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Pilot study to collect more robust accident data for Sierra Leone

Final Report

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ReCAP Reference number: SLE2129A

August 2018

CENTRO DI RICERCA PER IL TRASPORTO E LA LOGISTICA
SAPIENZA UNIVERSITÀ DI ROMA
FRED ENGINEERING

Preferred citation: Tripodi A., Wurie N., Robibaro M., Centro di ricerca per il Trasporto e la Logistica - FRED Engineering S.r.l. (2018). Pilot study to collect more robust accident data for Sierra Leone, Final Report, SLE2129A. London: ReCAP for DFID.

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Cover photo: http://cocorioko.net

Quality assurance and review table

Version	Author(s)	Reviewer(s)	Date
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ReCAP Database Details:

Reference No:	SLE2129A	Location	Freetown – Sierra Leone
Source of Proposal	ReCAP Website	Procurement Method	Competitive Tender
Theme	Transport Services	Sub-Theme	Road Safety
Lead Implementation Organisation	Centro di ricerca per il Trasporto e la Logistica	Partner Organisation	FRED Engineering S.r.l.
Total Approved Budget	£ 125,550	Total Used Budget	£ 95,550
Start Date	5 March 2018	End Date	31 August 2018
Report Due Date	31 August 2018	Date Received	28 August 2018

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Abstract

This final report provides a detailed overview of the activities performed during the pilot study to collect more robust accident data in Sierra Leone. It especially summarises the initial activities related to assessment of the current road safety situation in the country and stakeholder consultations to identify the main needs for a standardised road traffic crash data collection framework. After definition of a proposed framework and its validation by Sierra Leone stakeholders, a pilot road traffic crash data collection has been performed. The report also describes the proposed road traffic crash data analysis framework and the accident data management system tailored to Sierra Leone characteristics, as well as the training activities performed.

Key words

Road crash; Data analysis; Road Safety; Accident data management system; Stakeholders

Acronyms, Units and Currencies

$	United States Dollar (US$ 1.00 ≈ provide conversion to local currencies)
ADB	Asian Development Bank
AsCAP	Asia Community Access Partnership
CADaS	Common Accident Dataset
GIS	Geographic Information System
GPS	Global positioning system
ITPSIP	Integrated Transport Policy, Strategy and Investment Strategy
LVRs	Low Volume Roads
MoHS	Ministry of Health and Sanitation
ONISR	French Inter-ministerial Observatory for Road Safety
PRSP-III	Third Poverty Reduction Strategy Paper
ReCAP	Research for Community Access Partnership
RTC	Road Traffic Crash
SLICOM	Sierra Leone Insurance Commission
SLRA	Sierra Leone Roads Authority
SLRSA	Sierra Leone Road Safety Authority
SLP	Sierra Leone Police
SSL	Sierra Leone Statistics
ToR	Terms of Reference
ToT	Training of Trainers
UNECA	United Nations Economic Commission for Africa
UK	United Kingdom (of Great Britain and Northern Ireland)
UKAid	United Kingdom Aid (Department for International Development, UK)
WB	World Bank
WHO	World Health Organization

Executive summary

The pilot study to collect more robust accident data for Sierra Leone was organised according to the following activities:

- Overview of road safety data needs in Sierra Leone, identification of data types required and stakeholder consultations.
- Definition of a conceptual framework for road traffic crash (RTC) data collection and its validation during a stakeholder workshop.
- Pilot RTC data collection in three regions of Sierra Leone (this activity has been completed).
- Definition of a framework for RTC data analysis and implementation of an accident data management system tailored to Sierra Leone characteristics.
- Demonstration and validation of the accident data management system during a stakeholder workshop.
- Training of selected staff to use the RTC data collection framework and the accident data management system.

The pilot RTC data collection was performed by three trained enumerators in three areas of Sierra Leone. For two weeks the enumerators collected RTC data in that area, with reference to low volume roads.

After the pilot exercise, 25 completed RTC forms were collected. Both the data collection forms for police officers and for health service personnel have been used. Few missing information or errors were recorded, so that the forms can be considered valid. A revision of the data collection forms was deemed necessary. An example of the changes included the vehicle type. In fact, even if this information can be retrieved from existing SLRSA databases, a certain number of RTC cases including runaway drivers were collected, where the vehicle plate cannot be recorded. However, the vehicle type was often known from the description of RTC by victims.

A framework for RTC data analysis was developed based on international literature. The main statistics usually performed based on the available data and the way they can be presented is described in the framework.

Main statistics refer to: trends of the number of fatalities, injury accidents and injured people, fatality rate, percentage change in the number of fatalities and injury accidents, fatalities by mode of transport, fatalities by area type, fatalities by gender and age, fatalities by road type, fatalities by time periods, fatalities by weather conditions.

All the above-mentioned statistics can be performed using the accident data management system implemented for Sierra Leone. The system is composed of two software: SFINGE and SAFETY MANAGER.

SFINGE supports the activities of entities in charge of RTC data collection. It includes interfaces to directly input RTC data elements into the software, as well as modules to analyse the data, to verify their coherence and exhaustivity and to send the data to a national database.

SAFETY MANAGER supports the activities of road safety authorities. It includes the following modules:

- Data acquisition and management: to create new RTC forms, to export and import data from external sources (SLP, health service, etc.).
- Database management, for archives updates.
- Road safety studies: definition of RTC data subsets, elaboration of graphics (maps), preparation of reports, descriptive analysis of RTC.
- Selection of road safety interventions: creation of projects to select interventions, identification of critical road infrastructure elements, identification and classification of RTC, identification and selection of RTC causes, identification and selection of solutions, economic assessment of solutions.

A training of trainers event was also executed on the use of RTC data collection framework and of the accident data management system.

1 Background

The pilot study to collect more robust accident data in Sierra Leone had a twofold objective:

- Set up a methodology for road traffic crash (RTC) data collection using sample data collected on a pilot basis on low volume roads (LVRs) in Sierra Leone.
- Develop and implement an electronic accident data management system for RTC data storage, analysis and retrieval for LVRs in Sierra Leone.

The pilot study included activities that allowed to understand the current situation in Sierra Leone regarding the collection and management of RTC data and to compare it with the international standards. A new framework to the RTC data collection and management was then defined. The activities were accompanied by stakeholder consultations. Table 1 provides details about the pilot study activities.

Table 1 Pilot study activities

No	Activity	Status	Report
1	General overview of the state of road safety data needs in Sierra Leone.	Completed	Inception report
2	Literature review on the scope of RTC data types and elements based on best international practices.	Completed	
3	Assess existing RTC data quality for completeness, sufficiency of details etc. by comparison with best practices in literature.	Completed	
4	Identify of a set of RTC data types required in Sierra Leone.	Completed	
5	Stakeholder consultations to agree and finalise the above-mentioned set of data types.	Completed	
6	Design an RTC data collection format/tool and define the method for the data collection.	Completed	Report #1
7	Set a conceptual framework for an RTC data management system.	Completed	
8	Stakeholder workshop to build consensus on identified RTC data types by elements, stakeholder need, data sources.	Completed	Report #2
9	Select pilot locations for RTC data collection on low volume roads in Sierra Leone.	Completed	Report #3
10	Train enumerators in the application of the RTC data collection tools.	Completed	
11	Pilot RTC data collection in the selected locations.	Completed	
12	Set an analytical framework based on combined RTC data sets, including characterisation of crash patterns by statistical tools such as frequencies, rates, severity etc.	Completed	
13	Stakeholder workshop to demonstrate and validate the accident data management system	Completed	Report #4
14	Train selected staff for a trainer of trainers in RTC data collection and the use of the accident data management system	Completed	Report #5
15	Prepare a final report on all the study aspects	Completed	Final Report

Legend:

- Report #1: Report on Framework for Accident Data Collection and Management
- Report #2: 1st Workshop Report
- Report #3: Draft Final Report
- Report #4: 2nd Workshop Report
- Report #5: Training Report

This Final Report describes the outcomes of the pilot study, including the final versions of the recommended RTC data collection forms and the guidelines on the use of the proposed accident data management system.

2 Situation analysis and consultations

The road safety situation in Sierra Leone is serious, mainly due to the growing vehicle population and an ineffective implementation of road safety interventions. Economic growth is deemed to increase road safety challenges in the country.

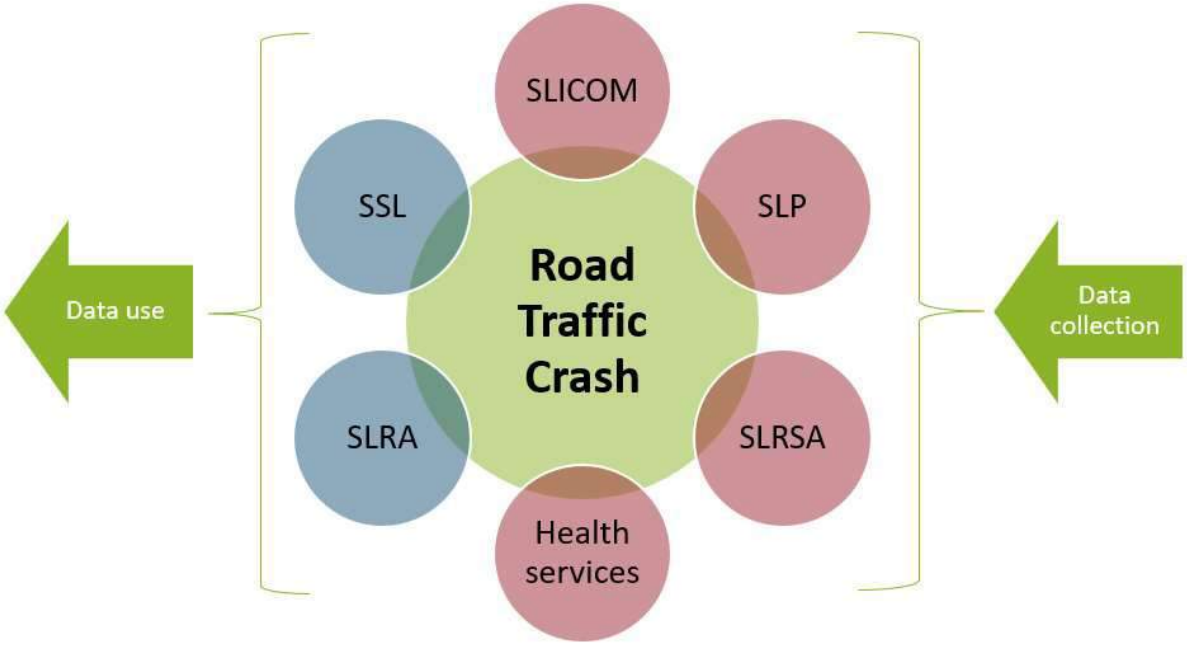
Various sources of information for RTC data exist in Sierra Leone. However, they are not homogeneous and provide different figures. RTC data collection and management process is also not standardised across the entities involved.

Main entities involved in the RTC data collection and management are as listed below and presented in Figure 1:

- Sierra Leone Police (SLP). They are in charge of data collection when a crash occurs. SLP utilises a data collection form containing generic information on victims, number of vehicles and persons involved. However, no detailed information is collected, so the analysis of crash patterns and risk factors is not possible.
- Sierra Leone Road Safety Authority (SLRSA). They are in charge of management of the national RTC database. They also collect RTC data when a crash occurs. SLRSA also has its own data collection form (different from that of SLP). Similar to that of the SLP it only contains generic information on victims, number of vehicles and persons involved.
- Health services (hospitals, emergency centres, mortuary department). They collect information on RTC victims (deaths or injured). However, this information is usually not shared with other stakeholders (e.g. SLP, SLRSA, other health services).
- Statistics Sierra Leone (SSL). They are in charge of issuing official statistics for Sierra Leone, including among others also those about RTC. They receive data from entities in charge of data collection. However, the sharing of information is not done frequently.
- Sierra Leone Roads Authority (SLRA). They manage all the road infrastructures in Sierra Leone. To this aim, they are interested in receiving information on RTC data. This would, for instance, facilitate the treatment of black spots.
- Sierra Leone Insurance Commission (SLICOM). Insurance companies could be a good source of data for RTC with only damage to vehicles. However, road users do not often report a crash to their insurance company, to avoid issues with police and additional insurance costs. Thus, the amount of information currently available is limited.

All the above-mentioned stakeholders were consulted to collect information on the procedures and tools currently in place in their services. Information on their main needs to deal with the RTC data collection and analysis was also collected. Some of the agencies, including SLRSA, SLRA and SLP, were visited twice in order to verify the set of RTC data types proposed for collection in the new process to be piloted.

Figure 1 Entities involved in RTC data collection process



A benchmark analysis was undertaken on the current practices for RTC data collection and management practices in Sierra Leone with those of selected European and African countries. Many differences were highlighted that need to be solved through the gradual implementation of a standardised framework for RTC data collection and management.

Main challenges highlighted for Sierra Leone refer to:

- Missing standard data collection forms complying with international standards.
- Missing information allowing for the location of each RTC situation.
- Missing information in the data collection form allowing for an understanding of the patterns and causes of RTC.
- Absence of a national database on RTC where all data and information are centralised.
- Lack of database validation methodology (i.e. crosschecks with other databases).
- Missing use of IT tools to fill out data collection forms and to perform analysis.
- Missing instructions for the correct compilation of completed RTC data collection forms.
- Lack of training for those involved in the RTC data collection.

Following a review of the best international practices regarding the collection and management of RTC data, preliminary proposals were prepared for the minimum set of data elements to be collected. These proposals were discussed with stakeholders in order to verify their coherence with current practices in Sierra Leone and with stakeholder needs.

Following the success of the consultations, a conceptual framework for RTC data collection and management was drafted.

3 Conceptual framework for RTC data collection and management

The framework for RTC data collection and management defines a common platform for merging information collected by police forces and health services into a single national database with provision for a follow-up on injured persons.

In defining the framework, a set of standardised definitions related to road traffic crashes with reference to those recommended by the World Health Organization (WHO) was proposed as presented in Table 2 and Table 3.

Table 2 Definitions for indicators related to road users

Category	Sierra Leone (current definitions)	WHO (internationally agreed definition)
Fatality	Died at scene	Person killed immediately or died within 30 days because of a road traffic injury.
Serious Injury	No standard definition	Injury that requires admission to hospital for at least 24 hours, or specialist attention such as fractures, concussions, severe shock or severe lacerations.
Casualty	No definition	A person who has sustained physical injury because of an RTC (including death).

Table 3 Definitions for indicators related to road traffic crashes

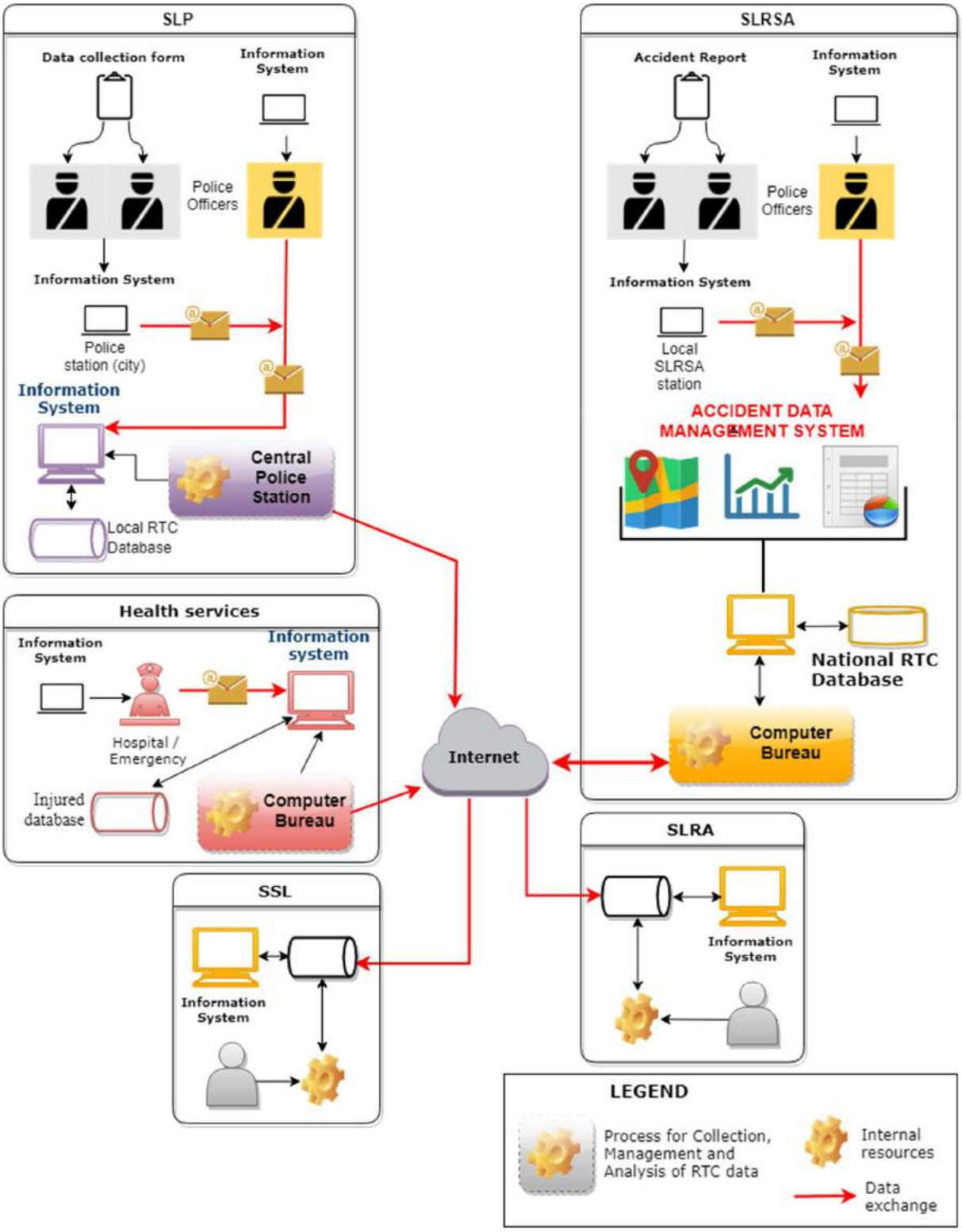
Category	Sierra Leone (current definitions)	WHO (internationally agreed definition)
Fatal Crash	Any RTC resulting in a person killed immediately because of the crash	Any RTC resulting in a person killed immediately or dying within 30 days because of the crash
Casualty Crash	No standard definition	A person who has sustained physical damage because of an RTC (including death)

The proposed RTC data collection and management framework is shown in Figure 2. The key actors of this framework are:

- SLP should collect RTC data. For each crash analysed by SLP, a form for data collection on paper or through an electronic device (computer or tablet) must be filled in by police officers.
- SLRSA has the following responsibilities:
  - Collection of RTC data. For each crash analysed by SLRSA, a data collection form, on paper or through an electronic device (computer or tablet) should be filled in by police officers.
  - RTC analysis and reports on road safety.
  - Maintenance of the national RTC database.
- Hospitals, Emergency Centres, mortuary department should collect data on persons injured in RTC and transported to a health service (this is valid for persons injured as well as who die within 30 days because of the crash). Data are collected on paper or through electronic means.
- SSL is in charge of preparing official statistics on RTC. It should receive data periodically from SLRSA.
- SLRA should receive statistics and analysis of RTC data to be used for assessment of road infrastructure quality and safety conditions.

The framework entails the centralisation of all the information at SLRSA. Data should be exchanged via web connections. Each entity involved in the RTC data collection and management process must be accredited for data access based on their role. SLRSA should be the sole entity entitled to access the whole set of data collected in Sierra Leone. SLP, SLRSA and health services should be mandated to provide periodical (e.g. each month) data on RTC and on persons injured. SLP and health services should also receive consolidated data from SLRSA (e.g. after validation or update of injured persons' conditions). SLRSA should be mandated to maintain the national road crash database, perform analysis, provide consolidated data and information to other stakeholders.

Figure 2 RTC data collection and management framework



Two RTC data collection forms were recommended for use in Sierra Leone: one for police forces and one for health services. Both forms were discussed with stakeholder during a workshop and during a training of trainers' session. Comments provided by stakeholders (especially SLP and SLRSA) allowed to refine the forms based on Sierra Leone needs. The police RTC data collection forms and its user manual are included in Annex 1. The health RTC data collection forms and its user manual are included in Annex 2.

The police form was developed based on the minimum set of RTC data elements recommended by WHO. Data elements are divided into four categories (Table 4):

- Crash related elements, describing the overall characteristics of the crash (including for instance crash type and causes of the crash).
- Road related elements, describing the characteristics of the road and associated infrastructure at the place and time of the crash.
- Vehicle related elements, describing the characteristics and events of the vehicle(s) involved in the crash.
- Person related elements, describing the characteristics, actions, and consequences relating to the people involved in the crash. These elements are to be completed for every person injured in the crash, and for the drivers of all vehicles (motorised and non-motorised) involved in the crash.

Some data elements related to vehicles and drivers can be collected by merging of RTC database with SLRSA existing databases.

Table 4 Data elements recommended for Sierra Leone police forces

Crash related	Road related	Vehicle related	Person related
C1 - Identifier	R1 - Type of roadway	V1 - Vehicle number	P1 - Person ID
C2 - Date	R2 - Road functional class	V2 - Vehicle plate number	P2 - Occupant's vehicle number
C3 - Time	R3 - Speed limit	V3 - Vehicle special function	P3 - Pedestrian's linked vehicle number
C4 - City / place	R4 - Road obstacles	V4 - Vehicle manoeuvre	P4 - Date of birth
C5 - Location	R5 - Surface conditions	V5 – Vehicle type	P5 - Sex
C6 - Crash Type	R6 - Junction	V6 – Vehicle run-away	P6 - Type of road user
C7 - Impact type	R7 - Traffic control		P7 - Seating position
C8 - Weather conditions			P8 - Injury severity
C9 - Light conditions			P9 - Safety equipment
C10 - Crash cause			P10 - Pedestrian manoeuvre
			P11 - Alcohol use
			P12 - Drug use
			P13 - Blood group
			P14 – Person name

The health form was developed to allow for matching of information with those collected by police. Collecting information from health services allows to verify the situation of persons injured in RTC until 30 days after the crash (e.g. to verify if a person dies within 30 days because of a road traffic injury).

Data elements are divided into two categories (Table 5):

- Crash related elements, describing the crash characteristics such as location, date and time of occurrence, date and time of arrival of the person at the health service.
- Person related elements, describing the main information about the persons injured in RTC (such as name, sex, birth date) and the information related to injuries occurred to the persons (type of injury, final diagnosis). Information about date and time of exit from the health services must also be collected. It is worth mentioning that "exit" can refer to the situation when a person is alive or dead.

Table 5 Data elements recommended for Sierra Leone health services

CRASH RELATED	PERSON RELATED
C1 - Identifier	P1 - Person ID
C2 - Date of RTC	P2 - Name
C3 - Time of RTC	P3 - Sex
C4 - Date of admission	P4 - Date of birth
C5 - Time of admission	P5 - Type of injury
C6 - RTC location	P6 - Final diagnosis (at discharge)
	P7 – Date exit
	P8 – Time exit

4 Stakeholder workshops

Two stakeholder workshops were organised during study to build consensus about the RTC data collection and management framework (Workshop #1) and about an accident data management system used to collect, manage and analyse RTC data (Workshop #2).

4.1 Workshop #1

The RTC data collection and management framework was presented to Sierra Leone road safety stakeholders during a workshop hosted by SLRSA.

The following stakeholders attended the:

- Sierra Leone Road Safety Authority.
- Road Safety Corps of SLRSA
- African Community Access Partnership.
- Sierra Leone Roads Authority.
- Sierra Leone Police.
- Statistics Sierra Leone.
- Banga Bety Village.
- National Laboratory and Mortuary Services.

The following aspects were presented to the stakeholders:

- A theoretical session dealing with the importance of road traffic crash data in road safety management. This session especially describes good practices and main challenges on the use of road traffic crash data and the requirements for RTC data.
- A presentation of the main tools to collect, manage and analyse RTC data.
- A session about the proposed framework for RTC data collection and management.

Before opening the discussion, the consultant requested for the main stakeholders (especially SLP, SLRSA and health services, involved in the collection of RTC data) to comment on the proposed data elements to be collected and about the data collection forms and the response was positive. The proposed data collection forms were well accepted with request for adequate training for effective application.

The consultant also highlighted that some of the current practices used by SLP and SLRSA when an RTC occurs will continue to exist independently of the new framework. This relates especially to the information collected for prosecution purposes when a person makes an infraction of the road rules.

During the open discussion with stakeholders some questions were raised, and interesting inputs were provided. Following questions, clarifications were provided regarding:

- How the framework could work when internet facilities are not available in some locations of the country.
- What kind of resources should be needed to ensure the framework establishment and the training of officers for data collection.
- What kind of road safety laws or decrees should be changed or established to ensure framework works.
- How the accident data management system could be used to visualise RTC on map.
- Should be insurance companies play a role in the proposed framework.
- Where the proposed accident data management system will be installed within the pilot study.
- What kind of data protection and security protocols are included in the accident data management system.

The framework for the RTC data collection and management was approved. No major changes to the RTC data collection forms were requested.

4.1 Workshop #2

The 2nd stakeholder workshop was organised to demonstrate and validate an accident data management system that has been selected and adapted to the main needs of Sierra Leone. The workshop also allowed to get approval for its installation and training.

The following stakeholders attended the workshop:

- Sierra Leone Road Safety Authority.
- Road Safety Corps of SLRSA
- Sierra Leone Roads Authority.
- Sierra Leone Police.
- Statistics Sierra Leone.
- Gberray Village.
- Banga Bety Village.
- Connaugh hospital.
- Transnation Insurance.

The consultant made presentations on the following aspects:

- Current status of the study and next steps.
- Main results of the pilot data collection, including challenges and recommendations.
- Demonstration of the accident data management system.

The accident data management system was approved by the road safety stakeholders. Following questions, clarifications were provided regarding:

- Inclusion of all data elements proposed in the RTC data collection forms into the accident data management system.
- Possibility to analyse the causes of RTC using the system.
- How social costs are considered into the system for decision making about road safety interventions.
- Possibility to include information about relatives of persons injured into the module for health services.
- How different methods currently used by SLP and SLRSA are considered in the system.
- How duplications of collected data can be avoided.
- Possibility to include in-depth investigation data in the national database.
- What is the process of involvement of various stakeholders during data collection.

5 Pilot RTC data collection

To test the RTC data collection framework, a pilot data collection exercise was undertaken. Three enumerators were selected with the help of local stakeholders (especially SLRSA and SLRA). The

enumerators were to collect several RTC cases covering a range of different types of crashes (e.g. different crash configurations, vehicle types, road users and levels of injury severity).

The main objectives of the pilot RTC data collection were:

- To verify if the data collection practices are feasible and not too complicated.
- Test the use of the data elements identified for collection, management and analysis of data.

For these purposes, it was deemed sufficient to collect a small number of RTC cases with a set of attributes relevant for Sierra Leone that could guide the pilot data collection process. The selection of the number of RTC cases to be collected was based on attributes such as severity (fatal or non-fatal crash), time of the day (day-time or night-time), ecological zone within high, medium and low rainfall patterns, occurrence of the crash on low volume roads.

Based on the discussions with stakeholders (especially with SLRA), the three ecological zones selected for the pilot data collection mainly correspond with the three main regions of Sierra Leone (northern, eastern and southern). The western region was assimilated with the northern one in terms of rainfall pattern.

The selected pilot locations were:

- Matotoka (close to Makeni) in the north.
- Blama (close to Kenema) in the south.
- Mano Junction (close to Bo district) in the east.

All three areas are in different geographical locations with different rainfall belts. These stations were also classified as LVRs and are prone to road accidents. Specifically, the following road links were considered:

- North station(Figure 3): Matotoka links (Matotoka – Magburaka, Matotoka – Masingbi, Matotoka – Mapaki, Matotoka – Matamp).
- South station(Figure 4): Blama links (Blama – Kenema, Blama – Bo, Blama – Boajibu, Blama – Potoru).
- East station(Figure 5): Mano Junction links (Mano Junction – Kenema, Mano Junction – Daru, Mano Junction – Lago).

The data collection process lasted for two weeks. All relevant information was recorded by enumerators on the proposed accident data collection form. The vehicle/motorcycle drivers, passengers and pedestrians involved in RTC responded to questions from the accident data collection forms.

The RTC data collection in the field was performed by the enumerators using the data collection form developed for the police force. In addition to the collection of RTC data in the field, the enumerators identified the victims of crashes and performed a follow-up to verify their health status. This was done in connection with hospitals or emergency centres. In this case, the enumerators used the data collection form developed for health services.

Figure 3 Main LVRs considered for RTC data collection in the northern zone

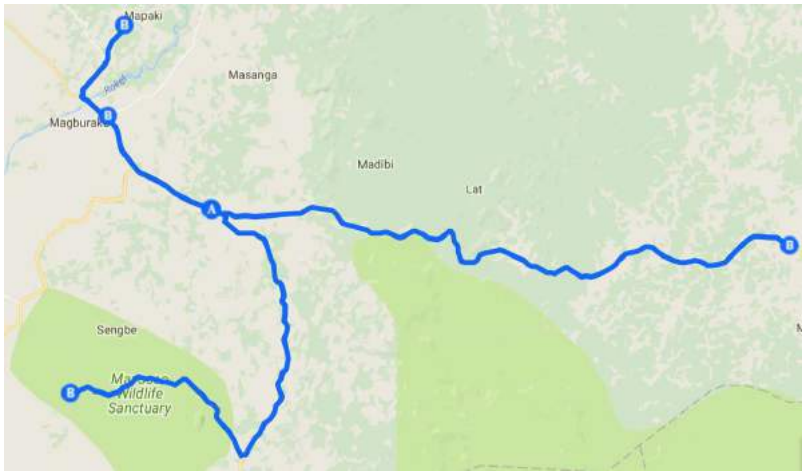


Figure 4 Main LVRs considered for RTC data collection in the southern zone

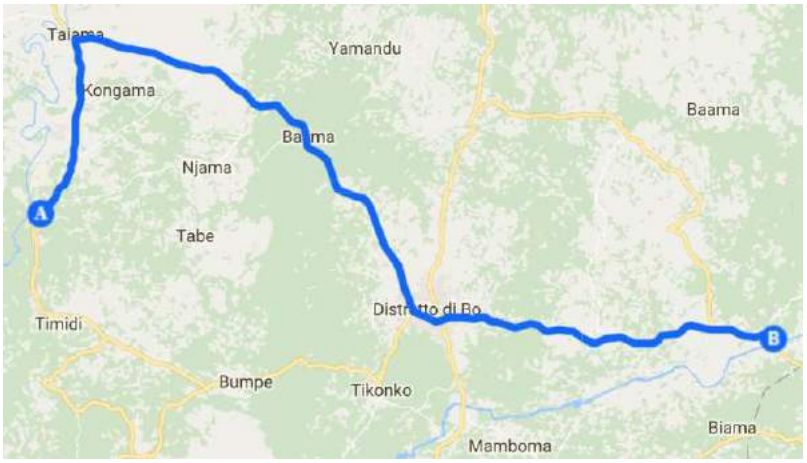
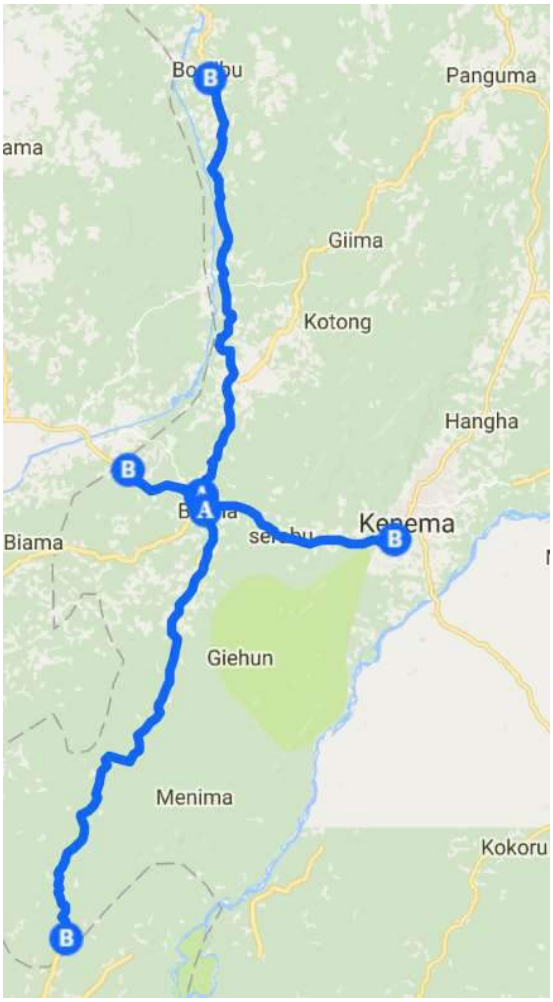


Figure 5 Main LVRs considered for RTC data collection in the eastern zone



A minimum data set of twelve crashes per region was specified as the target. However, the targeted number of crashes was achieved only in the eastern region; amounting to thirteen crashes. Six crashes were collected in each of the other two regions. The reasons for the low RTC rates in these regions are explained below.

5.1 Main challenges of the pilot data collection

In carrying out the data collection for this study, some challenges were encountered.

In the first place, the victims involved in the road accidents had to understand the purpose of the study and the purpose for which the information obtained from them was to be used only for. It had to be explained to them that, the information was only for statistical analysis and not for use by any ministry or government department for litigation or prosecution.

Even after a lot of explanation, some vehicle drivers or motorcycle riders were very reluctant to respond and cooperate, a lot of them ran away before being questioned (especially motorcycle riders). In certain instances, law enforcers were uncooperative as they thought they were being audited, while some even asked for financial incentive before being of any help.

It was also observed that some RTC cases were hardly reported to health facilities. Sometime victims prefer to go to herbalists or local bone specialists for health treatments. In some cases, instead of reporting an RTC to police officers, victims prefer to cover up for drivers / riders and reach an agreement with them.

Some vehicles or motorcycles were unregistered and with no registration plates affixed. Furthermore, some drivers or riders were unlicensed. Therefore, getting accurate information from them proved futile or impossible at times. Also, some of the people involved in the accidents were semi-illiterate or illiterate, so understanding some of the questions in the form and providing appropriate or responsive feedback was a challenge. Accurate information about their age and date of birth was not obtained in most cases (illiteracy and poor data recording).

Inclement weather, bad road conditions also posed challenges as some crash locations where remote and/or hardly accessible. The relevant law enforcement officers, such as the police and traffic wardens, lack the necessary equipment for drug and alcohol use testing and the logistics to get to certain remote locations during inclement weather.

Night crashes were also hardly reported. Crash scenes were chaotic and extra tact and wit was required to obtain an appreciable level of cooperation from respondents.

5.2 Accuracy of pilot data collection

For the data collected to be representative of the communities and for the subsequent deductions from the data analysis to be correct, special care was taken when filling the forms and interviewing of victims.

It was difficult to get the victims to answer directly, so conscious effort was made to explain every aspect of the questioning. For instance, the reasons and intentions for which the results are needed were explained, as well as the need for the maximum co-operation from the respondents.

Follow-up visits were also made to hospitals, health centres and pharmacies to obtain more information on victims taken to hospitals. This initiative to follow-up ultimately enhanced the accuracy of the survey.

Every RTC data form was carefully reviewed to ensure that locations, times, road, weather and light conditions were consistent with the actual RTC scenes as the information on victims at the crash site and at the hospital must needed to correspond.

5.3 Pilot study results

Northern region

Six data sets were collected from the four road links in the north. Three RTC occurred along the main Matotoka highway and its surroundings, one along the main Matotoka – Magburaka road link, two along Matotoka – Masingbi road link and its surrounding and one along Matotoka – Mapaki road link. None was obtained from Matotoka – Matamp link.

There were three RTC categories in this region:

- car–motorcycle (3 cases);
- single carcrash (1 case);
- motorcycle–pedestrian (2 cases).

Most of the RTC's occurred during the day. Crashes occurred mostly on motorways/freeways and principal arterials. Road conditions did not have much effect, as most crashes occurred under dry road surface. Weather conditions were clear in four RTC out of six (the remaining two RTC occurred during rain). Light conditions had an influence on RTC, since half of them occurred during the night.

A huge percentage of the crashes were caused by overtaking and over speeding, implying careless or reckless driving. A lot of crashes occurred along the main carriageway and not at junctions.

No obstacles were encountered in most of the crashes, but one crash had an animal crossing the road. Almost all the roads had speed limit signs, others did not have but their speed limits were given by the police from records, whilst some could not be ascertained even by the police.

Most crashes involved cars and motorcycles. Two pedestrians were involved in the crashes, one was hit on the carriage way whilst crossing the road, the other was hit outside the carriage way. Most drivers and

passengers had slight/minor injuries as they used seat belts and wore crash helmets. In fact, only one driver had slight / minor injury, the rest did not sustain any injury as they protected themselves.

Because the injuries were slight/minor, most victims were taken to local pharmacies and one was taken to an herbalist. One driver ran away. No fatality was recorded. No vehicle failure was recorded.

Southern region

Six data sets were collected from the four links in the south. One RTC occurred along Blama – Kenema road link, three along Blama – Bo road link and its surroundings, one along Blama – Boajibu road link and one along Blama – Potoru link.

There were four RTC categories in this region:

- car–motorcycle (2 cases);
- single carcrash (2 cases);
- single motorcycle crash (1 case);
- motorcycle–motorcycle (1 case).

Most of RTC's occurred in the evenings and some few crashes in the afternoon.

Crashes occurred mostly on motorways/freeways and principal arterials. Road conditions did not have much effect, as most crashes occurred under dry road surface. Weather conditions were clear in three RTC out of six (the remaining RTC occurred during rain). Light conditions had an influence on RTC, since two out of six of them occurred during the night.

A significant number of RTC's were caused by overtaking and over speeding - implying careless or reckless driving.

No obstacles were encountered in most of the crashes, if any; it was only ditches and potholes. Some roads had speed limit signs, others did not have (but their speed limits were provided by the police from records) and some could not be ascertained, even by the police.

Most crashes involved vehicle-motorcycle (mostly vehicle related crashes). Most drivers and passengers sustained slight/minor injuries as they used seat belts and wore crash helmets. Most drivers did not have any injuries (meaning they protect themselves).

Because the injuries were slight/minor, most victims were taken to local pharmacies and one was taken to an herbalist. One case was taken to the hospital as it was somehow critical.

All but two drivers were present (one vehicle driver ran away, but was later apprehended and one motorcycle driver also ran away).

Three fatalities involving a passenger of a vehicle and two motorcycle riders were recorded. One vehicle failure was recorded.

Eastern region

Thirteen data sets were collected from the three links in the east. Eight RTC occurred along Mano Junction – Kenema road link and its surroundings, one along Mano Junction – road Daru road link and four along Mano Junction – Lago road link and its surroundings.

There were five RTC categories of in this region:

- car–motorcycle (3 cases);
- single car crash (2 cases);
- single motorcycle crash (2 cases);
- motorcycle–motorcycle (2 cases);
- motorcycle–pedestrian (4 cases).

Most of RTC occurred in the morning and some few crashes at other times during the day. Crashes occurred mostly on motorways/freeways and principal arterials. Road conditions did not have much effect,

as most crashes occurred under dry road surface. Weather conditions were clear in eight RTC out of thirteen (the remaining RTC occurred during rain). Light conditions had an influence on RTC, since eight out of thirteen of them occurred during the night.

A huge percentage of the crashes were caused by overtaking and over speeding (implying careless or reckless driving). A lot of crashes occurred along the main carriageway and not at junctions.

No obstacles were encountered in most of the crashes and if any, there were mostly ditches and potholes. Some roads had speed limit signs, others did not have but their speed limits were given by the police from records while some could not be ascertained even by the police.

Several RTC involved motorcycles and pedestrians who were crossing the road. Most passengers had serious/severe injuries as they were not wearing helmets or using seat belts (only one passenger used seat belt).

Persons with serious/severe injuries were taken to the nearest hospital or referred to Freetown. Most stayed a day or two at the hospital. Persons with slight or minor injuries (bruises) were not taken to the hospital, most were taken to local pharmacies and in one case, the victim was taken to a native doctor.

Two fatalities involving motorcycles passengers were recorded. In both cases the motorcycle had an impact with a car and over-speeding was reported as the main RTC cause. In one of the two RTC, the car was overtaking while the motorcycle was moving off. In the second RTC, the motorcycle was waiting to turn while the car was making an avoidance manoeuvre.

No testing equipment was available for ascertaining alcohol and drug use. Enumerators had to use smell and sight judgment to establish whether the victims had consumed alcohol or are under the influence of drugs. In all the cases no alcohol or drug use was detected on the victims.

Two vehicle failures were also recorded.

Statistical analysis of collected RTC

All the RTC were collected on Low Volume Roads. The data were stored into the accident data management system and were successively analysed. Statistics are reported below.

The majority of RTC occurred between two or more vehicles or between a vehicle and a pedestrian (eight out of 25 RTC respectively). Five out of 25 RTC occurred with an obstacle (parked vehicle or another kind of obstacle). The other RTC's were single vehicle crashes (Figure 6).

The majority of RTC's occurred in clear weather conditions (14 RTC out of 25). However, 11 out of 25 RTC occurred in adverse weather conditions (rain, hail, wind). This is quite normal since the pilot data collection has been done at the beginning of the raining season (Figure 7).

Light conditions also influence RTC (Figure 8). Half of the collected RTC occurred during darkness. In fact, more than 50% of RTC occurred during night hours (Figure 9). About 44% of the collected RTC occurred on Monday or Tuesday (Figure 10).

Figure 6 Collected RTC by impact type

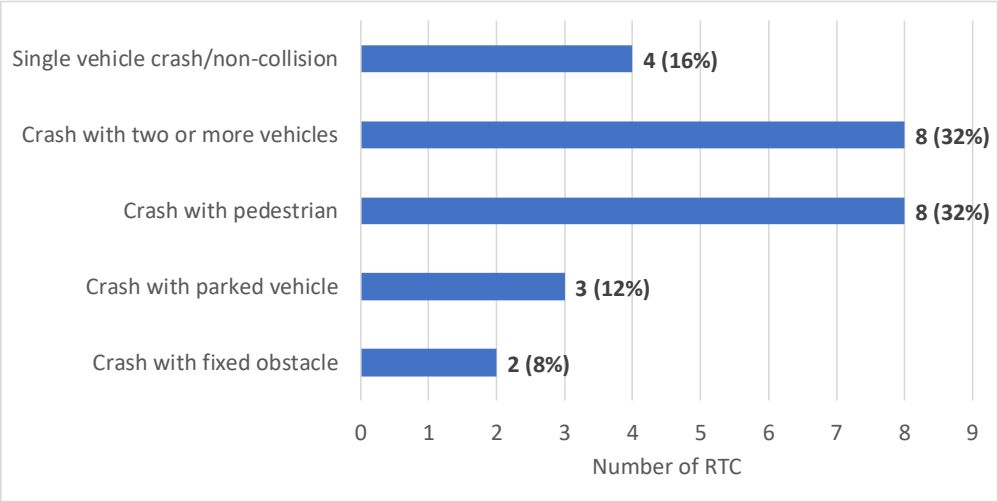


Figure 7 Collected RTC by weather conditions

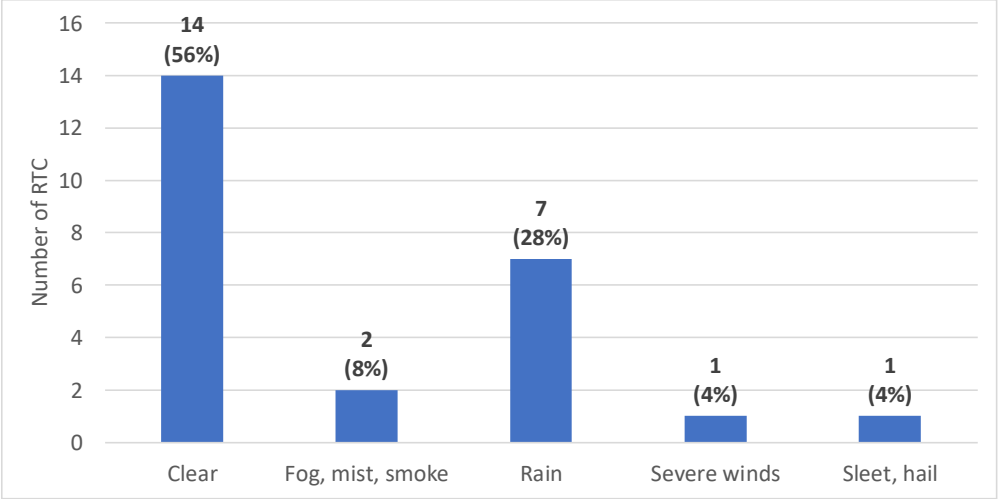


Figure 8 Collected RTC by light conditions

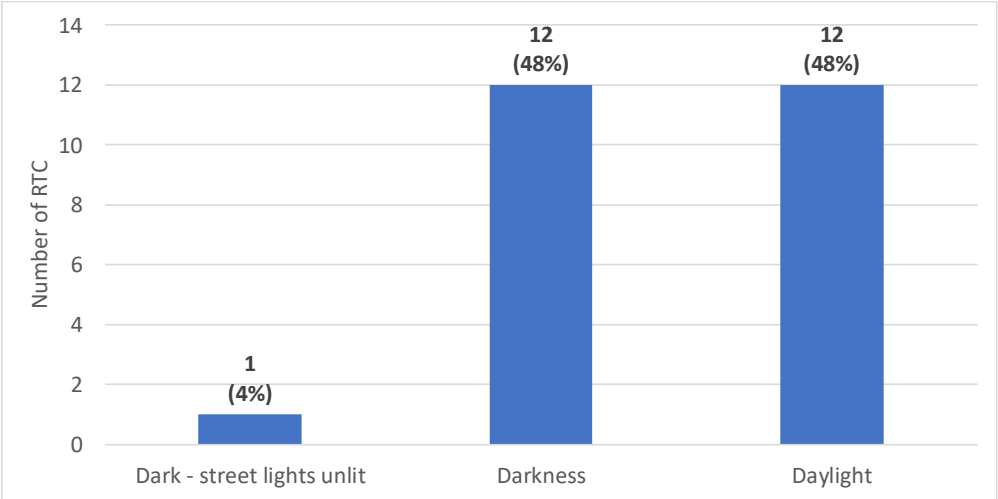


Figure 9 Collected RTC by time of the day

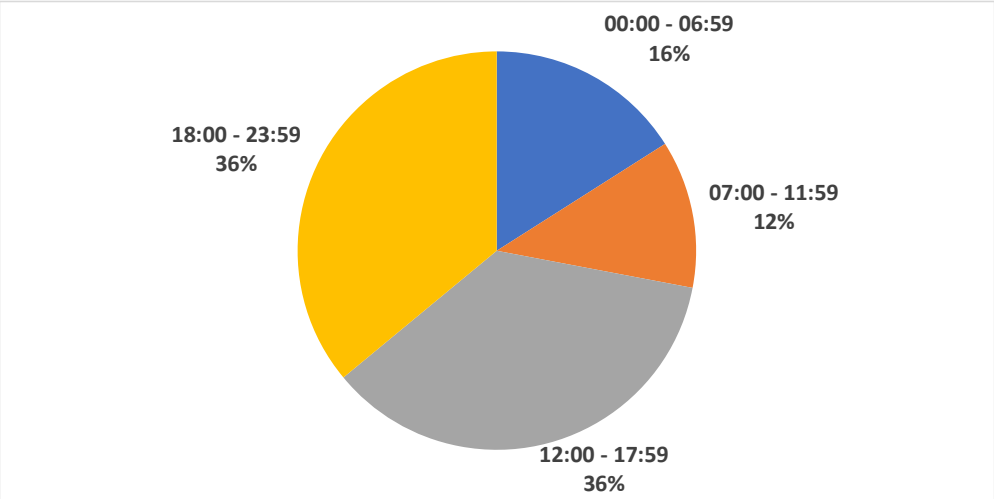
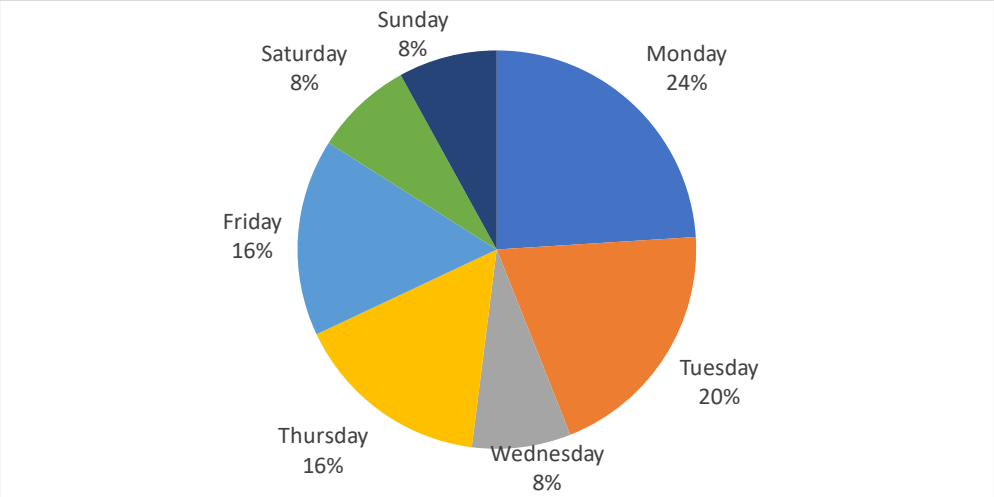


Figure 10 Collected RTC by day of the week



About 25% of the collected RTC were single crashes (Figure 11). This percentage is significant and is typical of low volume roads and of rural environments.

