death index” = (Total death/total road accidents)*100	1,93
4) Pedestrian death/total VRUs involved in road accidents	0,0248
5) Pedestrian injured/total VRUs involved in road accidents	0,49
6) Cyclist death/total VRUs involved in road accidents	0,0088
7) Cyclist injured/total VRUs involved in road accidents	0,45
8) Awareness level	-

Table 2) BaU values

C2 Measure results

The results are presented under sub headings corresponding to the areas used for indicators – Society and Transport.

C2.1 Transport

Table C2.1.1: Measure results for the indicators of the category "Transport"

Indicator	Before (2009)	After	B-a-U	Difference: After –Before	Difference: After – B-a-U
1) % of accidents on crossroads/ total number of accidents **Proportion=I/LP= 0,87**	42,20 % (From ISTAT)	Year 2010: 56,50 %	Year 2010: 43,60%	14,30 %	12,90%
		Year 2011: (not available)	Year 2011: 43,30%	Not Assessable	Not Assessable
	48,25 % (Local Police)	Year 2010: 55,68%	Year 2010: 50,11%	7,43 %	5,57%
		Year 2011: (not available)	Year 2011: 49,77%	Not Assessable	Not Assessable
2) % of accidents on roads/on total number of accidents **Proportion=I/LP= 1,12**	57,80 % (From ISTAT)	Year 2010: 43,50 %	Year 2010: 56,4%	-14,3 %	-12,9%
		Year 2011: (not available)	Year 2011: 56,7%	Not Assessable	Not Assessable
	51,75 % (Local Police)	Year 2010: 44,32 %	Year 2010: 50,36%	-7,43 %	-6,04%
		Year 2011: (not available)	Year 2011: 50,62%	Not Assessable	Not Assessable
3) "Death index" **Proportion=I/LP = 0,94**	1,44 %	Year 2010: 0,60 %	Year 2010: 1,6 %	-0,84 %	-1,00%
		Year 2011: (not available)	Year 2011: 1,77%	Not Assessable	Not Assessable
	1,53 (Local Police)	Year 2010: 0,67	Year 2010: 1,7	-0,86	-1,03
		Year 2011: 0,52	Year 2011: 1,88	-1,01	-1,36

Indicator	Before (2009)	After	B-a-U	Difference: After –Before	Difference: After – B-a-U
4) Pedestrian death/total VRUs involved in road accidents **Proportion=I/LP = 1,11**	0,0186 (From ISTAT)	Year 2010: 0,00	Year 2010: 0,0193	-0,0186	-0,0193
		Year 2011: (not available)	Year 2011: 0,0221	Not Assessable	Not Assessable
	0,0167 (Local Police)	Year 2010: 0,00	Year 2010: 0,0173	-0,0167	-0,0173
		Year 2011: 0,008	Year 2011: 0,0199	-0,0087	-0,0119
5) Pedestrian injured/total VRUs involved in road accidents **Proportion=I/LP = 0,93**	0,51 (From ISTAT)	Year 2010: 0,53	Year 2010: 0,50	0,02	0,03
		Year 2011: (not available)	Year 2011: 0,50	Not Assessable	Not Assessable
	0,55 (Local Police)	Year 2010: 0,51	Year 2010: 0,54	-0,04	-0,03
		Year 2011: (not available)	Year 2011: 0,54	Not Assessable	Not Assessable
6) Cyclist death/total VRUs involved in road accidents	0,004 (From ISTAT)	Year 2010: 0,00	Year 2010: 0,0074	-0,004	-0,0074
		Year 2011: (not available)	Year 2011: 0,0081	Not Assessable	Not Assessable
	0,00 (Local Police)	Year 2010: 0,00	Year 2010: 0,00	0,00	0,00
		Year 2011: 0,008	Year 2011: 0,00	0,008	0,008
7) Cyclist injured/total VRUs involved in road accidents **Proportion=I/LP = 0,94**	0,47 (From ISTAT)	Year 2010: 0,47	Year 2010: 0,48	0,00	-0,01
		Year 2011: (not available)	Year 2011: 0,46	Not Assessable	Not Assessable
	0,50 (Local Police)	Year 2010: 0,50	Year 2010: 0,45	0,00	0,05

Indicator	Before (2009)	After	B-a-U	Difference: After –Before	Difference: After – B-a-U
		Year 2011: (not available)	Year 2011: 0,43	Not Assessable	Not Assessable

C2.5 Society

Table C2.2.1: Measure results for the indicators of the category "Society"

Indicator	Before (March 2010, before formal approval of PSSU)	After	B-a-U	Difference: After –Before	Difference: After – B-a-U
8) Awareness level	About CIVITAS: 16% About PSSU:24%	(April 2011) About CIVITAS: 6% About PSSU: 8%	(April 2011) About CIVITAS: 0% About PSSU: 0%	- 10% - 16%	+ 6% +8%
		(April 2012) About CIVITAS: 9,7% About PSSU: 8%	(April 2012) About CIVITAS: 0% About PSSU: 0%	- 6,3% - 16%	+9,7% +8%

It's important to bear in mind that this Measure is characterized by activities, which haven't a visible impacts on road safety statistics in the short period. Alongside this, the following considerations can be made, according to the results observed during the Civitas measure implementation.

In Brescia the number of road accidents increased from 2009 to 2010, while at national level the opposite trend is observed (-1,8%). At the same time in Brescia the crash severity decreased (the number of deaths goes from 14 in 2009 to 6 in 2010), which means that more accidents occured but they were less serious (it's possible to see this phenomenon through indicator 3 "death index").
Another important consideration regards data availability. The more complete and official road accidents data came from the Italian National Institute of Statistics (ISTAT), but their late delivery made the most recent year data collection not possible. For this reason, the partial data coming from the Municipal Police (which was one of the police force, together with Carabinieri, Road Police and Province Police, that intervene when a road accident occur to write up the minutes) were considered. Municipal Police collects the most part of the road accidents occuring in urban areas, where vulnerable road users are usually most involved.
Observing both the partial data coming from the Municipal Police and the ISTAT ones, road accidents increased at the intersections and at the same time decreased along the roads (indicators n.1 and 2), which means that interventions made on a site likely produced a local accident reduction, but an increase elsewhere, in this case at intersections.

Even if the scarce availability of data (2-3 years) didn't allow to make significant statistical considerations, in general the number of pedestrians and cyclists dead or injured on roads slightly decreased or registered a stable trend, as it's possible to see for indicators n. 4, 5, 6 and 7.

Even if the impacts of planning actions on road safety are tangible in the medium/long period, the effectiveness of the PSSU, from a quantitative point of view, can be higlighted in these terms:

- thanks to the implementation of the plan, a reduction of the road accidents severity was registred, in spite of the road accidents general trend;
- as regards the general trend of road accidents, both at national level and at city level, the number of accidents in which VRUs were involved decreased in terms of percentage.

A further consideration should be made: a recent survey, carried out by the University of Brescia within the Project SOL (Save Our Life) about the road accidents, showed some interesting results. In particular, 459 inhabitants of the East Lombardy took part to a Public Opinion Survey by means of an on-line questionnaire.The respondents answered the following question according to a 7-point scale "To what extent do you agree with the following statements". The following table includes the main results of that survey (higher score means bigger acceptance of the statement):

Statement	*M*
Dangerous situations on the road happen to us because of a bad luck	3.11
I often feel that I do not have influence on things that happen to me on the road	5.12
I am responsible myself for things that happen to me on the road	2.09
Some people are just born unlucky and they are also unlucky on the road	5.17

Table 3) Source: ALOT (2011), Italy - Brescia: SOL Community Situational Assessment Baseline Report (contributors: Maurizio Tira, Angela Ortogni, Silvia Rossetti and Michela Tiboni)

The collected information highlighted that road accidents were actually considered as a fatality. The survay made evidence of the users psychological passive resistance in understanding that road safety is striktly linked to road design and road interventions, rather than to fortune.
In the end, in general terms, there is a lack of awareness about the importance of the dissemination of the Urban Road Safety Plan, which is seen by the Local Administration as an internal act, not made to be spread among citizens. This consideration is confirmed by the data collected for indicator n. 8 "Awareness level" about the PSSU, which decreases from 24% (2010) to 8% (2012).

C3 Achievement of quantifiable targets and objectives

No.	Target	Rating
1	Improvement the existing road accident database in order to have the localization of road accidents in a GIS. This objective can be considered achieved in full. *The indicators able to express this achievement are the following: indicators 1 (% of accidents on crossroads/ total number of accidents) and 2 (% of accidents on roads/on total number of accidents), which are calculated thanks to database queries and which are useful to find critical points where a riqualification is needed.*	**
2	Elaboration of the Road Safety urban plan (PSSU) in order to give administrators a local tool to face road safety and to reduce road accident about 13% during the validity period of the plan (2 years) Therefore, the objectives can be summarized as follows: - elaboration of the Plan; - road accident reduction Elaboration of the Plan *In the first case, actions are linked with the information contained in PSSU and the administrators understood the importance to have and to consult a plan made "ad hoc" for the road safety improvement; The objective can be considered exceeded because the PSSU has been realized and already updated once during Civitas.* *The second goal wasn't achieved because the total number of accidents increased* *Before (2009):973* *After (2010): 1003* *On the contrary, the severity of road accidents decreased, as observed for indicator n. 3 "Death index":* *Before (2009):1,44* *After (2010): 0,60* *This means that a reduction of the road accidents severity has been registred, in spite of the road accidents general trend, which slightly increased.*	***
	Road accident reduction *On the contrary, the severity of road accidents decreased, as observed for indicator n. 3 "Death index":* *Before (2009):1,44* *After (2010): 0,60* *This means that a reduction of the road accidents severity has been registred, in spite of the road accidents general trend, which slightly increased.*	O
3	To improve road accident reporting through GPS technology *This objective can be considered achieved in full because a new system for the road accident relief was introduced. This new platform foresees the use of palmtops and tablets during the road accident reliefs able to recur to the GPS technology for the precise localization of the accidemt.*	**

NA = Not Assessed O = Not Achieved * = Substantially achieved (at least 50%)
**** = Achieved in full *** = Exceeded**

C4 Up-scaling of results

For this Measure is not possible to predict an upscaling of the results, as it is already dedicated to the whole population and to the whole Municipal urban area.