The majority of RTC involved motorcycles (18 out of 25 crashes). Private cars are involved in 11 out of 25 RTC (Figure 12). Few heavy vehicles have been reported in the collected data. This could be related to the main reported cause of crashes: speeding (heavy vehicles have usually lower speeds than motorcycles or cars, even on low volume roads).

Figure 12 also shows the number of vehicles involved in RTC. 35 vehicles were involved in the 25 collected RTC. Most vehicles were motorcycles (21 out of 35), followed by cars (11 out of 35). It is worth mentioning that most vehicles (especially the motorcycles) were used as taxi (more than 50% of vehicles).

Figure 11 Single vs multiple vehicle RTC crashes

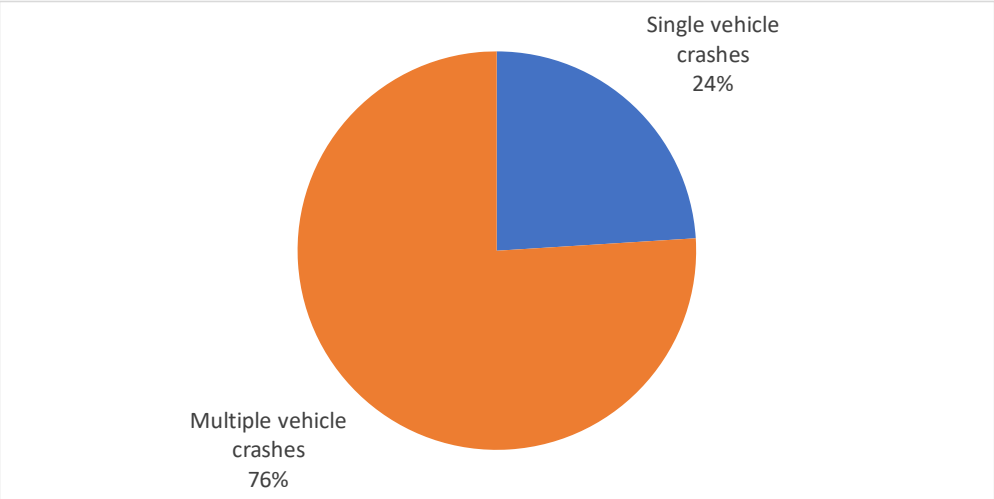
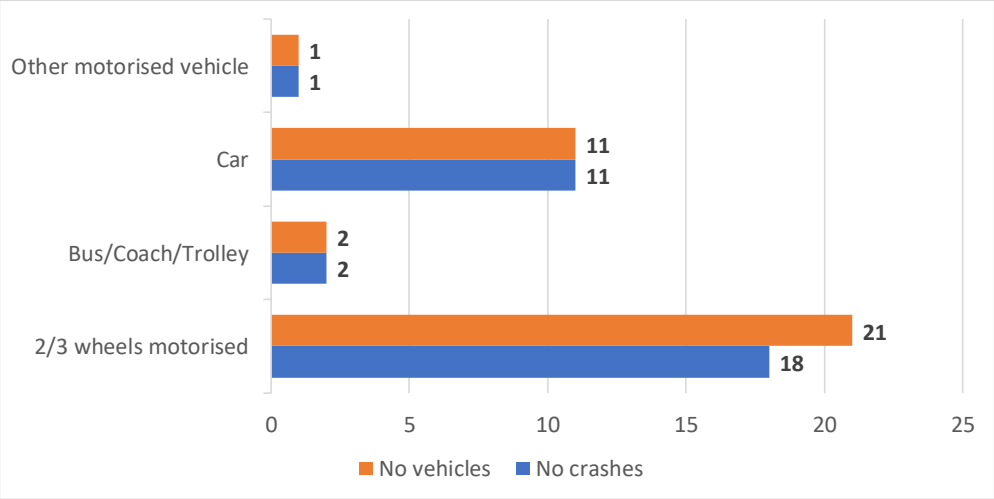


Figure 12 Number of RTC and vehicles by vehicle type



The collected RTC involved 44 persons. Most road users involved in the collected RTC were male. Only 23% of female were reported (Figure 13). While most persons involved in RTC were drivers (48% of road users), a high percentage of pedestrians have also been reported (about 23%). 29% of road users were passengers of a vehicle (often a motorcycle - Figure 14).

About 43% of RTC had serious consequences for road users involved. 14 out of 44 persons had serious injuries, while 5 out of 44 persons (about 11%) died to RTC (Figure 15). Only 8 persons had no injuries and 15 out of 44 persons had minor injuries.

These numbers result in a very high severity index (i.e. number of fatalities plus number of injuries divided by number of RTC). 34 casualties were reported for 25 RTC, leading to a severity index equal to about 136%. This means that about 1.4 people is injured or dies for each RTC.

It is worth mentioning that half of the road users involved in the collected RTC are vulnerable road users (i.e. pedestrians or motorcycle passengers - Figure 16). This is coherent with the high presence of motorcycles involved in RTC. However, 10 out of 44 road users were pedestrians.

Figure 13 Collected RTC by gender

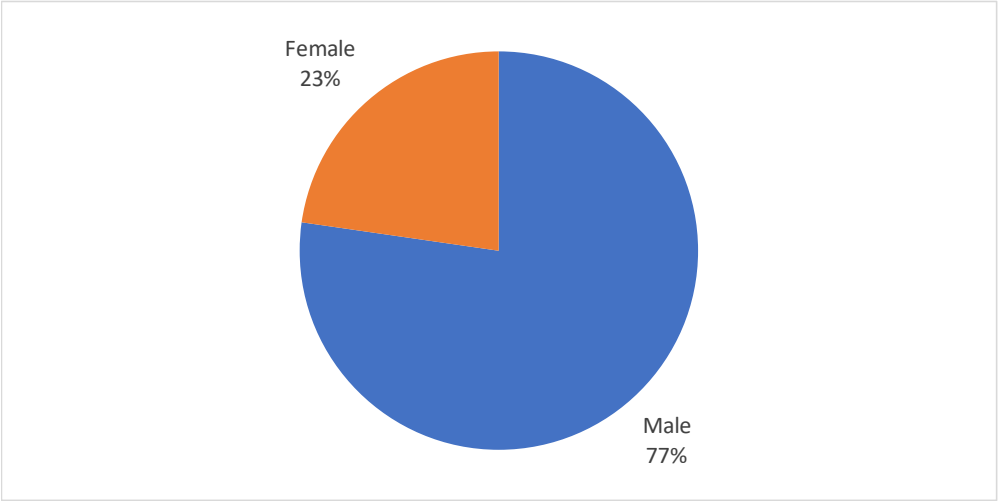


Figure 14 Collected RTC by road user type

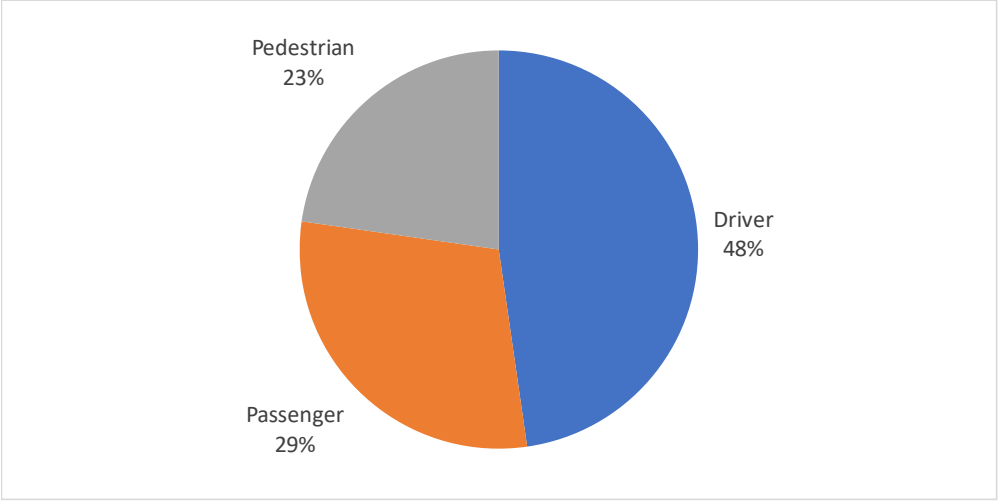


Figure 15 Collected RTC by injury type

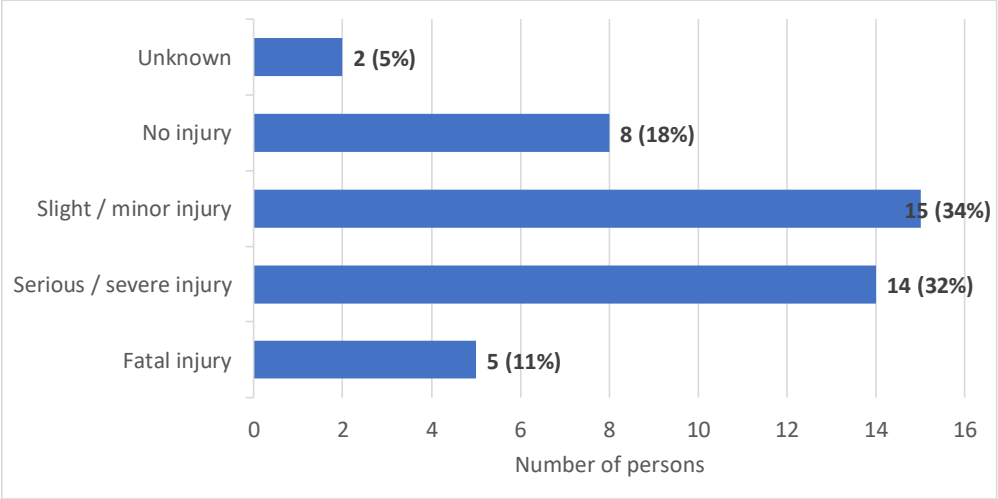
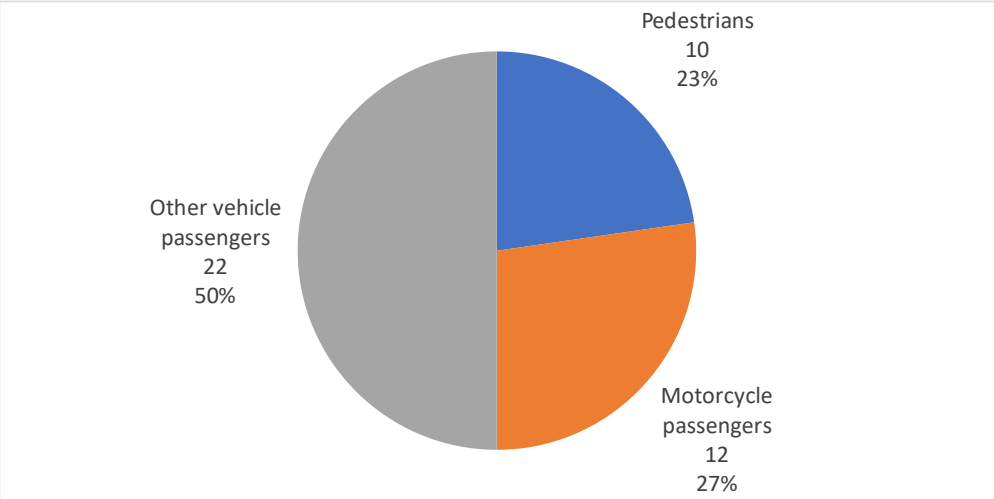


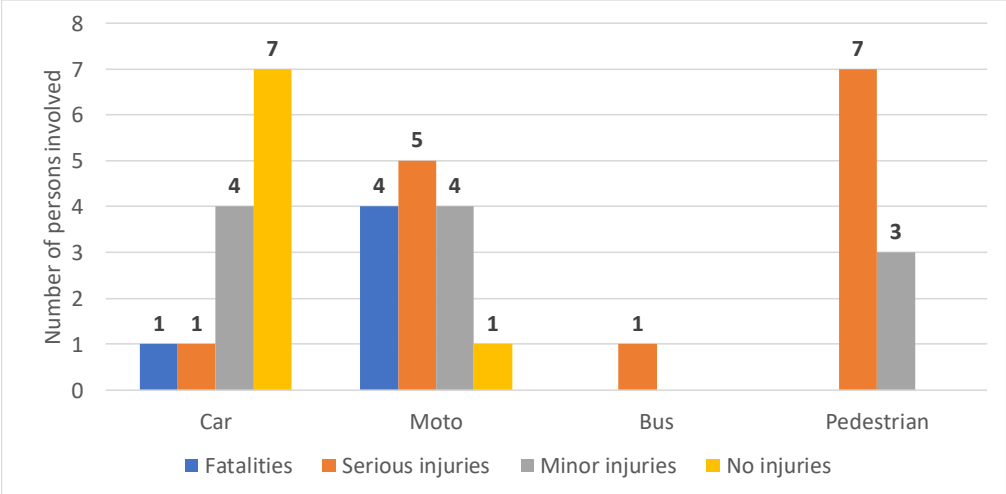
Figure 16 Vulnerable road users vs other road users



The analysis of RTC severities by transport mode (Figure 17) shows that most of the fatalities and serious injuries occur to vulnerable road users (i.e. moto riders / pillions and pedestrians): 80% of fatalities occur to moto riders / pillions, while 86% of serious injuries occur to moto riders / pillions and pedestrians.

The probability of being injured (including minor injuries) for moto riders / pillions and pedestrians is very close to 100%. Only one moto rider / pillion had no injuries. On the opposite, car drivers / passengers were mostly not injured in RTC or had minor injuries.

Figure 17 Persons involved in RTC by transport mode



Most of the persons involved in RTC were male (34 out of 44 persons). They were mainly drivers or riders of a vehicle (more than 60%). On the contrary no female drivers or riders were involved in RTC. 60% of them were passengers of a vehicle (Figure 18).

The distribution of RTC by type of road user and day of the week (Figure 19) shows differences between drivers / riders, passengers and pedestrians. While about 24% of drivers / riders had an RTC on Thursday, few passengers and pedestrians were involved in RTC on that day. The majority of passengers and pedestrians were mainly involved in RTC on Monday.

Figure 18 Gender of persons involved in RTC by road user's type

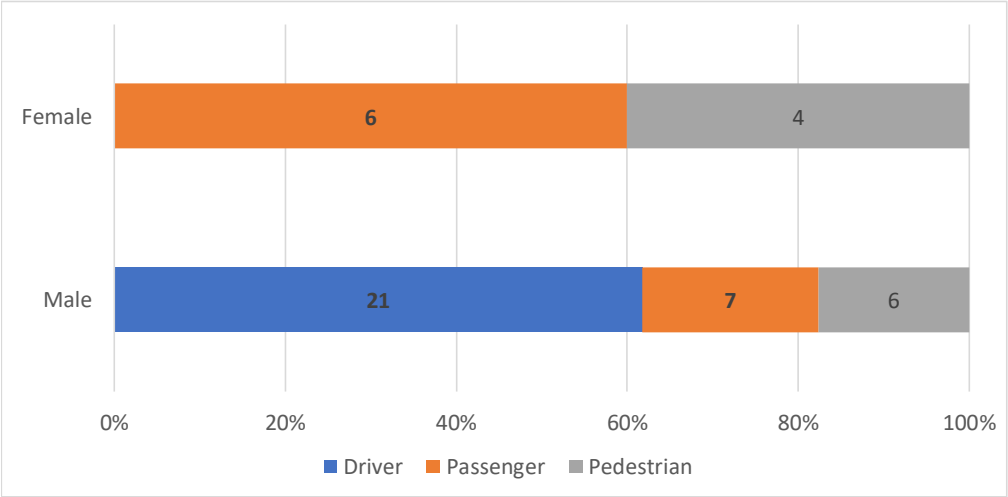
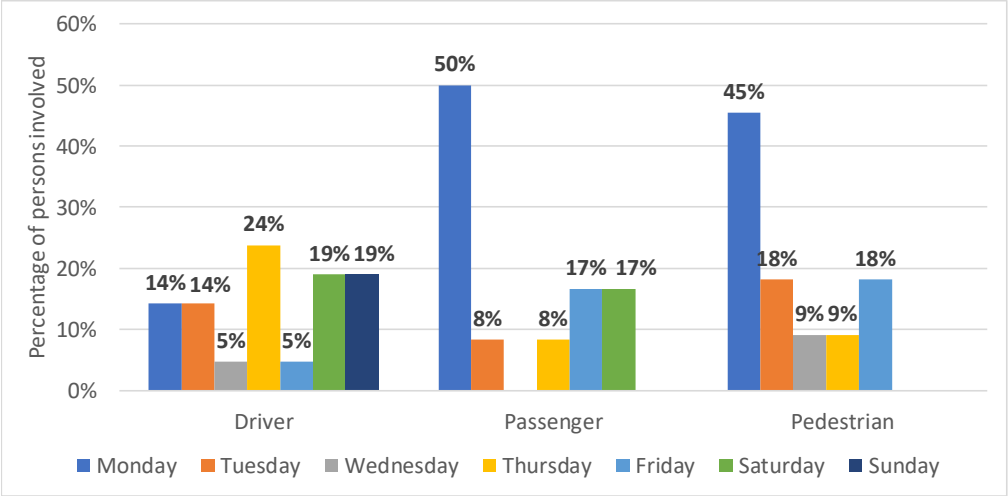


Figure 19 RTC by road user's type and day of the week



Most of the RTC (about 66%) occurred with a vehicle going straight forward or having a normal driving (Figure 20). Overtaking manoeuvre and changing lane contributed together to about 25% of RTC.

Another contributing factor for RTC was the non-use of safety equipment. About 38% of vehicle passengers (i.e. drivers, riders, pillions and car passengers) did not wear the seatbelt or a helmet (Figure 21). In some cases (6% of RTC) the information about safety equipment use was missing.

About half of the pedestrians involved in RTC were walking on the carriageway, while only 20% were crossing the carriageway (Figure 22). Probably the road infrastructures where RTC occurred had poor or no facilities for pedestrians (such as footpaths). It is worth mentioning that most of the RTC were collected outside urban areas, on low volume roads, and that over-speeding was reported as the main cause of RTC. The combination of these factors makes highly probable having an accident when walking on carriageway.

Figure 20 Percentage of RTC by vehicle manoeuvre

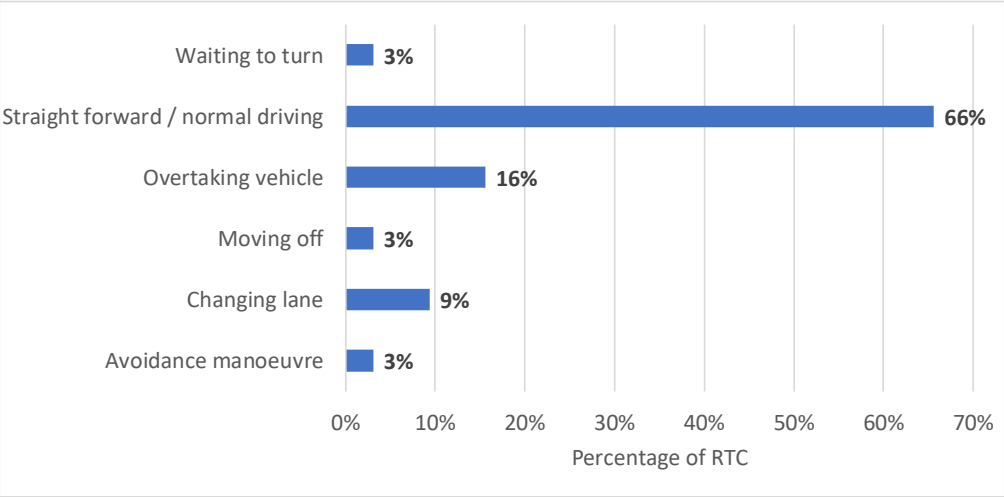


Figure 21 Percentage of RTC by safety equipment use

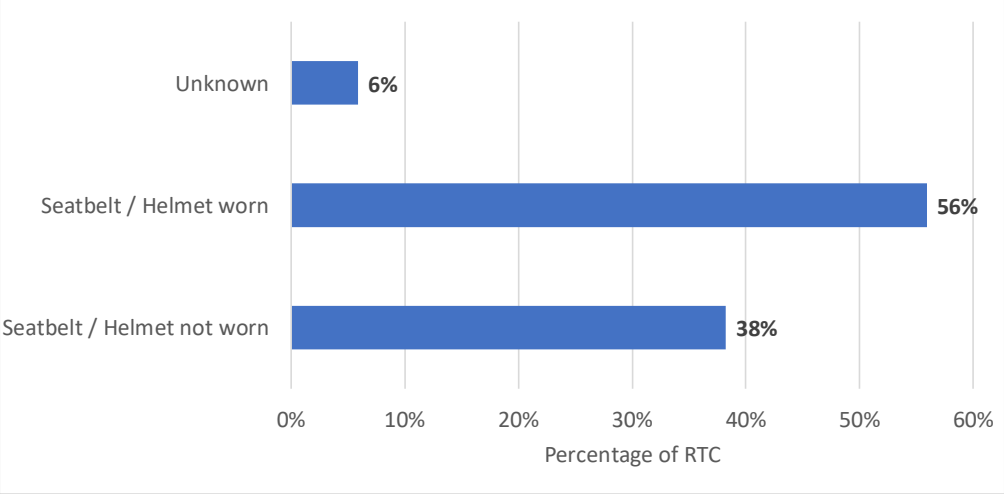


Figure 22 Percentage of RTC by pedestrian manoeuvre

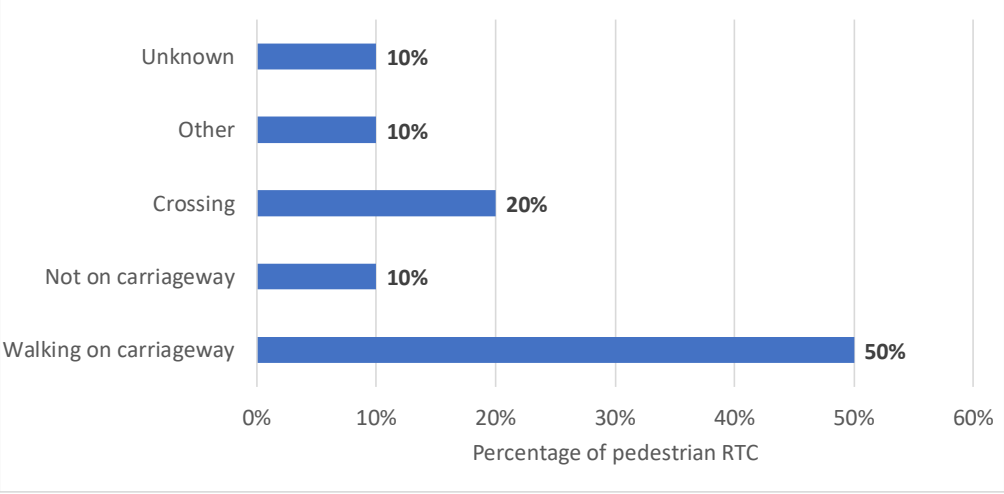


Figure 23 shows the percentages of RTC by type of road users and type of injuries as reported by health services. About 50% of drivers / riders had only minor injuries. However, about 25% of them had a head injury, while 13% had multiple fractures. Passengers of vehicles had mostly minor injuries (64%), while 18% of them had multiple fractures.

The situation of quite different for pedestrians. Only one out of five pedestrians had minor injuries. 40% of them had a multiple fracture or a leg fracture.

The type of injuries is strongly related with the type of vehicle used by road users (Figure 24). In fact, most of car drivers or passengers (67%) had minor injuries, while about 46% of riders or pillions had a serious injury (15% of them had a head injury or a multiple fracture).

Head injuries (occurred to riders or pillions) contributed to one third of fatalities, while the other fatalities recorded were due to multiple fractures (Figure 25).

Most of the serious injuries (56%) were associated by health services to leg fractures. One third of serious injuries were due to multiple fractures and 11% of them to head injuries.

Figure 23 RTC by road user's type and injury type

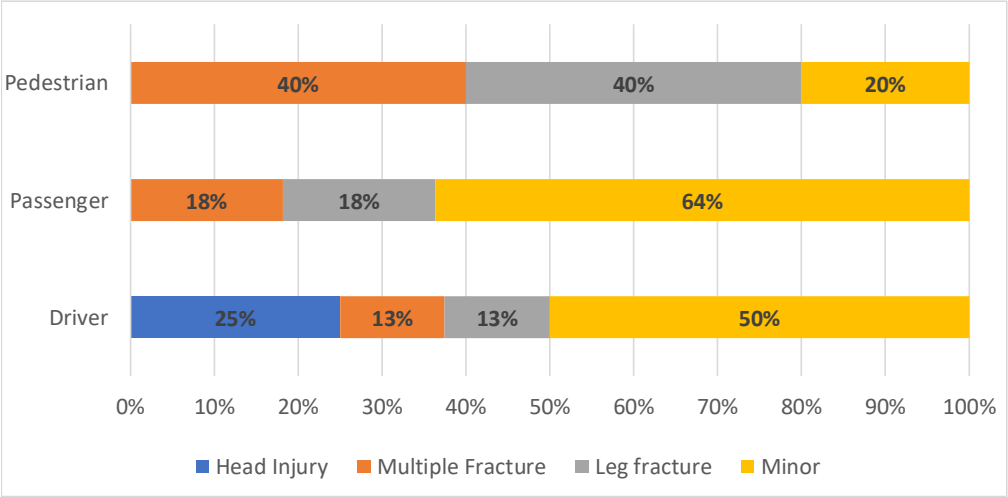


Figure 24 RTC by transport mode and injury type

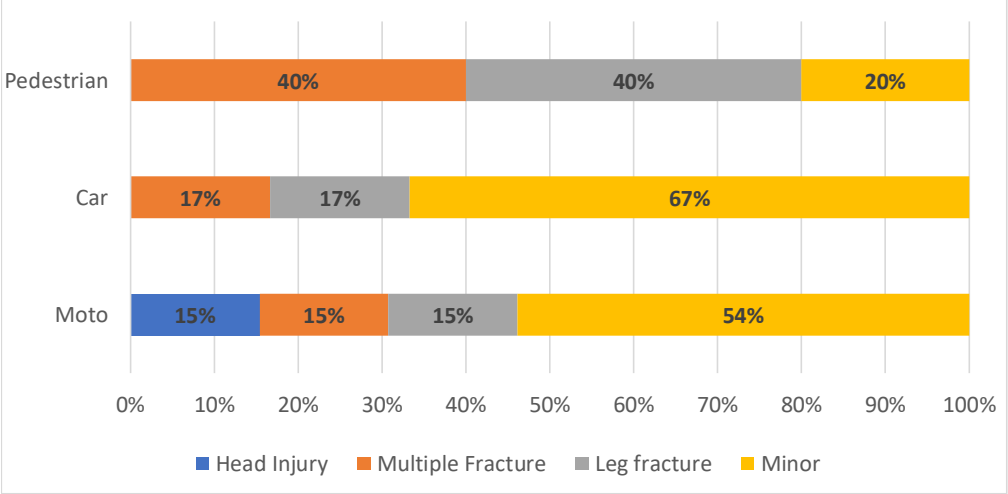
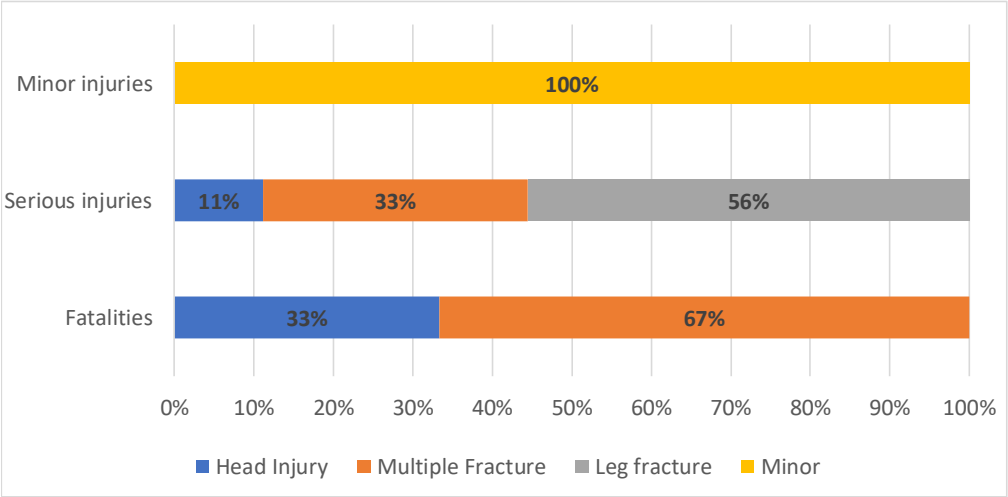


Figure 25 RTC by severity and injury type



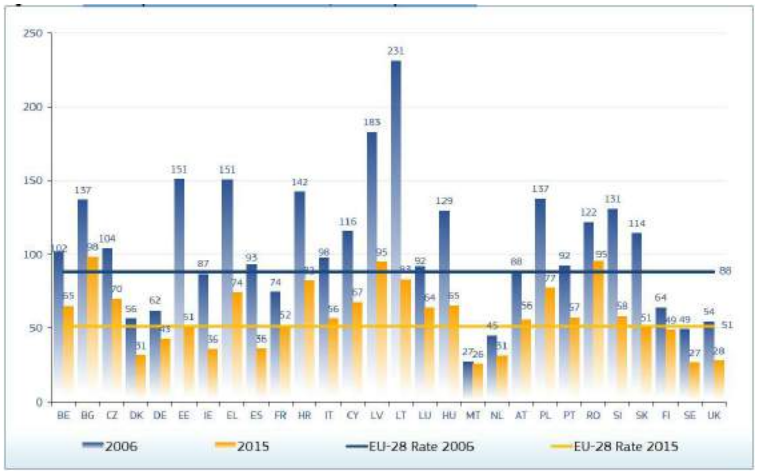
6 Data analysis framework

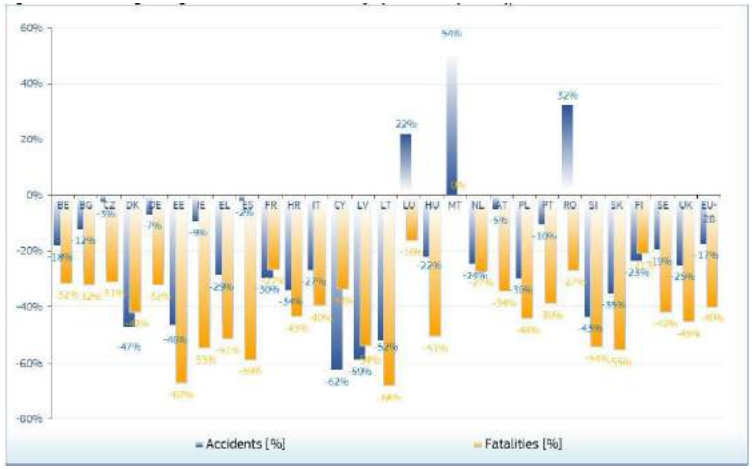
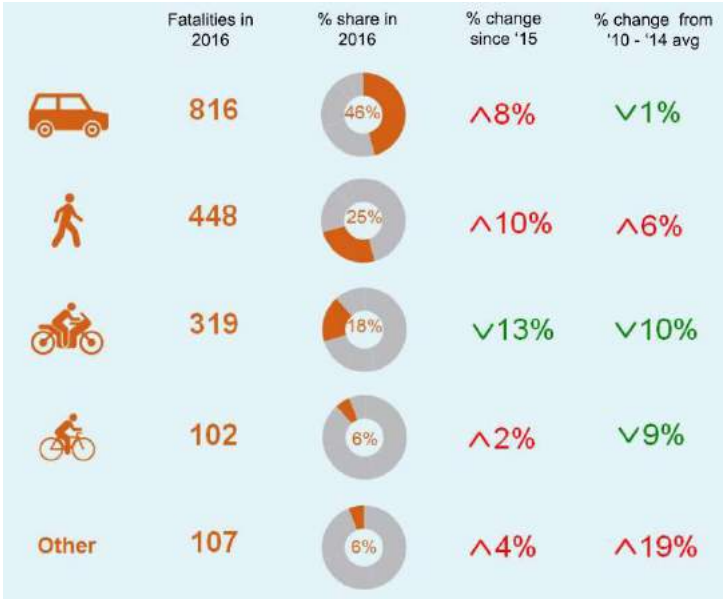
A framework for RTC data analysis was developed, based on the best international practices. Some RTC data analysis reports were assessed to verify what kind of information and analysis should be recommended for Sierra Leone. Especially reference was made to the annual report on road casualties from UK (1) and to the CARE reports included in the European Road Safety Observatory (2).

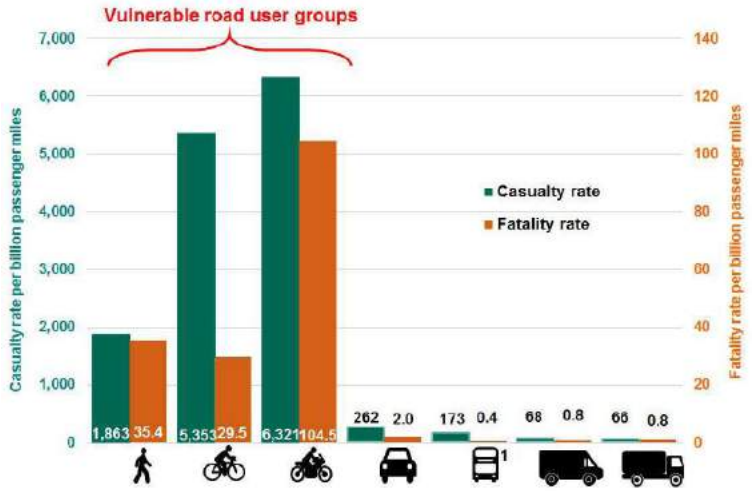
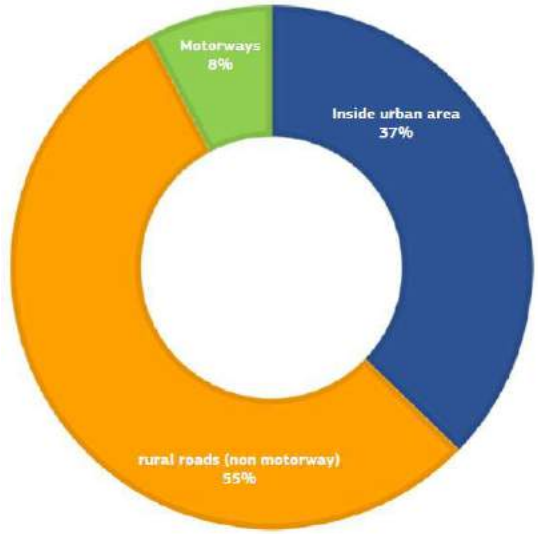
The data analysis framework is described in Table 6. Especially, the statistics that should be prepared are described, together with an example. All the statistics shown in Table 6 can be prepared as graphics or as tables with data.

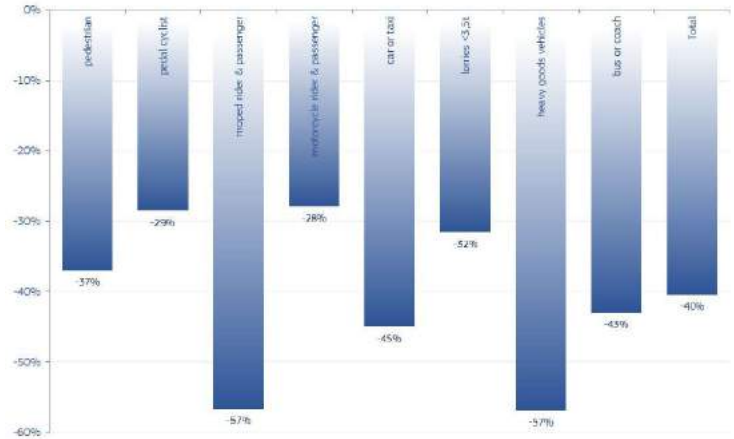
Despite the recommendations provided below, various statistics can be useful. Thus, these recommendations should not be considered restrictive.