C5 Appraisal of evaluation approach

The evaluation approach firstly considered the project objectives as expressed explicitly in the original evaluation plan. The data collection methodology and the data quality were sufficient to evaluate the measure performance.
Indicators were selected at the begining of Civitas project and the chosen ones belonged to the chategories “Transport” and “Society”. In the first part, indicators were able to monitor the road accidents occurred in the urban area, divided by the different mobility components and infrastructure (road or intersection).
One indicator (no. 8 "Awareness") belonged to the category “Society” and provided the population knowledge about CIVITAS project and about the PSSU.
From the evaluation process point of view, it was important to monitor the application of the Plan, in order to evaluate the possible barriers that could lead to its abandon and to avoid its lack of efficiency. On the other hand, it was also interesting to investigate the potential drivers that could, instead, bring to its success.

C6 Summary of evaluation results

The key results are as follows:

- **Key result 1** – the realization of the Monitoring Center brougth to the enhancement of the road accident reporting activity for the Local Police Department. This means that the road accident reliefs were made easier, faster and more accurate.
- **Key result 2** – PSSU can be considered a good result because in Italy the elaboration of this important planning tool is not very spread;
- **Key result 3** – Civitas initiative favoured the constant updating and mapping of the road accident database.
- **Key result 4** – the PSSU is an useful tool and is consulted by the Administration to prioritize road safety actions.

C7 Future activities relating to the measure

Among the possible activities related to the measure, which can be carried out at the end of Civitas, the most important activity is to keep the plan updated and monitored.

D. Process Evaluation Findings

D0 Focused measure

This measure is not a focused one.

D1 Deviations from the original plan

The most significant deviation from the original plan was related to the monitoring center implementation. According to the activities scheduled in the DOW, a first system was successfully activated. By the end of 2010 the Local Police Department decided to abandon that system and to implement another one, most suitable to its needs. In particular, instead of a platform dedicated only to the road accident reporting, a platform able to manage all the Local Police services was activated in 2012.

D2 Barriers and drivers

D2.1 Barriers

The most significant barrier was encountered during the **operation phase**:

- **Barrier 1 Organizational** – During the operation phase of the Monitoring Center, some problems were encountered in the features supported by the first system: The Local Police detected limits in the system implemented by Telecom, therefore the Police decided to abandon it and to implement a new system, able not only to manage the road accident reporting, but also to share infos among enforcement agencies.

D2.2 Drivers

The following main drivers were experienced during the measure implementation, namely:

During the preparation phase.

- **Driver 1 Positional –** Road safety was considered a priority in Brescia and was an important issue shared by the politicians (in particular by the Mobility and Traffic Committee chairman) in the political agenda. This priority was very helpful in delivering the road safety actions.

During the operation phase.

- **Driver 2 Planning –** The PSSU is a useful planning tool for the detection and managing of the most critical points in terms of road safety. In particular, the PSSU allows to give priorities to the road safety actions and where infrastructural interventions are required (road segments or intersections), specific analysis are made in order to understand the road safety problems that characterize the black spots, so that an accurate/targeted design solutions of the road spaces are possible;
- **Driver 3 Organizational -** Constructive involvement of different Municipality Departments for the measure activity (Informatics and Mobility and Traffic Departments) was helpful in succeeding in the road safety actions;

- **Driver 4 Organizational –** A better definition of the Local Police needs in terms of service management allowed to develop a better solution for the monitoring Center.

D2.2 Activities

During the operation phase of the Monitoring Center, in order to get over the experienced barrier, several meetings were arranged with the software developer, trying to solve the detected problems.
During the operation phase of the PSSU infrastructural interventions were realized aiming at improving road safety in the most dangerous black spots of the city.
The dissemination activities carried out in Brescia during the measure implementation contributed to inform population about the road safety issues concerning Brescia.

D3 Participation

D.3.1 Measure partners

The partners involved in this measure were the Brescia Municipality and the Local Police.
The Municipality of Brescia is the promoter of all the planning actions in Brescia. In particular, the Mobility and Traffic Department was in charge of planning and implementing the road safety actions and the Statistics Department of the Municipality of Brescia was in charge of collecting the Istat data concerning the City of Brescia.
The Local Police was in charge of reporting road accidents when they occurred in the urban area of Brescia, together with other enforcement agencies such as Carabinieri, National Police, Province Police, etc. The local policies concerning safety and security are defined by the Municipality of Brescia and are then implemented through the Local Municipal Police.

D3.2 Participation of stakeholders

In this measure stakeholders were represented by the inhabitants of the city of Brescia. Their direct involvement was possible through administering them a survey; another category of stakeholders was represented by the Local Police, who was involved in the realization of the Monitoring Center and in the training activities.

D4.1 Recommendations: measure replication

- **Recommendation 1 – customization**. The operative version of the Monitoring Center needs to be developed basing on a technology that doesn't require any particular care to be transferred, even if a customization to the specific organizational requirements is needed. Moreover this software allows the updating of the accident database either through smart-phones or notebooks, without the necessity to acquire any particular devices.

- **Recommendation 2 – transfer operation**. *The system implemented in Brescia has a high level of transferability and its implementation is recommended to improve the accidents relief and management. Of course the used product reflects the organization of the work existing in Brescia and the Italian legislation and rules for detecting and collecting accidents data. These aspects must be taken into account for any transfer operation. Anyway the experience developed in Brescia can be an useful guide.*

D4.2 Recommendations: process

- **Recommendation 1 – Priority sharing**. It's very important to share the priority toward road safety among the policy makers, the citizens and the Municipalities Departments. Namely, it's helpful to spread the awareness concerning the PSSU utility in order to better coordinate and deliver the road safety actions;

- **Recommendation 2 – To train the personnel**. It's fundamental to train the personnel in charge of fill in the road accident database and to explain the importance of their activities, in order to prevent errors and to improve the road accident database quality.

- **Recommendation 3 – Data availability**. In order to lay out an effective PSSU, it's important to verify the availability of the required data at city level, namely, the geo-referenced road accident data and the traffic data set.

- **Recommendation 4 – Steadily update the database**. The data updating phase is an important process which must be done constantly, in order to have a common framework to be taken as reference;

- **Recommendation 5 – Users need definition**. As regards the Monitoring Centre, a better definition of the Local Police needs in terms of service management allowed to develop a better solution for the monitoring Centre.

Annex 1: Historical data series for the BaU calculation

Indicator 1 (PERCENTAGE OF ACCIDENTS ON CROSSROADS OVER TOTAL NUMBER OF ACCIDENTS)

Year	2005	2006	2007	2008	2009
Road accidents on intersections	607	556	575	513	411
Total Road accidents	1350	1254	1270	1106	973
Of which unknown localization	5	7	14	5	0
ratio	0,4496	0,4434	0,4528	0,4638	0,4224
%	45,0	44,3	45,3	46,4	42,2

Indicator 2 (PERCENTAGE OF ACCIDENTS ON ROADS OVER TOTAL NUMBER OF ACCIDENTS)

Year	2005	2006	2007	2008	2009
Accidents on roads	743	698	695	593	562
Total road accidents	1350	1254	1270	1106	973
Of which unknown localization	5	7	14	5	0
ratio	0,5504	0,5566	0,5472	0,5362	0,5776
%	55,0	55,7	54,7	53,6	57,8

Indicator 3 (DEATH INDEX)

Year	2005	2006	2007	2008	2009
Morti totali	11	10	15	13	14
Incidenti totali	1350	1254	1270	1106	973
Death index	0,81	0,80	1,18	1,18	1,44

Indicator 4 (RATIO BETWEEN THE NUMBER OF PEDESTRIAN DEATHS AND THE TOTAL VRUS INVOLVED IN ROAD ACCIDENTS)

Year	2005	2006	2007	2008	2009
pedestrian dead	2	2	2	4	5
total VRUs involved	245	252	283	277	269
ratio	0,0082	0,0079	0,0071	0,0144	0,0186
Pedestrian involved	124	117	115	124	142
Cyclists involved	121	135	168	153	127

Indicator 5 (RATIO BETWEEN THE NUMBER OF PEDESTRIAN INJURED AND THE TOTAL VRUS INVOLVED IN ROAD ACCIDENTS)

Year	2005	2006	2007	2008	2009
Pedestrian injured	131	122	125	127	137
Total VRUs involved	245	252	283	277	269
ratio	0,53	0,48	0,44	0,46	0,51
Pedestrian involved	124	117	115	124	142
Cyclists involved	121	135	168	153	127

Indicator 6 (RATIO BETWEEN THE NUMBER OF CYCLIST DEATHS AND THE TOTAL VRUS INVOLVED IN ROAD ACCIDENTS)

Year	2005	2006	2007	2008	2009
Cyclist dead	1	0	4	2	1
Total VRUs involved	245	252	283	280	269
ratio	0,004	0,000	0,014	0,007	0,004
Pedestrian involved	124	117	115	124	142
Cyclists involved	121	135	168	156	127

Indicator 7 (RATIO BETWEEN THE NUMBER OF CYCLIST INJURED AND THE TOTAL VRUS INVOLVED IN ROAD ACCIDENTS)

Year	2005	2006	2007	2008	2009
Cyclist injured	134	140	172	157	126
Total VRUs involved	245	252	283	280	269
ratio	0,55	0,56	0,61	0,56	0,47
Pedestrian involved	124	117	115	124	142
Cyclists involved	121	135	168	156	127

Annex 2: Ex ante and Ex Post data collection

- **Indicator 1 (PERCENTAGE OF ACCIDENTS ON CROSSROADS OVER TOTAL NUMBER OF ACCIDENTS)** – Using data coming from ISTAT, it's possible to extract data concerning the only accidents occurred on crossroads.

  EX ANTE:

  The ex ante situation of this indicator considers data referred to the year 2009:

Year	2009
Road accidents on intersections	411
Total Road accidents	973
Of which unknown localization	0
ratio	0,4224
%	42,2

  AFTER:

Year	2010
Road accidents on intersections	567
Total Road accidents	1003
Of which unknown localization	0
ratio	0,5653
%	56,5

As regards tavailabilty of data, the more complete and official road accodents data comes from the Italian National Institute of Statistics (ISTAT), but their late delivery to the city of Brescia makes the most recent year data collection not possible. For this reason, the partial data coming from the Municipal Police (which is one of the police force, together with Carabinieri, Road Police and Province Police, that intervene whene a road accident occur to write up the minutes) have been considered. Municipal Police collects the most part of the road accidents occuring in urban areas, where vulnerable road users are most involved.