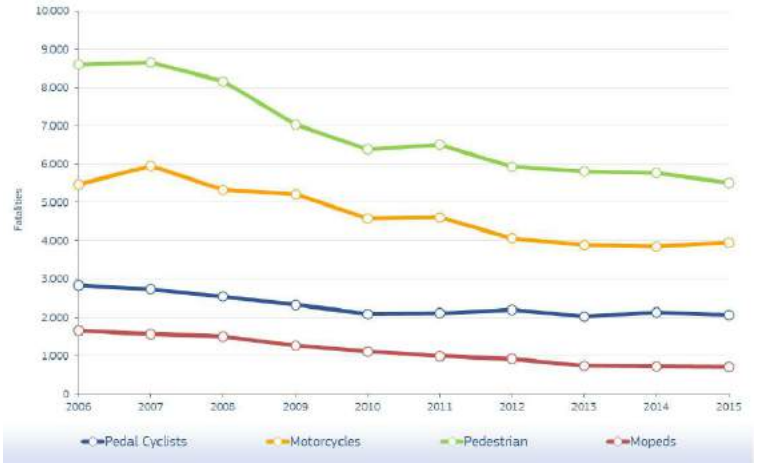
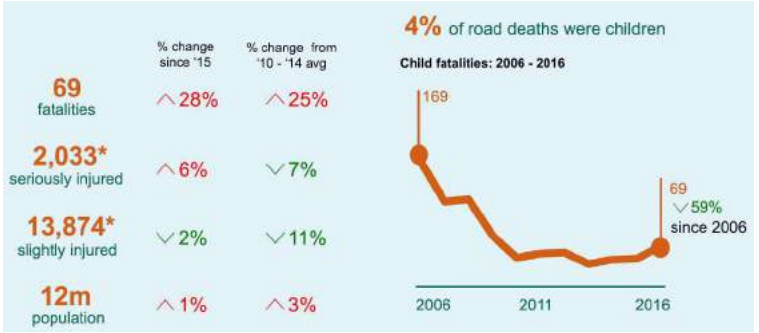
Table 6 RTC data analysis framework

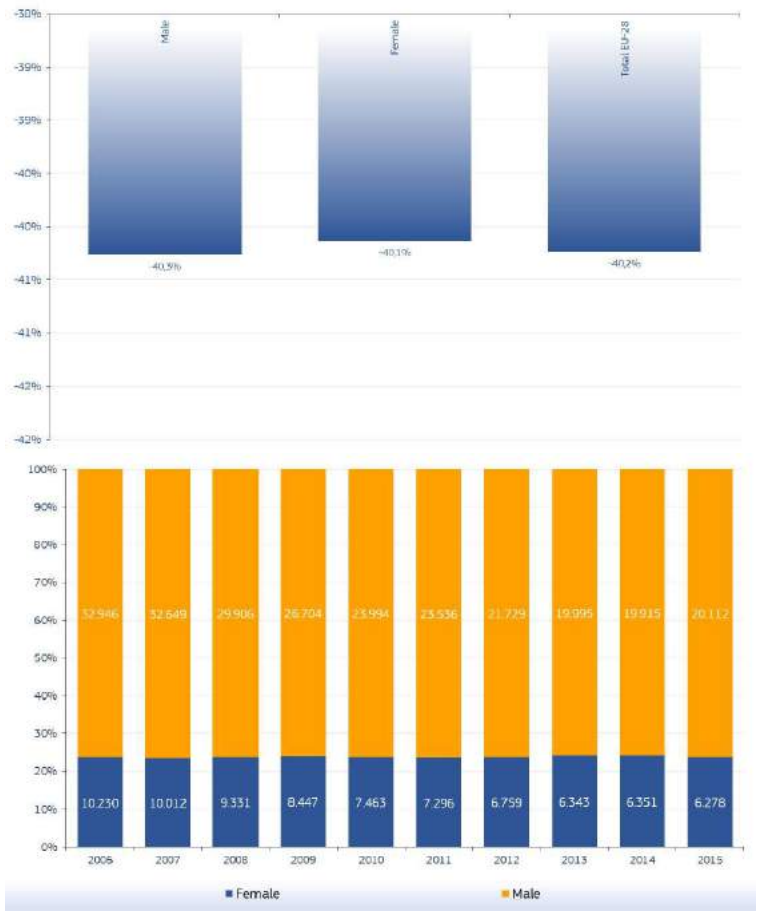
Statistic title	Description	Example
Trends of number of fatalities, injury accidents and injured people.	This statistic provides the annual number of fatalities, injury accidents and injured people in Sierra Leone for the last 10 years. If 10 years of data are not available, the maximum number of years possible should be provided. Since usually the number of fatalities has a different scale of values compared to number of injury accidents and injured people, respective values are reported on two different ordinate axes (see example on the right). Usually graphics with lines are used for this statistic.	 Source: Annual Accident Report 2017 (2)
Fatalities per million inhabitants in Sierra Leone (Fatality Rate)	This statistic compares the number of fatalities with the number of inhabitants. The fatality rate is given by: *(number of fatalities) / (number of inhabitants) x 1,000,000* The information can be provided for the whole country or for parts of the country (e.g. regions). The example on the right shows, for instance, the fatality rate for each European country for two years: 2015 and 2006 (vertical bars). It also shows the average European fatality rate for these two years (horizontal bars). A similar graphic could be done for Sierra Leone with reference to regions or provinces. Usually graphics with bars are used for this statistic.	 Source: Annual Accident Report 2017 (2)

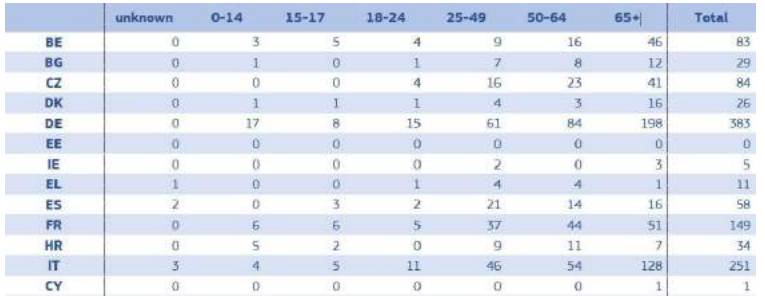
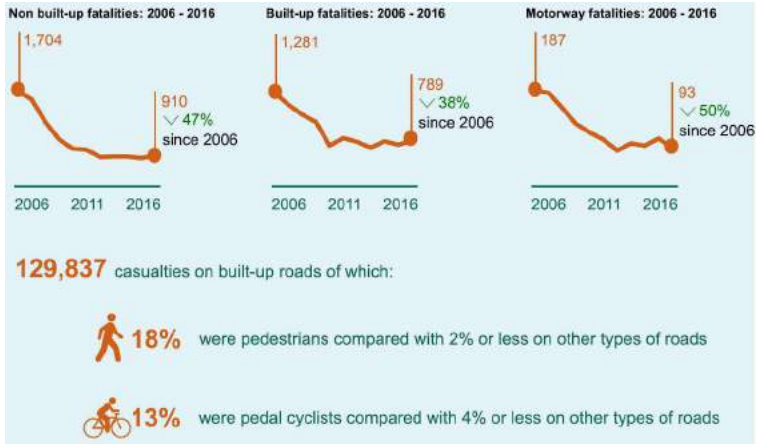
Statistic title	Description	Example
Percentage change in number of fatalities and injury accidents	This statistic compares the change in number of fatalities and injury accidents from a year to another. The percentage change is given by: *(number of fatalities of last year - number of fatalities of first year) / (number of fatalities of first year)* The information can be provided for the whole country or for parts of the country (e.g. regions). The example on the right shows, for instance, the percentage change for each European country from 2006 to 2015. The same statistic is provided for number of injury accidents (blue bars) and for number of fatalities (yellow bars). A similar graphic could be done for Sierra Leone with reference to regions or provinces. Usually graphics with bars are used for this statistic.	 Source: Annual Accident Report 2017 (2)
Fatalities by mode of transport	This statistic provides information on the fatalities by mode of transport and allows to immediately understand what mode is more exposed to fatal crashes. The example on the right shows the number of fatalities by mode, the share of fatalities of each mode compared to the total number of fatalities, the percentage change for each mode compared to the previous year and to some years before. The share of fatalities of each mode is given by: *number of fatalities of the mode / total number of fatalities x 100* These statistics can be provided using graphic bars or infographics (like the example on the right).	 Source: 2016 Annual Report UK (1)

Statistic title	Description	Example
Casualty and fatality rate per billion passenger miles by mode of transport	This statistic compares the number of fatalities or of casualties by mode of transport with the distance travelled annually with that mode of transport. The fatality rate per billion passenger miles is given by: *(number of fatalities) / (number of miles travelled) x 1,000,000,000* Usually graphics with bars are used for this statistic. It is worth mentioning that information on passenger miles is often hardly available in many countries.	 Source: 2016 Annual Report UK (1)
Share of fatalities by area type	This statistic provides an overview on where the RTC occur. The percentage of fatalities for each area type is especially provided. The share of fatalities by area type is given by: *number of fatalities of the area / total number of fatalities x 100* In Sierra Leone the area type is coded according to the following categories: 1) Motorway/freeway 2) Express road 3) Urban road, two-way 4) Urban road, one-way 5) Road outside a built-up area 6) Restricted road Categories 1) and 2) can be merged into “motorways”. Categories 3) and 4) can be merged into “inside urban area”. Categories 5) and 6) can be merged into “rural roads (non-motorway).	 Source: Annual Accident Report 2017 (2)

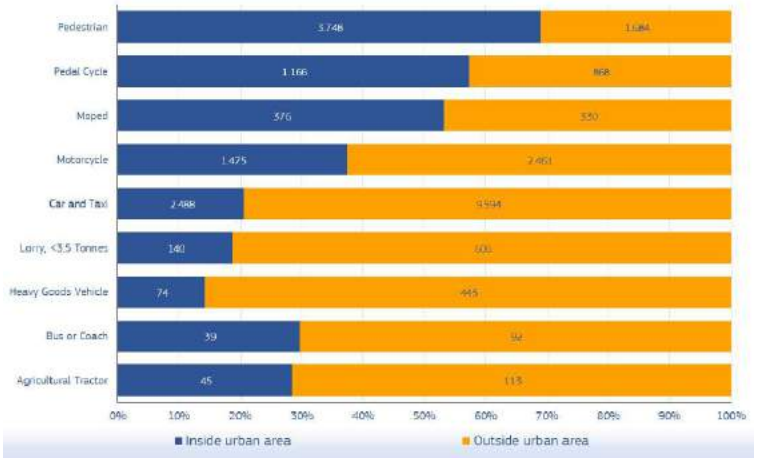
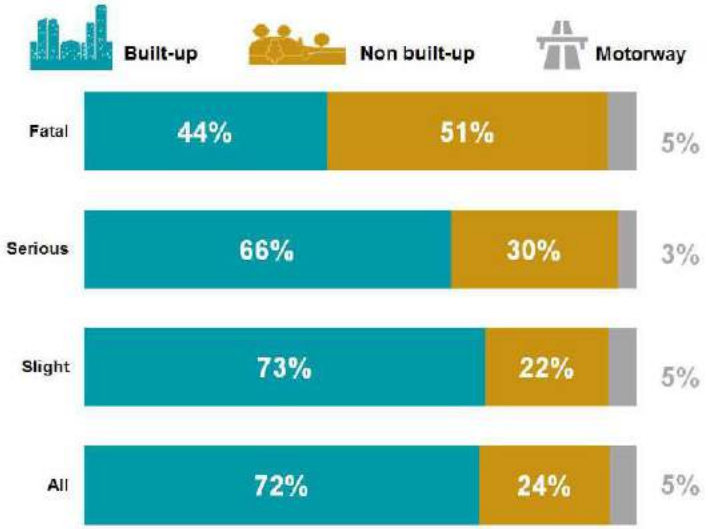
Statistic title	Description	Example
Distribution of male and female fatalities by road user type	This statistic puts together two information: the road user gender and the road user type (intended as driver or rider of a vehicle, passenger of a vehicle or pedestrian). The example on the right shows in the same graph: 1) The percentage of fatalities by road user type. 2) The number of fatalities by road user type. 3) The division of number and percentage of fatalities by gender.	 Source: Annual Accident Report 2017 (2)
Percentage change in number of fatalities by mode of transport	This statistic shows for each mode of transport the percentage change in the number of fatalities. It provides an immediate overview of the mode of transport that performed better from a year to another and of those that would need attention in future road safety interventions. The percentage change is given by: *(number of fatalities of last year - number of fatalities of first year) / (number of fatalities of first year)*	 Source: Annual Accident Report 2017 (2)

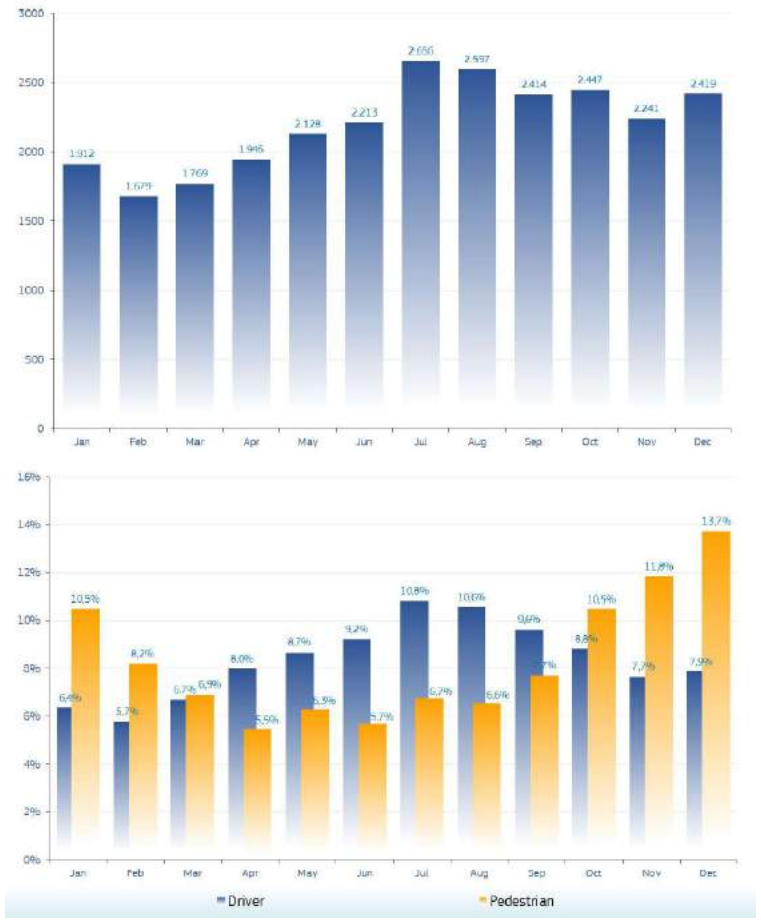
Statistic title	Description	Example
Annual number of fatalities by mode of transport	This statistic provides details about the evolution over the years of fatalities by mode of transport. Usually this is done only for the modes of transport accounting for most of fatalities or for specific road user categories (e.g. the vulnerable road users). For instance, in the top figure on the right, the trend of fatalities is analysed for bicycles, powered two-wheelers (motorcycles and mopeds) and pedestrians: i.e. the vulnerable road users. Other categories that are usually investigated due to their vulnerability in case of accident are: children (aged 15 or under) and elderly people (aged 60 and over). In the bottom figure on the rights, an infographic about children is shown, including the main information about number and trend of fatalities, percentage changes towards time periods.	 Source: Annual Accident Report 2017 (2)  Source: 2016 Annual Report UK (1)

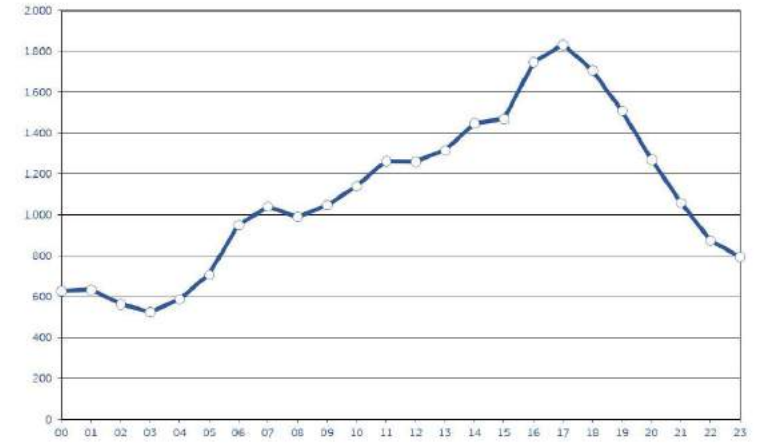
Statistic title	Description	Example
Number of fatalities by gender	This statistic provides information on gender of road users involved in road traffic crashes and their percentage change towards a period. Different kind of analysis can be done (as shown in the figures on the right): - The percentage change for male and female road users from a year to another (typically the last 10 years – top figure). - The annual distribution of fatalities by gender (bottom figure).	 Source: Annual Accident Report 2017 (2)

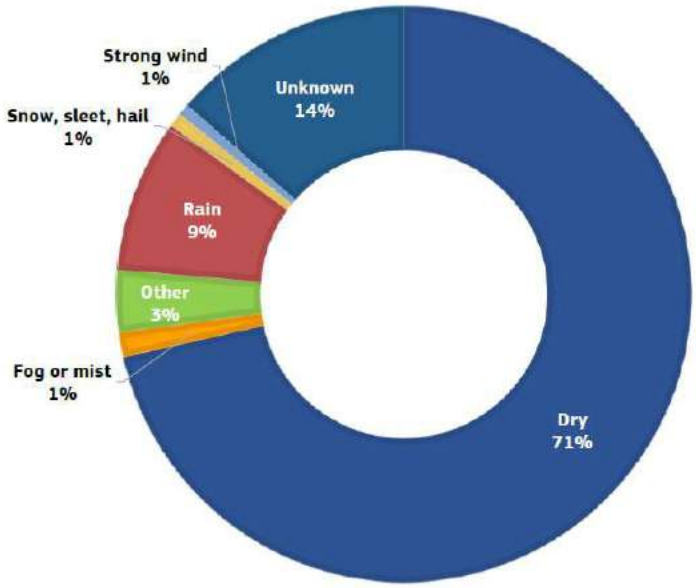
Statistic title	Description	Example
Number of fatalities by age	Similarly, to gender, statistics can be prepared for age periods and compared by mode of transport. The usual age period considered are: - From 0 to 14 years old. - From 15 to 17 years old. - From 18 to 24 years old. - From 25 to 49 years old. - From 50 to 64 years old. - Over 64 years old. The example on right shows the number of pedestrian fatalities by age group in some European countries.	 Source: Annual Accident Report 2017 (2)
Casualties by road type	Statistics can be provided considering the type of road where RTC occurred. Typical distinctions are made between non-built-up and built-up areas (or in some cases between urban and non-urban areas). Often also motorways are considered separately. The infographic on the right provides different kind of information: trend of fatalities by road type, details of casualties in built-up roads by road users type. Often, information on road type and on mode of transport can be assessed together, to better understand on which roads some road user categories are more involved in RTC (see example on the right – central figure). Statistics can also be prepared comparing casualties by severity and road type (see example on the right – bottom figure)	 Source: 2016 Annual Report UK (1)

	unknown	0-14	15-17	18-24	25-49	50-64	65+	Total
BE	0	3	5	4	9	16	46	83
BG	0	1	0	1	7	8	12	29
CZ	0	0	0	4	16	23	41	84
DK	0	1	1	1	4	3	16	26
DE	0	17	8	15	61	84	198	383
EE	0	0	0	0	0	0	0	0
IE	0	0	0	0	2	0	3	5
EL	1	0	0	1	4	4	1	11
ES	2	0	3	2	21	14	16	58
FR	0	6	6	5	37	44	51	149
HR	0	5	2	0	9	11	7	34
IT	3	4	5	11	46	54	128	251
CY	0	0	0	0	0	0	1	1

Statistic title	Description	Example
		 Source: Annual Accident Report 2017 (2)  Source: 2016 Annual Report UK (1)

Statistic title	Description	Example
Various periods of time (month, day of week, hour of day)	Statistics can be prepared for various periods of time, such as: - Months. - Day of week. - Hour of day. Some examples are shown on the right. Sometimes it is useful to assess together the RTC by month and the road user type (passenger of a vehicle vs pedestrian). Usually the trends of RTC or of fatalities over the months are very influenced by the distances travelled by road users by foot or by vehicle. The third graphic on the right shows the number of fatalities per day by road user type (driver, passenger, pedestrian). The fourth graphic on the right shows the trends of fatalities by hour of day. In this case it is relevant to know the RTC that occur during night hours.	

Statistic title	Description	Example
		  Source: Annual Accident Report 2017 (2)

Statistic title	Description	Example
Number of fatalities by weather conditions	This statistic provides the percentage of fatalities (or of RTC) for various possible weather conditions. It is useful to understand if adverse conditions have an influence on RTC.	 Source: Annual Accident Report 2017 (2)

7 Accident data management system

An accident data management system was developed by adapting and integrating two already existing information systems:

SFINGE is a web-based modular software allowing for the collection and analysis of RTC data and for geo-coding of data on maps (Figure 26). It is developed by the private company I.T. Ingegneria dei Trasporti Srl, based in Italy.

Safety Manager is a web-based information system allowing for storage, management and detailed analysis of RTC (Figure 27). It is developed by the Research Centre for Transport and Logistics of "Sapienza" Università di Roma, based in Italy.

Figure 26 Outline of SFINGE modules

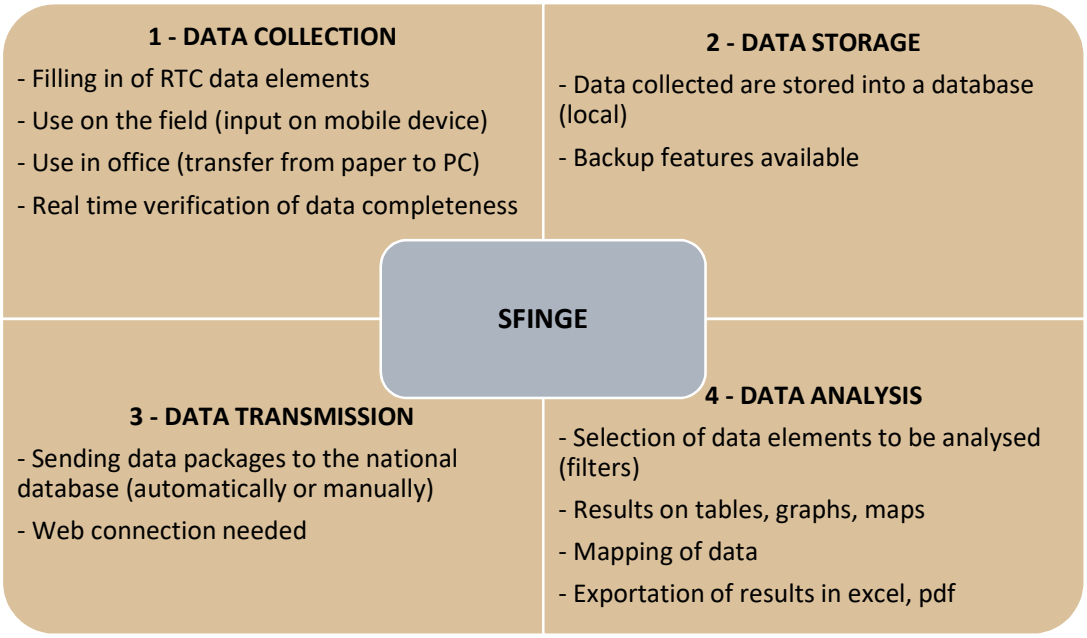
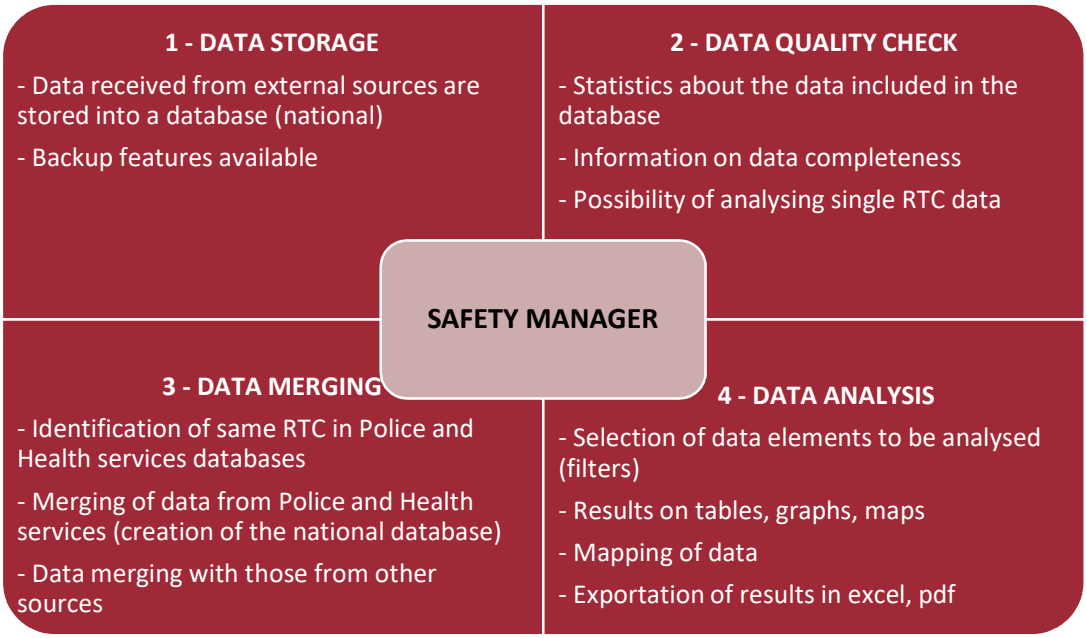


Figure 27 Outline of SAFETY MANAGER modules



The following sections describe the functions and capabilities of the two software composing the accident data management system.

The system is accompanied by user manuals in English (see Annex 3, 4 and 5). The user manuals are also integrated directly inside the software.

The two software are integrated in order to facilitate the transmission of data between the entities charged with the collection and management of RTC data (SLRSA, SLP, health services) and those charged with RTC data analysis (SLRSA, SLRA, SSL). Data exchange protocols between the entities are embedded into the software.

The accident data management system was adapted to the specific context of Sierra Leone based on:

- The RTC data collection form designed for Sierra Leone (in terms of software interface, database organisation, statistical analysis.
- Integration of the RTC data database embedded into the software with existing databases on vehicle registration and driver licences available at SLRSA.

7.1 SFINGE

SFINGE is a modular software supporting technicians and decision makers for:

- The RTC data collection from the field (using, for instance, a personal computer, a tablet or a smartphone).
- The management and processing of the data and their storage (i.e. capture of RTC data collected on paper using a data collection form).
- The analysis of data included in the RTC database to make statistics.
- The data transfer to a “central” database (e.g. national database hosted at SLRSA).
- The data geo-referencing on a map (e.g. Google Map or others) in order to precisely place RTC on the road network.

SFINGE is a web application with the advantages of ease of use interface.

SFINGE does not need complex installations and is compatible with the main internet browsers (e.g. explorer, Firefox, chrome, safari, etc.). It can also be used in tablets and smartphones. It utilises a Web and SQL server architecture for the data storage.

SFINGE includes an interface allowing for rapid capture of all the information related to an RTC. Thanks to the “smart modality”, different police officers or health service personnel can work at the same time on the same RTC using different devices. This increases the execution rapidity for collection and finalisation of RTC.

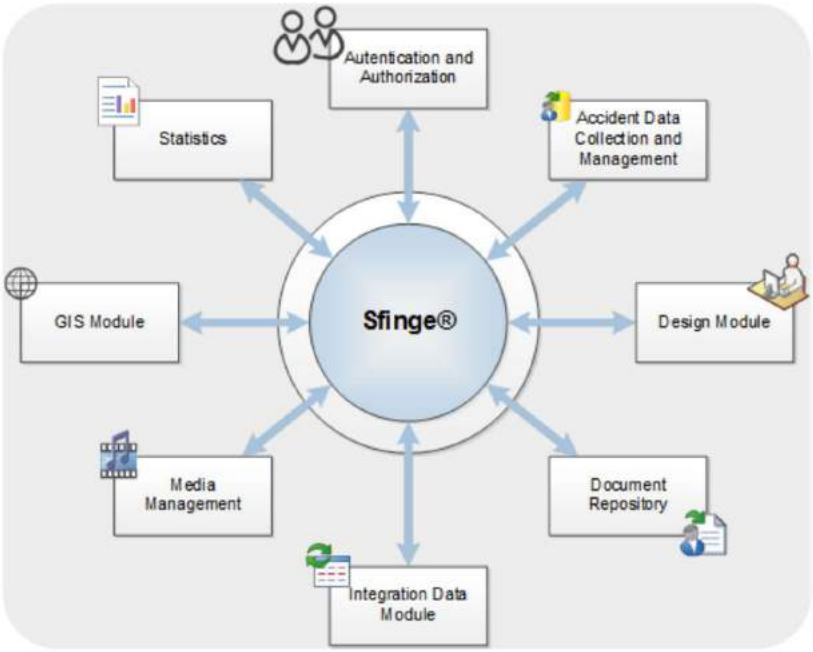
SFINGE interface allows for verification of exactitude of the collected variables through automatic control procedures of stored data. This function provides in real time the status of information (e.g. completeness, contradicting information) and warns about correction needs.

Thanks to a Geographic Information System (GIS) module integrated into the software, SFINGE can easily interact with road network information. Different research tools are available so that it is always possible to identify the RTC location on the road. RTC geo-referencing is possible thanks to a cartography including the whole national road network, so that an RTC can be located using the road name or zooming tools or just clicking on the road.

SFINGE also includes a module for data extraction set up for transmission of data to other entities.

Figure 28 shows the main functions of SFINGE.

Figure 28 Functions of SFINGE

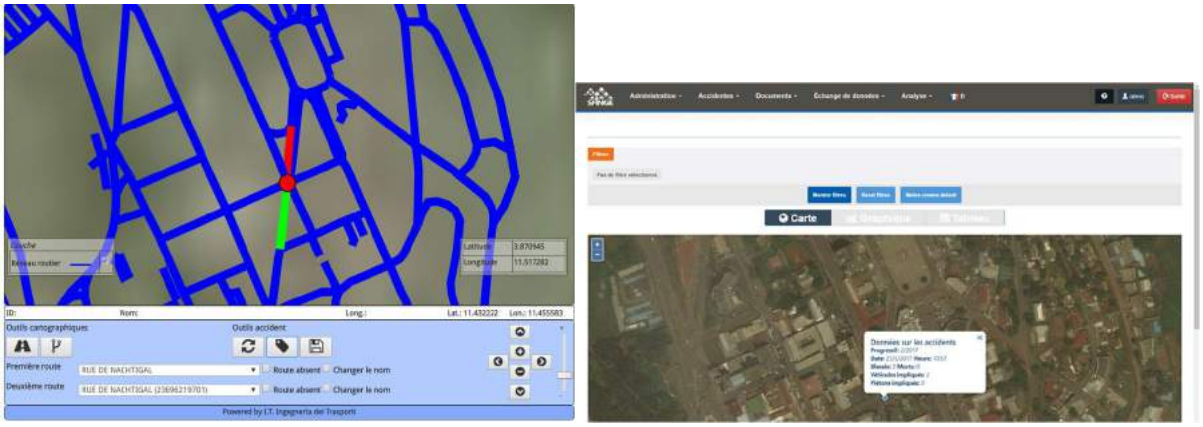


For the geographic location of RTC two modalities are integrated:

- A normal window for geo-referencing using a graph representing the road network.
- An online cartography (Google, Bing, OSM, etc.).

The combination of these two modalities allows for a high precision of RTC location while simplifying searching and identification of the crash location. The result is a location on the graph and at the same time on an aerial photo of the area (Figure 29).

Figure 29 RTC location on graph and on cartography

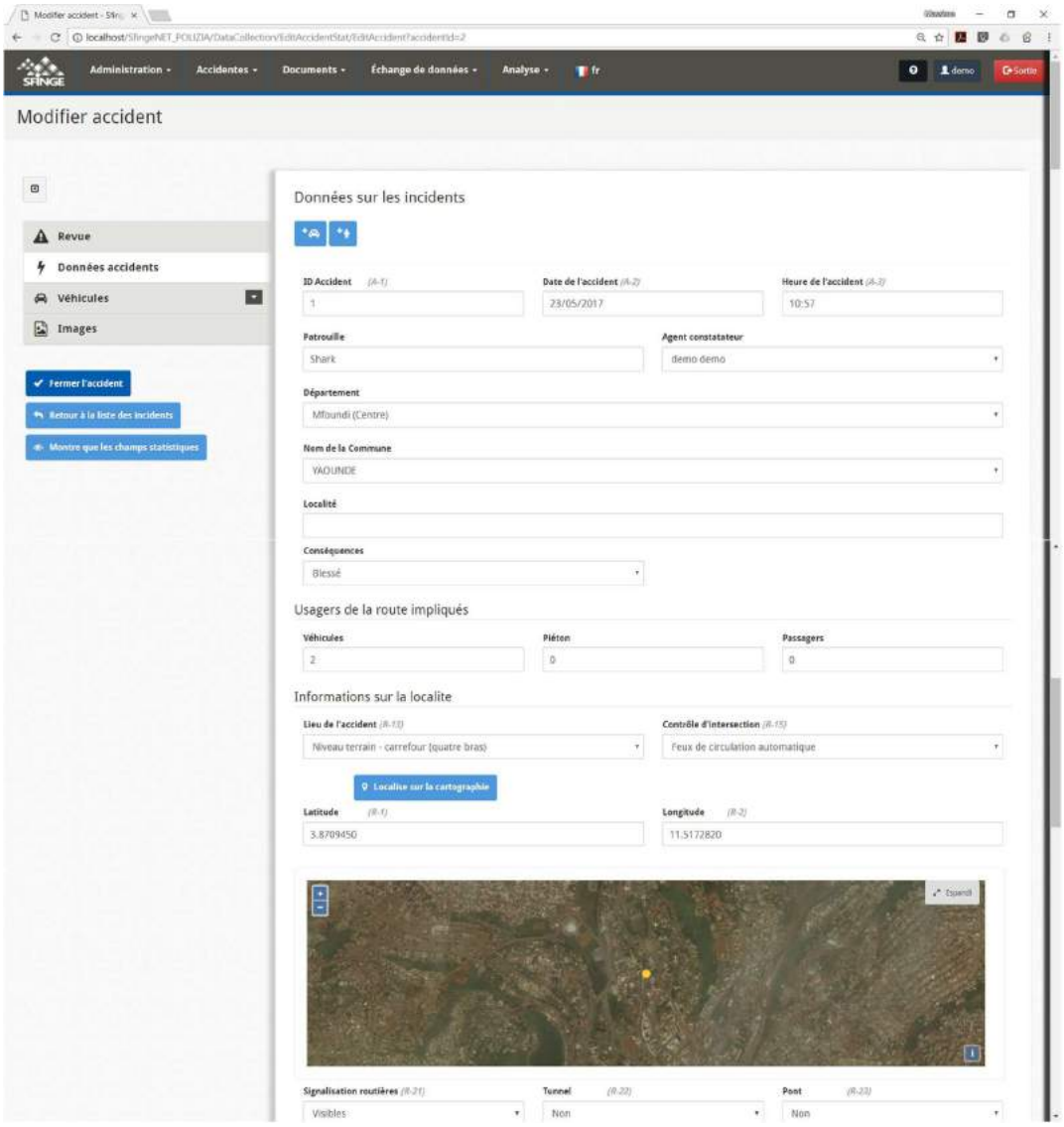


SFINGE can be used by:

- SLRSA and SLP for RTC data collection directly in the field or in the office (after collection of data on paper).
- Health services (hospitals, emergency centres, mortuary department) to collect data on injured or dead persons.

The software can be used everywhere to store data directly in the central database of an entity. In this way the data can be immediately treated by the central offices (Figure 30).

Figure 30 RTC data collection



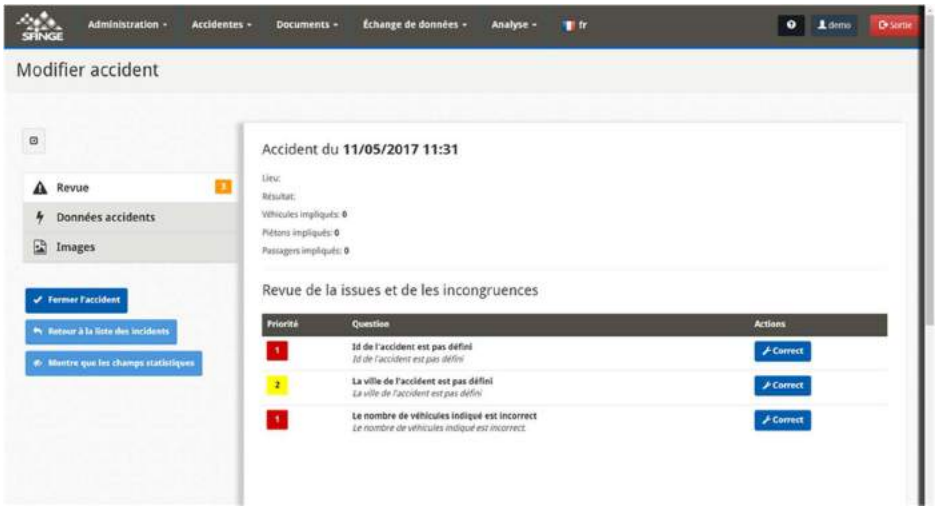
The software also includes functions for RTC data analysis (similar to those included in SAFETY MANAGE – see section 4.2). These functions can be used by the single entities (e.g. SLP or health services) to prepare periodic reports, statistics or studies on RTC. Data can be analysed on map, graphics or tables.

Several tasks are simplified thanks to automatic functions:

- Data transfer to the national database.
- Preparation of statistical reports.
- Creation of maps on RTC.
- Management of users and of authorisations.

In each window used for data storage a data verification is associated allowing for exhaustivity and coherence controls. The user has a list of warnings and issues that need to be corrected (Figure 31).

Figure 31 List of warnings and issues

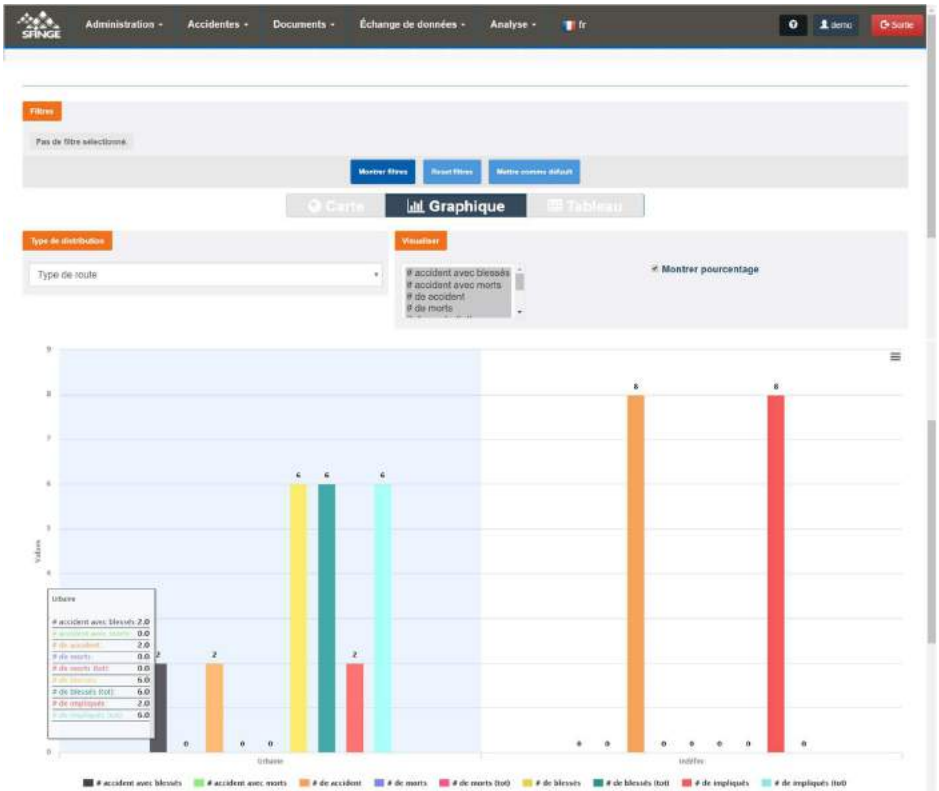


A description or a legend is associated with each form so that recognition of its content is simplified.

The data archives are protected by passwords provided to single users. The tasks of each user can be defined by an administrator. For instance, it is possible to decide who can insert an RTC and who can manage the data verification and transmission to the national database.

SFINGE integrates functions to create reports and statistics. The interface is interactive and allows to easily create all kinds of reports needed, as well as all the statistical analysis on map, graphics or tables (Figure 32).

Figure 32 Creation of reports and statistics



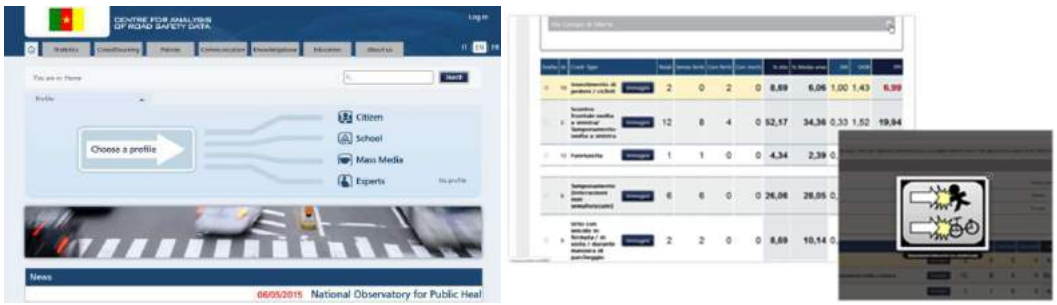
7.2 SAFETY MANAGER

SAFETY MANAGER is a web-based information system supporting the activities of RTC analysis centres or those of road safety authorities. The software allows to manage the tasks related with acquisition, management and analysis of RTC data, as well as to plan road safety interventions.

The following functions are available (Figure 33):

- **Data acquisition and management**: to create new RTC forms, to export and import data from external sources (SLP, health service, etc.).
- **Database management**, for archives updates.
- **Road safety studies**: definition of RTC data subsets, elaboration of graphics (maps), preparation of reports, descriptive analysis of RTC.
- **Selection of road safety interventions**: creation of projects to select interventions, identification of critical road infrastructure elements, identification and classification of RTC, identification and selection of RTC causes, identification and selection of solutions, economic assessment of solutions.

Figure 33 Example of SAFETY MANAGER



Data acquisition and management

RTC data must be uploaded and management through a dedicated interface providing tools for monitoring the database status and controlling all tasks related to addition, modification and elimination of data.

The software is equipped with a management module to read information. It includes tools to import RTC data, for instance from a text file correctly formatted or through a database (e.g. compiled using SFINGE).

The upload process performs all the necessary verification on data coherence and exhaustivity to avoid instability situations or lack of compatibility between databases or simply to avoid that the same data are uploaded several times.

A specific function to merge the data collected in the field (by SLRSA and SLP) and inside the health services (for persons injured in RTC) is also included in this part of SAFETY MANAGER.

The acquisition and management module includes the following functions:

- Visualisation and configuration of data acquisition process.
- Visualisation and management of connections.
- Management of RTC list.
- Association of an RTC to a road element.
- Association of a crash pattern to an RTC.
- Control about data exhaustivity and coherence.
- Acquisition of data from external sources (e.g. SLRSA databases).
- Merging of data from SLP, SLRSA, health services to eventually correct them based on injury severity (especially for persons died within 30 days after the RTC).
- Notification of errors in the uploaded data.

Database management

RTC data can be analysed together with other data. This especially includes information on:

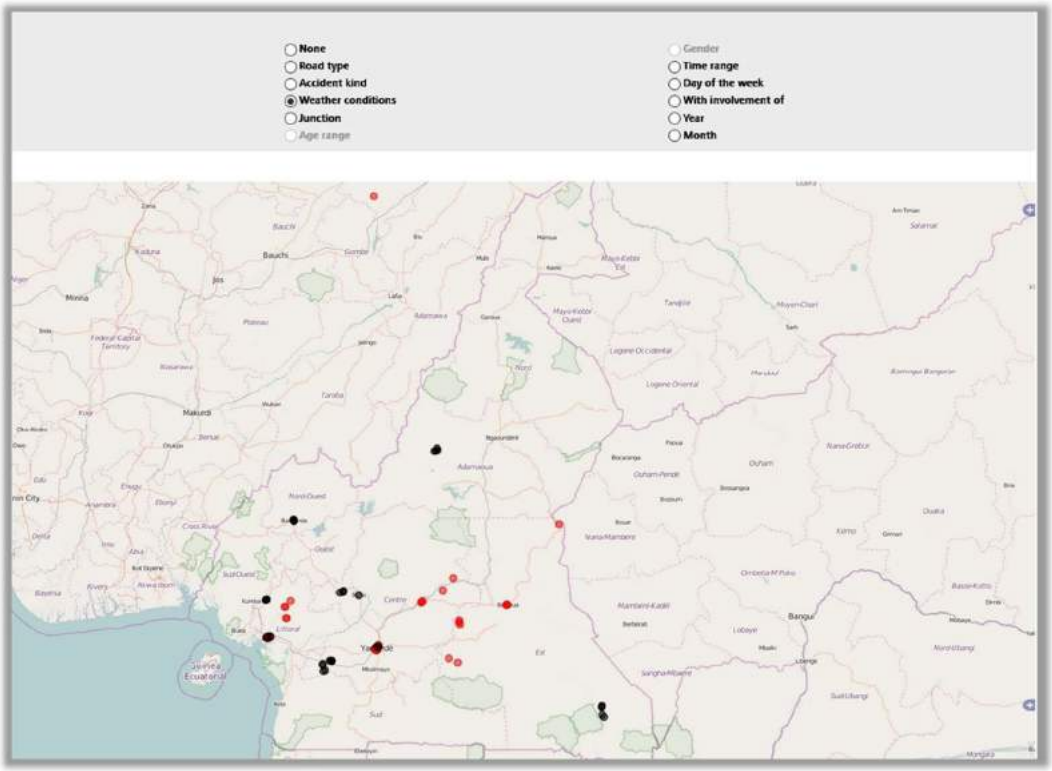
- **Road network**: needed to correlate RTC with road elements and to classify them according to a priority scale.
- **Geographic data**: database with other information related to risk factors, socioeconomic characteristics, etc. are needed for a more extended analysis of the road safety phenomenon.
- **Traffic flow data**: this information concerns the road network use and other similar variables.

All this information can be uploaded in SAFETY MANAGER when available. For the pilot study, information on vehicle registration and driver licences, available at SLRSA, are imported into the software and merged with the collected RTC data.

Road safety studies

Road safety studies allow to analyse RTC in an aggregate manner, as well as to assess their spatial and temporal distribution. SAFETY MANAGER supports such kind of analysis through maps and graphics (Figure 34).

Figure 34 Example of map on SAFETY MANAGER



The software allows to make analysis concerning crashes, vehicles and persons involved. It especially provides the following kind of analysis:

- RTC severity (casualty crashes and no consequences).
- Transport mode (RTC with at least one pedestrian or vehicle).
- Road type (urban, rural, motorway, low volume).
- Impact type (rear end, head on, lateral, etc.).
- Weather conditions (clear, rain, etc.).
- Junction type (crossroad, roundabout, T, etc.).

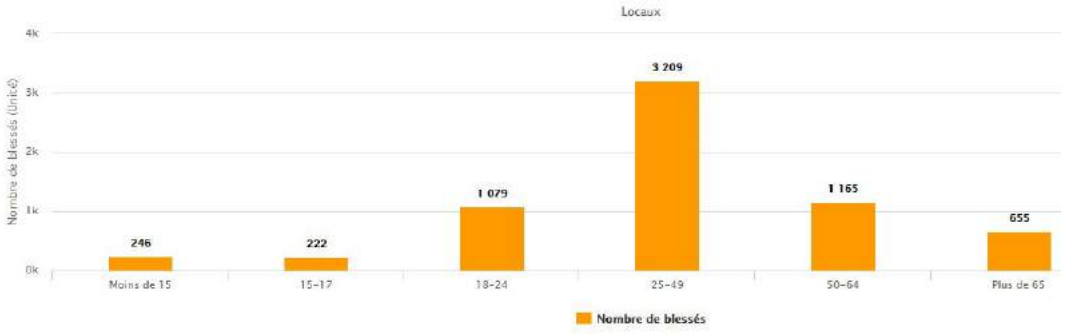
- Temporal characteristics (time of day, day of week, month - Figure 35).
- Age of persons involved (Figure 36).
- Gender of persons involved.
- Etc.

All the data elements included in the RTC data collection form can be analysed singularly or in combination with other data elements.

All the analysis can then be downloaded in different formats (excel, pdf).

Figure 35 Example of RTC by day of week on SAFETY MANAGER

Figure 36 Example of RTC by age on SAFETY MANAGER



Selection of road safety interventions

The process for selection of interventions is based on the observed RTC and entails the knowledge of some information on the road network.

The process can be applied to:

- All road network elements where RTC occurred.
- A subset of the road network (e.g. all the intersection with four legs).
- A road path, i.e. a corridor composed of road sections and junctions.

The process implemented in SAFETY MANAGER is based on the international literature and on recent research results (e.g. SEMCOG Traffic Safety Manual, Highway Safety Manual).

The process entails the following tasks.

<u>Management of intervention selection projects</u>

An intervention selection project includes all the information related to the analysis task aimed at an economic decision and at the assessment of a set of countermeasures. The user has an overview of:

- The four phases of the process.

- A list of projects previously performed with the indication of their status (e.g. concluded, in progress).

The user can:

- Select and open the final report of a completed project.
- Select and open a project in progress.
- Select and delete a project.
- Create a new project.

Identification of the critical road network elements.

The process for selection of road safety interventions follows the following phases:

- Phase 1: selection of the analysis approach – aggregated or disaggregated.
    - Synthetic information from the RTC database are shown: number of RTC data available, RTC crash type, etc.
      Based on the number of RTC data by road network element, the software suggests the type of analysis to be performed (aggregated or disaggregated).
- Phase 2: specification of the parameters for identification of critical road network elements (black spots).
    - Before to proceed with critical road element classification, the user must specify:
        - The RTC to be analysed based on severity (all RTC, fatal crashes, casualty crashes).
        - The analysis period (by default the last five years are considered, if data are available).
        - The type of road elements to be analysed: road section or junctions.
        - The analysis method: frequency method, rate method, probability index method.
- Phase 3: analysis and presentation of results.
    - A table is shown with a row for each road element analysed and classified based on the analysis method selected.
      The following columns are shown:
        - Road name (or roads when the junctions are analysed).
        - Road section length.
        - Road or junction regulation type.
        - Number of RTC detected during the period selected.
        - Value of the selected severity indicator.
        - Link to a map showing the road element location.
- Phase 4: analysis of the probable RTC causes.
    - Three main steps are considered:
        - Crash pattern identification.
          Based on RTC characteristics and on the observed RTC rates, the software provides a table with the more significant crash patterns.
          On columns, for each crash pattern, the following information is provided: number and percentage of RTC associated with the crash pattern, the percentage observed for similar sites, the result of a significance test.
          The more important crash patterns are highlighted so that the user can select one or more crash pattern to be analysed.
        - Identification of possible RTC causes.
          The software shows a list of possible causes associated with the selected crash patterns. The user can choice the causes that can be applied to the specific case.
        - Road safety inspection (eventual).
          If the user cannot clearly identify from the suggested list the causes to be applied to the specific case, a road safety inspection can be performed to validate some of them.
- Phase 5: identification of possible road safety interventions.
    - Based on selected crash patterns and RTC causes, the software suggests for each RTC one or more possible road safety interventions.
      The user can select the most appropriate.

- Phase 6: Cost-benefit analysis or cost-effectiveness analysis.
    - The user can select from a list one or more suggested road safety interventions (i.e. a package of interventions) that have to be analysed from the cost-benefit ratio point of view.
      The user can define the analysis parameters (e.g. intervention duration, interest rate, …). It also defines the costs for implementation and maintenance of the interventions.
      The software calculates the cost-benefit or cost-effectiveness indicators.
      The user can save a report about the performed analysis.
      A table shows the order of the assessed interventions (from the more to the less effective).

8 Training and capacity development

As the last task of the study, a training of trainers event was organised to train key stakeholders on:

- How to use the RTC data collection forms developed for the police force and for health services.
- How to use the accident data management system (i.e. the software SFINGE and SAFETY MANAGER).

The training was hosted by Sierra Leone Road Safety Authority. Fourteen (14) participants from various entities attended the training course:

- Sierra Leone Road Safety Authority.
- Road Safety Corps of SLRSA
- Sierra Leone Roads Authority.
- Sierra Leone Police.
- Statistics Sierra Leone.
- Gberray Village.
- Banga Bety Village.
- Connaugh hospital (mortuary department).
- Transnation Insurance.

The training was organised into three modules. The first (Module 1) focused on the use of the RTC data collection forms. Modules 2 and 3 focused respectively on the use of the first and second software comprising the accident data management system (SFINGE and SAFETY MANAGER).

During the training some suggestions were made by stakeholders to further customise the RTC data collection forms and the accident data management system to Sierra Leone needs. The following changes were requested:

- Data element “Traffic control” in the police data collection form. The user manual should clarify the presence of an authorised person controlling the junction must prevail on other options.
- Data elements “Admission date” and “Admission time” in the health services data collection form. The user manual should clarify the “admission” refers to the date and time of entry to the health service.
- Data element “Vehicle type” in the police data collection form. The variable “2 / 3 wheels motor vehicle” should be separated into two variables: “motorcycles” and “tricycles”.
- Data element “Vehicle special function” in the police data collection form. The variable “vehicle used for commercial purposes” should be added.
- Data element “Type of user” in the police data collection form. It should be clarified that the variable “driver” also refers to riders of motorcycles and the variable “passenger” also refers to pillions of motorcycles.
- The data element “Discharge time” in the health services data collection form should be added into the user manual.

All these changes were integrated into the final versions of the RTC data collection forms (see Annexes 1 and 2).

9 Conclusions and recommendations

The pilot study to collect more robust accident data in Sierra Leone has been organised according to the following activities:

- Definition of recommendations for the organisation of an RTC data collection, management and analysis (i.e. RTC data collection and management framework), and consequent validation from Sierra Leone stakeholders.
- Test of the framework through a pilot RTC data collection in three regions of Sierra Leone, and consequent validation of the proposed process.
- Implementation of an accident data management system allowing to support all the tasks defined the process: data collection, management and analysis.
- Validation of the system by the Sierra Leone stakeholders and training of trainers for its use.

The scope of services has been completed. The accident data management system has been adapted to the characteristics of Sierra Leone and to the RTC data collection form proposed.

The RTC data collection framework and the accident data management system installed at SLRSA can be immediately used by Sierra Leone stakeholders. However, some recommendations can be provided to ensure moving from a pilot study to a process fully established at national level (Table 7).

Table 7 Final recommendations

No	Challenge	Recommendation
1	Some road users could be reluctant to respond and cooperate during RTC data collection.	Education ahead of the data collection could be useful to engage road users. The services of opinion leaders could also be engaged to this.
2	In some cases, law enforcers, charged of data collection, could be uncooperative and they could ask for financial incentives.	Education towards law enforcers is crucial to reduce under-reporting of RTC. Persons charged of RTC data collection should be provided with sufficient resources and tools to perform their tasks.
3	During the pilot data collection, it was observed that most RTC cases are hardly reported to health facilities or police, but rather to herbalists or local bone specialists.	More sensitization should be done on the advantages of RTC victims accessing hospitals and medical health facilities immediately after the crash. Consulting herbalists or native doctors should be discouraged. Moreover, collection of data on persons injured should also involve non-official health services like herbalists, as well as communities.
4	During the pilot data collection, it was observed that victims prefer to cover up for vehicle drivers/motorcycle riders and reach settlement with them; instead of reporting to assigned authorities (they are critical of any dealings with the police).	Education ahead of the data collection could be useful to engage road users and explain that collection of statistical RTC data has nothing to do with police prosecution.
5	Some vehicles are unregistered and with no registration plates affixed. Furthermore, some drivers or riders are unlicensed. Therefore, getting accurate information from them could be impossible at times.	Sierra Leone Government has already in place of process to eliminate unregistered vehicles and unlicensed drivers or riders. Anyway, it is recommended to accelerate as far as possible this process.
6	During the pilot data collection, it was observed that some of the people involved in RTC are semi-illiterate or illiterate, so understanding some of the questions in the form and providing appropriate or responsive feedback was a challenge.	As far as possible, communication could be also done in local dialect.

No	Challenge	Recommendation
7	During the pilot data collection, it was observed that inclement weather, bad road conditions posed challenges as some crash locations where remote and/or hardly accessible. The law enforcement officers lack the necessary equipment for drug and alcohol use testing and the logistics to get to certain remote locations during inclement weather.	Providing adequate equipment and resources to law enforcement officers is highly important. Various equipment would be useful, such as:
8	During the pilot data collection, it was observed that often the RTC causes are related to overspeeding.	Drivers should be sensitized on the dangers of overspeeding and be encouraged to pay attention to speed limit signs and other cautionary signs in order to prevent or minimize the probability of RTC. A greater enforcement against overspeeding is also recommended.
9	During the pilot data collection, it was observed that several drivers or riders do not use seatbelts or wear helmets.	Drivers, riders and vehicle passengers should be encouraged to use seatbelts and wear helmets at all times during the journey. A greater enforcement against missing use of protective equipment is also recommended.
10	During the pilot data collection, it was observed that several drivers or riders involved in RTC run away.	The general public and in particular RTC victims and on-lookers should be sensitized on the implications of road-side justice which results mostly to drivers or motor cycle riders being lynched (the cause of most drivers or riders running away from RTC scene).
11	Police officers lack of resources and equipment to perform their tasks, including RTC data collection.	Policemen and traffic wardens should be specifically provided with equipment, such as: alcohol and drug testing kits and GPS devices.
12	RTC occurring in remote provinces, especially on low volume roads, can sometime be difficult to reach. Sometimes, police officers lack of logistics to rapidly go to the crash scene.	Policemen and traffic wardens should be provided with adequate logistics for their trips to reach RTC scenes.
13	Some police stations could lack of equipment for storage of collected RTC data.	Adequate informatic equipment and internet facilities should be provided in all police stations across the Country, so that storage and transmission of RTC data can be performed.
14	The framework for RTC data collection and management is still in a pilot phase and would need to be expanded to the whole country	Policemen and traffic wardens should be routinely trained for RTC data collection and management (i.e. use of data collection forms as well as of the accident data management system).
15	Currently the activities performed for RTC data collection and management by the various road safety stakeholders in Sierra Leone are not uniform. Each stakeholder (SLP, SLRSA, health services) execute their tasks independently of the others and in different ways. There is also little communication between the stakeholders	It is highly recommended that the road safety stakeholders in Sierra Leone agree on the roles and responsibilities for RTC data collection and management. Preparing a memorandum of understanding to be signed by each stakeholder, based on the framework developed in this pilot study, could be a first step to give continuity to the pilot study.

To conclude, it is recommended to continue working on the collection and management of adequate road traffic crash data, based on the framework developed in this pilot study. Since the methodologies and tools developed within this study have been validated by the Sierra Leone road safety stakeholders, the process

can now be expanded at the whole country (as well as eventually to other kind of roads, in addition to the low volume ones). Moreover, the pilot data collection executed with the proposed framework has proven to be effective.

It is now crucial to set up the adequate conditions for continuation of RTC data collection according to the agreed methodologies. A possible limitation for this could be related to the lack of resources to provide the road safety stakeholders with adequate equipment, logistics and training.

This was recently underlined by the executive director of SLRSA when discussing about the possibility of moving from the pilot study to a fully established process. SLP officers also reported about the need for resources to invest in this field.

Recent discussions have been held between World Bank, SLRSA and SLP about the possibility of getting funding for road safety related projects. All these parties agreed that it would positive to establish a cooperation starting from the results of this pilot study. This would mean, for instance, providing support for training, equipment, software installation in other entities, etc.

10 References

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Annex 1 Police RTC data collection form

ROAD TRAFFIC CRASH DATA COLLECTION FORM - POLICE FORCES

CRASH RELATED INFORMATION

Information about Officer compiling the form		C1 - Crash ID		C6 - Crash Type	1	2	3	4	5	6	7	8			
Name		C2 - Date		C7 - Impact type	1	2	3	4	5	6	7	8	9	10	11
Designation		C3 - Time		C8 - Weather cond.	1	2	3	4	5	6	7				
Police station of		C4 - City / place		C9 - Light conditions	1	2	3	4	5	6					
Service no		C5a - Location		C10 - Crash cause											
Signature		C5b - GPS longitude													
		C5b - GPS latitude													

ROAD RELATED INFORMATION

R1 - Type of roadway	1	2	3	4	5	6	7	8	R4 - Road obstacles	YES
R2 - Road functional class	1	2	3	4						NO
R3 - Speed limit										UNK

R5 - Surface conditions	1	2	3	4	5	6		
R6 - Junction	1	2	3	4	5	6	7	8
R7 - Traffic control	1	2	3	4	5	6	7	8

VEHICLE RELATED INFORMATION [VEH 1]

V1 - Vehicle number		V3 - Vehicle special function	1	2	3	4	5	6	7						V6 - Vehicle run away	YES	NO
V2 - Vehicle plate no		V4 - Vehicle manoeuvre	1	2	3	4	5	6	7	8	9	10	11	12	13		
		V5 - Vehicle type	1	2	3	4	5	6	7	8	9	10					

VEHICLE RELATED INFORMATION [VEH 2]

V1 - Vehicle number		V3 - Vehicle special function	1	2	3	4	5	6	7						V6 - Vehicle run away	YES	NO
V2 - Vehicle plate no		V4 - Vehicle manoeuvre	1	2	3	4	5	6	7	8	9	10	11	12	13		
		V5 - Vehicle type	1	2	3	4	5	6	7	8	9	10					

VEHICLE RELATED INFORMATION [VEH 3]

V1 - Vehicle number		V3 - Vehicle special function	1	2	3	4	5	6	7						V6 - Vehicle run away	YES	NO
V2 - Vehicle plate no		V4 - Vehicle manoeuvre	1	2	3	4	5	6	7	8	9	10	11	12	13		
		V5 - Vehicle type	1	2	3	4	5	6	7	8	9	10					

PERSON RELATED INFORMATION [PER 1]

P1 - Person ID		P5 - Sex	1	2	3		P9 - Safety equipment	1	2	3	4		P13 - Blood group
P2 - Occupant veh no		P6 - Type of road user	1	2	3	4	5	P10 - Pedestrian manoeuvre	1	2	3	4	5	6	
P3 - Pedestrian veh no		P7 - Seating position	1	2	3	4	5	P11 - Alcohol use	1	2	3	4		P14 - Person name
P4 - Birth date		P8 - Injury severity	1	2	3	4	5	P12 - Drug use	1	2	3	4		

PERSON RELATED INFORMATION [PER 2]

P1 - Person ID		P5 - Sex	1	2	3		P9 - Safety equipment	1	2	3	4		P13 - Blood group
P2 - Occupant veh no		P6 - Type of road user	1	2	3	4	5	P10 - Pedestrian manoeuvre	1	2	3	4	5	6	
P3 - Pedestrian veh no		P7 - Seating position	1	2	3	4	5	P11 - Alcohol use	1	2	3	4		P14 - Person name
P4 - Birth date		P8 - Injury severity	1	2	3	4	5	P12 - Drug use	1	2	3	4		

PERSON RELATED INFORMATION [PER 3]

P1 - Person ID		P5 - Sex	1	2	3		P9 - Safety equipment	1	2	3	4		P13 - Blood group
P2 - Occupant veh no		P6 - Type of road user	1	2	3	4	5	P10 - Pedestrian manoeuvre	1	2	3	4	5	6	
P3 - Pedestrian veh no		P7 - Seating position	1	2	3	4	5	P11 - Alcohol use	1	2	3	4		P14 - Person name
P4 - Birth date		P8 - Injury severity	1	2	3	4	5	P12 - Drug use	1	2	3	4		

ROAD TRAFFIC CRASH DATA COLLECTION FORM - POLICE FORCES

LEGEND

C6 - Crash Type		
	1	Crash with pedestrian
	2	Crash with parked vehicle
	3	Crash with fixed obstacle
	4	Non-fixed obstacle
	5	Animal
	6	Single vehicle crash/non-collision
	7	Crash with two or more vehicles
	8	Other crashes

R1 - Type of roadway		
	1	Motorway / freeway
	2	Express road
	3	Urban road, two way
	4	Urban road, one way
	5	Road outside a built up area
	6	Restricted road
	7	Other
	8	Unknown

R5 - Surface conditions		
	1	Dry
	2	Slippery
	3	Wet, damp
	4	Flood
	5	Other
	6	Unknown

V4 - Vehicle manoeuvre		
	1	Reversing
	2	Parked
	3	Entering or leaving a parking position
	4	Slowing or stopping
	5	Moving off
	6	Waiting to turn
	7	Turning
	8	Changing lane
	9	Avoidance manoeuvre
	10	Overtaking vehicle
	11	Straight forward / normal driving
	12	Other
	13	Unknown

P9 - Safety equipment		
	1	Seatbelt / Helmet worn
	2	Seatbelt / Helmet not worn
	3	Not applicable
	4	Unknown

C7 - Impact type		
	1	No impact
	2	Rear end
	3	Head on
	4	Angle – same dir
	5	Angle - opposite dir
	6	Angle - right
	7	Angle - no dir specified
	8	Side by side - same dir
	9	Side by side - opposite dir
	10	Rear to side
	11	Rear to rear

R2 - Road functional class		
	1	Principal arterial
	2	Secondary arterial
	3	Collector
	4	Local

V3 - Vehicle special function		
	1	No special function
	2	Taxi
	3	Vehicle used as bus
	4	Police / military
	5	Emergency vehicle
	6	Commercial
	7	Unknown

P5 - Sex		
	1	Male
	2	Female
	3	Unknown

P6 - Type of road user		
	1	Driver / Rider
	2	Passenger / Pillion
	3	Pedestrian
	4	Other
	5	Unknown

P7 - Seating position		
	1	Front
	2	Rear
	3	Not applicable
	4	Other

P10 - Pedestrian manoeuvre		
	1	Crossing
	2	Walking on carriageway
	3	Standing on carriageway
	4	Not on carriageway
	5	Other
	6	Unknown

C8 - Weather conditions		
	1	Clear
	2	Rain
	3	Fog, mist, smoke
	4	Sleet, hail
	5	Severe winds
	6	Other
	7	Unknown

C9 - Light conditions		
	1	Daylight
	2	Twilight
	3	Darkness
	4	Dark - street lights unlit
	5	Dark - street lights lit
	6	Unknown

R6 - Junction		
	1	At-grade, crossroad
	2	At-grade, roundabout
	3	At-grade, T or staggered junction
	4	At-grade, multiple junction
	5	At-grade, other
	6	Not at grade
	7	Not at junction
	8	Unknown

R7 - Traffic control		
	1	Authorized person
	2	Stop sign
	3	Give-way sign or markings
	4	Other traffic signs
	5	Automatic traffic signal (working)
	6	Automatic traffic signal (out of order)
	7	Uncontrolled
	8	Other

P8 - Injury severity		
	1	Fatal injury
	2	Serious / severe injury
	3	Slight / minor injury
	4	No injury
	5	Unknown

P11 - Alcohol use		
	1	Yes
	2	No
	3	Not applicable
	4	Unknown

P12 - Drug use		
	1	Yes
	2	No
	3	Not applicable
	4	Unknown

V5 - Vehicle type	
1	Bicycle
2	Other non-motor
3	Motorcycle
4	Car
5	Bus/Coach/Trolley
6	Light good
7	Heavy good
8	Tricycle
9	Other motor
10	Unknown

Police Accident data collection form and data elements

Table 1 Description of crash related data elements

#	Element name	Definition	Data type	Comment
C1	Crash identifier	Unique identifier (e.g. a 10-digit number) within a given year that identifies a particular crash	Character string	
C2	Crash date	Date (day, month, year) on which the crash occurred	Numeric (DDMMYYYY)	If a part of crash date is unknown, the respective places are filled in with 99 (for day and month). Absence of year result in an edit check.
C3	Crash time	Time at which the crash occurred	Numeric (HH:MM)	Midnight is defined as 00:00 and represents the beginning of a new day
C4	City / Place	The municipality or the place in which the crash occurred	Character string	
C5	Location	Exact location at which the crash occurred. Route name and GPS coordinates.	Character string Latitude / Longitude coordinates	If GPS is not available, street name, reference point, distance from reference point and direction from reference point.
C6	Crash type	First injury or damage-producing event of the crash.	Numeric	See Table 2 for data values
C7	Impact type	Indicates the manner in which the road motor vehicles involved initially collided with each other. The variable refers to the first impact of the crash if that impact was between two road motor vehicles.	Numeric	See Table 3 for data values
C8	Weather conditions	Prevailing atmospheric conditions at the crash location, at the time of the crash.	Numeric	See Table 4 for data values
C9	Light conditions	The level of natural and artificial light at the crash location, at the time of the crash.	Numeric	See Table 5 for data values
C10	Crash cause	Prevailing cause of the crash.	Character string	Short description of the main crash causes (e.g. speeding, vehicle failure, driver failure, etc.)

Table 2 Data values for "Crash type"

#	Definition
1	**Crash with pedestrian**: Crash between a vehicle and at least one pedestrian

#	Definition
2	**Crash with parked vehicle**: Crash between a moving vehicle and a parked vehicle. A vehicle with a driver that is just stopped is not considered as parked.
3	**Crash with fixed obstacle**: Crash with a stationary object (i.e. tree, post, barrier, fence, etc).
4	**Non-fixed obstacle**: Crash with a non-fixed object or lost load.
5	**Animal**: Crash between a moving vehicle and an animal.
6	**Single vehicle crash/non-collision**: Crash in which only one vehicle is involved, and no object was hit. Includes vehicle leaving the road, vehicle rollover, cyclists falling etc.
7	**Crash with two or more vehicles**: Crashes where two or more moving vehicles are involved.
8	**Other crashes**: Other crash types not described above.

Table 3 Data values for "Impact type"

#	Definition
1	**No impact between motor vehicles**: There was no impact between road motor vehicles. Refers to single vehicle crashes, collisions with pedestrians, animals or objects.
2	**Rear end impact**: The front side of the first vehicle collided with the rear side of the second vehicle.
3	**Head on impact**: The front sides of both vehicles collided with each other.
4	**Angle impact - same direction**: Angle impact where the front of the first vehicle collides with the side of the second vehicle.
5	**Angle impact - opposite direction**: Angle impact where the front of the first vehicle collides with the side of the second vehicle.
6	**Angle impact - right angle**: Angle impact where the front of the first vehicle collides with the side of the second vehicle.
7	**Angle impact - direction not specified**: Angle impact where the front of the first vehicle collides with the side of the second vehicle.
8	**Side by side impact - same direction**: The vehicles collided side by side while travelling in the same direction.
9	**Side by side impact - opposite direction**: The vehicles collided side by side while travelling in opposite directions.
10	**Rear to side impact**: The rear end of the first vehicle collided with the side of the second vehicle.
11	**Rear to rear impact**: The rear ends of both vehicles collided with each other.

Table 4 Data values for "Weather conditions"

#	Definition
1	**Clear**
2	**Rain**
3	**Fog, mist or smoke**
4	**Sleet, hail**
5	**Severe winds**
6	**Other weather condition**
7	**Unknown weather condition**

Table 5 Data values for "Light conditions"

#	Definition
1	**Daylight**: Natural lighting during daytime
2	**Twilight**: Natural lighting during dusk or dawn
3	**Darkness**: No natural lighting, no artificial lighting
4	**Dark with street lights unlit**: Street lights exist at the crash location but are unlit
5	**Dark with street lights lit**: Street lights exist at the crash location and are lit
6	**Unknown**: Light conditions at time of crash unknown

Table 6 Description of road related data elements

#	Element name	Definition	Data type	Comment
R1	Type of roadway	Describes the type of road, whether the road has two directions of travel, and whether the carriageway is physically divided. For crashes occurring at junctions, where the crash cannot be clearly allocated in one road, the road where the vehicle with priority was moving is indicated	Numeric	See Table 7 for data values
R2	Road functional class	Describes the character of service or function of the road where the first harmful event took place. For crashes occurring at junctions, where the crash cannot be clearly allocated in one road, the road where the vehicle with priority was moving is indicated.	Numeric	See Table 8 for data values
R3	Speed limit	Legal speed limit at the location of the crash	Numeric	**nnn**: The legal speed limit as provided by road signs or by the country's traffic laws for each road category, in kilometres per hour (km/h). **999**: The speed limit at the crash location is unknown
R4	Road obstacles	The presence of any person or object which obstructed the movement of the vehicles on the road. Includes any animal standing or moving (either hit or not), and any object not meant to be on the road. Does not include vehicles (parked or moving vehicles, pedestrians) or obstacles on the side of the carriageway (e.g. poles, trees).	Numeric	**1) Yes**: Road obstacle(s) present at the crash site. **2) No**: No road obstacle(s) present at the crash site. **3) Unknown**: Unknown presence of any road obstacle(s) at the crash site.

#	Element name	Definition	Data type	Comment
R5	Surface conditions	Condition of the road surface at the time and place of the crash	Numeric	See Table 9 for data values
R6	Junction	Indicates whether the crash occurred at a junction (two or more roads intersecting) and defines the type of the junction. In at-grade junctions all roads intersect at the same level. In not-at-grade junctions roads do not intersect at the same level.	Numeric	See Table 10 for data values
R7	Traffic control	Type of traffic control at the junction where crash occurred. Applies only to crashes that occur at a junction	Numeric	See Table 11 for data values

Table 7 Data values for "Type of roadway"

#	Definition
1	**Motorway/freeway**: Road with separate carriageways for traffic in two directions, physically separated by a dividing strip not intended for traffic. Road has no crossings at the same level with any other road, railway or tramway track, or footpath. Specially sign-posted as a motorway and reserved for specified categories of motor vehicles.
2	**Express road**: Road with traffic in two directions, carriageways not normally separated. Accessible only from interchanges or controlled junctions. Specially sign-posted as an express road and reserved for specified categories of motor vehicles. Stopping and parking on the running carriageway are prohibited.
3	**Urban road, two-way**: Road within the boundaries of a built-up area (an area with sign-posted entries and exits). Single, undivided street with traffic in two directions, relatively lower speeds (often up to 50 km/h), unrestricted traffic, with one or more lanes which may or may not be marked.
4	**Urban road, one-way**: Road within the boundaries of a built-up area, with entries and exits sign-posted as such. A single, undivided street with traffic in one direction, relatively lower speeds (often up to 50 km/h).
5	**Road outside a built-up area**: Road outside the boundaries of a built-up area (an area with sign-posted entries and exits).
6	**Restricted road**: A roadway with restricted access to public traffic. Includes cul-de-sacs, driveways, lanes, private roads.
7	**Other**: Roadway of a type other than those listed above.
8	**Unknown**: Not known where the incident occurred.

Table 8 Data values for "Road functional class"

#	Definition
1	**Principal arterial**: Roads serving long distance and mainly interurban movements. Includes motorways (urban or rural) and express roads. Principal arterials may cross through urban areas, serving suburban movements. The traffic is characterized by high speeds and full or partial access control (interchanges or junctions controlled by traffic lights). Other roads leading to a principal arterial are connected to it through side collector roads.
2	**Secondary arterial**: Arterial roads connected to principal arterials through interchanges or traffic light-controlled junctions supporting and completing the urban arterial network. Serving middle distance movements but not crossing through neighbourhoods. Full or partial access control is not mandatory.

#	Definition
3	**Collector**: Unlike arterials, collectors cross urban areas (neighbourhoods) and collect or distribute the traffic to/from local roads. Collectors also distribute traffic leading to secondary or principal arterials.
4	**Local**: Roads used for direct access to the various land uses (private property, commercial areas etc). Low service speeds not designed to serve interstate or suburban movements.

Table 9 Data values for "Surface conditions"

#	Definition
1	**Dry**: Dry and clean road surface
2	**Slippery**: Slippery road surface due to existence of sand, gravel, mud, leaves, oil on the road. Does not include snow, frost, ice or wet road surface
3	**Wet, damp**: Wet road surface. Does not include flooding
4	**Flood**: Still or moving water on the road
5	**Other**: Other road surface conditions not mentioned above
6	**Unknown**: The road surface conditions were unknown

Table 10 Data values for "Junction"

#	Definition
1	**At-grade, crossroad**: Road intersection with four arms.
2	**At-grade, roundabout**: Circular road.
3	**At-grade, T or staggered junction**: Road intersection with three arms. Includes T intersections and intersections with an acute angle.
4	**At-grade, multiple junction**: A junction with more than four arms (excluding roundabouts).
5	**At-grade, other**: Other at-grade junction type not described above.
6	**Not at grade**: The junction includes roads that do not intersect at the same level.
7	**Not at junction**: The crash has occurred at a distance greater than 20 metres from a junction.
8	**Unknown**: The crash location relative to a junction is unknown.

Table 11 Data values for "Traffic control"

#	Definition
1	**Authorized person**: Police officer or traffic warden at intersection controls the traffic. Applicable even if traffic signals or other junction control systems are present.
2	**Stop sign**: Priority is determined by stop sign(s).
3	**Give-way sign or markings**: Priority is determined by give way sign(s) or markings.
4	**Other traffic signs**: Priority is determined by traffic sign(s) other than 'stop', 'give way' or markings.
5	**Automatic traffic signal (working)**: Priority is determined by a traffic signal that was working at the time of the crash.
6	**Automatic traffic signal (out of order)**: A traffic signal is present but out of order at time of crash.
7	**Uncontrolled**: The junction is not controlled by an authorized person, traffic signs, markings, automatic traffic signals or other means.
8	**Other**: The junction is controlled by means other than an authorized person, signs, markings or automatic traffic signals.

Table 12 Description of vehicle related data elements

#	Element name	Definition	Data type	Comment
V1	Vehicle number	Unique vehicle number assigned to identify each vehicle involved in the crash	Numeric, sequential two-digit number	
V2	Vehicle plate number	Plate number of the vehicle	Numeric	Allows for merging with vehicle registration database of SLRSA
V3	Vehicle special function	The type of special function being served by this vehicle regardless of whether the function is marked on the vehicle	Numeric	See Table 13 for data values
V4	Vehicle manoeuvre	Controlled manoeuvre for this motor vehicle prior to the crash	Numeric	See Table 14 for data values
V5	Vehicle type	Type of vehicle involved in the crash	Numeric	See Table 15 for data values

Table 13 Data values for "Vehicle special function"

#	Definition
1	**No special function**: No special function of the vehicle.
2	**Taxi**: Licensed passenger car for hire with driver, without predetermined routes.
3	**Vehicle used as bus**: Passenger road motor vehicle used for the transport of people.
4	**Police / military**: Motor vehicle used for police / military purposes.
5	**Emergency vehicle**: Motor vehicle used for emergency purposes (includes ambulances, fire service vehicles, etc.).
6	**Commercial**: Normal vehicle (e.g. moto) used for commercial purposes.
7	**Unknown**: It was not possible to record a special function.

Table 14 Data values for "Vehicle manoeuvre"

#	Definition
1	**Reversing**: The vehicle was reversing.
2	**Parked**: Vehicle was parked and stationary.
3	**Entering or leaving a parking position**: The vehicle was entering or leaving a parking position
4	**Slowing or stopping**: The vehicle was slowing or stopping
5	**Moving off**: The vehicle was still and started moving. Does not include vehicle leaving or entering a parking position.
6	**Waiting to turn**: The vehicle was stationary, waiting to turn.
7	**Turning**: The vehicle was turning (includes U-turns).
8	**Changing lane**: The vehicle was changing lane.
9	**Avoidance manoeuvre**: The vehicle changed its course to avoid an object on the carriageway (including another vehicle or pedestrian).

#	Definition
10	**Overtaking vehicle**: The vehicle was overtaking another vehicle.
11	**Straight forward / normal driving**: The vehicle was moving ahead away from any bend.
12	**Other**
13	**Unknown**

Table 15 Data values for "Vehicle type"

#	Definition
1	**Bicycle**: Road vehicle with two or more wheels, generally propelled solely by the energy of the person on the vehicle, in particular by means of a pedal system, lever or handle.
2	**Other non-motor**: Other vehicle without engine not included in the list above.
3	**Motorcycle**: Two-wheeled road motor vehicle (includes mopeds, motorcycles).
4	**Passenger car**: Road motor vehicle other than a two or three-wheeled vehicle, intended for the carriage of passengers and designed to seat no more than nine (driver included).
5	**Bus/coach/trolley**: Passenger-carrying vehicle, most commonly used for public transport, inter-urban movements and tourist trips, seating more than nine persons. Includes vehicles connected to electric conductors and which are not rail-borne.
6	**Light goods vehicle (<3.5 t)**: Smaller (by weight) motor vehicle designed exclusively or primarily for the transport of goods.
7	**Heavy goods vehicle (≥3.5 t)**: Larger (by weight) motor vehicle designed exclusively or primarily for the transport of goods.
8	**Tricycle**: Three-wheeled road motor vehicle (includes tricycles and all-terrain vehicles).
9	**Other motor vehicle**: Other vehicle not powered by an engine and not included in the two previous lists of values.
10	**Unknown**: The type of the vehicle is unknown or it was not stated.

Table 16 Description of person related data elements

#	Element name	Definition	Data type	Comment
P1	Person ID	Number assigned to uniquely identify each person involved in the crash	Numeric (two-digit number, nn)	The persons related to the first vehicle will be recorded first. Within a specific vehicle, the driver will be recorded first, followed by the passengers. Allows the person record to be cross-referenced to crash, road and vehicle records to establish a unique linkage with the Crash ID (C1) and the Vehicle number (V1).
P2	Occupant's vehicle number	Unique number assigned for this crash to the motor vehicle in which the person was an occupant (V1)	Numeric (two-digit number, nn)	Allows the person record to be cross-referenced to the vehicle records, linking the person to the motor vehicle in which they were travelling
P3	Pedestrian's linked vehicle number	Unique number assigned for this crash to the motor vehicle which collided with this person (V1). The vehicle number assigned under (V1) to the	Numeric (two-digit number, nn)	Allows the person record to be cross-referenced to the vehicle records, linking the person to the motor vehicle in which they were travelling

#	Element name	Definition	Data type	Comment
		motor vehicle which collided with this person		
P4	Date of birth (excluding drivers)	Indicates the date of birth of the person involved in the crash.	Numeric (date format – dd/mm/yyyy, 99/99/9999 if birth date unknown)	
P5	Sex (excluding drivers)	Indicates the sex of the person involved in the crash	Numeric	1) Male. 2) Female. 3) Unknown.
P6	Type of road user	This variable indicates the role of each person at the time of the crash	Numeric	See Table 17 for data values
P7	Seating position	The location of the person in the vehicle at the time of the crash	Numeric	1) Front 2) Rear 3) Not applicable 4) Other 5) Unknown
P8	Injury severity	The injury severity level for a person involved in the crash	Numeric	See Table 18 for data values
P9	Safety equipment	Describes the use of occupant restraints, or helmet use by a motorcyclist.	Numeric	See Table 19 for data values
P10	Pedestrian manoeuvre	The action of the pedestrian immediately prior to the crash	Numeric	See Table 20 for data values
P11	Alcohol use	Verified abuse of alcohol	Numeric	1) Yes 2) No 3) Not applicable 4) Unknown
P12	Drug use	Verified use of drugs	Numeric	1) Yes 2) No 3) Not applicable 4) Unknown
P13	Blood group	Person blood group	String character	**xxx**: blood group **999**: unknown
P14	Person name	Name of the person involved in RTC	String character	

Table 17 Data values for "Type of road user"

#	Definition
1	**Driver / Rider**: Driver or operator of motorized or non-motorized vehicle. Includes cyclists, riders of motorcycles, persons pulling a rickshaw or riding an animal.
2	**Passenger / Pillion**: Person riding on or in a vehicle, who is not the driver. Includes person in the act of boarding, alighting from a vehicle or sitting/stranding. Includes pillions of motorcycles.
3	**Pedestrian**: Person on foot, pushing or holding a bicycle, pram or a pushchair, leading or herding an animal, riding a toy cycle, on roller skates, skateboard or skis. Excludes persons in the act of boarding or alighting from a vehicle.
4	**Other**: Person involved in the crash who is not of any type listed above.

#	Definition
5	**Unknown**: It is not known what role the person played in the crash

Table 18 Data values for "Injury severity"

#	Definition
1	**Fatal injury**: Person was killed immediately or died within 30 days, because of the crash.
2	**Serious/severe injury**: Person was hospitalised for at least 24 hours because of injuries sustained in the crash.
3	**Slight/minor injury**: Person was injured and hospitalised for less than 24 hours or not hospitalised.
4	**No injury**: Person was not injured.
5	**Unknown**: Injury severity was not recorded or is unknown.

Table 19 Data values for "Safety equipment"

#	Definition
1	**Seatbelt / Helmet worn**
2	**Seatbelt / Helmet not worn**
3	**Not applicable**
4	**Unknown**

Table 20 Data values for "Pedestrian manoeuvre"

#	Definition
1	**Crossing**: The pedestrian was crossing the road.
2	**Walking on the carriageway**: The pedestrian was walking across the carriageway facing or not facing traffic.
3	**Standing on the carriageway**: The pedestrian was on the carriageway and was stationary (standing, sitting, lying etc).
4	**Not on the carriageway**: The pedestrian was standing or moving on the sidewalk or at any point beside the carriageway.
5	**Other**: The vehicle or the pedestrian was performing a manoeuvre not included in the list of the previous values.
6	**Unknown**: The manoeuvre performed by the vehicle or the pedestrian was not recorded, or it was unknown.

Annex 2 Health RTC data collection form

ROAD TRAFFIC CRASH DATA COLLECTION FORM - HOSPITALS

CRASH RELATED INFORMATION

Information about person compiling the form		C1 - Crash ID	
Name		C2 - Date of crash	
Designation		C3 - Time of crash	
Hospital of		C4 - Date admission	
Service no		C5 - Time admission	
Signature		C6 - Location	

PERSON RELATED INFORMATION

P1 - Person ID		P4 - Birth date						
P2 - Person name		P5 - Type of injury	1	2	3	4	5	6
P3 - Sex		P6 - Final diagnosis	1	2	3			
P8 - Time exit		P7 - Date exit						

CRASH RELATED INFORMATION

Information about person compiling the form		C1 - Crash ID	
Name		C2 - Date of crash	
Designation		C3 - Time of crash	
Hospital of		C4 - Date admission	
Service no		C5 - Time admission	
Signature		C6 - Location	

PERSON RELATED INFORMATION

P1 - Person ID		P4 - Birth date						
P2 - Person name		P5 - Type of injury	1	2	3	4	5	6
P3 - Sex		P6 - Final diagnosis	1	2	3			
P8 - Time exit		P7 - Date exit						

CRASH RELATED INFORMATION

Information about person compiling the form		C1 - Crash ID	
Name		C2 - Date of crash	
Designation		C3 - Time of crash	
Hospital of		C4 - Date admission	
Service no		C5 - Time admission	
Signature		C6 - Location	

PERSON RELATED INFORMATION

P1 - Person ID		P4 - Birth date						
P2 - Person name		P5 - Type of injury	1	2	3	4	5	6
P3 - Sex		P6 - Final diagnosis	1	2	3			
P8 - Time exit		P7 - Date exit						

LEGEND

P5 - Type of injury	1	Spinal Injury
	2	Head Injury
	3	Leg Fracture
	4	Multiple Fracture
	5	Minor
	6	Other

P6 - Final diagnosis	1	Dead
	2	Serious injury
	3	Non-serious injury

Health services data collection form

Table 21 Description of crash related data elements

#	Element name	Definition	Data type	Comment
C1	Crash identifier	Unique identifier (e.g. a 10-digit number) within a given year that identifies a particular crash	Character string	
C2	Crash date	Date (day, month, year) on which the crash occurred	Numeric (DDMMYYYY)	If a part of crash date is unknown, the respective places are filled in with 99 (for day and month). Absence of year result in an edit check.
C3	Crash time	Time at which the crash occurred	Numeric (HH:MM)	Midnight is defined as 00:00 and represents the beginning of a new day
C4	Admission date	Date (day, month, year) on which the person has been admitted to the health service	Numeric (DDMMYYYY)	
C5	Admission time	Time at the person has been admitted to the health service	Numeric (HH:MM)	Midnight is defined as 00:00 and represents the beginning of a new day
C6	Location	Location at which the crash occurred. Route name, city.	Character string	Street name, reference point

Table 22 Description of person related data elements

#	Element name	Definition	Data type	Comment
P1	Person ID	Number assigned to uniquely identify each person involved in the crash	Numeric (two-digit number, nn)	Should be the same ID used by Police forces in their data collection form
P2	Person name	Name of the person involved in RTC	String character	
P3	Sex	Indicates the sex of the person involved in the crash	Numeric	1) Male. 2) Female. 3) Unknown.
P4	Date of birth	Indicates the date of birth of the person involved in the crash.	Numeric (date format – dd/mm/yyyy, 99/99/9999 if birth date unknown)	
P5	Type of injury	This variable indicates the type of injury occurred to the person	Numeric	See Table 22 for data values
P6	Final diagnosis	This variable indicated the final diagnosis of the person involved in the crash after all the treatments in the health services	Numeric	1) Dead 2) Serious injury 3) Non-serious injury

#	Element name	Definition	Data type	Comment
P7	Date exit	Date (day, month, year) on which the person has been discharged from the health service. Includes the death date.	Numeric (DDMMYYYY)	
P8	Time exit	Time at which the person has been discharged from the health service. Includes the death time.	Numeric (HH:MM)	Midnight is defined as 00:00 and represents the beginning of a new day

Table 23 Data values for "Type of injury"

#	Definition
1	**Spinal Injury**
2	**Head Injury**
3	**Leg Fracture**
4	**Multiple Fracture**
5	**Minor**
6	**Other**

Annex 3 SFINGE “Police” user manual

Sfinge “Police”
User Manual

Index

1 Introduction

SFINGE is an innovative information system that allows the collection and the management of accident data.

SFINGE allows also the graphical representation of the accidents on a cartographic map and the analysis of the factors that determine these phenomena.

SFINGE is designed to answer to the needs of several users. Its use is for:

- Police
- Health Services
- SLRSA

2 Management and configuration of accounts

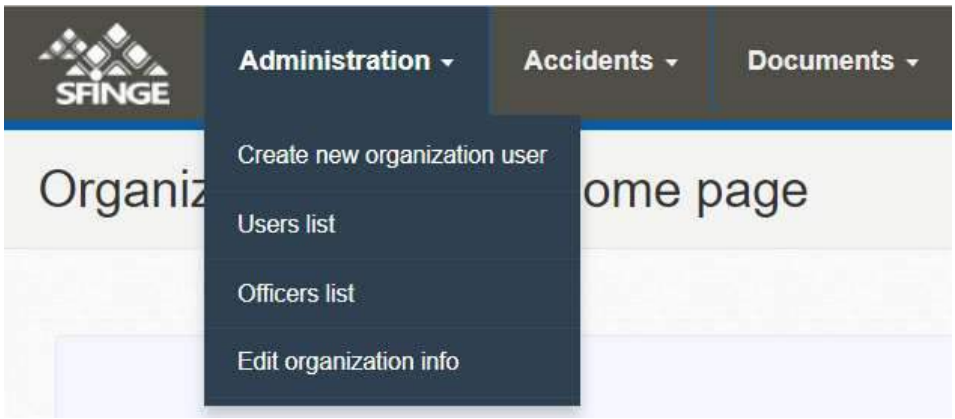
This section describes the functions related to the management of user accounts.

Table of contents:

2.1 Creating a new user account

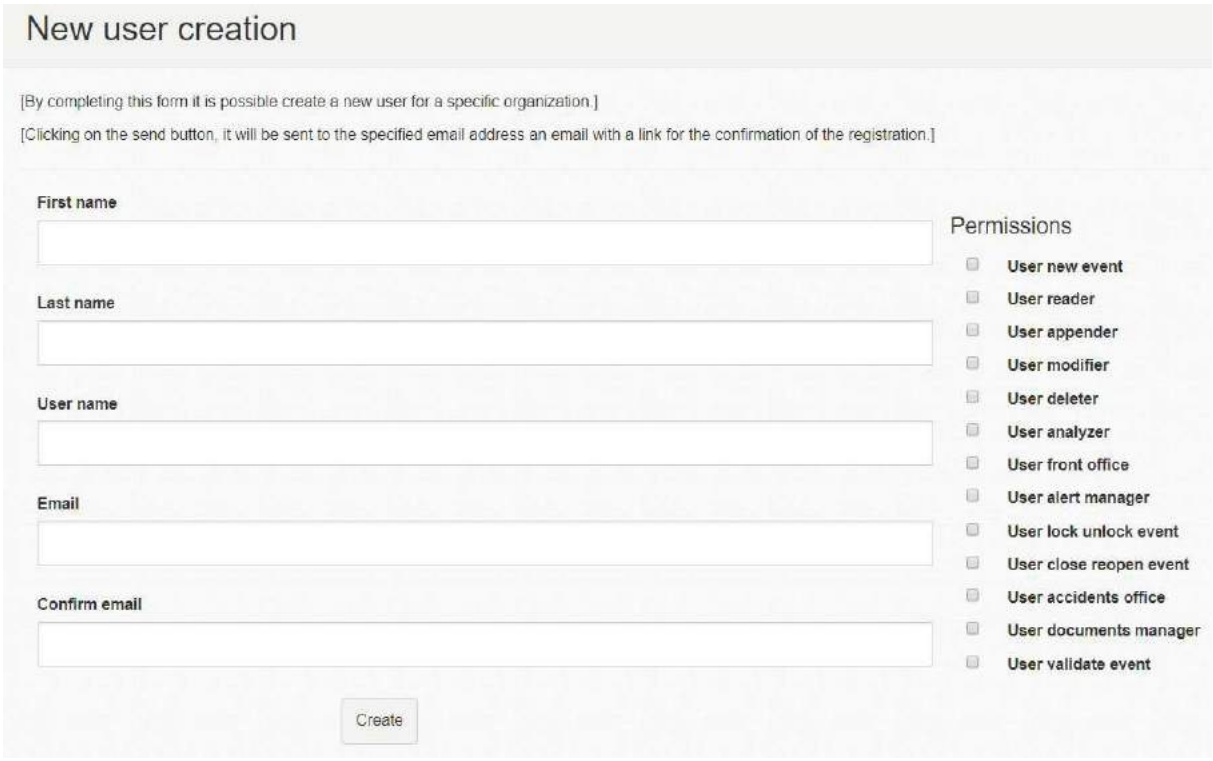
This allows you to create a new account for access to the system SfingeNET.

To complete the user account creation, click the voice of ***administration*** menu and select the item ***Create new organization user***.



This will open the page where you can enter summary information about the user:

- *Name and surname*
- *User Name*, which is the unique name that identifies the user in the system. The user name can consist of uppercase and lowercase letters, digits, and / or the point symbols (.) and underscore (_).
- *E-mail address* used by the user you are creating. To avoid typing errors, you are asked to enter twice the e-mail address.



In addition to the above information (mandatory), the system also allows you to specify the permissions associated with the user. To assign a specific permission to a user simply click on the check to the left of the name of the permission.

For example, the image below, you create a user that will have the permissions of write access and added, and permissions for the management of reports.

Clicking on the button ***create***, you make the user account creation. If the creation is successful, the message « … ». Same will be sent an email to the email address specified. This email will contain,

in addition to the account creation notification, a link to the account confirmation. By clicking on that link, the user can confirm their personal details and enter your password for access to the system. This password must have at least 8 characters. Upon completion of the registration an e-mail notification will be sent to responsible.

Note. The created account will not be accessible until it is not confirmed recording.

2.2 Creating new agent

This operation creates a new agent in the system SfingeNET.

So that a user can play specific activities for the role of agent (E.g. Car crash pad), it is to perform a transformation of a simple account to agent.

In order to create an agent is needed before you create a simple user who it can be then transformed into agent.

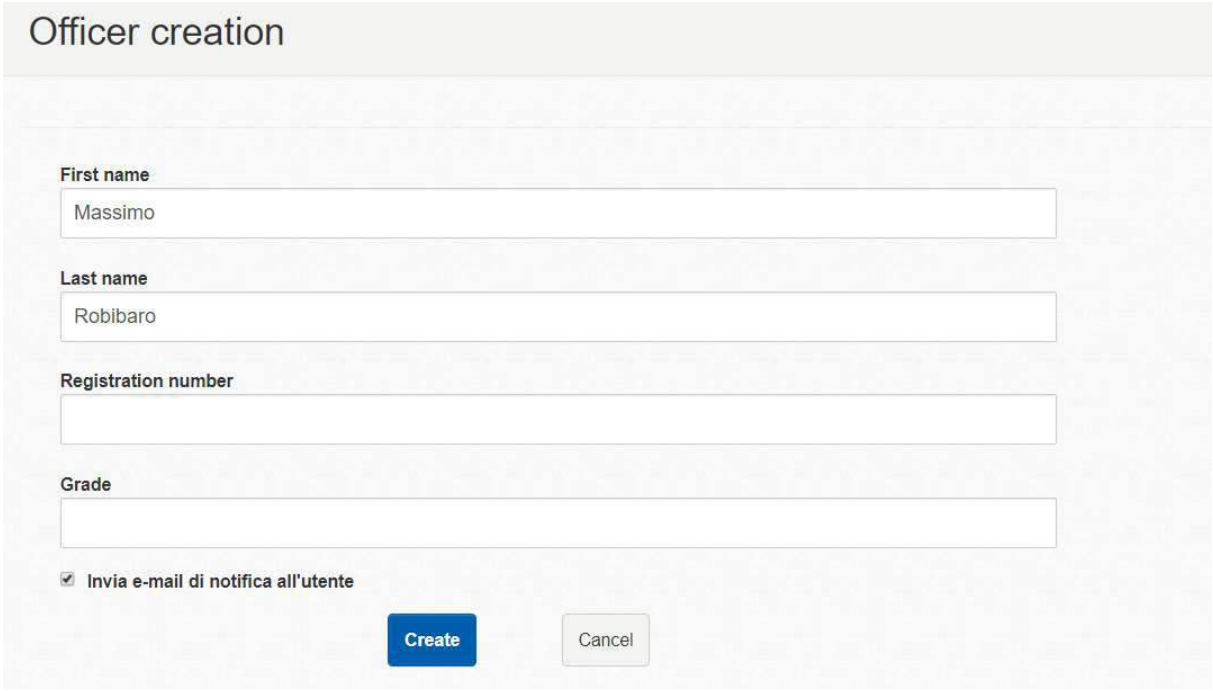
To make the agent's creation is necessary to fill in the fields, following the guidance in the creation of an agent:

Click the voice of ***administration*** menu and select the item ***Officers List***. This will open the page where there will be a list **Members of agents** and **Members not agents**.