Proportion=I/LP= 0,87

Year	2010
ratio	0,5568
%	55,68

- **Indicator 2 (PERCENTAGE OF ACCIDENTS ON ROADS OVER TOTAL NUMBER OF ACCIDENTS)** – Using data coming from ISTAT, it's possible to extract data concerning the only accidents occurred on roads.

  EX ANTE:

  The ex ante situation of this indicator considers data referred to the year 2009:

Year	2009
Accidents on roads	562
Total road accidents	973
Of which unknown localization	0

ratio	0,5776
%	57,8

AFTER:

Year	2010
Accidents on roads	436
Total road accidents	1003
Of which unknown localization	0
ratio	0,4347
%	43,5

As regards tavailabilty of data, the more complete and official road accodents data comes from the Italian National Institute of Statistics (ISTAT), but their late delivery to the city of Brescia makes the most recent year data collection not possible. For this reason, the partial data coming from the Municipal Police (which is one of the police force, together with Carabinieri, Road Police and Province Police, that intervene whene a road accident occur to write up the minutes) have been considered. Municipal Police collects the most part of the road accidents occuring in urban areas, where vulnerable road users are most involved.

Proportion=I/LP= 1,12

Year	2010
ratio	0,5062
%	50,62

- **Indicator 3 (DEATH INDEX)** – This indicator fallows this formula: (M/I)*100 where M = total death I = total road accidents occurred in the period under consideration (with regard to the calculation frequency and the data reliability, see the specifications reported for the first indicator).

  EX ANTE:

  The ex ante situation of this indicator considers data referred to the year 2009:

Year	2009
Dead total	14
Total accidents	973
Death index	1,44

AFTER:

Year	2010
Dead total	6
Total accidents	1003
Death index	0,60

As regards tavailabilty of data, the more complete and official road accodents data comes from the Italian National Institute of Statistics (ISTAT), but their late delivery to the city of Brescia makes the most recent year data collection not possible. For this reason, the partial data coming from the Municipal Police (which is one of the police force, together with Carabinieri, Road Police and Province Police, that intervene whene a road accident occur to write up the minutes) have been considered. Municipal Police collects the most part of the road accidents occuring in urban areas, where vulnerable road users are most involved.

Proportion=I/LP= 0,94

Year	2010
Death index	0,67

Year	2011
Death index	0,52

- **Indicator 4 (RATIO BETWEEN THE NUMBER OF PEDESTRIAN DEATHS AND THE TOTAL VRUS INVOLVED IN ROAD ACCIDENTS)** – Using data coming from ISTAT, it's possible to extract data concerning the only accidents involving dead pedestrians and total involved VRUs (VRUs = sum of Cyclists and Pedestrians).

  EX ANTE:

  The ex ante situation of this indicator considers data referred to the year 2009:

Year	2009
pedestrian dead	5
total VRUs involved	269
ratio	0,0186
Pedestrian involved	142
Cyclists involved	127

AFTER:

Year	2010
pedestrian dead	0
total VRUs involved	271
ratio	0,0
Pedestrian involved	144
Cyclists involved	127

As regards tavailabilty of data, the more complete and official road accodents data comes from the Italian National Institute of Statistics (ISTAT), but their late delivery to the city of Brescia makes the most recent year data collection not possible. For this reason, the partial data coming from the Municipal Police (which is one of the police force, together with Carabinieri, Road Police and Province Police, that intervene whene a road accident occur to write up the minutes) have been considered. Municipal Police collects the most part of the road accidents occuring in urban areas, where vulnerable road users are most involved.

Proportion=I/LP= 1,11

Year	2010
ratio	0,00

Year	2011
ratio	0,008

- **Indicator 5 (RATIO BETWEEN THE NUMBER OF PEDESTRIAN INJURED AND THE TOTAL VRUS INVOLVED IN ROAD ACCIDENTS)** – Using data coming from ISTAT, it's possible to extract data concerning the only accidents involving injured pedestrians and total involved VRUs.

  EX ANTE:

The ex ante situation of this indicator considers data referred to the year 2009:

Year	2009
Pedestrian injured	137
Total VRUs involved	269
ratio	0,51
Pedestrian involved	142
Cyclists involved	127

AFTER:

Year	2010
Pedestrian injured	144
Total VRUs involved	271
ratio	0,53
Pedestrian involved	144
Cyclists involved	127

As regards tavailabilty of data, the more complete and official road accodents data comes from the Italian National Institute of Statistics (ISTAT), but their late delivery to the city of Brescia makes the most recent year data collection not possible. For this reason, the partial data coming from the Municipal Police (which is one of the police force, together with Carabinieri, Road Police and Province Police, that intervene whene a road accident occur to write up the minutes) have been considered. Municipal Police collects the most part of the road accidents occuring in urban areas, where vulnerable road users are most involved.

Proportion=I/LP= 0,93

Year	2010
ratio	0,51

- **Indicator 6 (RATIO BETWEEN THE NUMBER OF CYCLIST DEATHS AND THE TOTAL VRUS INVOLVED IN ROAD ACCIDENTS)** – Using data coming from ISTAT, it's possible to extract data concerning the only accidents involving dead cyclists and total involved VRUs. This indicator is also scheduled for the measure M05.03 ("Development of bycicle safety in Brescia").

  EX ANTE:

  The ex ante situation of this indicator considers data referred to the year 2009:

Year	2009
Cyclist dead	1
Total VRUs involved	269
ratio	0,004
Pedestrian involved	142
Cyclists involved	127

AFTER:

Year	2010
Cyclist dead	0
Total VRUs involved	271
ratio	0,00
Pedestrian involved	144
Cyclists involved	127

As regards tavailabilty of data, the more complete and official road accodents data comes from the Italian National Institute of Statistics (ISTAT), but their late delivery to the city of Brescia makes the most recent year data collection not possible. For this reason, the partial data coming from the Municipal Police (which is one of the police force, together with Carabinieri, Road Police and Province Police, that intervene whene a road accident occur to write up the minutes) have been considered. Municipal Police collects the most part of the road accidents occuring in urban areas, where vulnerable road users are most involved.

Year	2010
ratio	0,00

Year	2011
ratio	0,008

- **Indicator 7 (RATIO BETWEEN THE NUMBER OF CYCLIST INJURED AND THE TOTAL VRUS INVOLVED IN ROAD ACCIDENTS) –** Using data coming from ISTAT, it's possible to extract data concerning the only accidents involving injured cyclists and total involved VRUs. This indicator is also scheduled for the measure M05.03 ("Development of bycicle safety in Brescia").

EX ANTE:

The ex ante situation of this indicator considers data referred to the year 2009:

Year	2009
Cyclist injured	126
Total VRUs involved	269
ratio	0,47
Pedestrian involved	142
Cyclists involved	127

AFTER:

Year	2010
Cyclist injured	127
Total VRUs involved	271
ratio	0,47
Pedestrian involved	144
Cyclists involved	127

As regards tavailabilty of data, the more complete and official road accodents data comes from the Italian National Institute of Statistics (ISTAT), but their late delivery to the city of Brescia makes the most recent year data collection not possible. For this reason, the partial data coming from the Municipal Police (which is one of the police force, together with Carabinieri, Road Police and Province Police, that intervene whene a road accident occur to write up the minutes) have been considered. Municipal Police collects the most part of the road accidents occuring in urban areas, where vulnerable road users are most involved.

Proportion=I/LP= 0,94

Year	2010
ratio	0,50

- **Indicator 8 (AWARENESS LEVEL)** – The initial idea was to charge the statistical unit staff with realizing, distributing, collecting and analyzing specific questionnaires. Furthermore, we thought about the possibility of including in the same questionnaire the survey for the "Awareness level" indicator scheduled for the measure 05.03 ("Development of bycicle safety in Brescia"). The reasons are mainly 2: the first one is that the two measures are similar in the contents; the second one is that we try to optimize the survey costs. As far as this measure is concerned, the questionnaire made by the statistical unit staff will focus on the awareness level about road safety. The target area is extended to the whole urban area of Brescia. The representative sample is to be chosen among the resident population (this choice is based on operative considerations: extending the survey also to the gravitating population would have introduced too many complications and would have incrised the costs). The sample size, of 600 filled in questionnaires, can be selected among the personal data of the Municipality (this allows a statistical significancy of more than the 90%). Involved families will be visited by a certificated person in charge for the compilation of the questionnaire.

  The key questions could be similar to the followings:
  Do you consider road accidents a priority problem? (Yes/No); What is the priority level that you would give to road accident problem? (High, Medium, Low);
  Do you know any initiatives, informative campaigns or measures recently undertaken by the municipality of Brescia that deal with safety on roads? (Yes/No) If yes, which ones and where?;

  The specific questions that can be used to express the awareness level are the following:
  The Municipality of Brescia is involved in an European project called "Civitas Plus Modern". Have you ever heard about this project? (Yes/No);
  Do you know that, within that project, the Municipality of Brescia is realizing projects dealing with the road safety (For example a Urban Road Safety Plan)? (Yes /No);

Following an "Ex-ante/ex-post" approach, the administration of the questionnaires (in order to measure the awareness level) is scheduled three times during the whole Civitas project.The same questionnaire has been administered the first time in March 2010, the second time in April 2011 and the last one it will be administered in April 2012.

EX ANTE SITUATION (MARCH 2010):

We experienced some organizational problem with the Statistical Unit staff: they couldn't guarantee the availability of the certificated detectors in charge of administering the questionnaires, so we had to charge an external company to manage this drawback. As the survey based on face to face interviews required more time than the scheduled, to collect a significant ex-ante before the implementation of the measure, we chose a faster procedure that slightly differs from the initial one scheduled: the questionnaires have been administered by phone. The sample size characteristics are the same described above. The company's duty is to administer the questionnaires by phone, to collect them, to enter data in a database and to elaborate the results.