To add a new **Agent,** position the user you want, and click the **Create new officer**.

This will open the page where you can enter summary information about the user:

- *First Name and Last name*
- *Registration number*
- *Grade*



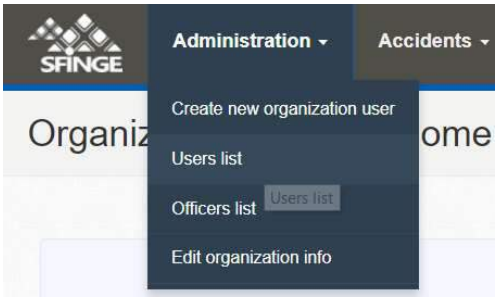
Click the **Create**, in the list of **Officers** will be shown the new officer.

2.3 Management User Data

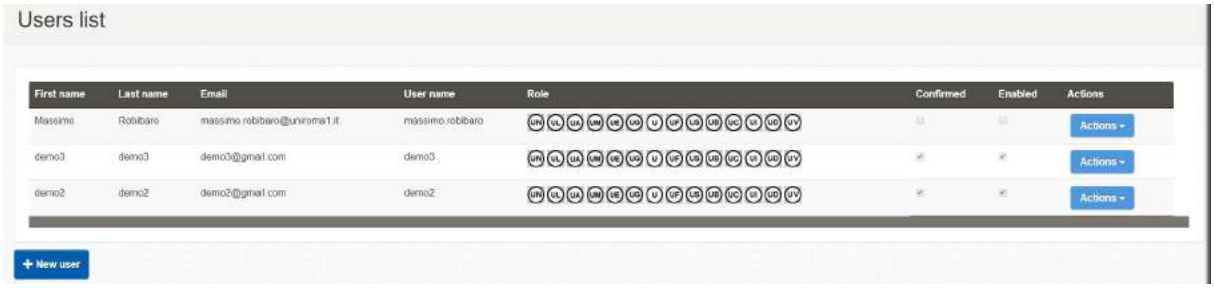
This allows you to manage system user data SfingeNET.

This can be done by the **organization manager**.

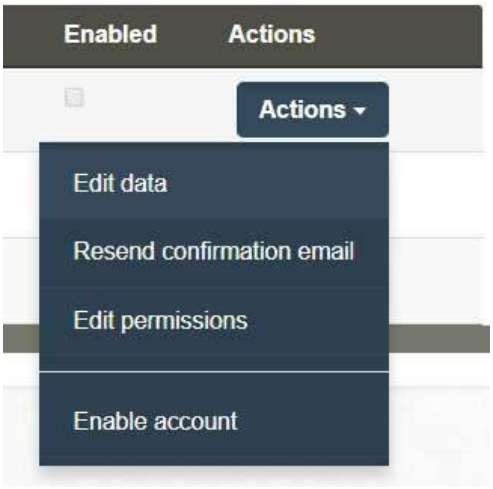
To make the change of user data, click the voice of administration menu and select the item **Users list.**



You will be shown a page where you can view the list users and carry out transactions on their account.

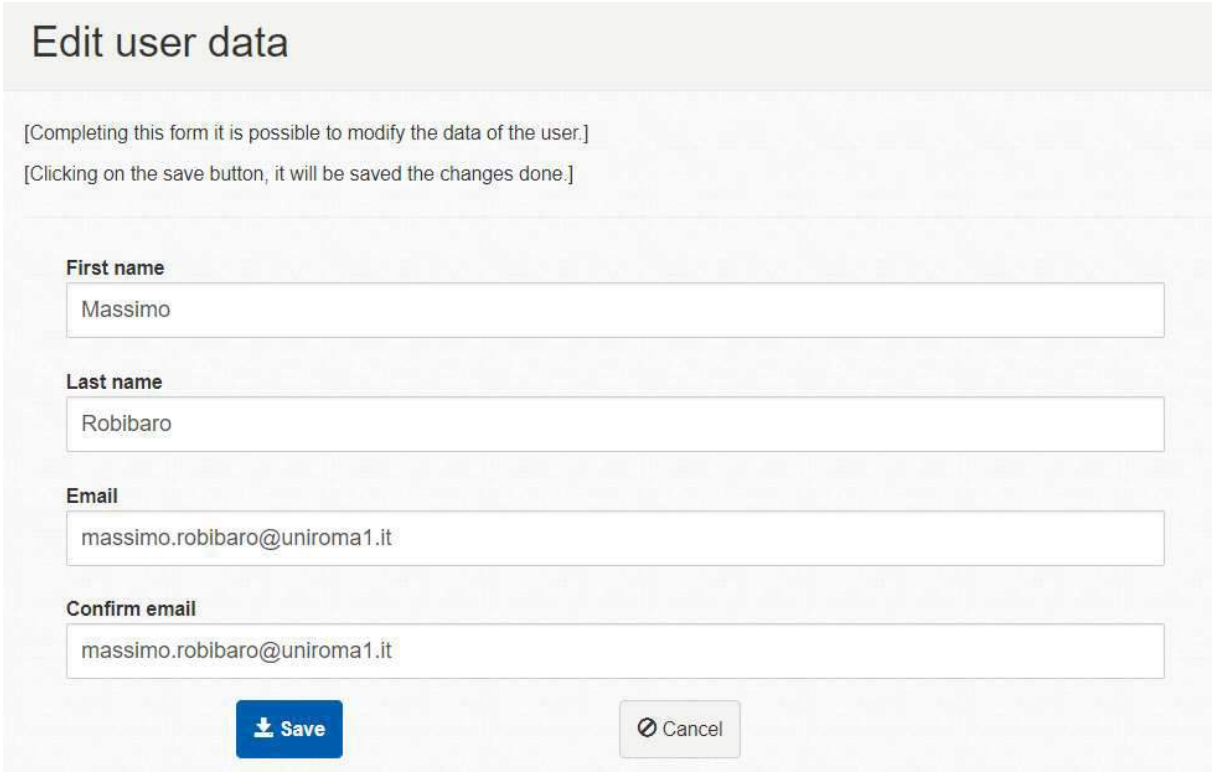


Position in user correspondence desired and click the action, selection **Edit date**.



This will open a page where you can make changes the summary information about the user:

- ***First Name***
- ***Last name***
- **Email** used by the user. To avoid typing errors, you are asked to enter twice the email address.



By clicking on **Save** will save the changes made.

2.4 Resend user account confirmation email

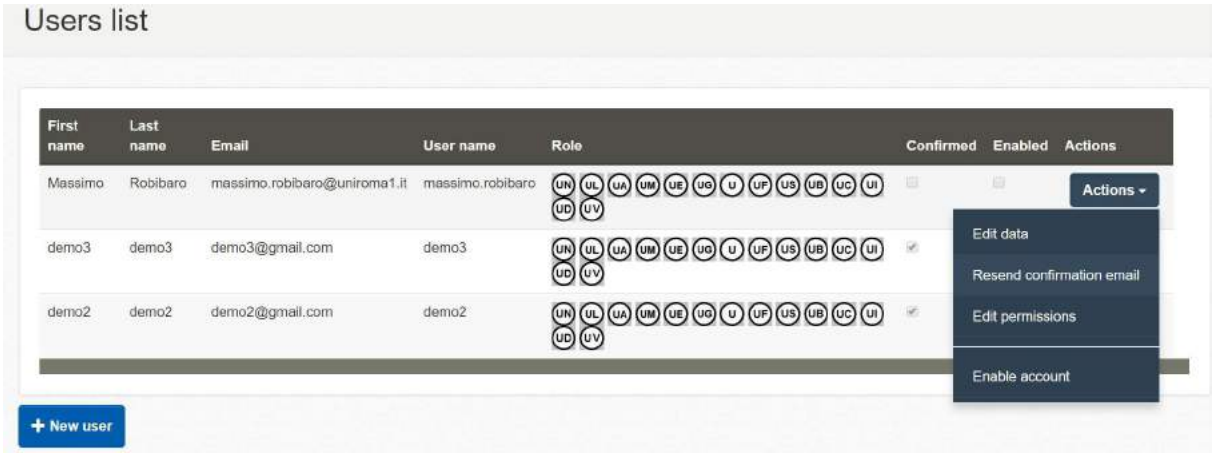
This allows you to manage system user data SfingeNET.

In order to be usable user account, it is necessary that you acknowledge the user account using the instructions received on email sent to the account creation. In the case where the mail is accidentally erased or lost, the administrator can overcome this issue through resending system.

This can be done by the **organization manager**.

To make the change of user data, click the voice of **Administration** menu and select the item **Users list**. This will open the page where you can view the users list and carry out transactions on their account.

Position in the user correspondence desired and click the **Actions**, select **Resend confirmation email**.



A message will appear with the result of the request.

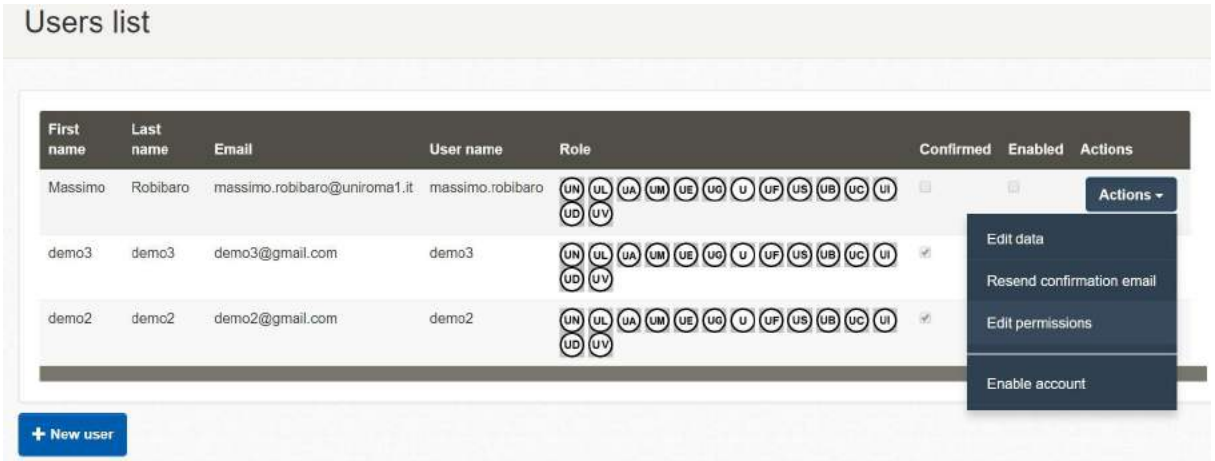
2.5 Management of user permissions

This allows you to manage access to permissions sections associated to each user of **SfingeNET** system.

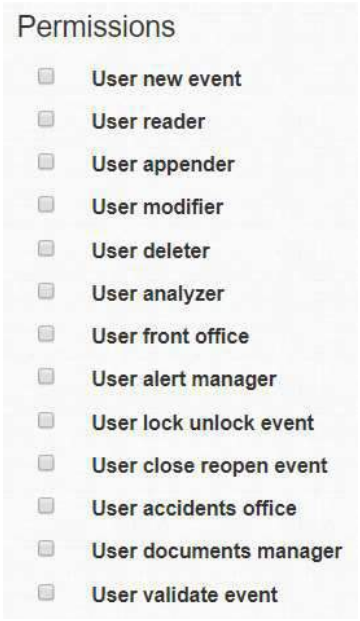
This can be done by the **organization manager**.

To make the change of user permissions, click the voice of ***Administration*** menu and select the item ***Users list***. This will open the page where you can view the users list and carry out transactions on their account.

Position in user correspondence desired and click the ***Actions button***, select ***Edit permissions***.



This will open a window from which you can make changes relative to the user.



By clicking on **Save** button it will save the changes made.

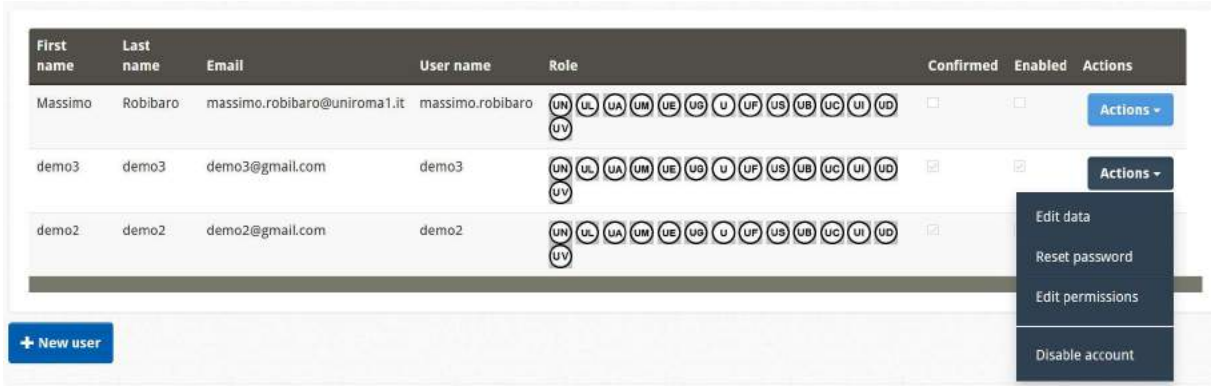
2.6 Disabling User Accounts

This allows you to disable a system user account in **SfingeNET**.

In order for an account you may be disabled, must first be enabled. A new account is enabled by default. This can be done by the **organization manager**.

To make the user account disabling, click the voice of ***Administration*** menu and select the item ***Users list***. This will open the page where you can select the user that you want to disable.

Go to the user desired position and clicking the ***Actions*** button will be possible disable user selecting **Disable account**.



Note. The account is disabled automatically, if at logon (login) is mistaken data entry for more than five times.

2.7 Enable user account

This enables a system user account in **SfingeNET.**

In order for an account can be enabled, it must first be disabled. A new account is enabled by default. This can be done by **organization manager**.

To make the user account enabled, click the voice of ***Administration*** menu and select the item ***Users list***. This will open the page where you can select the user you want to enable.

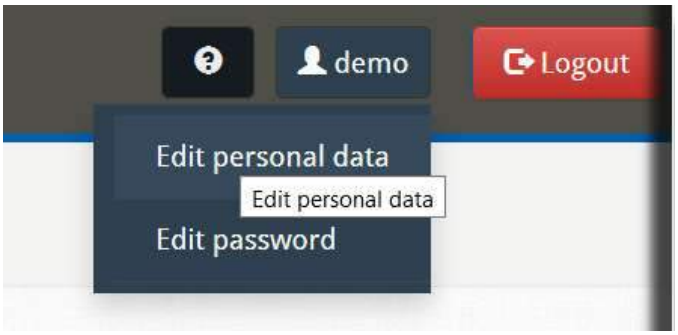
Going to the user desired position and clicking the ***Actions*** button will be possible enable the user selecting ***Enable account***.

2.8 Management personal data

This operation allows you to change the data about the organization of the **SfingeNET**.

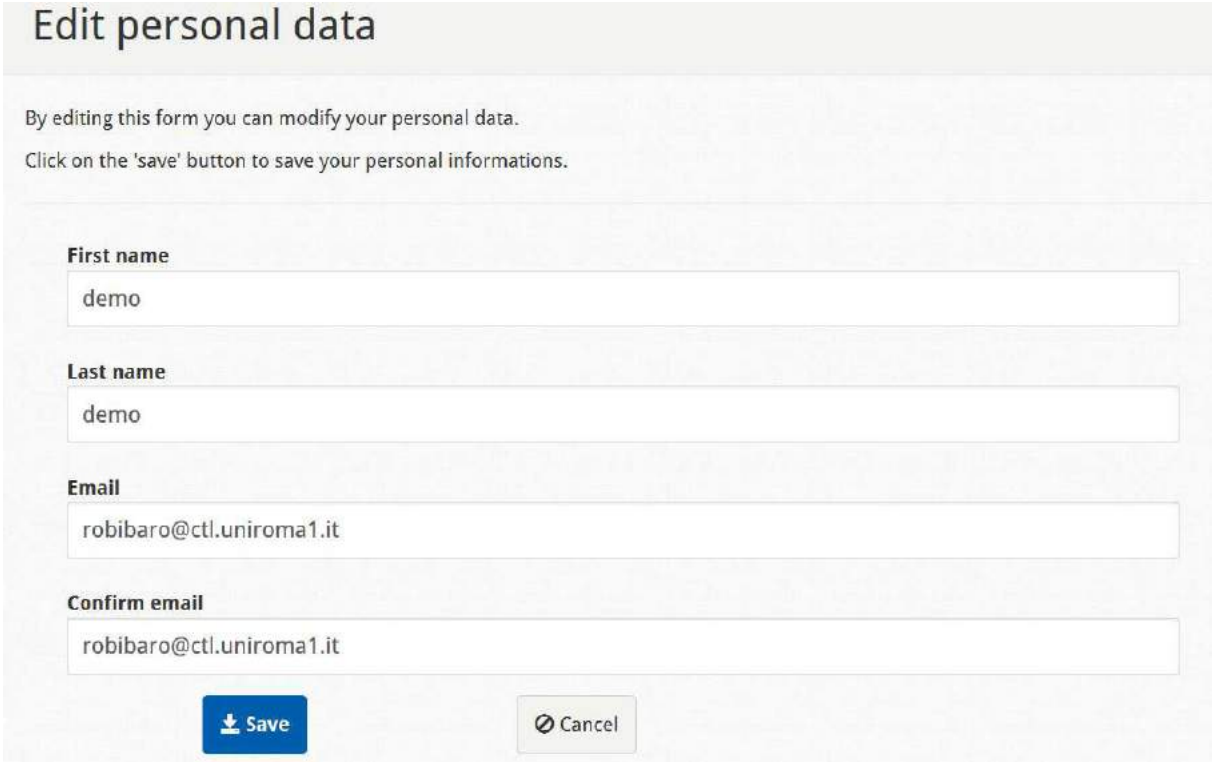
You can change your personal details, after the log in. This can be done by **logged in user**.

To make the change of personal data, click on your *Username* and select the element Change personal data.



This will open the page where you can make changes concerning personal information:

- **Name**
- **Last name**
- **Email**, it is prompted to enter twice the email, to avoid typos.



By clicking on **Save button** will save the changes made.

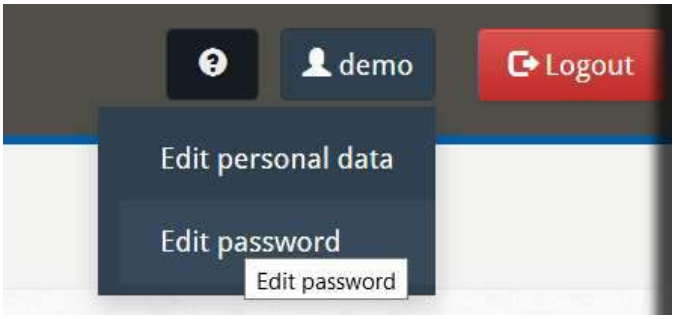
2.9 Changing the password

This allows you to manage user password in **SfingeNET**.

In order to change their system access password, you must be logged.

This can be done by **logged in user**.

To make the change of your password, click on your Username and select the item **Edit password**.



This will open the page where you can make changes regarding the password:

- **Old password**
- **New password**, the system prompts you to enter twice the password, to avoid typos.

Click the **Save** button for saving changes.

3 Management of accident data

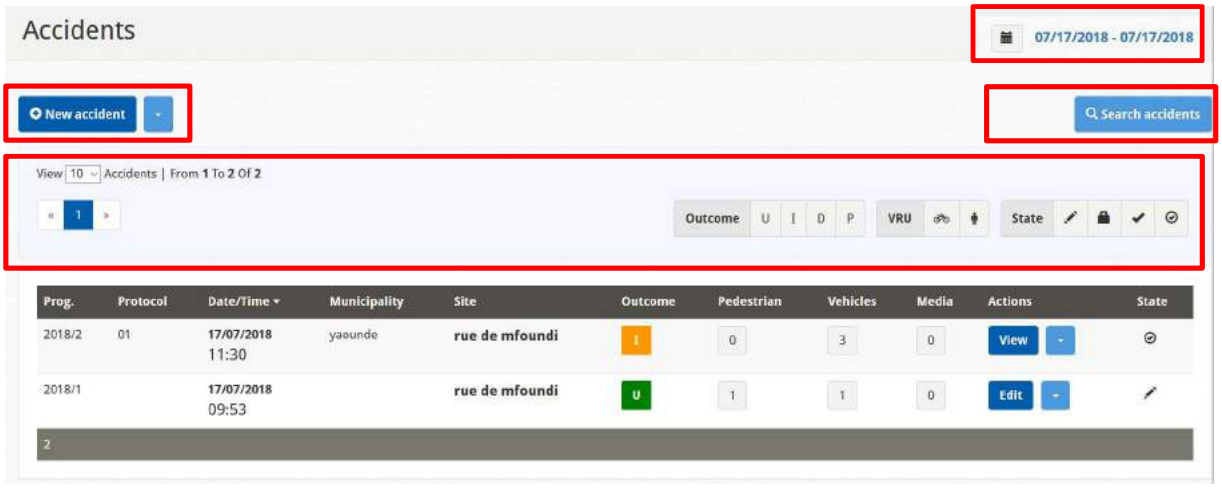
In this section related to the management of features are described accidents.

Table of contents:

3.1 Accident list

This page displays the list of included accidents in your organization and carry out operations related to the management of the same. Access to this page is reserved for the manager organization and users who have permission in read to them.

To view the accident list, click the voice of ***Accidents*** menu and select the item ***Accidents List***. A page will open with the following elements:



1. the selected date range (see the section: ***accidents_DateRange***)
2. two buttons, one for the authoring of a new incident (see the section: ***accident_CreationNewAccident***) and another for advanced search (see the section: ***accidents_SearchAccident***`)
3. a panel with tools for the pagination of results and for the application of filters in the list
4. the table with the list of accidents

3.1.1 Table of accidents

The accidents list is organized by row, the data can be rearranged according to a determined field simply clicking the field name in the header. By default, the data are sorted in ascending order; a further click on same field will sort the data in descending order.

For each incident you are as shown in the following information:

Prog.
unique sequence number assigned to the accident by the system.
Protocol
protocol number assigned to the accident; manually entered by the agent.
Date/Time
date and time when the accident occurred.
Municipality
town of competence in which it is happened the accident.
Site
street / square where the accident occurred; in an accident at an intersection They show both afferent pathways.
Outcome
the outcome of the accident: U (Uninjured people) if there are no injuries, I (Injured people) if there are not seriously injured, P (with Prognoses) if you are injured in guarded prognosis, D (with Deaths) if there are deceased persons.
Pedestrians
indicates the number of pedestrians involved; clicking on the corresponding box It opens a window containing the main data of pedestrians (full name and document number). Click on the button **Edit** associated with each record will open the interface Accident editing directly on the page containing the data of the pedestrian. Clicking on **Modify** it displays the accident and it will instead open the page the main interface of accident modification mode, respectively editing or viewing only.
Vehicles
indicates the number of vehicles involved, by clicking the corresponding box
It opens a window containing the main vehicle data (type, make and model, license plate number and vehicle identification number) Click on the button **Edit** associated with each vehicle will open the interface Accident editing directly on the page containing the data of the vehicle. Clicking **Modify** renders the accident will instead open the page the main interface of accident modification mode, respectively editing or viewing only.

actions

This column contains commands that allow you to change the status accident.

View - Opens the accident management interface in read-only mode

Edit - Opens the accident management interface for editing

Lock - Block the accident in which case you cannot make changes to the accident until it is unlocked

Unlock - Unlock the accident in order to rehabilitate the changes at the same

Close - Closes the accident

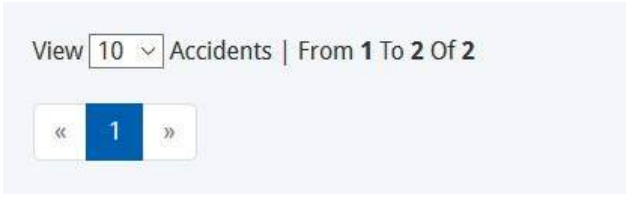
The main command is displayed in full; other commands available They are accessible by clicking the button in the shape of a triangle

state

An icon indicates the current status of the accident: **open**, **blocked**, **closed**, **validate**

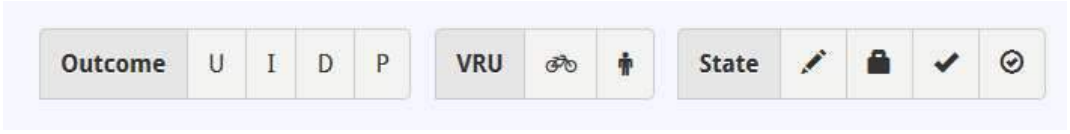
3.1.2 Pagination

If the list of displayed accidents is too big or too small, you can increase or decrease the number of accidents per page through the appropriate selection box.



3.1.3 Filters

In case you want to display only accidents with certain characteristics, you can filter the results. To do this, simply select one or more items in the Filters Bar:



These elements are grouped in three categories:

- Filters outcome (Uninjured, Injured, Dead, reserved prognosis)

- Weak Presence users involved (cyclists and pedestrians)

- Filters on the accident status (Open, Locked, Closed, Validated).

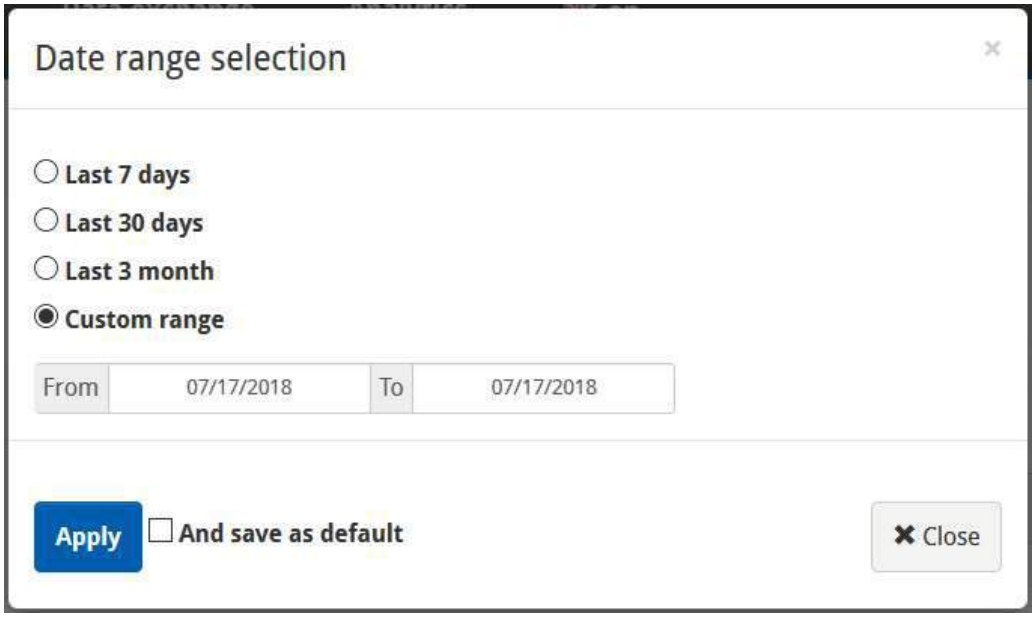
3.2 Search by date range

This allows you to select a specific date range, in order to show only accidents occurred in that time frame. This interval can be customized and saved as a default. *

As of the page with the list of accidents, clicking the small calendar at the top right

A dialog box will be displayed for the arc selection time, with the following options:

- **Last 7 days**
- **Last 30 days**
- **Last 3 months**
- **Custom Range**



Selecting the **Custom range** option will show two additional input fields for the definition of the start and end dates interval.

Once the preferred option selected, to confirm your choice click on the **Apply** button. In case you want to make this default choice for the next Access to the page you just check the box **and save as default**.

3.3 Advanced search

This operation allows you to search one or more accidents based on specific attributes. *

To access the advanced search function, click the button **Search accidents** in the top right. The right of the screen will open a form with the following fields of research:

Date
This field allows you to search by date accident.

Site
It allows you to search the accident according to the way in which it occurred. Type in at least 3 characters an autocomplete mechanism will be able to suggest user with a list of possible valid choices.

Outcome
It allows you to search based on the outcome accident.

State
It allows you to search the accident according to the state.

Officer
It allows you to search the accident through the name of one of the officers intervened.

Progressive
accident research to sequence number.

Person involved
It allows you to search the accident through the surname of one of the people involved. Even in this case, at least 3 characters by typing a mechanism of auto completion will suggest all possible valid names.

Vehicle type

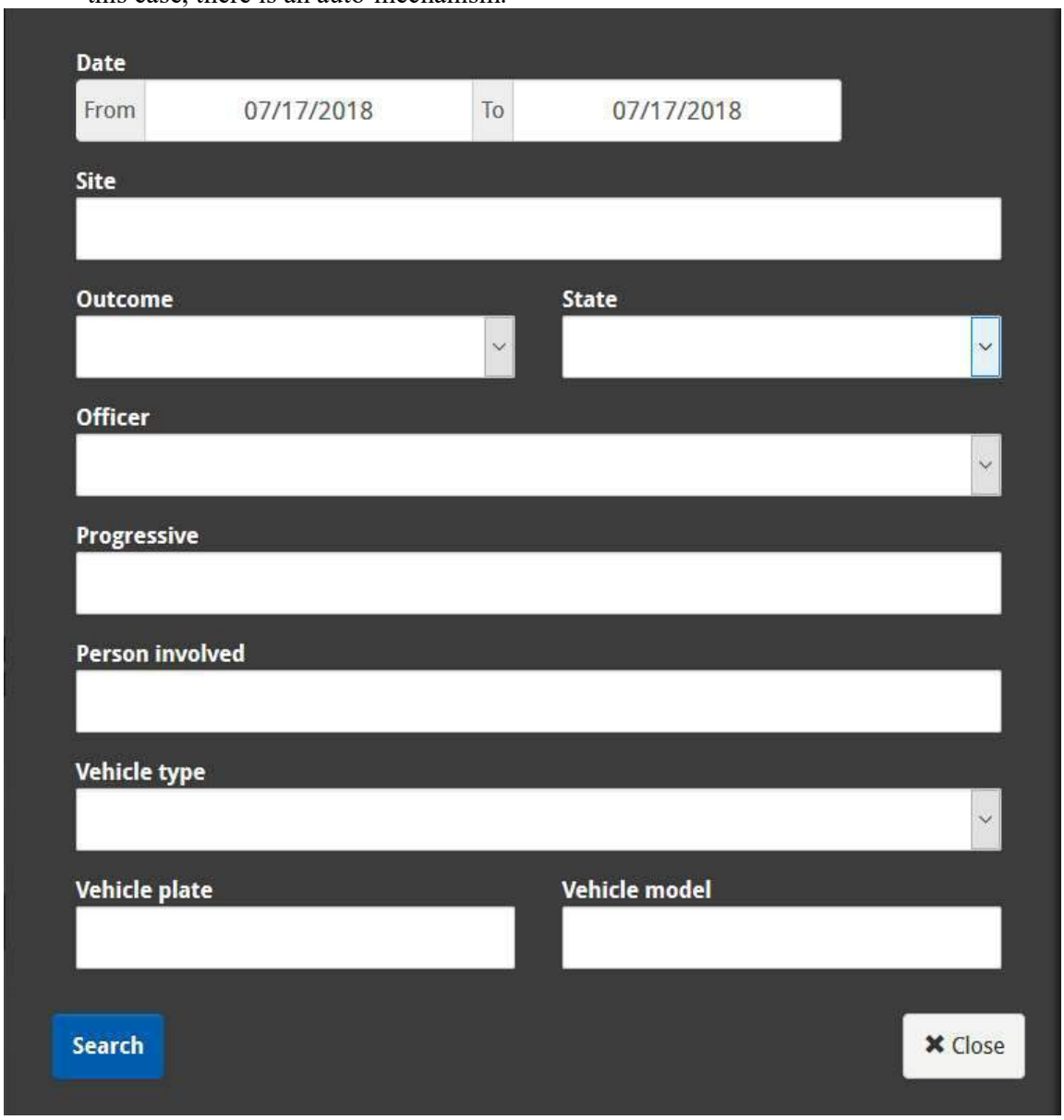
Search the accident that involve a particular type of vehicle (e.g. passenger car).

Vehicle plate

Search the accident according to the vehicle plate of one of involved vehicles. Even in this case, there is an auto-mechanism.

Vehicle model

Search the accident on the model of one of the vehicles involved (e.g. Multiple). Even in this case, there is an auto-mechanism.

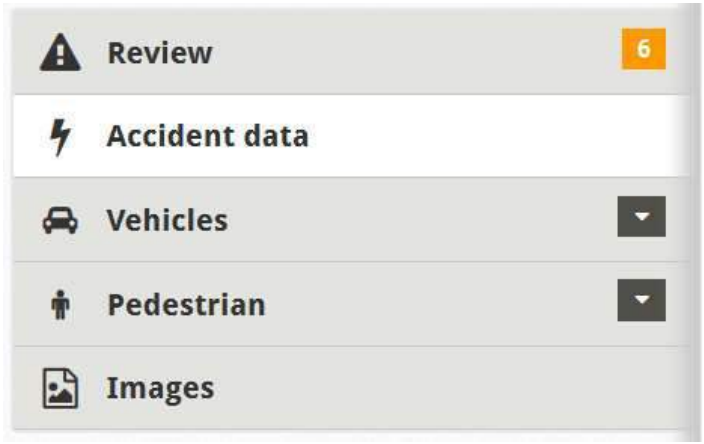


You can start your search by clicking on the inserted fields the **Search** button. After the search the main page will be

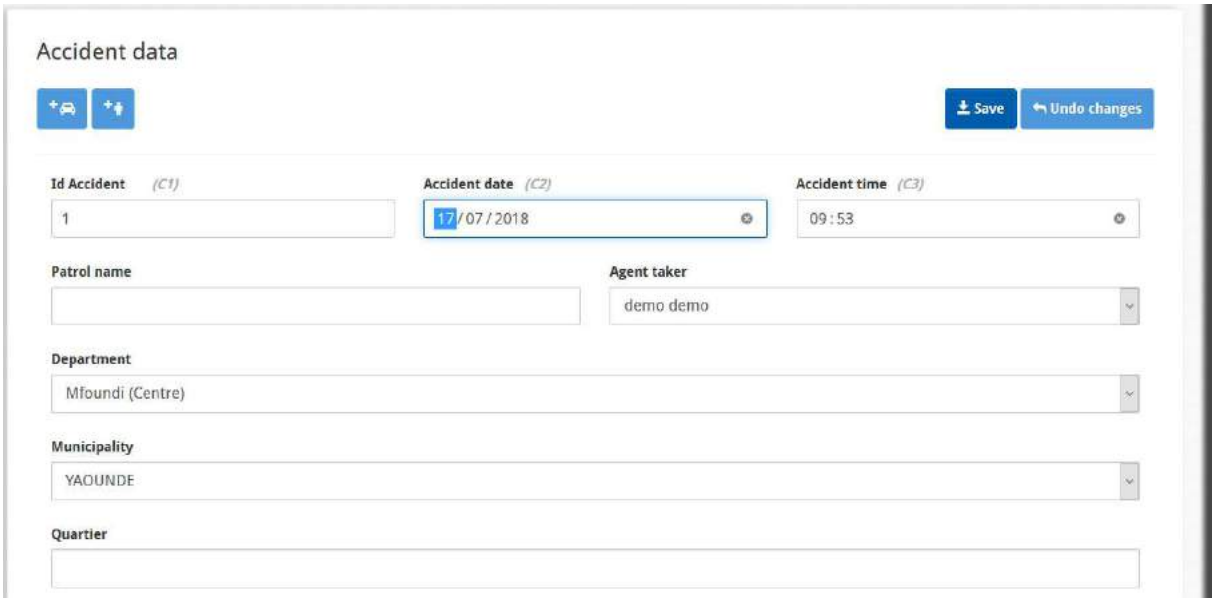
4 Entering accident data

The interface for entering and editing accident data is divided into two parts. In the left part there are the main elements of the accident:

- **Review** - contains the main issues or problems that need to be solved before that is possible to close the accident
- **Accident data** - contains data related to the accident (e.g. the accident site).
- **Vehicles** - contains the data of the vehicles involved, the relevant drivers, owners and transported. The number in the box to the right indicates the number of vehicles involved. **Note:** the item is not displayed if you have not yet entered vehicles.
- **Pedestrians** ** - it contains data related to pedestrians. The number in the box to the right indicates the number of pedestrians involved. **Note**: the item is not displayed if you have not yet entered pedestrians.
- **Images:** it contains data about the images uploaded in the database about the accident



The right part of the interface is occupied from time to time by the masks for the insertion of the various data entities.



If the space for the insertion of data is too small (for example in small screens), you can resize the left pane by clicking on the button with the triangle symbol placed above it; doing so will remain visible only the icons for the various elements and the right panel will occupy most of the screen. You can return to full view by clicking again on the same button.

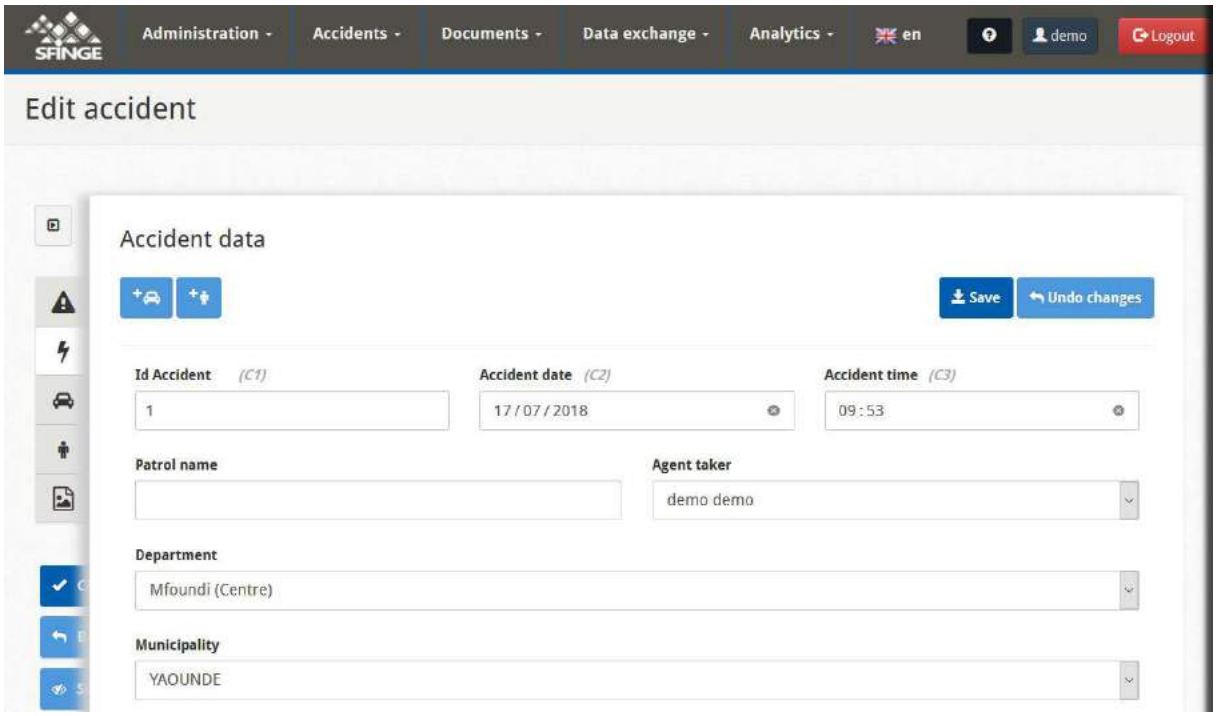


Table of contents:

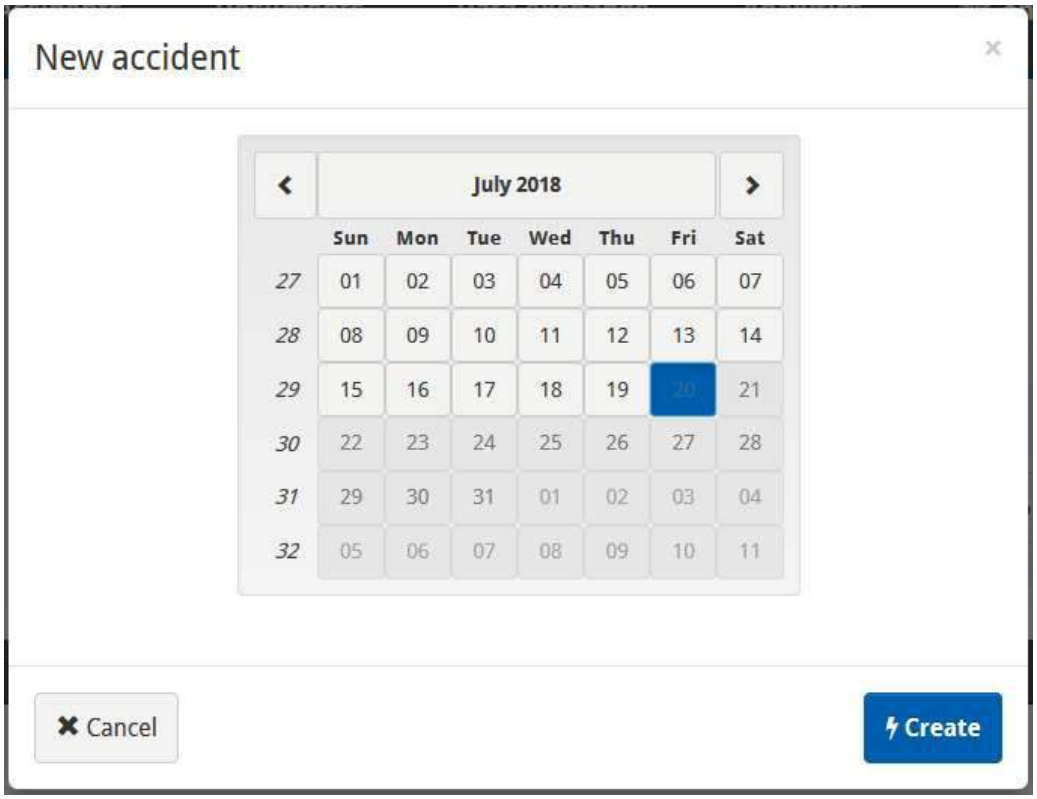
    - Button bar
    - Label
    - Data sheet
    - Physical person
    - Society
    - Identification sheet
    - Declaration form
    - Conditions file
    - Motorist Card
    - Record violations
    - Fact sheet
- Entering data on the animal
    - button bar
    - Label
    - Animal card data
- Data entry related to the asset
    - button bar
    - Label
    - Well card data
- Input of accident data
- Management the document
    - Changing the content of an existing document
    - The preview of a document display
    - Regeneration of a document
    - A message will appear with the result of the request.
    - Release changes to a document
    - Restoration of the previous version of a document
    - The generation of a PDF document for printing
    - Management of external attachments

4.1 Creating a new accident

Access the Accident Management page by clicking the item ***Accident*** menu and selecting the item ***Accident List***.

Click the New accident, located on the top left of the page.

This will open a window in which to select the date of the accident, which by default is set to today's date.



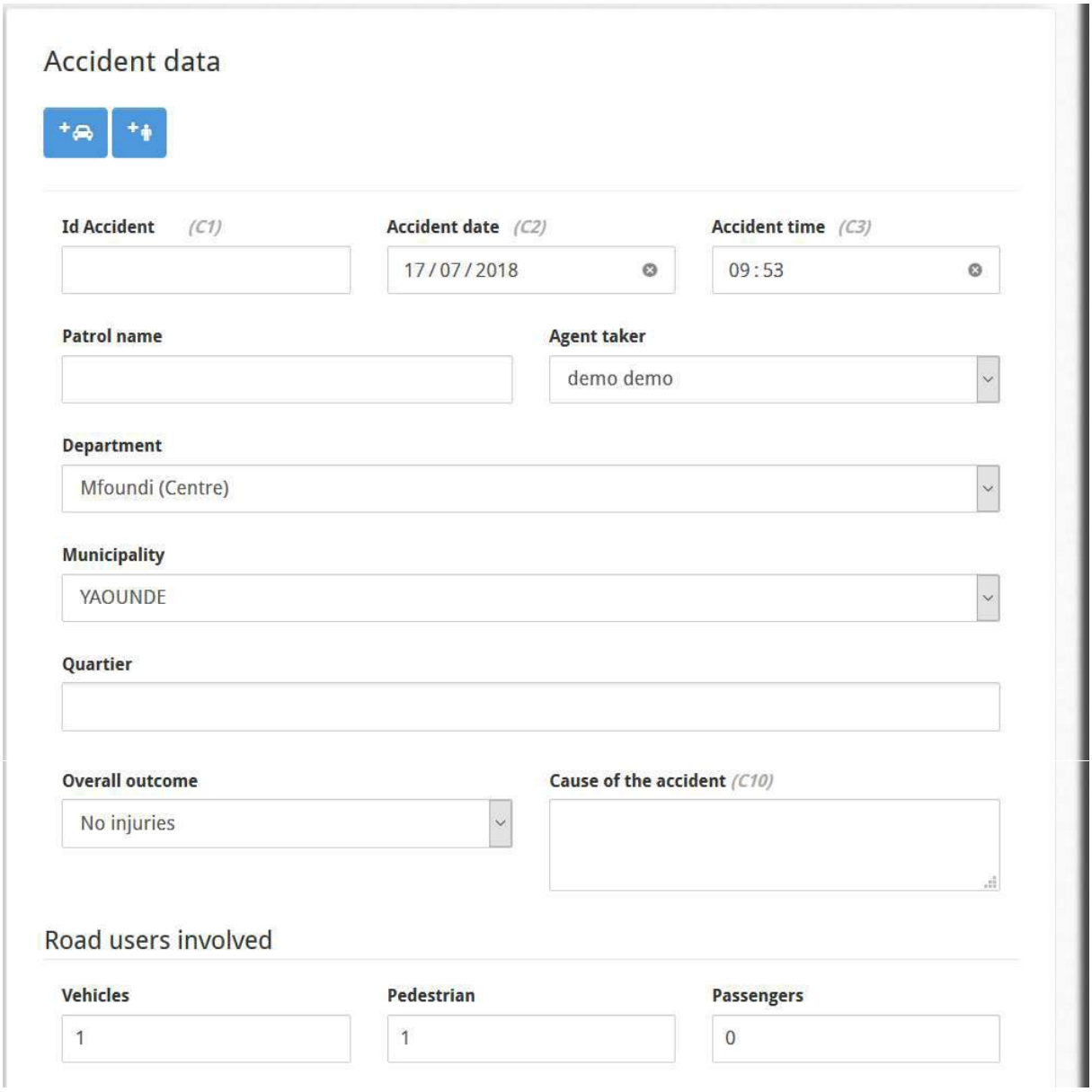
Click the ***Create*** key to make the creation of the new accident.