Results elaboration:

To reach the goal of 600 filled in questionnaires, the company contacted 787 families. Only 220 of them answered to the phone calls but thanks to the fact that families are generally composed by more than one members, we collected totally **601 filled in questionnaires**. The questionnaires have been administered **from 5th February to 3rd March 2010**. This period can be considered as a valid ex ante for this measure even if the milestone (referred to the approval of the PSSU) was scheduled in January (project month 15). The justification to this apparent delay in data collection, comes from the fact that even if the milestone has been formally

respected, the actual approval of the PSSU requires more time (even months) because of bureaucratic procedures involving several departments of the public administration.

The calculated indicator is composed by 2 results: the awareness level of the population respect to the CIVITAS project in general and respect to the PSSU implemented in the ambit of the specific measure 05.02. These 2 results are expressed by percentage of people who has knowledge of a specific aspect respect to the total number of people who answered the questionnaire.

- Awareness level about CIVITAS: **16,00%**
- Awareness level about PSSU: **24,00%**

AFTER DATA COLLECTION (APRIL 2011):

The beginning of the questionnaire administration (the same distributed during the previous survey) started by the end of April 2011 and ended by the end of May 2011. The results of the survey arrived in June and are reported below:

- Awareness level about CIVITAS: **6,00 %**
- Awareness level about PSSU: **8,00 %**

AFTER DATA COLLECTION (APRIL 2012):

- Awareness level about CIVITAS: **9,70 %**
- Awareness level about PSSU: **8,00 %**

The used questionnaire is reported below:

Comune di Brescia
Settore Mobilità e Traffico
Assessorato alla Mobilità e Traffico

CIVITAS MODERN

THE CIVITAS INITIATIVE IS CO-FINANCED BY THE EUROPEAN UNION

INDAGINE "CIVITAS PLUS"
sul livello di conoscenza dei progetti "Centro di Monitoraggio per la sicurezza stradale", "Miglioramento della sicurezza per i ciclisti", "Car sharing" e "Car pooling"

Scheda familiare
Anno 2009

Informazioni sull'indagine

Il Comune di Brescia è coinvolto, dall'ottobre 2008, in un programma europeo chiamato Civitas Plus Modern. Tale programma riunisce in un consorzio 4 città europee (Brescia, Vitoria Gasteiz, Craiova e Coimbra) impegnate nell'implementazione di progetti che mirano alla mobilità sostenibile, alla riduzione dell'inquinamento e alla sicurezza. Le misure cofinanziate dalla Comunità Europea e portate avanti dalla città di Brescia sono in totale 14 e conseguono gli obiettivi del programma europeo agendo su fronti diversi: si stanno portando avanti progetti che vanno dalla promozione dell'uso di carburanti alternativi e mezzi ad elevata efficienza energetica allo sviluppo di sistemi integrati di bigliettazione del trasporto pubblico, dall'organizzazione di campagne informative allo studio di soluzioni innovative per gli spostamenti casa/lavoro o per le merci in città, dalla pianificazione della sicurezza stradale allo sviluppo di sistemi innovativi per la gestione della domanda per il trasporto pubblico.
Per i sotto progetti riguardanti il Centro di Monitoraggio per la sicurezza stradale, il miglioramento della sicurezza per i ciclisti, il Car Sharing e il Car pooling, gestiti dal Comune Di Brescia, è prevista, mediante indagini campionarie presso la popolazione residente, un'attività periodica di monitoraggio per valutare il livello di conoscenza dei progetti da parte della cittadinanza.
Il presente questionario raccoglie informazioni anche su aspetti demografici e sociali della famiglia intervistata, ma la scheda è anonima e la sua compilazione è facoltativa e lasciata alla disponibilità e collaborazione delle famiglie.

Ringraziamo le famiglie rispondenti e tutte le persone coinvolte nella rilevazione per la collaborazione.

Codice Famiglia
Codice rilevatore
Data di consegna / /
Numero di componenti

Circoscrizione di residenza
Quartiere di residenza

1

Componente 1

Relazione di parentela	1 Intestatario scheda anagrafica			
Sesso	F M	**Anno di nascita**		
Stato civile	1 Nubile/celibe	2 Coniugata/o	3 Separata/o Divorziata/o	4 Vedova/o
Titolo di studio	1 Nessuno	2 Licenza elementare	3 Diploma media inferiore	
	4 Diploma media superiore o professionale		5 Laurea	
Condizione professionale	1 Occupato	2 Disoccupato/in cerca di lavoro	3 Casalinga	
	4 Ritirato dal lavoro	5 Studente	6 Altro	

Qual'é il principale mezzo di trasporto che utilizza abitualmente per…	Tragitto casa/lavoro o casa/scuola	Spese, commissioni, accesso ai servizi	Tempo libero	Altri spostamenti
Piedi	□ 1	□ 1	□ 1	□ 1
Bicicletta	□ 2	□ 2	□ 2	□ 2
Ciclomotore	□ 3	□ 3	□ 3	□ 3
Automobile	□ 4	□ 4	□ 4	□ 4
Trasporto pubblico	□ 5	□ 5	□ 5	□ 5