If the operation is successful it will access the interface of the incident data entry. The system automatically assigns a unique incident in the progressive format year / number.

4.2 Entering accident data

This mask, accessible by clicking the ***Accident data*** of the left panel. It lets you enter your accident data.

The mask consists of a bar of buttons and a tab:



Location information

Junction *(R-6)*

At-grade - T or staggered junction

Junction control *(R-7)*

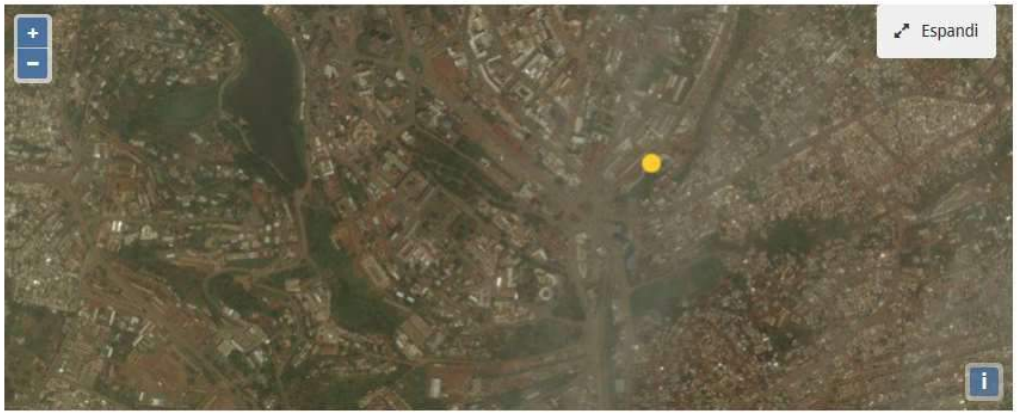
Locate on cartography

Latitude *(C5b)*

3.8630233

Longitude *(C5b)*

11.5227864



Motorway *(R1)*

Unknwon

Urban Area *(R1)*

Unknwon

Weather *(C8)*

Lighting *(C9)*

Accident type *(C6)*

First road

First road name

RUE DE MFOUNDI

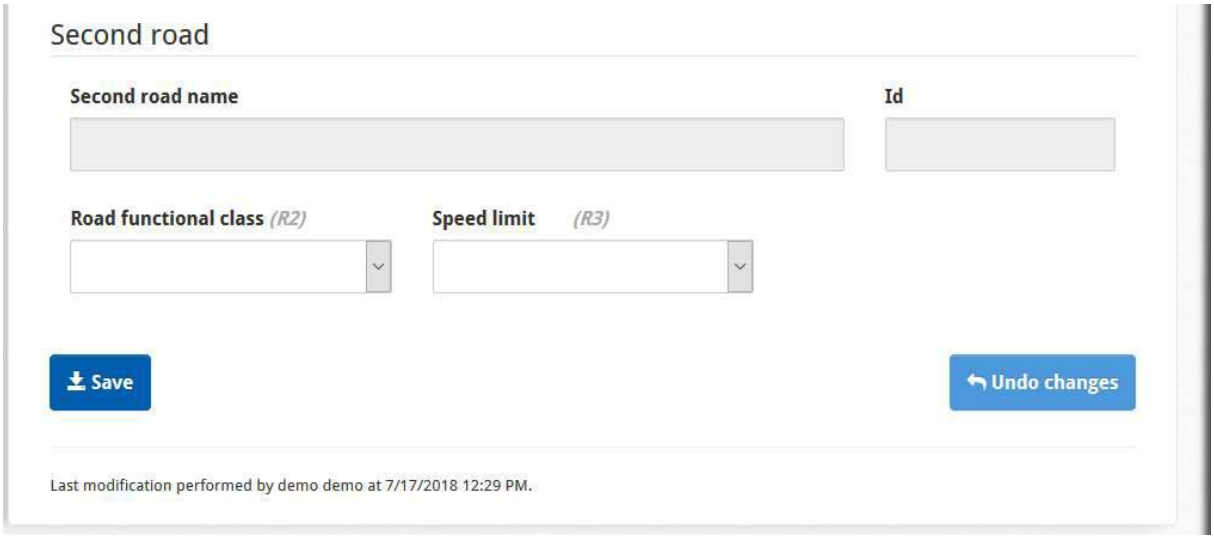
Id

19902852801

Road functional class *(R2)*

Speed limit *(R3)*

Road surface *(R5)*



To save the changes, or cancel your changes, click on the respective buttons (***Save***, ***Undo Changes***) located at the end of the page. Note that if there are any unsaved changes and you select another item in the left panel, the system will ask first if you want or not to save your changes.

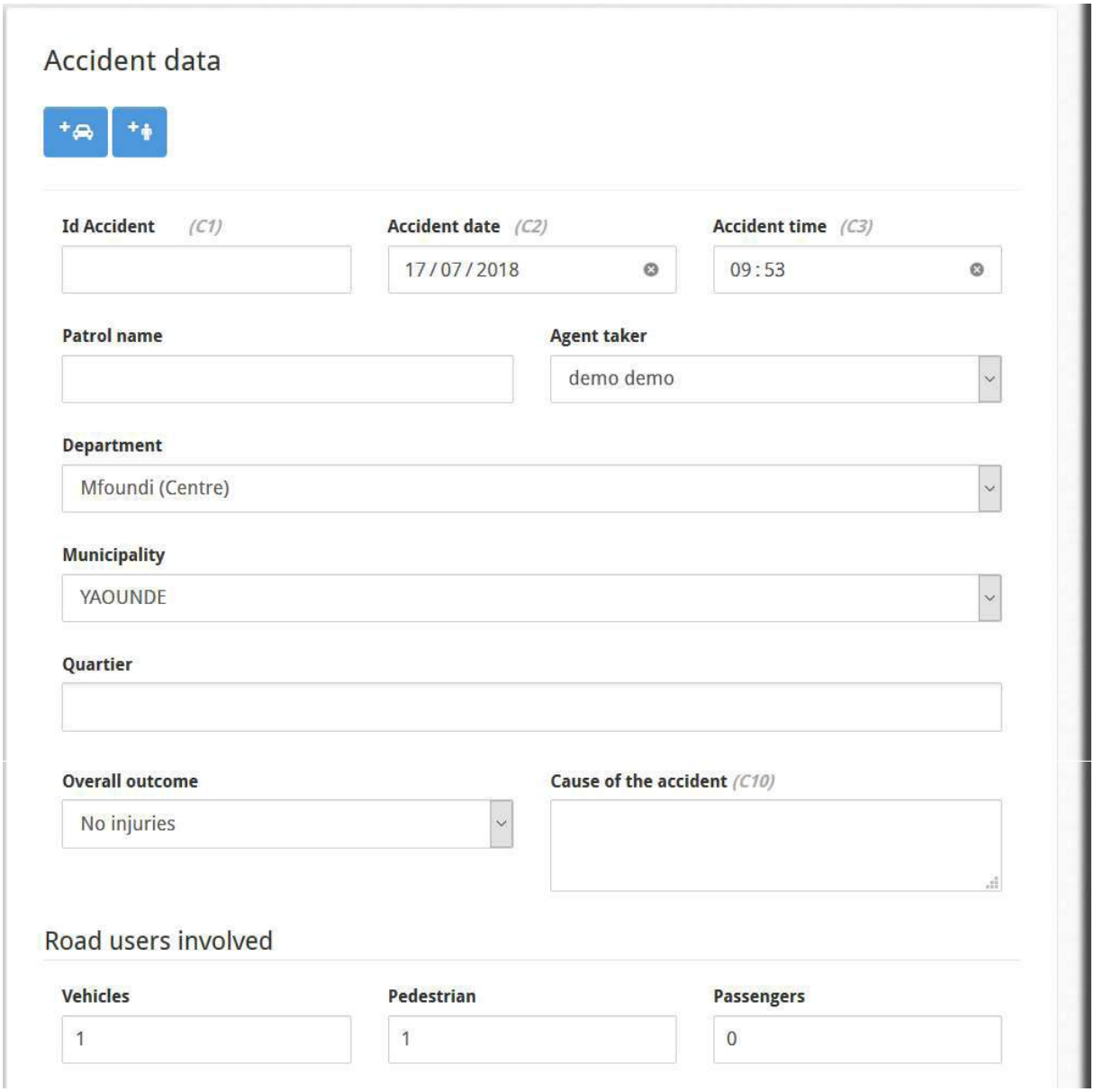
4.3.1 Button bar

The Bar has two buttons.

1. **Add vehicle accident** - This button lets you add a new vehicle connected to the accident. Clicking on the button is added to the vehicle. All related to the accident vehicles are visible in the left panel under the heading **Vehicle**. You can expand the list of those vehicles, by clicking the triangle to the right. If the addition of vehicle operation is successful it will pass to the interface input of vehicle data.

2.**Add pedestrian to the accident**- This button lets you add a new pedestrian connected to the accident.

4.3.2 General data form



Type in **Id Accident**, the registration number assigned to the accident.

Type in the text box **Accident date** and **Accident time**, the date and time at which the event occurred, in the following format: date **dd / mm / yyyy** and **hh: mm**.

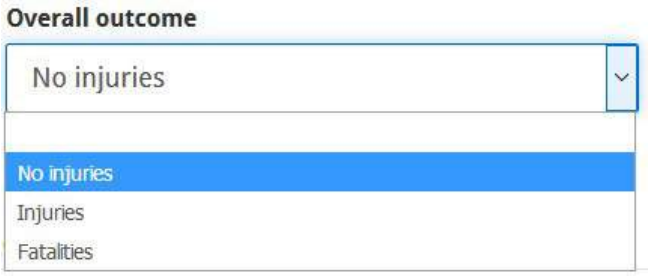
Type in the text box **Patrol name,** the name of the patrol

Select the officer in the drop-down list **Agent taker**

Select the **Department** and the **Municipality** from the drop-down list

Type the location in the **Quartier** text box

Select the outcome of the accident in the **Overall Outcome** drop down list

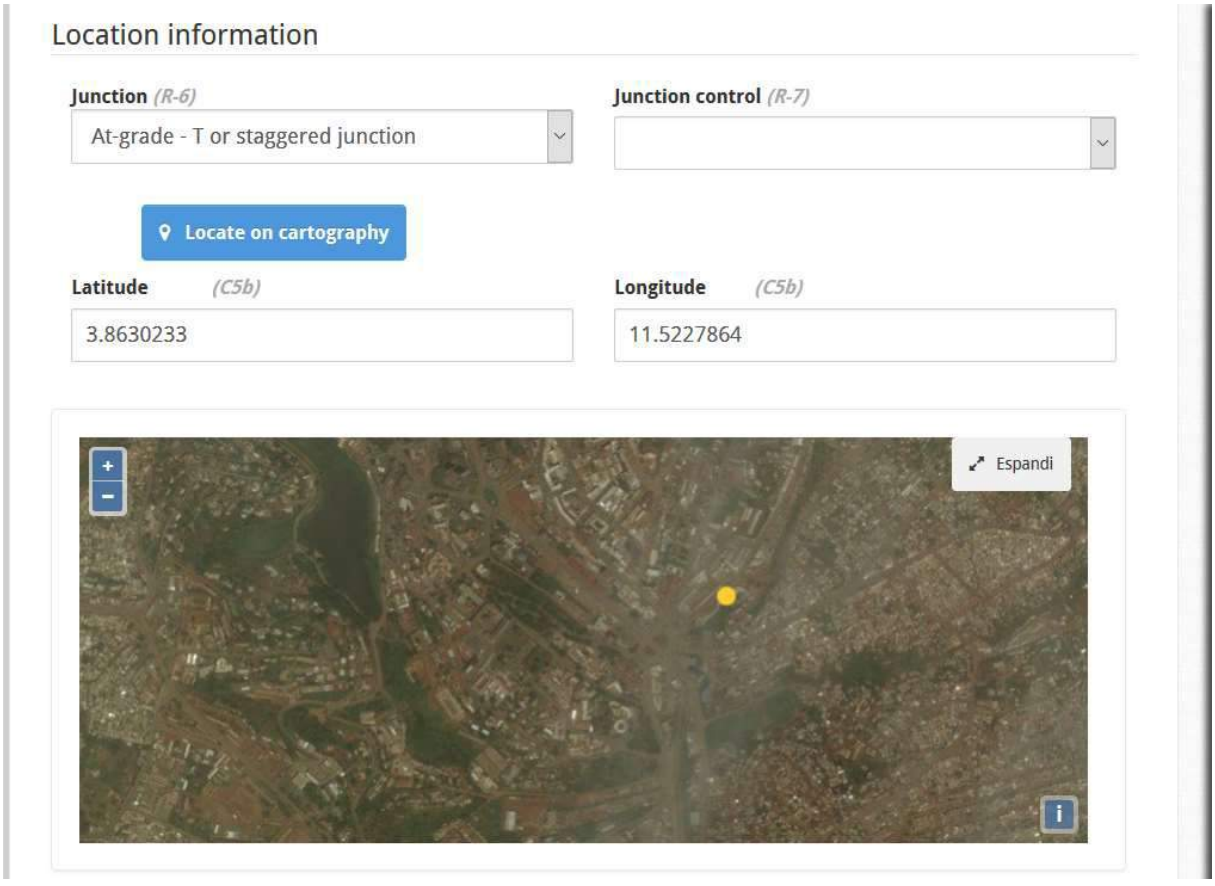


Type the cause of the accident in the field **Cause of the accident**

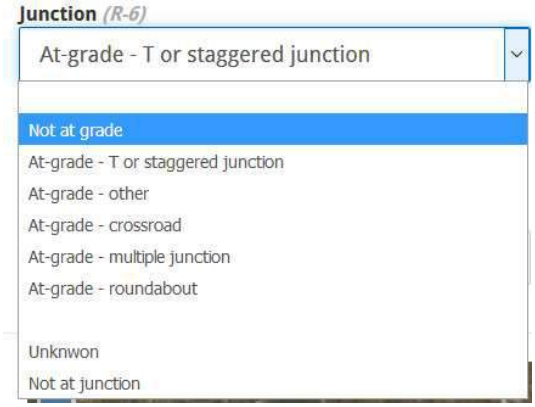
Type the number of road user involved in term of vehicles, pedestrians and passengers

4.3.3 Localization information

Local data



Select the **Junction** drop down list, you will see the common list; typing at least one character, an autocomplete mechanism will suggest all possible valid common.



Indicate in the **Junction** the characteristics of the road where the accident occurred. If the incident occurred at an intersection, indicating the item **"At-grade – crossroad"** as the type of intersection.

Click on **Locate on cartography** to make the event location on road maps.

Once the location will see a satellite view of the accident site through which it is possible to determine more precisely the location of the accident, dragging the corresponding yellow dot.

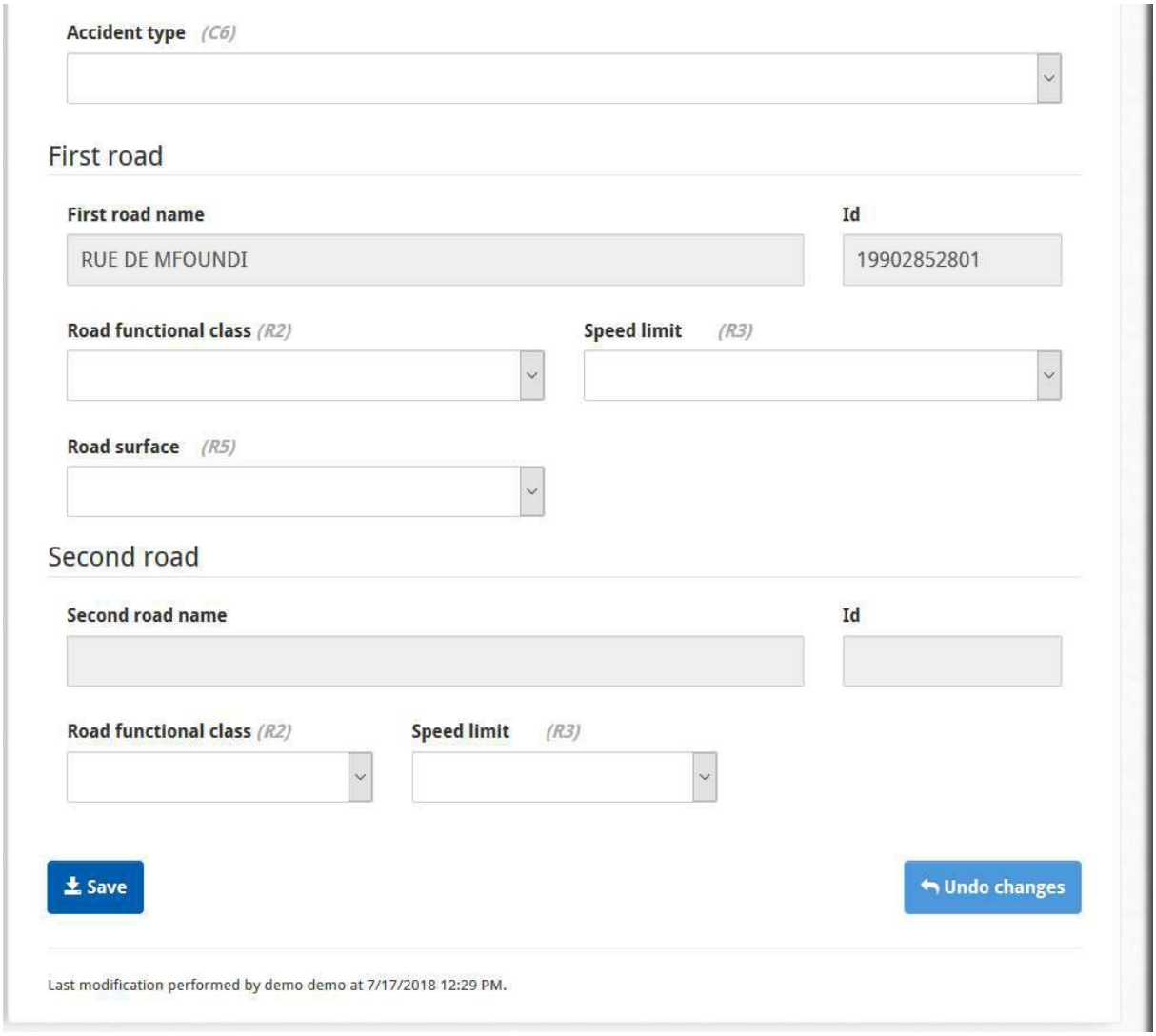
4.3.4 Road information

Type the **Motorway** and the **Urban Area** if the accident has occurred in a Motorway or in an Urban Area

Select from **Weather** the conditions at the time of the accident.

Click the **Lighting** box and select one of the default entries on the state of enlightenment: Natural, artificial, natural and artificial, Absent.

Select from **Accident type** the type of the accident



The box of text about the street name is not editable but is recovering Self Report the street name of the location on the map made previously.

In **Road Functional Class** box select one of the following items: highway, provincial street, extra-urban street, local street, etc.

Click the **Road surface** box and select one of the following items: dry, wet, slippery, Frozen, Snow-capped.

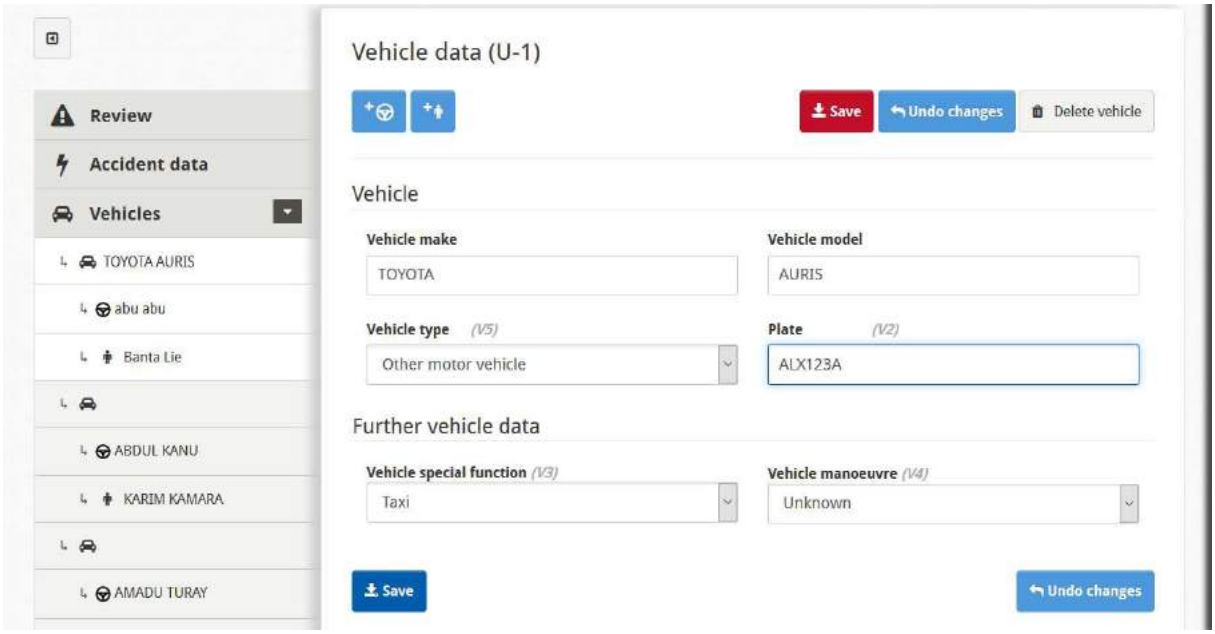
Features of the road

In the field **Speed limit** the speed limit that there is any road in the stretch in question.

4.4 Entering vehicle data

This mask, accessible by clicking one of the vehicles present under the heading **Vehicle** of the left panel, you can enter the relevant data.

The mask consists of: a button bar and a tab



To save the changes or discard the changes, click on the respective buttons (**Save**, **Undo Changes**) located at the end of the page. Note that if there are any unsaved changes and you select another entry in the left panel, the system will ask first if you want to or not save your changes.

4.4.1 button bar

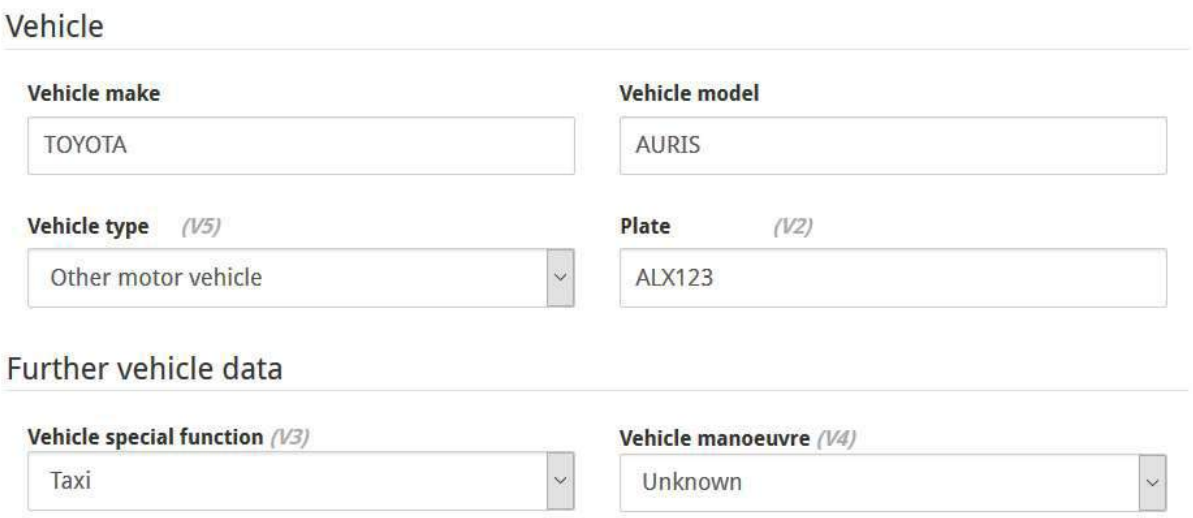
The bar consists of four buttons.

1.**Add a driver to the vehicle**- This button lets you add a new driver connected to the vehicle. All the people connected to the vehicle are visible in the left panel as below elements. If the creation of the person is successful it will go to the edit mask of personal data.

2.**Add a passenger to the vehicle**- This button lets you add a new passenger connected to the vehicle. If the creation of the person is successful it will go to the edit mask of personal data.

4.4.2 Vehicle data

This tab contains all the data relating to the vehicle, as deduced from its circulation card.



Click on the **Vehicle Type** box and select one of the default entries: Passenger Car, Taxi, etc.

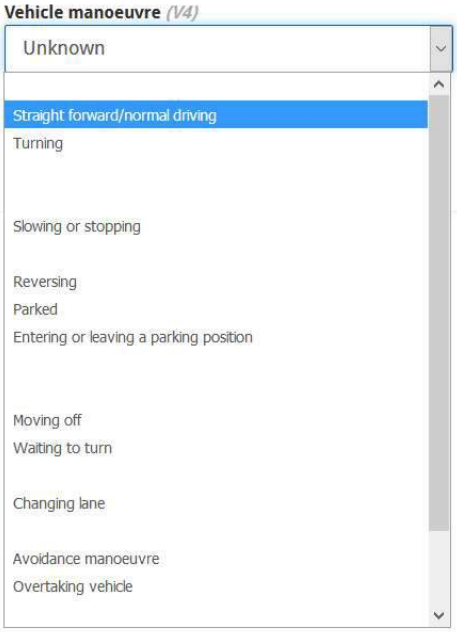
In the text box **Plate**, type the number of the vehicle plate.

Enter the **Vehicle make** text box for the vehicle make.

Type from the **Vehicle model** text box to the vehicle model.

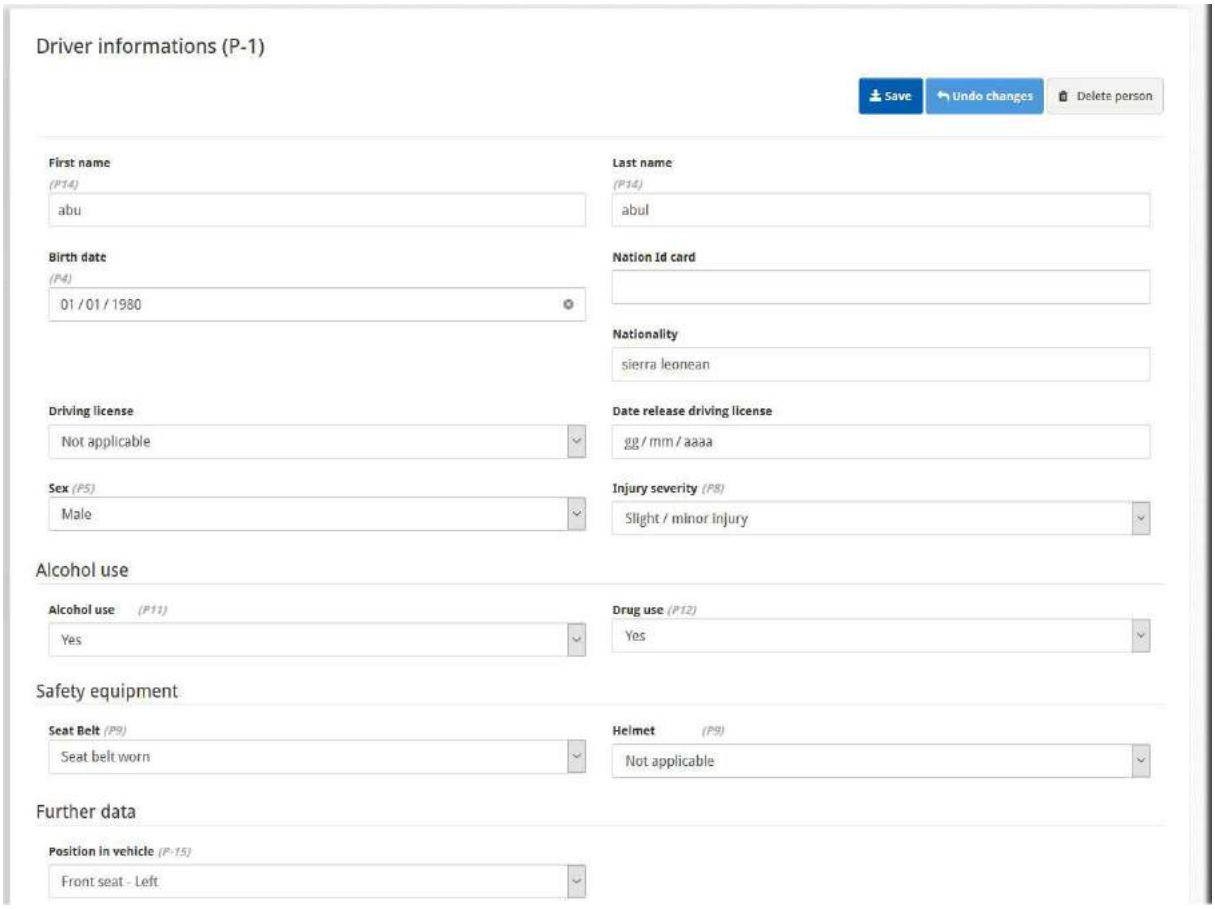
4.4.5 Further vehicle data (vehicle manoeuvre)

Click the "Manoeuvre before collision" box and select one of the default entries: Exceeded, Turned left, and so on.



4.5 Entering the person's data

This mask is used to add data about the person. Fields change according to its role.



The mask is composed of a bar of buttons and a tab

To save the changes or cancel the changes, click on the respective buttons (**Save**, **Undo Changes**) located at the end and in the top of the page. Note that if there are changes by still saved and you select another field in the left panel, the system will ask first whether you want to save the changes performed.

4.5.1 Button bar

The bar is composed of three buttons:

1. **Delete person**- This button eliminates the person. The system will request confirmation of the elimination because the operation is irreversible

4.5.2 Data sheet

Personal data

Insert the first and last names of the person in the respective text fields **First name** and **Last name**.

In the **Birth date** box, enter the date of birth of the person.

In the Sex box, select the sex of the person (Male / Female).

In the **Nationality** box, select the nationality.

4.6.6 Identification sheet

Insert in the **Driving license** text box the type of the driving license

Insert the date of release of the document in the **Date release driving license**.

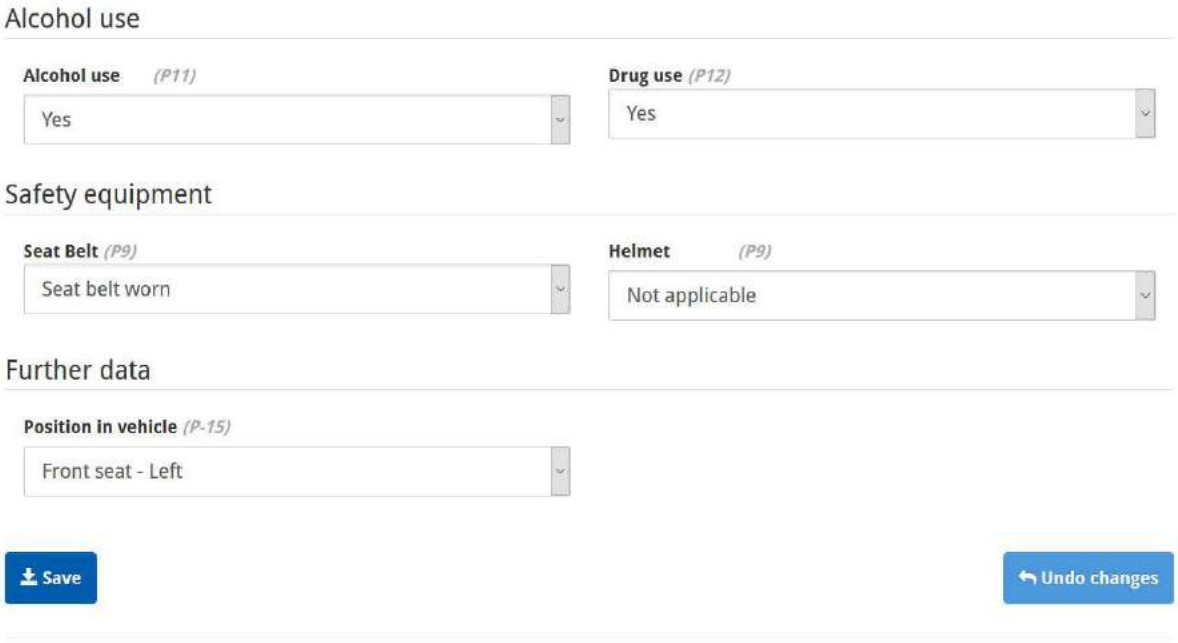
4.6.8 Circumstances of the accident relating to the person

This form allows to insert the circumstances of the accident relating to the person, for this the record is visible only if you insert the data of the person involved in the accident.

Click the box **Injury severity** and select the consequences to the person: No injury, Serious / severe injury, etc.

Then we have data about:

- **Alcohol use**
- **Safety Equipment**
- **Further data**



Alcohol and drug use

Select the **Alcohol use** box if the person has made use of alcohol

Select the **Drug use** box if the person has made use of drug

Safety Equipment

Select **Seat Belt** box for indicate the use of belts by selecting from: Worn, Not Wearing, Absent, etc.

Select the **Helmet** to indicate the use helmet by selecting from: Wore, Worn, Absent, etc.

Further data

Click on the **Position in vehicle** box and indicate the position of the person in the vehicle by selecting from the fields: Anterior to Left, Anterior to Right, etc.

Annex 4 SFINGE “Health” user manual

Sfinge “Health”
User Manual

Index

1 Introduction

SFINGE is an innovative information system that allows the collection and the management of accident data.

SFINGE allows also the graphical representation of the accidents on a cartographic map and the analysis of the factors that determine these phenomena.

SFINGE is designed to answer to the needs of several users. Its use is for:

- Police
- Health Services
- SLRSA

2 Management and configuration of accounts

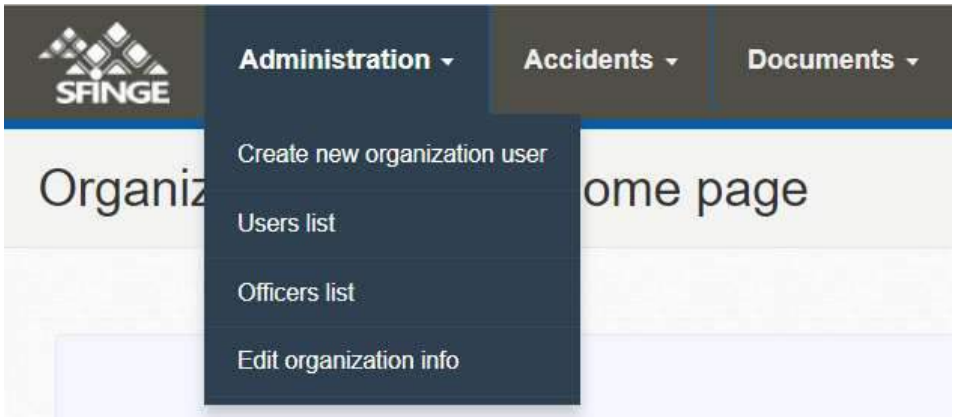
This section describes the functions related to the management of user accounts.

Table of contents:

2.1 Creating a new user account

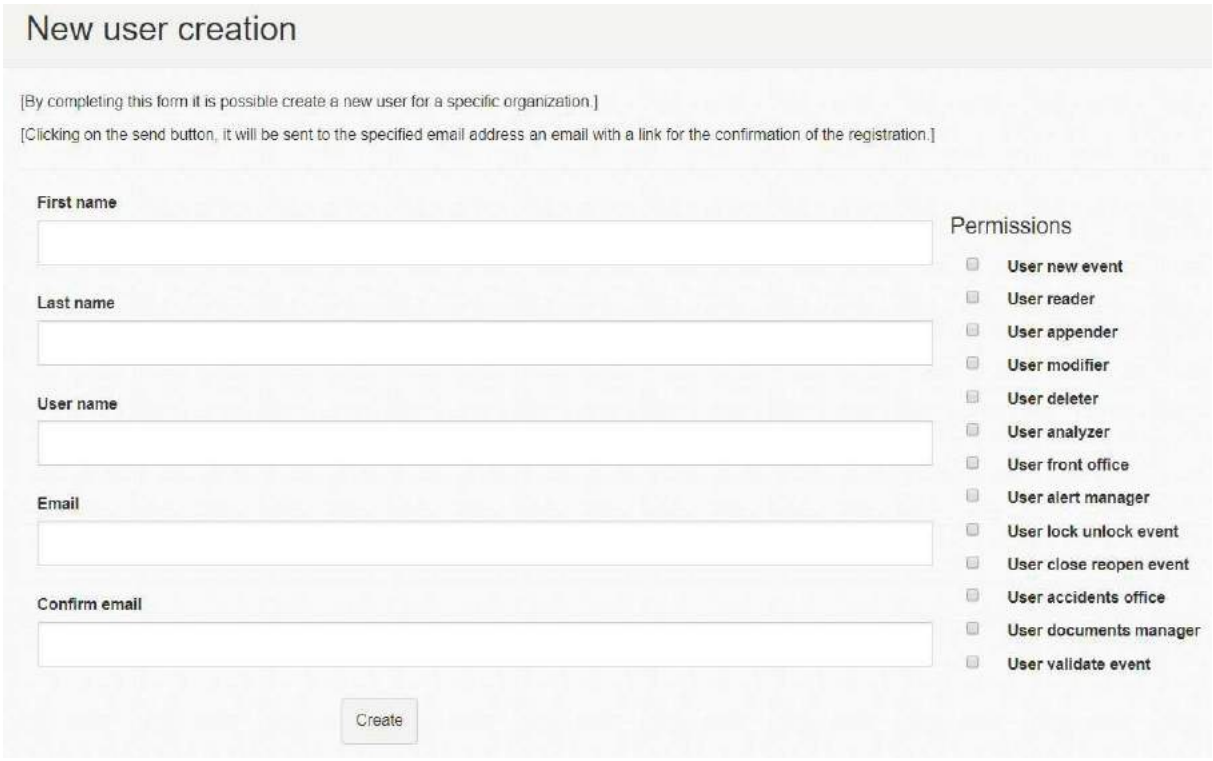
This allows you to create a new account for access to the system SfingeNET.

To complete the user account creation, click the voice of ***administration*** menu and select the item ***Create new organization user***.



This will open the page where you can enter summary information about the user:

- *Name and surname*
- *User Name*, which is the unique name that identifies the user in the system. The user name can consist of uppercase and lowercase letters, digits, and / or the point symbols (.) and underscore (_).
- *E-mail address* used by the user you are creating. To avoid typing errors, you are asked to enter twice the e-mail address.



In addition to the above information (mandatory), the system also allows you to specify the permissions associated with the user. To assign a specific permission to a user simply click on the check to the left of the name of the permission.

For example, the image below, you create a user that will have the permissions of write access and added, and permissions for the management of reports.

Clicking on the button ***create***, you make the user account creation. If the creation is successful, the message « … ». Same will be sent an email to the email address specified. This email will contain,

in addition to the account creation notification, a link to the account confirmation. By clicking on that link, the user can confirm their personal details and enter your password for access to the system. This password must have at least 8 characters. Upon completion of the registration an e-mail notification will be sent to responsible.

Note. The created account will not be accessible until it is not confirmed recording.

2.2 Creating new agent

This operation creates a new agent in the system SfingeNET.

So that a user can play specific activities for the role of agent (E.g. Car crash pad), it is to perform a transformation of a simple account to agent.

In order to create an agent is needed before you create a simple user who it can be then transformed into agent.

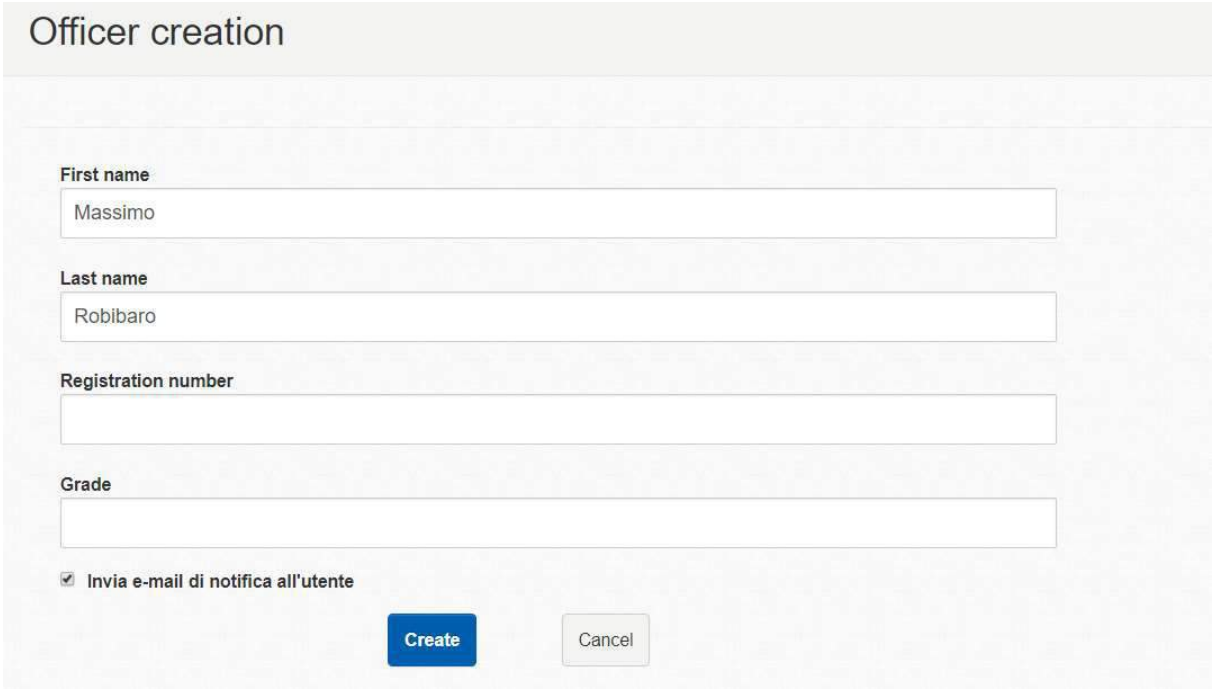
To make the agent's creation is necessary to fill in the fields, following the guidance in the creation of an agent:

Click the voice of ***administration*** menu and select the item ***Officers List***. This will open the page where there will be a list **Members of agents** and **Members not agents**.

To add a new **Agent,** position the user you want, and click the **Create new officer**.

This will open the page where you can enter summary information about the user:

- *First Name and Last name*
- *Registration number*
- *Grade*



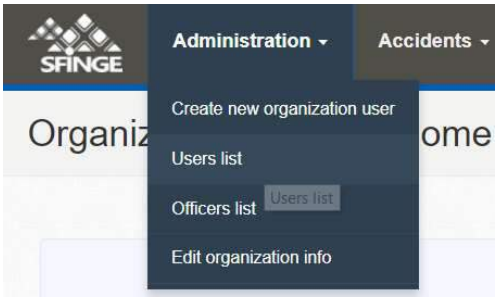
Click the **Create**, in the list of **Officers** will be shown the new officer.

2.3 Management User Data

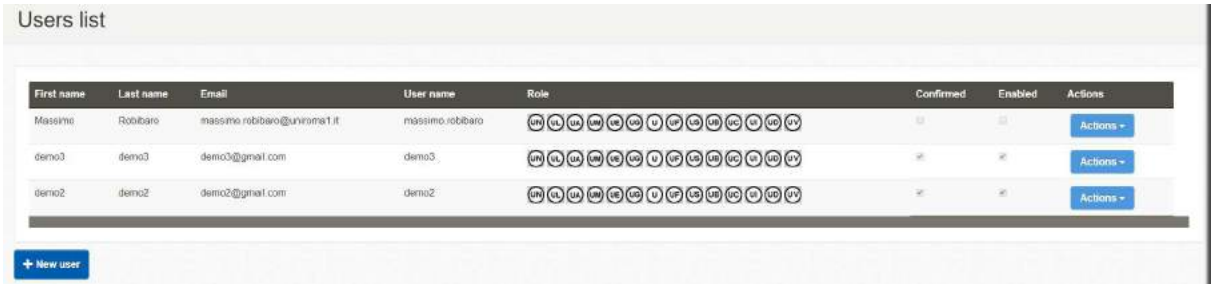
This allows you to manage system user data SfingeNET.

This can be done by the **organization manager**.

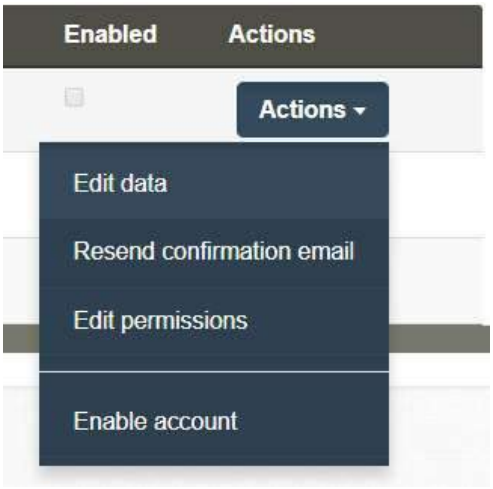
To make the change of user data, click the voice of administration menu and select the item **Users list.**



You will be shown a page where you can view the list users and carry out transactions on their account.

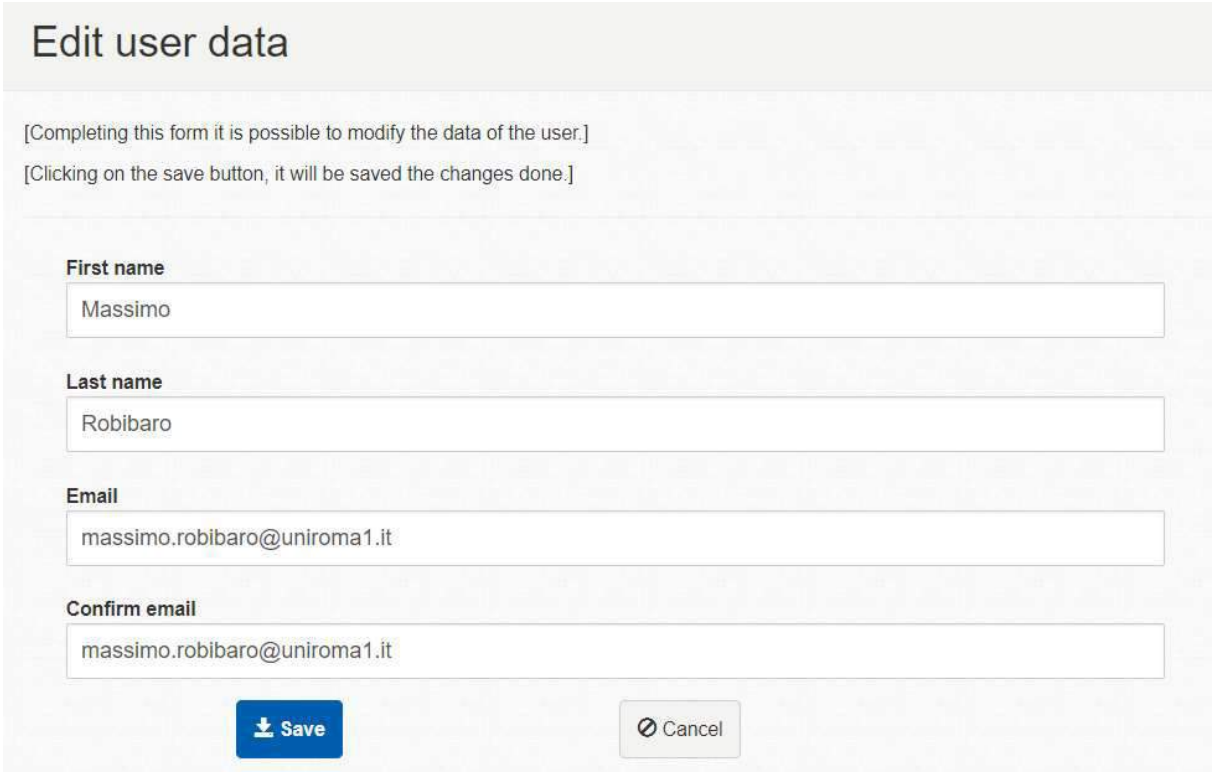


Position in user correspondence desired and click the action, selection **Edit date**.



This will open a page where you can make changes the summary information about the user:

- ***First Name***
- ***Last name***
- **Email** used by the user. To avoid typing errors, you are asked to enter twice the email address.



By clicking on **Save** will save the changes made.

2.4 Resend user account confirmation email

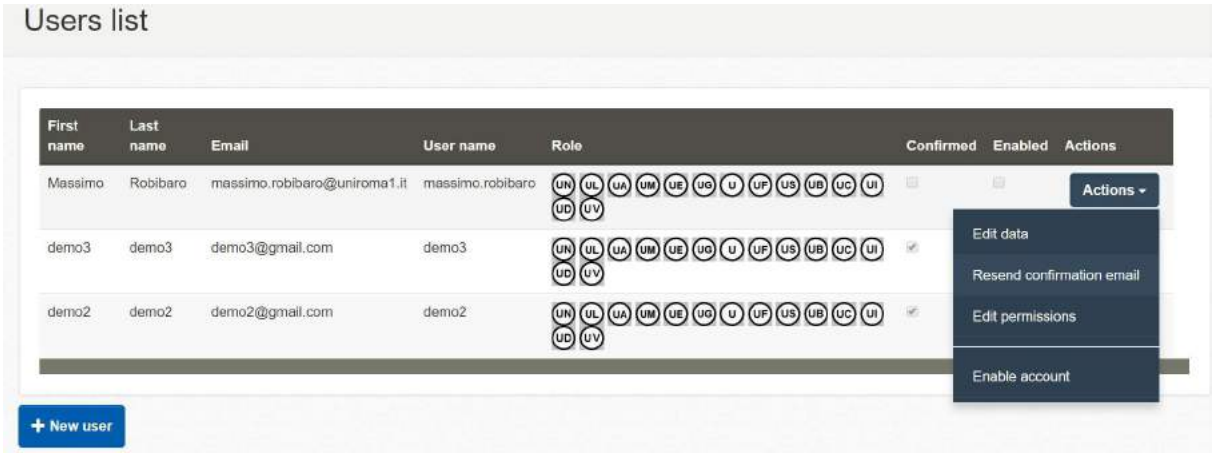
This allows you to manage system user data SfingeNET.

In order to be usable user account, it is necessary that you acknowledge the user account using the instructions received on email sent to the account creation. In the case where the mail is accidentally erased or lost, the administrator can overcome this issue through resending system.

This can be done by the **organization manager**.

To make the change of user data, click the voice of **Administration** menu and select the item **Users list**. This will open the page where you can view the users list and carry out transactions on their account.

Position in the user correspondence desired and click the **Actions**, select **Resend confirmation email**.



A message will appear with the result of the request.

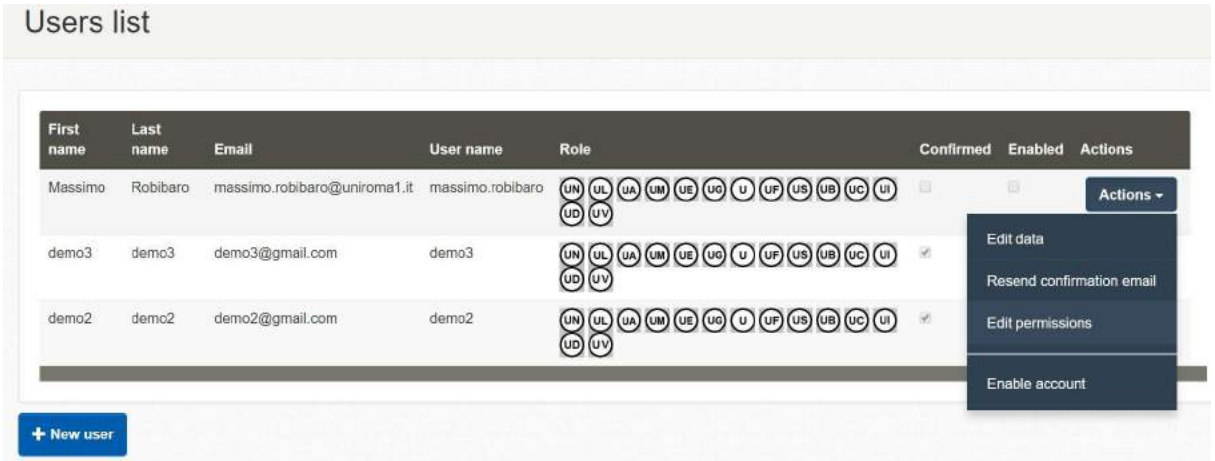
2.5 Management of user permissions

This allows you to manage access to permissions sections associated to each user of **SfingeNET** system.

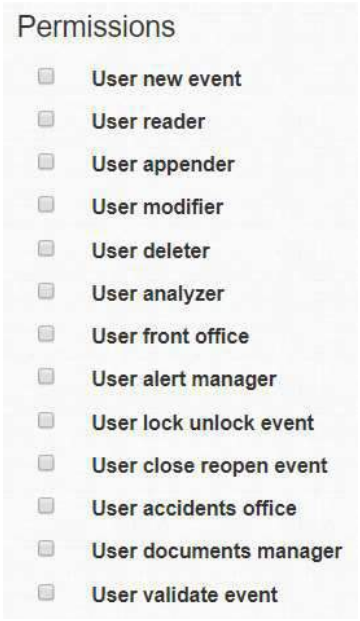
This can be done by the **organization manager**.

To make the change of user permissions, click the voice of ***Administration*** menu and select the item ***Users list***. This will open the page where you can view the users list and carry out transactions on their account.

Position in user correspondence desired and click the ***Actions button***, select ***Edit permissions***.



This will open a window from which you can make changes relative to the user.



By clicking on **Save** button it will save the changes made.

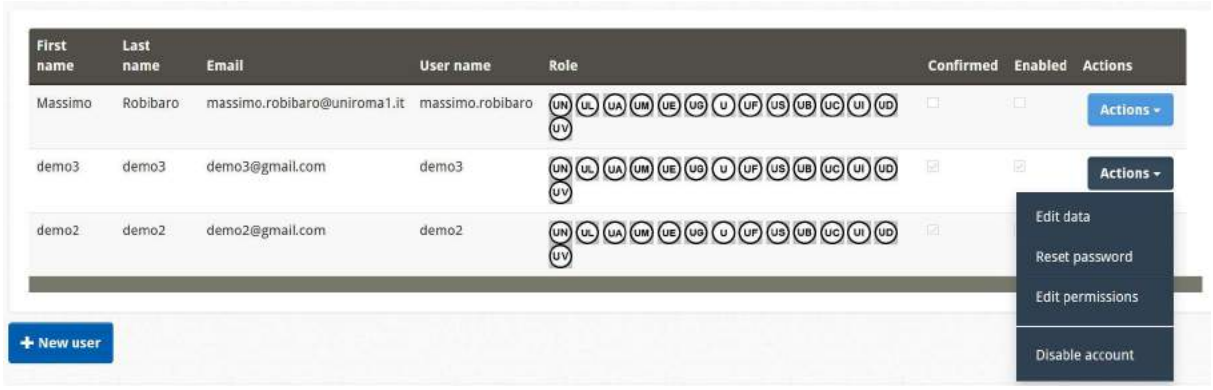
2.6 Disabling User Accounts

This allows you to disable a system user account in **SfingeNET**.

For an account to be disabled, it must firstly be enabled. A new account is enabled by default. This can be done by the **organization manager**.

To make the user account disabling, click the voice of ***Administration*** menu and select the item ***Users list***. This will open the page where you can select the user that you want to disable.

Go to the user desired position and clicking the ***Actions*** button will be possible disable user selecting **Disable account**.



Note. The account is disabled automatically, if at logon (login) is mistaken data entry for more than five times.

2.7 Enable user account

This enables a system user account in **SfingeNET.**

For an account to be enabled, it must firstly be disabled. A new account is enabled by default. This can be done by **organization manager**.

To make the user account enabled, click the voice of ***Administration*** menu and select the item ***Users list***. This will open the page where you can select the user you want to enable.

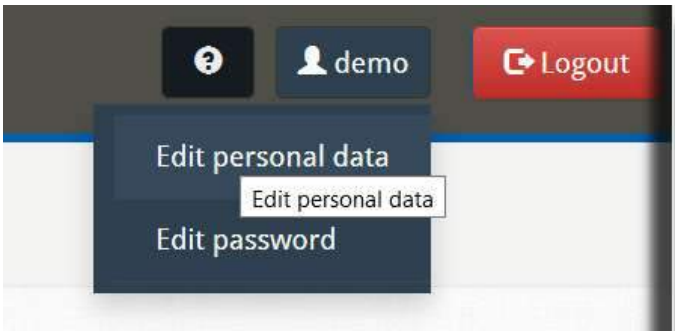
Going to the user desired position and clicking the ***Actions*** button will be possible enable the user selecting ***Enable account***.

2.8 Management personal data

This operation allows you to change the data about the organization of the **SfingeNET**.

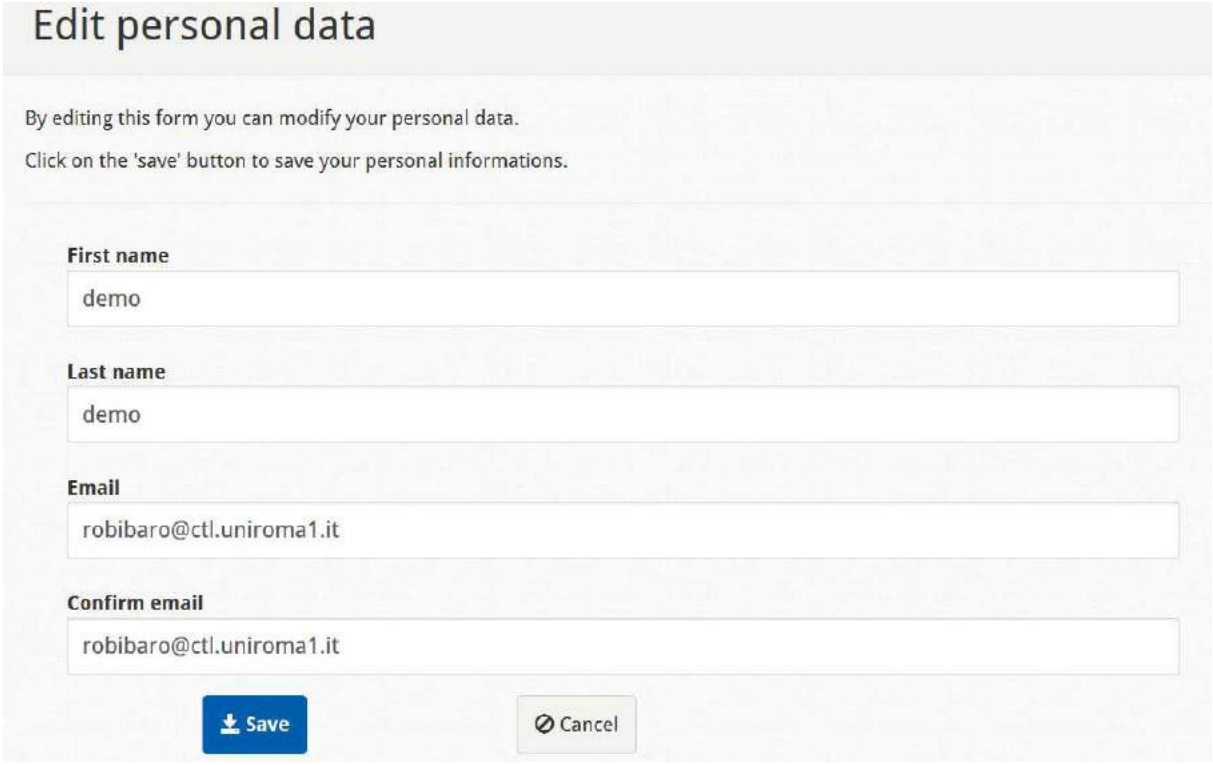
You can change your personal details, after the log in. This can be done by **logged in user**.

To make the change of personal data, click on your *Username* and select the element Change personal data.



This will open the page where you can make changes concerning personal information:

- **Name**
- **Last name**
- **Email**, it is prompted to enter twice the email, to avoid typos.



By clicking on **Save button** will save the changes made.

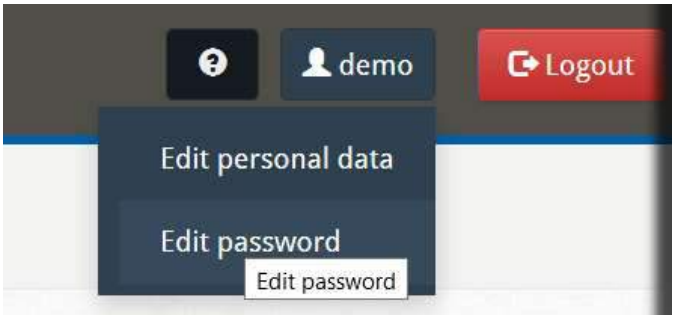
2.9 Changing the password

This allows you to manage user password in **SfingeNET**.

To change their system access password, you must be logged.

This can be done by **logged in user**.

To make the change of your password, click on your Username and select the item **Edit password**.



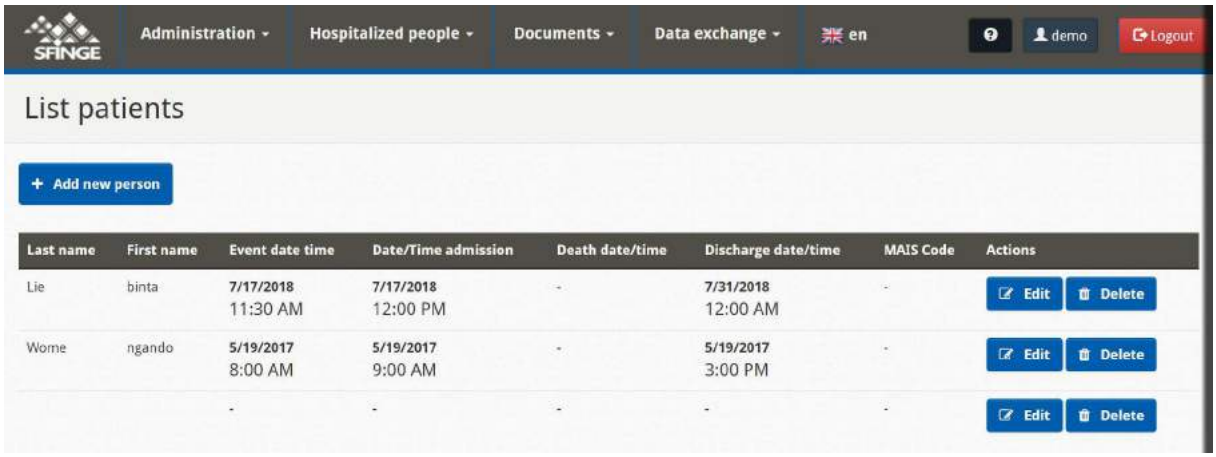
This will open the page where you can make changes regarding the password:

- **Old password**
- **New password**, the system prompts you to enter twice the password, to avoid typos.

Click the **Save** button for saving changes.

3 List of people in hospital

This page displays a list of people in hospital, and to carry out operations related to the management of the same.



The page is compost by:

- A button **Add new person:** clicking this button the entering data page will open and a new person will be added to the list.
- A **table** with the list of people already created, which shows the main data of the same, the table has: a column for the **Last name** field, a field for the **First name**, the **Event date / time** of the accident, **Date / Time of acceptance**, Date / Time death, the **Date / Time Discharge**, and finally code MAIS the action column.

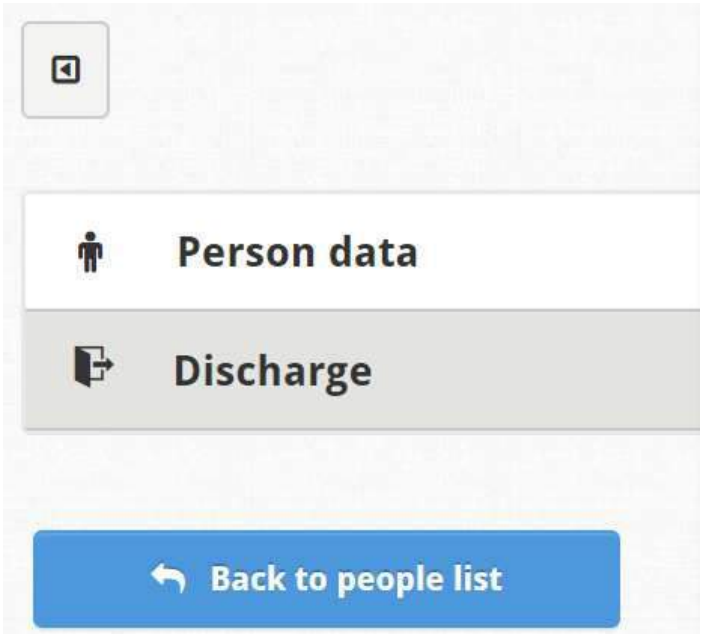
The **Actions** column has a button **Edit** for changing the details of the person and a button **Delete** to delete the person.

4 Data entry about the person

The interface for entering and editing data hospitalization is divided into two parts.

In the left part there are the main elements of hospitalization:

- **Person Data** - contains data on the hospitalized person (e.g. First Name, Last Name, and Document, etc.).
- **Discharge** - contains the data about the discharge of the person.



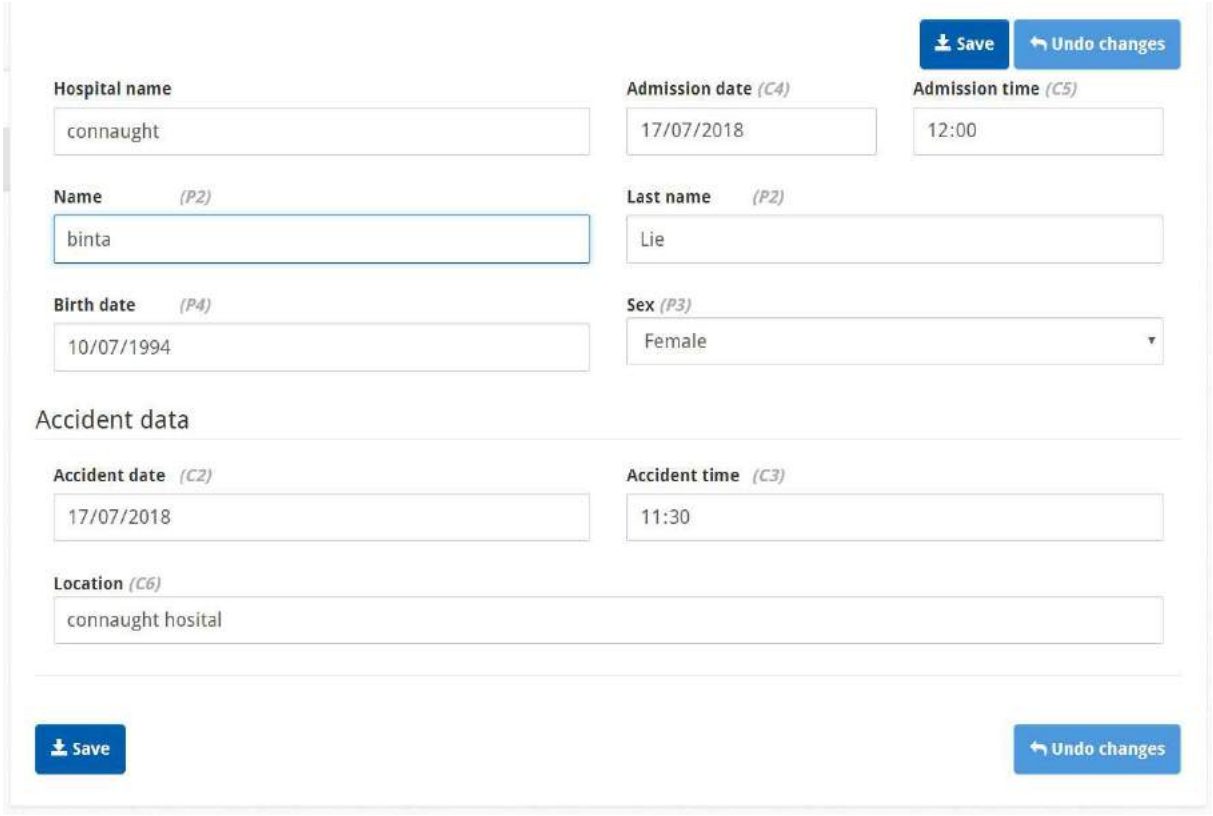
The right part of the interface is occupied from time to time by the masks for the insertion of the various data. If the space for the insertion of data is too small (for example in small screens), you can resize the left pane by clicking on the button with the triangle symbol placed above it; doing so will remain visible only the icons for the various elements and the right panel will occupy most of the screen. You can return to full view by clicking again on the same button.

Table of contents:

4.1 About person

This mask, accessible by clicking the **Person data** of the left panel, it allows you to enter the data of the person hospitalized.

To save the changes or discard the changes, click the respective buttons (**Save**, **Undo Changes**) located at the end of the page.



Type in the text box **Hospital name** the hospital name.

Type in the box **Admission date**, the date of acceptance of the patient, in the following format: date **dd / mm / yyyy**.

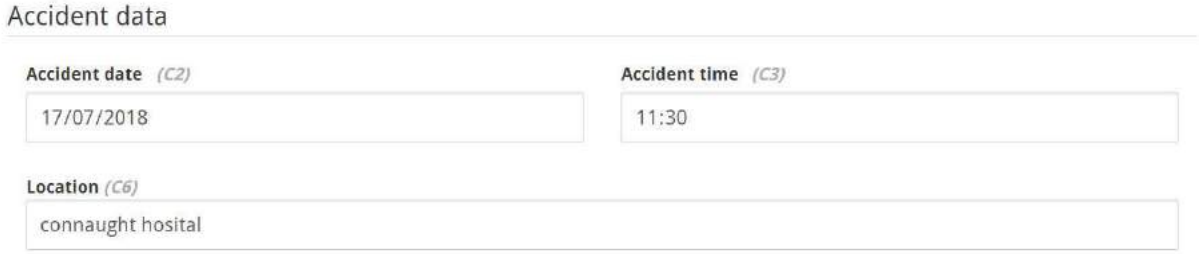
Type in the text box **Admission time**, time of patient acceptance, in the following format: date HH: mm.

Select the check box **Name**, the name of the person hospitalized.

Select the **Last name**, the name of the person hospitalized.

Type in the text box **Birth date**, the date of birth.

Select the **Sex** box, the person's sex.



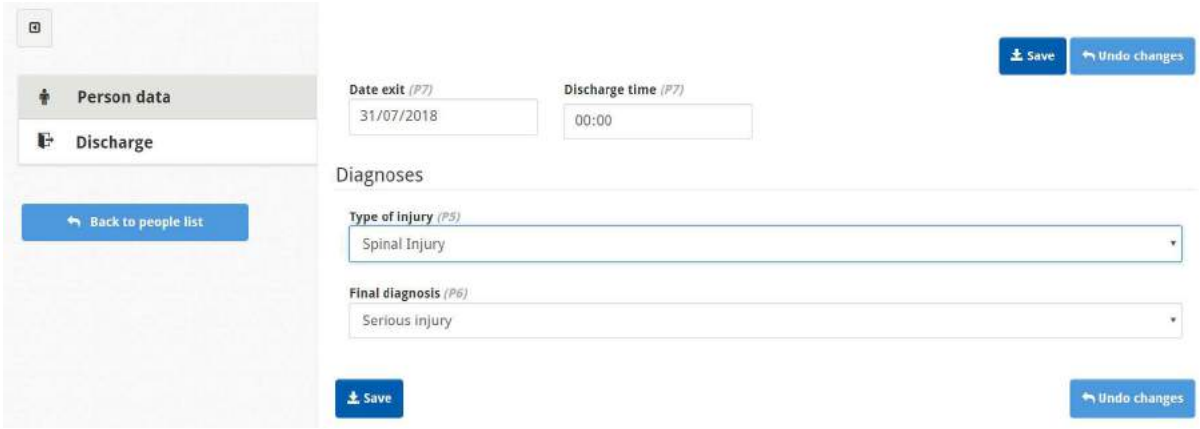
Type in the text **Accident date** box, the date of the accident in which the person is involved, in the following format: date **dd / mm / yyyy.**

Type in **Accident time** text box, the hour when the accident occurred, in the following format: date HH: mm.

Enter in the text box **Location**, the first street name where the accident occurred.

4.2 discharge

This mask, accessible by clicking the **Discharge** of the left panel. It allows you to enter data related to patient discharge.



To save the changes or discard the changes, click the respective buttons (**Save**, **Undo changes**) located at the end of the page.

Select in the **Date exit**, the discharge date.

Type the **Discharge time** in the **Discharge time** box

Diagnoses

Select in **Type of injury** box, **t**he diagnosis made.

Select in **Final diagnosis** box, the final diagnosis.

Annex 5 SAFETY MANAGER user manual

Safety Manager
User Manual

Index

1 Document Account (Users and Roles)

1.1 Registration

By clicking "**Register**", you can make a registration as a new user. The system will prompt you to enter your data, a valid email address and a password.
If the creation is successful, the message *"Dear User, your application for registration was taking charge. You will shortly receive an email with instructions to complete the registration."* Same will be sent an email to the specified email address. This email will contain, in addition to notification of account creation, a link to click to confirm your registration.

1.2 Log in

In order to log on, click on the enter button, and enter your user credentials that were created during the stage of registration data. During this phase, the new user is enabled to the role of *Guest* (See Sec. 1.3.1).

1.3 Roles

Safety Manager allows you to different roles associated with the individual user. As mentioned in paragraph (See 1.2), an essential role associated with a new user is the role of the *guest*. To link the individual roles for the user is to log on as an *administrator* is required.

1.3.1 Definition of roles

The basic configuration of the Safety Manager provides seven roles, which is a brief description:

- ***Super User:*** is the system administrator;
- ***Administrator:*** it is the software administrator and can associate the roles to different users;
- ***Analysis:*** performs the analysis of data in the Safety Manager (maps, graphs, etc.).
- ***CMS Editor:*** edit the contents of web pages;
- ***Opinion manager:*** manages content proposed by citizens;

- ***Survey Manager:*** creates and publishes surveys;
- ***Guest:*** is the basic role associated to a new user. You can only access the public part of the software.

1.3.2 Management role

To add a new role, you must log in as ***Administrator***. Click the ***Account*** menu- *Role Management.*

1.2 Users

To manage Users of the Safety Manager you must log on with ***Administrator*** credentials. Click on the *Account* menu- *Users Management.* You will display a list of all registered users, and some information about the user's status:

- **Username:** the name that you created during your *Registration.*
- **Approved:** user registration approval by the *Administrator.*
- **Status:** locked or unlocked by the Administrator user.
- **Mail:** mail address associated with the user.
- **Last activity:** date of last access to the Safety Manager.

1.2.1 User details

To get more detailed information on the individual User, click on the User to open the *User Details.* In this page, the Administrator may authorize the User to use the SM and lock / unlock the User and assign different roles (See Sec. 1.4.3).
To permanently delete the user, click the "*Delete*" button.

1.2.2 Create user

On the *Users Management,* click Create User and enter the credentials to create the new User: User Name, Password, Confirm Password.
Finally, to confirm your registration click on "*Create User*".
At this point you can map user roles (See Sec. 1.3.2).

1.2.3 Associate User to Role

To associate the roles to each user, in the *User details* page (See Sec. 1.4.1), click on "Edit" to open the *Manage User Roles page.* In alterative you can click "Associate User Roles" in User Management page.
Select a role from the list of available roles or the list of roles granted then click the 'Allow' or 'Withdrawal' button to grant or revoke a role to the user.

1.2.4 Search User

To search for a User in the *Users page,* click the drop-down menu if you search by user name, email address or both. Then insert the user desired initial search string and click "Search. "You will see all or achievements that match the search filter.

2 Home

On the Home page displays several panels that may contain summary data or previews of available administrator tools. Via the buttons in the upper left you can change the queuing of panels.

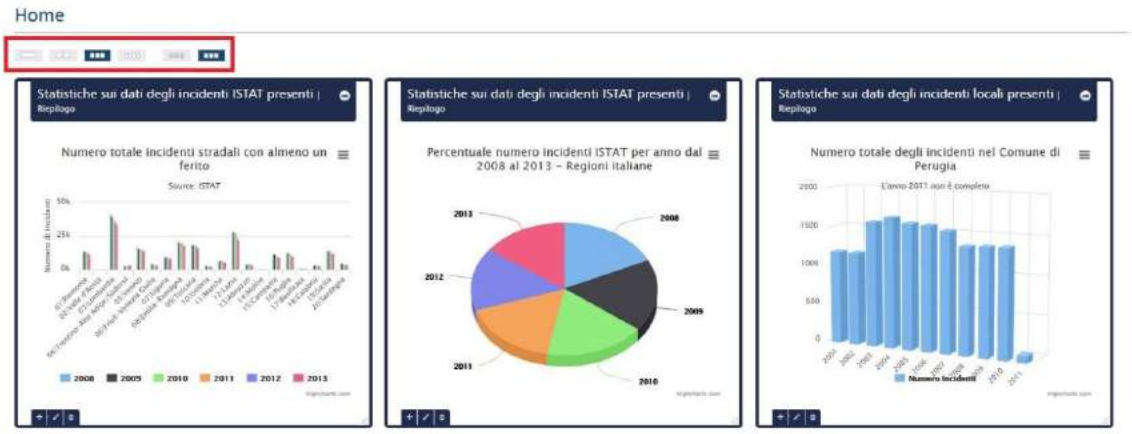


Figure 1 Panels of Home

The arrangement can also be changed by selecting one of panels and dragging it to the desired location.
Within each panel are buttons for:

- Reduce icon to the panel
- Moving the panel
- Edit content
- Remove the panel

The panels that are a preview of other pages also contain the *Continue* button, which when clicked sends the page with the complete contents.
To add a new panel, you must place in the bottom of the page where you placed an empty panel with the ***Add New*** button, selecting this button, a window appears where you can choose the type of widget to add.

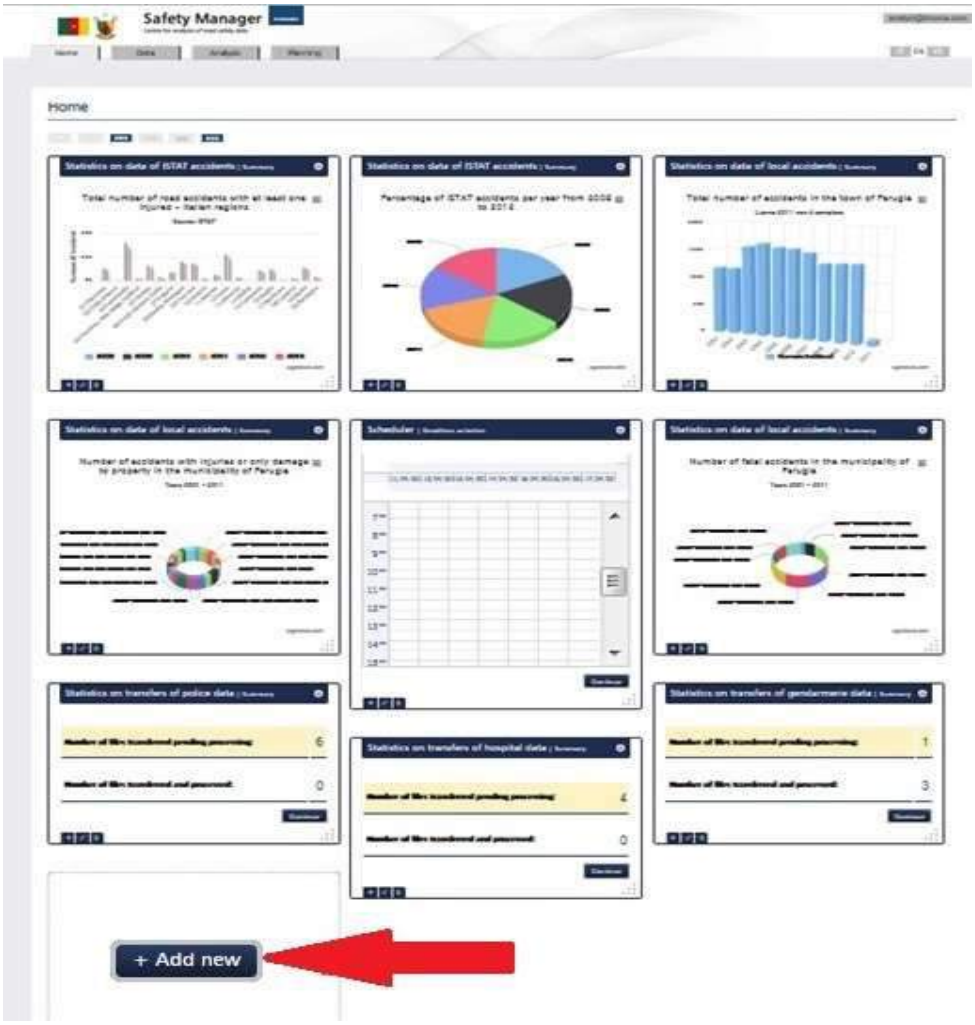


Figure 2 Add new widget

3 Data

In the Data section you can make the acquisition and management of accident data and hospitalization coming, the first by the National Police, the second by the hospitals.
Data is accessed by clicking on the label are displayed depending on the role with which you are logged on the panels:

- ***Accidents - Police,*** from where you can access the area for the management of data on road accidents collected by the National Police in urban areas.
- ***Hospital data,*** from where you can reach the area for the management of data on the people involved in road accidents collected from hospitals.
- ***Correspondences between the accident data and hospital data,*** where you can use tools that compare the data of accidents with those of hospitals.

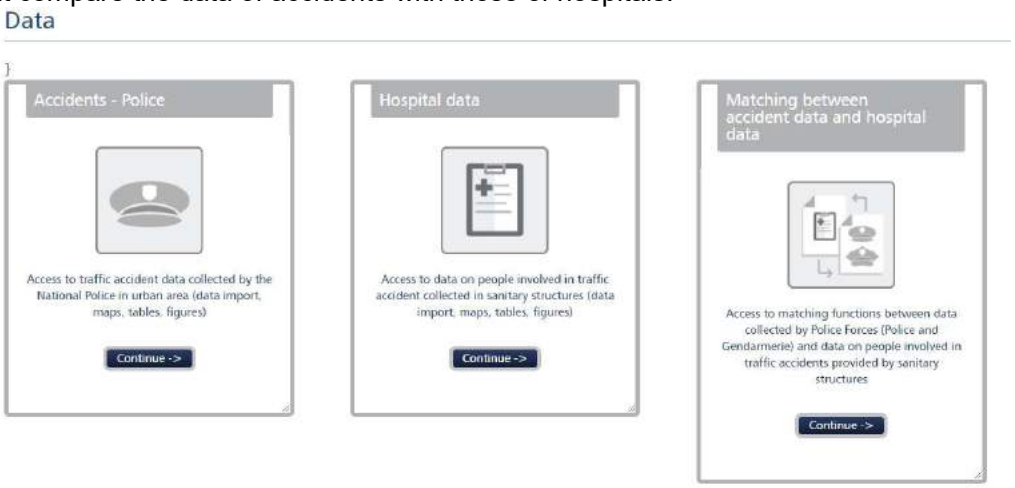


Figure 3 Data

3.1 Police accidents and Hospital data

Selecting one of the panels Accidents - Police or Data Hospital you will have access to a number of similar features for all three types of data. Below it is given a unique explanation of the features with specific details where necessary.
Selecting one of the panels on the data you can:

- view a summary of the data currently in the DB;
- view the archive of data transfers;
- view the archive of the data made acquisitions.

Figure 4 example of panel display for data management

3.1.1. Highlights

In this section, a schema can be viewed in tabular form of the data currently stored in the database.
The display can also be made for years, expanding by the *number of accidents* panel button *(/ people hospitalized) per year.*

3.1.2. Historical data transfers

In this section are displayed in tabular form the information about the data transfers from external organizations. Once the police or a hospital performs the export of a data, file is added to a table row, with information concerning the transfer. If the transfer is valid, you can do the actual data acquisition through the *Capture* button. Only after the acquisition, the data is stored in the DB.

3.1.3 Historical data acquisitions

In this section are displayed in tabular form the information on the data made acquisitions. Once an acquisition is completed, a row is added to the table, with information about the acquisition: the transaction identification, the level of detail with which log activity is constructed, the date on which it is made the acquisition and a *Details* button. By selecting this button, you can see the steps that have been made to perform data acquisition, including whether and where errors occurred.

3.2 Matching between the accident data and hospital data

In this section you can manage the activities related to comparisons between the data from the Police and involving accidents with those from hospitals and affecting involved in accidents. It can happen that involved in accidents are not transported immediately to hospital, but persons could go to an hospital on their own initiative. In this case it can happen that you lose the link between accident and persons involved, in particular that you may lose information about the severity of the involved in a crash and therefore its analysis may be inaccurate. In this case the user can make a comparison between data to have the ability to bind to a certain incident, a hospitalized person (because of a traffic accident). So, in *matches between the accident data and the data of hospitals,* you can view the panels:

- *Matching underway.*
- *Archive of matching accepted.*
- *Archive of matching rejected.*

Selecting one of these panels you can see the information related to matching performed. The possible actions are the same for all three cases only for Matching being displayed data refer to matches not it 'accepted it' rejected, for the Archive of Matching Accepted the data displayed refer to accepted correspondences for the Archive of Matching rejected the data displayed refer to reject matches.
Expanding *Highlights* panel, you can see the data of the inspections conducted both on accidents on people.
a table with the results of the scan is also presented: each line represents a possible match. Selecting the (*Choose button)* relative to a line will open a menu of possible actions for that line, as described below.
By selecting (*Edit) the association validation card* is opened (See Figure 5.): This tab shows the values of the fields that are compared in the scanning phase. Depending on the matches found, the user can decide to confirm *(Accept key)* or reject *(Reject* button) the association. If the association is confirmed in the Archives of the line passes accepted matching. Some accident values are also updated in the database, but the original values are still preserved. If the association is rejected the line passes in the Archives of rejected matching.
By selecting the *controls Historical* item displays a list of controls carried out on the element of that line, that is, every time a match on that item was found after running a scan.

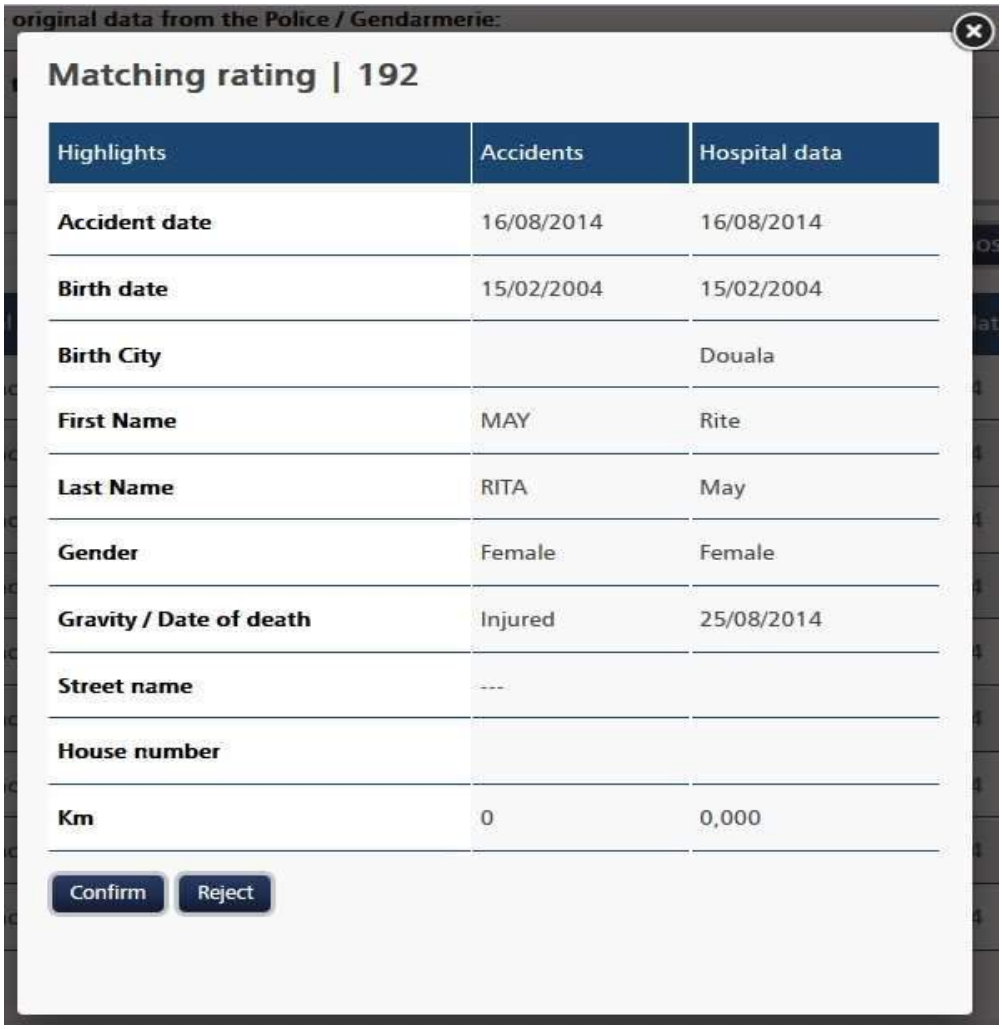


Figure 5 Rating Association

Selecting the *update Historical gravity* item displays a list of the time that a change is made on the severity concerning that association.

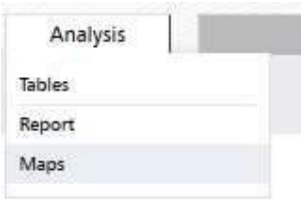
Selecting the *Historical update* voice *confirms/rejects* will show a list of times that a change on the severity concerning that association is accepted or rejected.
With *New Data Scan* button, you can start a new scan. This activity should be carried out periodically or when a new data acquisition was complete nanny. You can set the period in which to limit the search by setting the dates of interest in the fields *From* / *Al,* selecting these fields will open a calendar to facilitate the insertion of a date.