Prima di essere contattato per questa indagine,
era a conoscenza del Progetto Civitas Plus per la mobilità sostenibile, pulita e sicura? Sì | No

SICUREZZA STRADALE:

Lei è a conoscenza di **campagne informative** (realizzate nelle scuole, in città, ecc) sul tema degli **incidenti stradali?** Sì | No

Se sì, può precisare tramite quali **mezzi di comunicazione**? (Scelta multipla)

Cartelloni pubblicitari	
Volantini o brochures	
TV locali	
Stampa	
Siti web	
Radio	
Altro	

Specificare "altro"

Solo per i maggiori di 14 anni:
Considera prioritario il problema dell'incidentalità? Sì | No

Quale grado di priorità attribuirebbe ad interventi intrapresi al fine di risolvere tale problema? Alto | Medio | Basso

Tra le cause di incidente prevalenti riportate qui di seguito, qual è quella che le desta più preoccupazione?

Infrazioni semaforiche	
Eccesso di velocità	
Mancato rispetto di stop/precedenza	
Mancato rispetto della distanza di sicurezza	
Manovre/attraversamenti/svolte irregolari	
Sosta vietata agli incroci o presso gli attraversamenti pedonali	
Stato psico-fisico alterato	
Altro	

Specificare "altro"

E' a conoscenza del fatto che il Comune, attraverso il progetto Civitas Plus, intende dotarsi di un Piano della Sicurezza Stradale Urbano (PSSU) proprio per cercare di risolvere il problema dell'incidentalità stradale? Sì | No

2

Quali sono le categorie di utenti della strada da favorire nell'ambito di una pianificazione della sicurezza stradale? Potrebbe fornire un ordine di priorità?

Automobilisti	
Pedoni	
Ciclisti	
Motociclisti e ciclomotoristi	
Autobus	

BICICLETTA:

Negli ultimi 6 mesi, ha utilizzato la bicicletta? Si | No

Prosegue la compilazione solo chi ha risposto Si al quesito precedente:

Negli ultimi 6 mesi, ha utilizzato le piste ciclabili? Si | No

Ritiene che i percorsi ciclabili, siano sufficientemente segnalati e riconoscibili? Si | No

Conosce e ha utilizzato la mappa dei percorsi ciclabili cittadini?

Non sapevo dell'esistenza della mappa dei percorsi ciclabili	
Conosco la mappa, ma non l'ho mai usata	
Conosco la mappa e l'ho utilizzata saltuariamente	
Conosco la mappa e la utilizzo spesso	

Come giudica la dotazione di rastrelliere per biciclette in città nei luoghi da lei frequentati?

Inadeguata	
Adeguata	
Eccessiva	

E' a conoscenza del fatto che il Comune, attraverso il progetto Civitas, intende dotare tutti i percorsi ciclabili cittadini di un'apposita segnaletica di direzione, nonché rinnovare e migliorare la segnaletica orizzontale e verticale esistente ed incrementare il numero delle rastrelliere in città? Si | No

Conosce la possibilità di dotare la sua bicicletta di un codice univoco e di un'apposita targhetta adesiva che consenta, in caso di furto, di aumentare la possibilità di ritrovamento?

Sì, ma la mia bicicletta non è ancora dotata di targa	
Sì e la mia bicicletta è già dotata di targa	
Sì, ma non mi interessa/non credo sia efficace	
No, ma mi interessa	
No, non mi interessa	

CAR SHARING:

Ha mai sentito parlare di un servizio chiamato Car Sharing? Si | No

Se si, è a conoscenza che anche a Brescia presto sarà disponibile un servizio di Car Sharing? Si | No

In caso di risposta negativa al primo quesito sul CS:
Il Car Sharing è un servizio innovativo che, nelle nostre città, può validamente rappresentare un'alternativa efficace e utile all'idea corrente di mobilità. Se già conosce il servizio BiciMia, le modalità di accesso al servizio sono simili e molto semplici: ci si associa ad un circuito che eroga il servizio gestendo una flotta di veicoli di diversa tipologia. L'utente può prenotare e prelevare in qualsiasi momento del giorno e della notte il veicolo richiesto dall'area di parcheggio più vicina. E' una soluzione ideale per spostamenti brevi e frequenti. Un'alternativa per chi percorre pochi chilometri o per chi non intende rinunciare all'auto di proprietà, ma deve fare i conti con esigenze di mobilità che oggi sono risolte con l'acquisto di una seconda o terza macchina.

Alla luce delle sue attuali esigenze di mobilità, ritiene questo servizio interessante? Si | No

3

CAR POOLING:

Una modalità per ridurre il traffico è quella di condividere il percorso casa-lavoro con altre persone (principio del Car pooling). Lei sarebbe disposto a farlo sapendo che c'è da una parte la possibilità di dividere esattamente i costi del viaggio tra gli occupanti il veicolo e dall'altra di usufruire di privilegi una volta sul posto di lavoro/studio (parcheggi riservati, ecc…)? (Solo una risposta ammessa)

Sì	
Sì se ho un posto riservato	
Sì se conosco prima le persone	
Sì se le persone fanno parte di un "club" (quindi esiste un controllo dell'identità)	
Sì se il mio tempo di percorrenza non aumenta più di….	
No	

4