4 Analysis

Through this panel you can make about the accident data analysis. The carried analysis can be viewed:

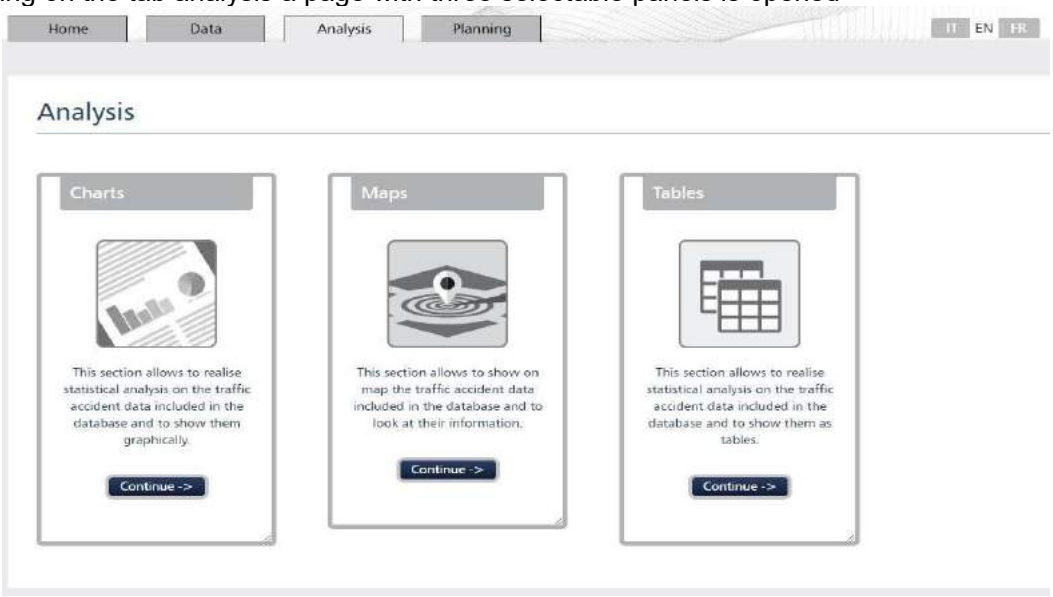
- as points on a map (Maps);
- display of charts (Reports);
- displayed in tabular form (Table).

The choice between the three modes can be performed in two ways: positioning tab Analysis shows the three menu subheadings.



6 Menu of the "Analysis" tab

or by clicking on the tab analysis a page with three selectable panels is opened



7 panels of the "Analysis" tab

4.1 Filters

Each type of analysis can be done by selecting the conditions of the filters. you can set the desired filter by clicking on *Show filters.*

Once clicked, will open a vertical window where you can select the type of filter to be displayed on the corresponding map.

Some of the options shown in the filters can be displayed or not depending on the selections made for the main filters.

Particularly in the section Data source will be able to choose the type of source from which you intend to retrieve the data, click on:

- Police.
- Hospital.

Selecting one of the first three items are disabled items related to the filters of the hospitals, while clicking on the Hospital, these are enabled voice while only to crash data are disabled some applicable filters (see figure filter).
The second main filter is Date, if this item is selected *Accidents* filter, analyses are performed on the data of accidents, some items in the filter are disabled, if you select the item *Involved in accidents* all views and distributions are made for involved in accidents, the filters on sex and age are enabled.

WARNING: To effectively apply the selection on the filters to select the Apply button at the top right.
To hide the filter window, you must select the close button.
To remove all selected filters using the voice Reset filters.
To store a configuration of the filters you select Set as default. The configuration is saved for the user who made the rescue, once this user Redo log in and select the analysis section will restart from the analysis page selected as default.

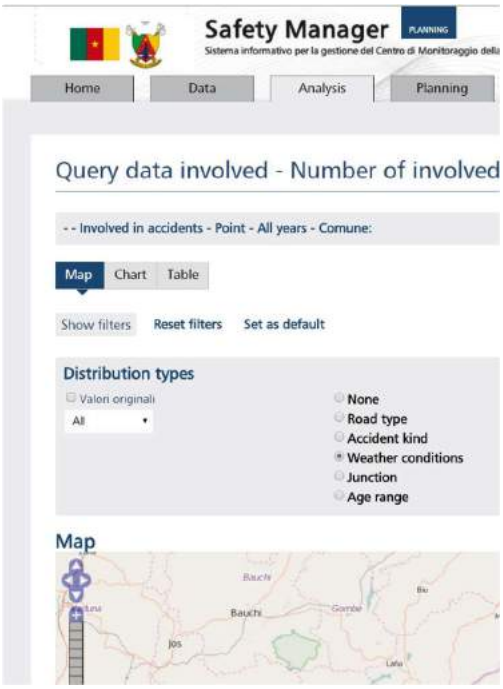


Figure 8 Buttons related to filters

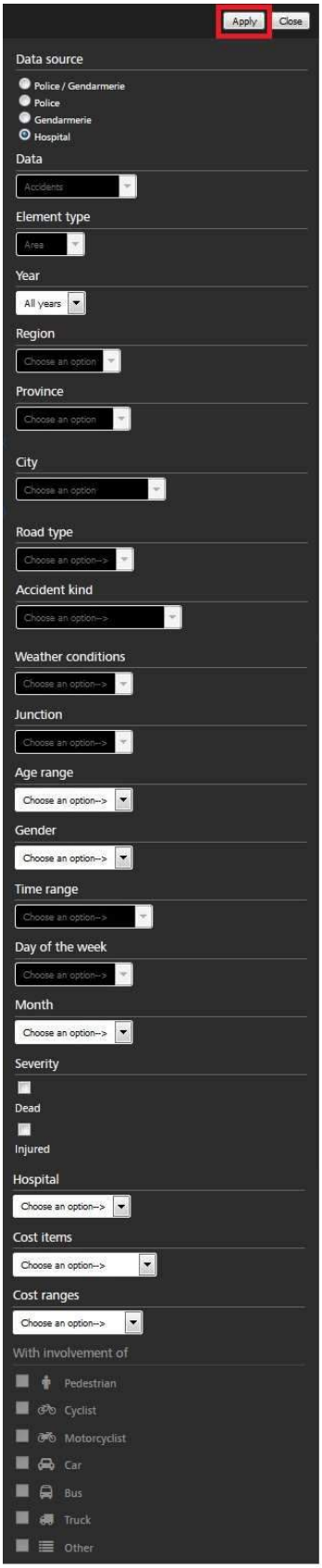


Figure 9 Example of a filter list

4.2 Types of distributions

Data can be grouped and displayed in graphs and tables for some filters.
Distributions that can be done depends on the selections made in the filters, they change depending on if you choose to do analysis of accidents or involved, on hospital data or not.
Under *Distribution Types* You can select the following items:

- no distribution.
- by type of road (not visible if you choose hospitals source data).
- by type of accident (not visible if you choose hospitals source data).
- for weather conditions (not visible if you choose hospitals source data).
- intersection / no intersection (not visible if you choose hospitals source data).
- by age group (disabled if you choose accident data).
- by sex (disabled if you choose accident data).
- per time slot (not visible if you choose hospitals source data).
- by day of the week (not visible if you choose hospitals source data).
- with the involvement of a certain type of vehicle (not visible if you choose hospitals source data).
- per year.
- per month.
- for costs of hospital (not visible if you choose a different data source from hospitals).
- for medicine costs (not visible if you choose a data source other than hospitals)
- for a total cost of hospitalization (not visible if you choose a data source other than hospitals)
- MAIS3 + (not visible if you choose a data source other than hospitals)
- by gravity (not visible if you choose a data source other than hospitals)
- For each deployment, you can select a single item from the menu at the top left.

Figure 10 Types of distribution

The filters applied are still valid: in distributions will display the data already filtered.

4.3 Map

In the dropdown menu or page *analysis* click *Maps* to display the contents of the page.
The selected page is displayed for points that represent one or more incidents according to the grouping that is required by the filters (via the *Element Type* heading). At each point will be associated label, clicking on each point will be displayed additional information (i.e. area of interest or street name, or severity of the accident, etc.). The colouring is the severity (or set of incidents).

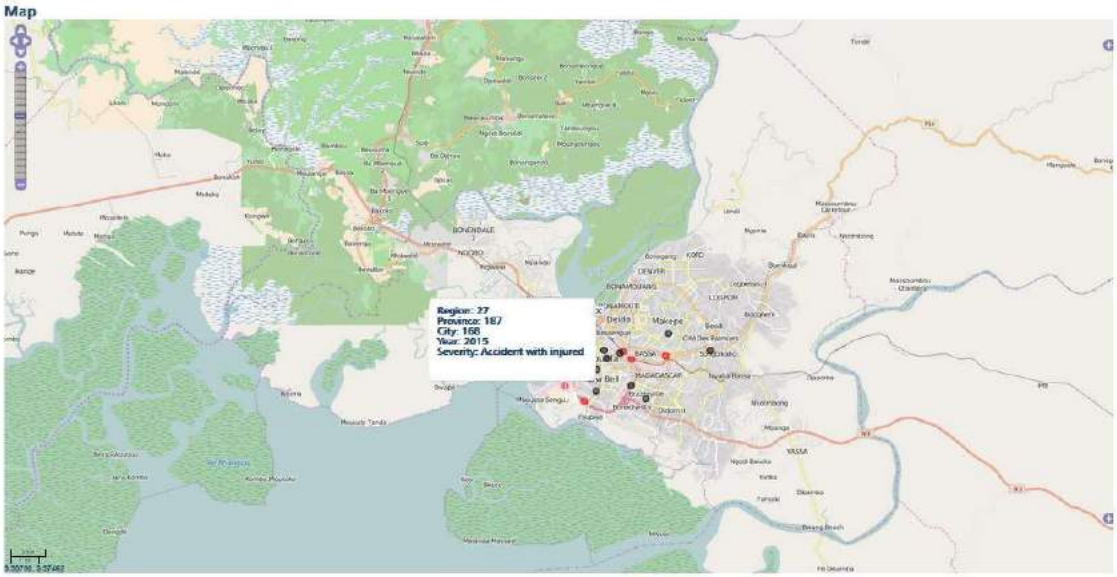


Figure 11 Display of accidents on map

4.4 Data distributions: graphs and tables

Distributions show data grouped according to the type of the most representative data for analysis
As mentioned in paragraph (See 4.2) distributions are created depending on some filter parameters.
The possible distributions are different depending on whether the data sources are hospitals or not, and that the figures are for accidents or involved in accidents. In the drop-down menu or on the *Analysis* page, click *Report* to view the graphs and *tables* for tables.

4.4.1 For accident data distributions

Distributions on accident data have as police data and as data source those incidents.
The distributions are available:

- no distribution.
- by type of road by type of accident.
- to weather conditions.
- intersection/no intersection.
- by hour.
- by day of week.
- with the involvement of a certain type of vehicle.
- per year.
- per month.

In the bar chart displays the number of accidents according to the chosen distribution.

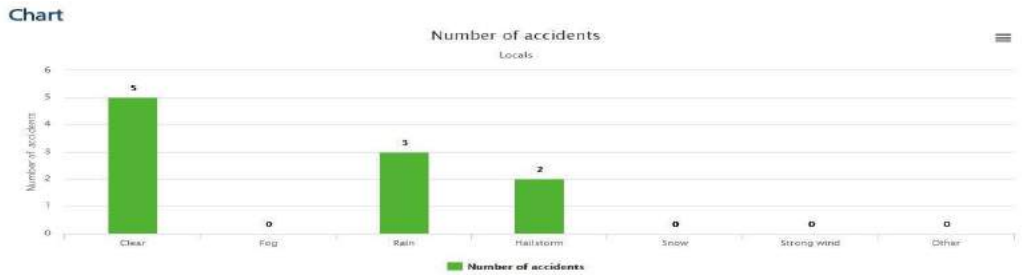


Figure 12 Number of accidents distributed to weather conditions

The table displays two columns, one with the tag that varies depending on the distribution the other provides the number of accidents.

Table

	Accidents
Monday	10 (20 %)
Tuesday	13 (26 %)
Wednesday	2 (4 %)
Thursday	8 (16 %)
Friday	7 (14 %)
Saturday	4 (8 %)
Sunday	6 (12 %)
Total	**50**

13 Table of accidents for days of the week Distribution

The filters applied are still valid: in distributions will display the data already filtered. For example, I can see all the incidents that took place on Monday distributed to weather conditions (see below).

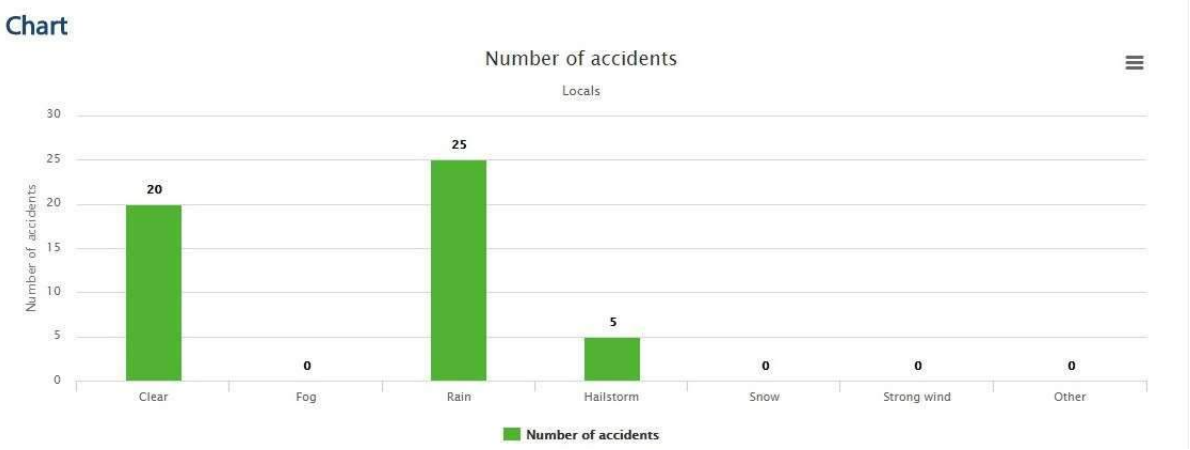


Figure 14 Number of accidents filtered by day of week and distributed to weather conditions

For each deployment, you can select a single item in the dropdown menu in the top left corner (see Figure 10).

4.4.2 Distributions for data involved

Distributions on accident data have as police data and as data source on those involved in accidents.
The distributions are available:

- no distribution.
- by type of road.
- by type of accident.
- to weather conditions.
- intersection/no intersection.
- by age group.
- by sex.
- by hour.
- by day of week.
- with the involvement of a certain type of vehicle.
- per year.
- per month.
-

Depending on the chosen distribution displays two bar charts: one for the number of casualties involved and one for the number of deaths involved.

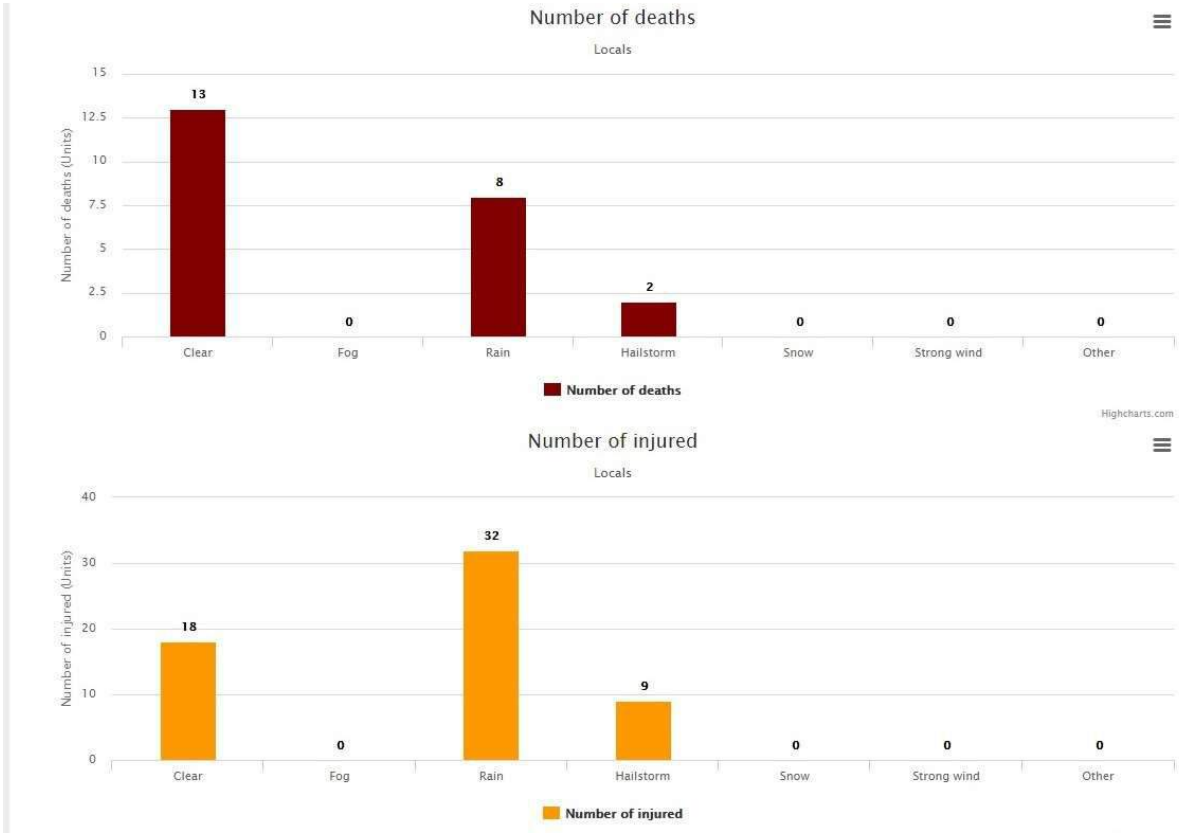


Figure 15 Number of deaths and injuries distributed to weather conditions

In the tables there will be three columns: one for the label of the distribution, one for the number of wounded and one for the number of deaths.

Table

	Deaths	Injured
Monday	6 (26.1 %)	9 (15.3 %)
Tuesday	6 (26.1 %)	18 (30.5 %)
Wednesday	1 (4.3 %)	2 (3.4 %)
Thursday	3 (13 %)	10 (16.9 %)
Friday	1 (4.3 %)	11 (18.6 %)
Saturday	3 (13 %)	4 (6.8 %)
Sunday	3 (13 %)	5 (8.5 %)
Total	**23**	**59**

16 Table for distributions of deaths and injuries by day week

The filters applied are still valid: in distributions will display the data already filtered. For example, I can see all the males involved in accidents distributed to weather conditions (see below).

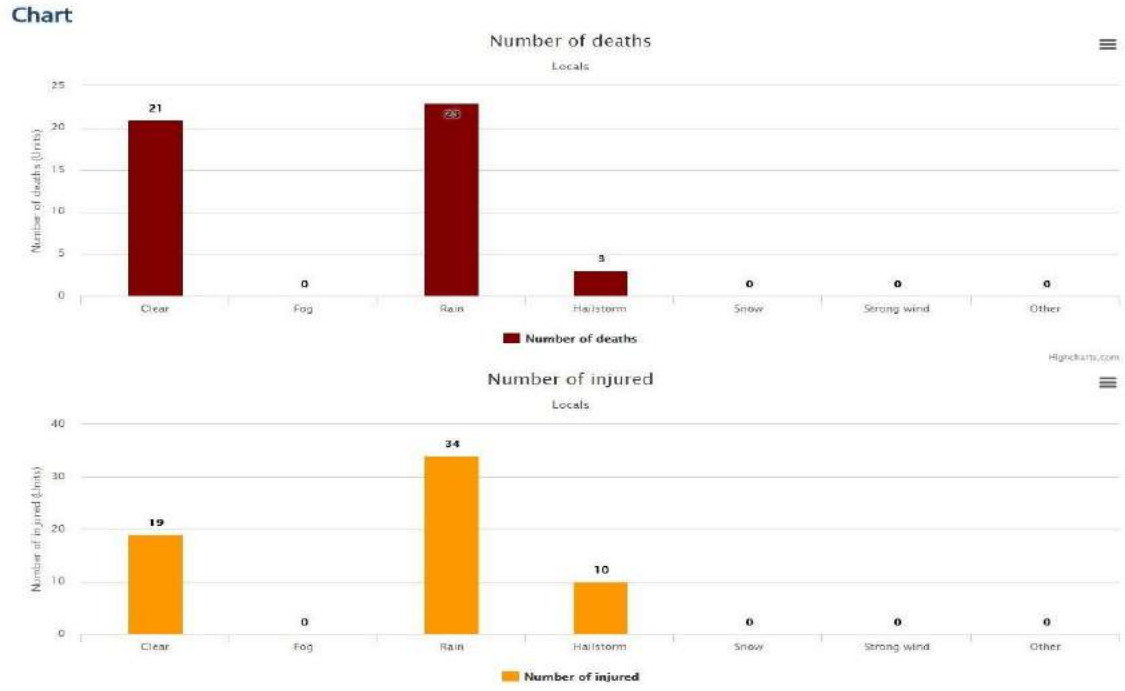


Figure 17 Number of deaths and injuries filtered by gender and distributed to weather conditions

For each deployment, you can select a single item in the dropdown menu in the top left corner (See Figure 10).

4.4.3 Distributions for hospitals Data

Distributions on hospital data have as hospitals and data as a data source on those involved in accidents hospitalized.
Depending on the chosen distribution displays two bar charts: one for the number of casualties involved and one for the number of deaths involved.
The distributions are available:

- no distribution
- by age group
- by sex
- per year (referred to admission)
- per month (related to admission)
- for costs of hospital
- for medicine costs
- for total costs of hospitalization
- MAIS3 +
- by gravity

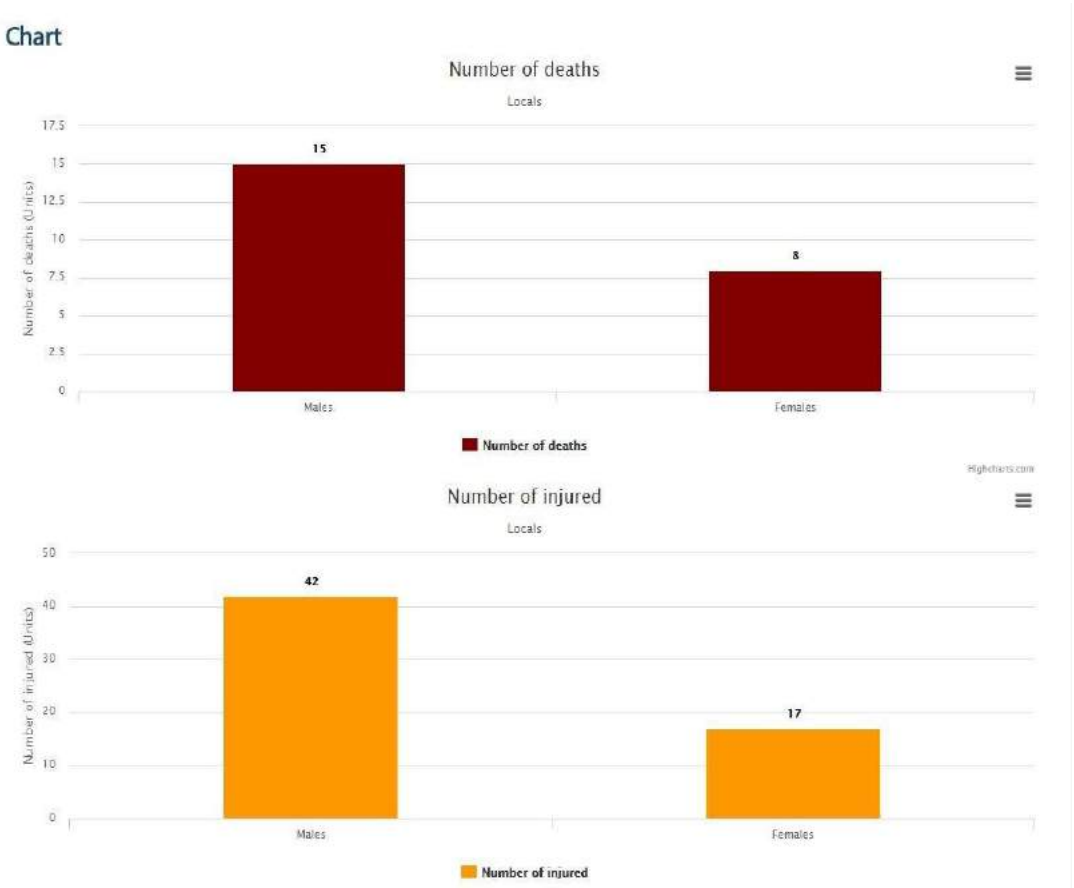


Figure 18 Number of deaths and injuries distributed by sex

In the tables there will be three columns: one for the label of the distribution, one for the number of wounded and one for the number of deaths.

Table

	Deaths	Injured
Males	15 (65.2 %)	42 (71.2 %)
Females	8 (34.8 %)	17 (28.8 %)
Total	**23**	**59**

19 Table of deaths and injuries distributed by sex

The filters applied are still valid: in distributions will display the data already filtered. For example you can see the dead and wounded in a certain year, distributed by sex (See Figure 20).

Table

	Deaths	Injured
Males	2 (66.7 %)	15 (78.9 %)
Females	1 (33.3 %)	4 (21.1 %)
Total	**3**	**19**

Figure 20 Number of deaths and injuries filtered for a year and distributed by sex

For each deployment, you can select a single item in the dropdown menu in the top left corner (See Figure 10).

4.5 Utilities (Select button)

Selecting the *Choose* button in the top left you can access to the following function:

- Save of the analyses *(Save)*
- Load previously saved analysis *(Analysis Save)*
- Make a print *(Print)*
- Export data to CSV *(Export CSV)*

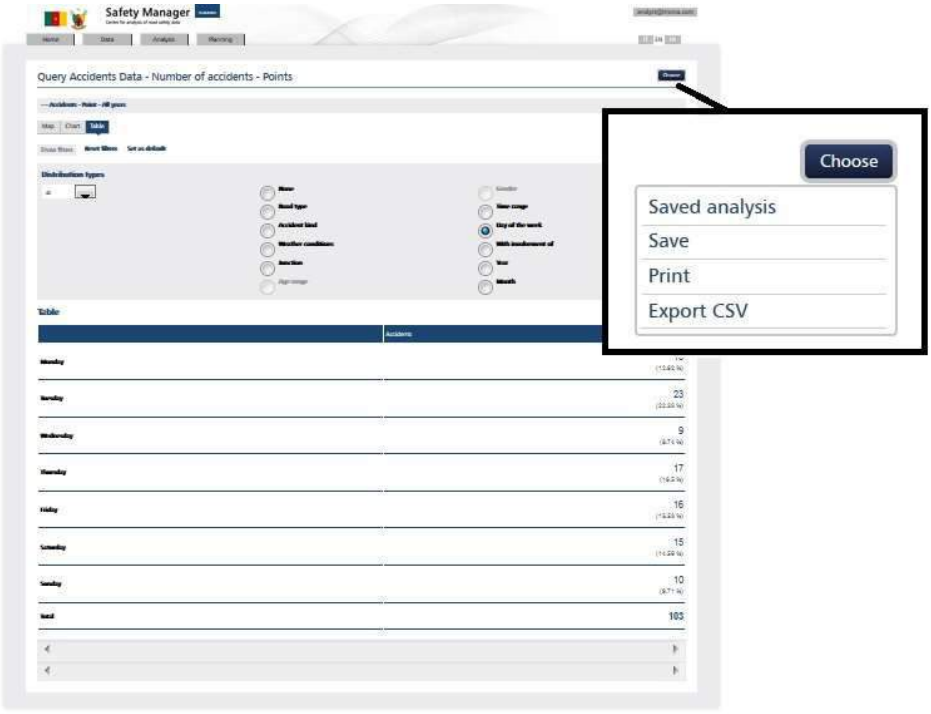


Figure 21 Utilities button "Choose"

4.5.1 Save

Select the *Save* button to save the elaborations. A form opens with the following fields.
Processing type, pre-set with "Maps Charts value and tables."
Title, where you enter the name to save processing.
Description, where you can enter a brief description of processing to save. Select *Save* to save the *drawing,* you will be sent to the page where you can see all the other saved calculations.

4.5.2 Saved analysis

Select the *Save Analysis* button to open the previously made calculations. the page that displays the list of saved analysis is opened. Each row represents a saving, the various fields are filled with information about saving: analysis title, name of the user who made the save, save date, etc. The field contains the button *Select* actions, selecting which opens a menu with the following items: *Associated project* to map processing to a project; *Editing* by which leads to a form where you can change the title and / or processing description; *delete* with which you can delete the save.
Actions in the field is the button *type,* selecting which opens a menu with the following items: *Map,* if you want to open the saved analysis in the form of maps, *chart,* if you want to open the saved analysis in the form of graphs; *table if* you want to open the saved analysis in table form.

4.5.3 Print

To print the active screen, you select the *Print* option. A window opens that provides the print preview and the Print window mask configured for the machine you are using.

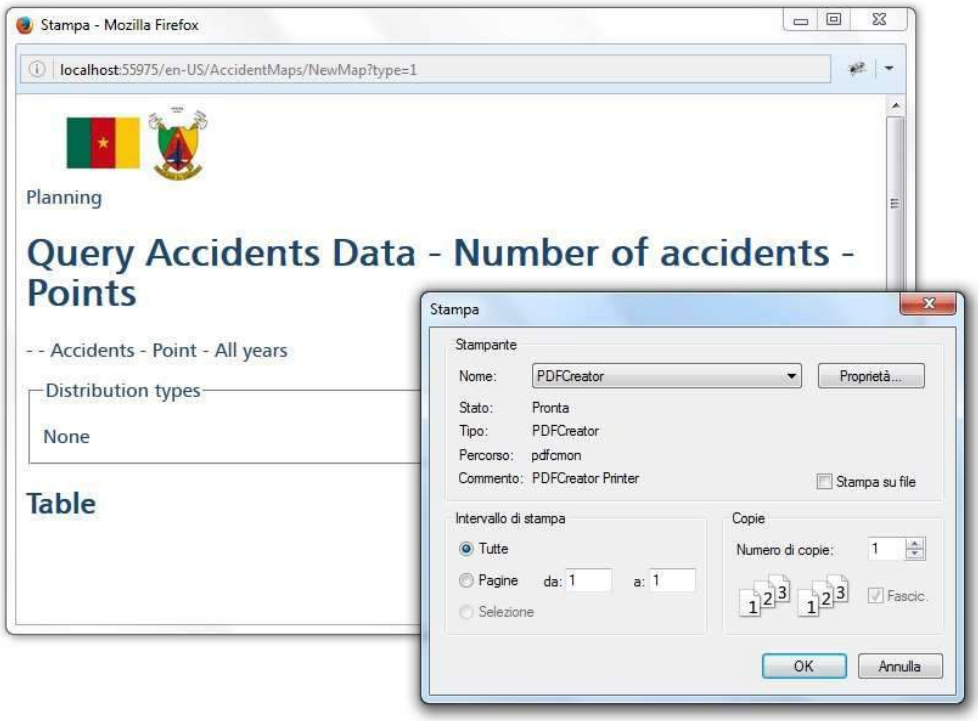


Figure 22 Print Window

4.5.4 Export CSV

By selecting the menu item *Export CSV,* you can save the data in the table in csv format. This is a text format that can be opened as an Excel spreadsheet or simply with a text editor. The document has set a default name but can be changed when saving.

5 Planning

Selecting the *Schedule* tab, you can access the planning of interventions.
In this area there are two tabs:

- *Create new processing.*
- *project list.*

5.1 Create new processing

In this section there is a series of calculations and carried that concern both analysis described in the previous chapter is the planning activities.
The visible panes in this area are:

- Interventions choice.
- maps.
- graphics.
- tables.
- critical elements.
- Causes and countermeasures.
- economic evaluation.

5.1.1 interventions choice

By selecting the button "Add new" in the *selection* panel *of the talk* will begin the procedure of choice of interventions.

The first window that appears "Create new drawing" is common to all types of processing CARRIED. In this module, enter the type of action in this case it will be *interventions Choice,* the title to be given to the development, a description and possibly a filter. The filter can be given directly from the interface by selecting a time interval, accidents considered in the analysis will therefore only those that occurred between the dates indicated, or you can select the filter from the drop-down filter menu. With the button you can add to the list created a filter. Select the "Create" button to create the new process.

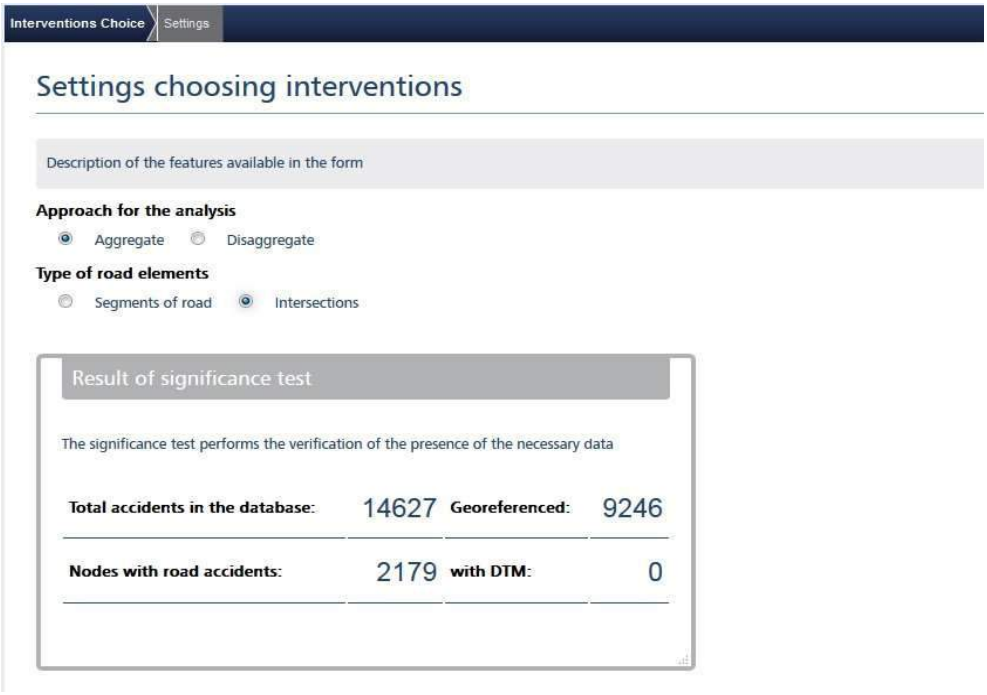


Figure 23 Settings Choosing interventions

On the next screen, you set the values to define the type of analysis to be done.
Select the *'Approach for the analysis:* "Aggregate", if you want to work on an aggregation of the data, "unbundled, if you want to work on a single road element.
Select the *type of road elements, "logs"* or "Intersections".
Once even made one choice a significance test is performed to see if there is enough data to proceed. Will be displayed so the windows *of the significance tests Outcome,* which lists the accident data in the database, and *accidents to logs / Nodes* (this entry varies depending on the choice made on the type of road elements).
In the following will be shown the method for aggregated data on logs, for aggregate data on nodes and disaggregated data on nodes / intersection of the process is similar.
If the window *Method of identification of the critical elements,* which select the statistical criteria used to calculate the annual frequency unbundled approach is selected is shown (of Incidents).
Click *Next* to continue *or* Back to exit.
The next step concerns *the identification of critical issues.*
In this area there is a summary panel (present in the windows of all the steps) in which shows a summary of the choices made in previous step and is expandable with the appropriate frets.
Following are two tabs: *All the elements,* where all the factors examined, *only the critical elements* are *shown,* which shows a subset of the foregoing, formed by the most significant critical elements.
In both tabs you see a table with the list of items considered critical sorted by the annual frequency of accidents.

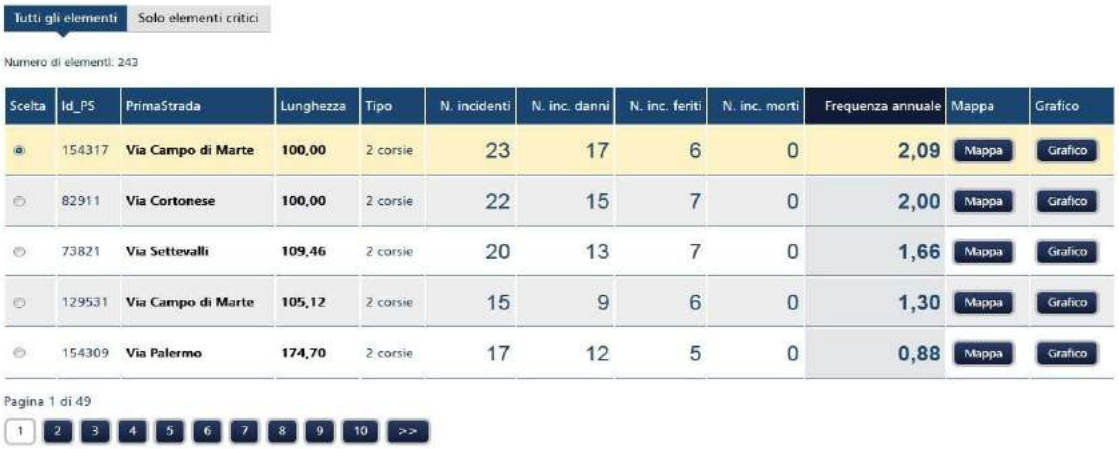


Figure 24 List of the critical elements

Each element of the list is associated with "Display" button to view the item on the map and "Graph" to see a graph with the values regarding the incidents that occurred on the specific element (some of the values shown in the columns, for example, number of accidents, number of injury accidents, etc.)
Below it is also a button to print a report of steps taken.
After selecting the item, you want to examine you select the "Next" button to move to the next step.

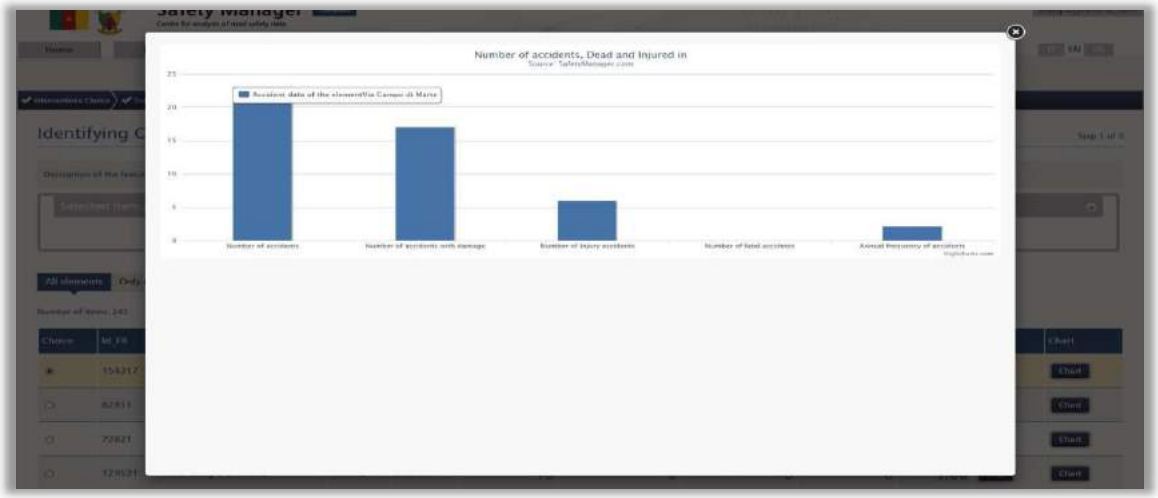


Figure 25 Graph on a critical element

The next section is related to *the crash type selection and* is composed of two panels and two expandable tables.
The first panel (which is hidden by default) contains the summary data of the choices made up to this step.
The second *of the Crash Type comparison graph* panel contains graphs in which are compared the percentage of type crash of a certain type occurred on the element (relative to the total of accidents) with the percentage of the average of the area
The first table is that of the *Crash significant Type* and the second is that of *non-significant Crash Type.* The table elements list the types of accidents that occurred on the selected item and are divided according to severity: the significant have at least one fatal accident and non-significant at most injury accidents.
The elements are sorted in ascending order based on the **PPI** value. The element with the lowest PPI is considered the most significant and therefore is automatically selected to be examined in the next step.

Selecting the image button (present in each line) you can see a picture of the relative explanatory crash type.
To move to the next step, select the button "Next".

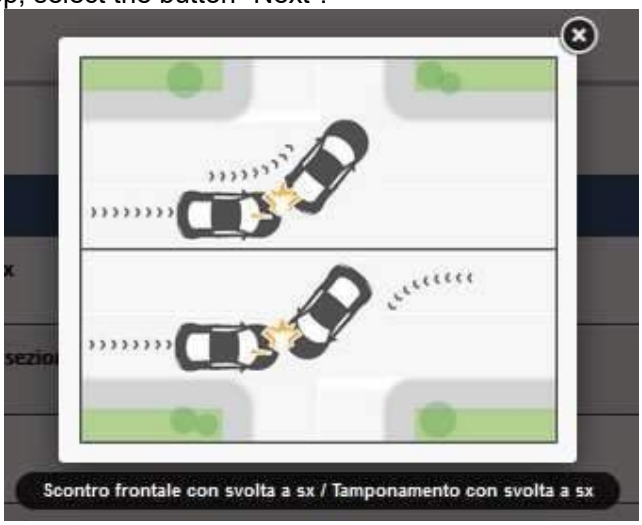


Figure 26 Example of crash type

The next section is called *Determination causes and* is composed of an expandable panel and two tables.
The panel (which is hidden by default) contains the summary data of the choices made up to this step.
The first table lists all the possible causes that may have caused that type of accident. a comment field, which can be directly filled or left blank for future observations at each item in the list is also associated.
The second table lists all the possible causes that may have caused other types of incidents that took place on the item in question. For each entry it is associated with a field indicating the type of event and a comment field, which can be directly filled or left blank for future observations.
You must check off the items that you want to examine the causes in the following procedure. If no entry is selected, the system displays an error message and will not allow to continue.
Bottom left is the button *Print Report*, you can print by selecting the tables. This feature is useful for example if you want to survey: in the comments field you can enter the information (as a reminder) on survey to do (or have done) on the field or leave them blank and fill them directly on the site.
To move to the next step, select the button "Next".
The next section is called *Choice of the countermeasures* and is composed of an expandable panel and two tables.
The panel (which is hidden by default) contains the summary data of the choices made up to this step.
The first table lists for each possible cause, selected in the previous step, a list of all possible countermeasures applicable to eliminate (or reduce) its cause. a comment field, which can be directly filled or left blank for future observations at each item in the list is also associated.
The second table lists for each possible cause, linked to other crash type is not significant, and selected in the previous step, a list of all possible countermeasures applicable to eliminate (or reduce) its cause. a comment field, which can be directly filled or left blank for future observations at each item in the list is also associated.
You must check the entries of the countermeasures that you want to examine in the following procedure. If no entry is selected, the system displays an error message and will not allow to continue.
To move to the next step, select the button "Next".
The next section is called *Creating packages*, and is composed of three panels

The first panel (which is hidden by default) contains the summary data of the choices made up to this step.
The second panel *Countermeasures* contains the table with all the countermeasures selected at the previous step. For each countermeasure will be awarded costs: selecting the buttonin the column *Assign to package* a form opens to input the various costs related to countermeasure.

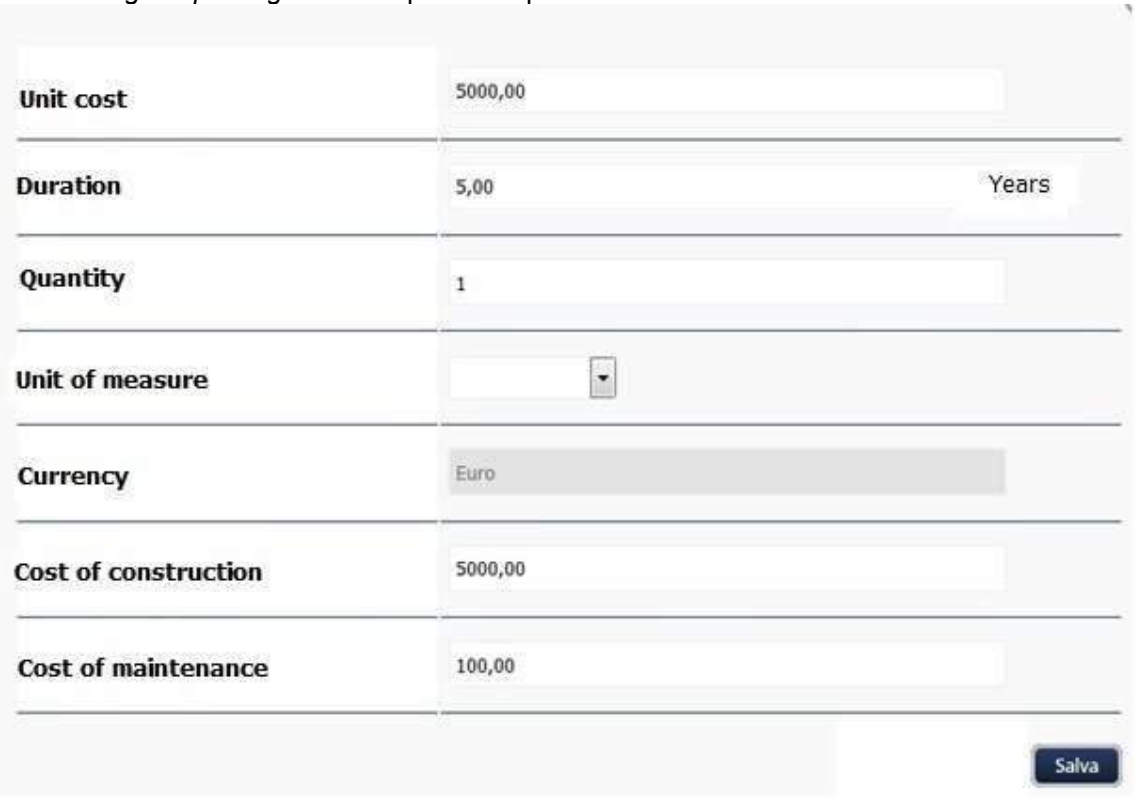


Figure 27 Cost of countermeasures

Once you filled in the fields on this form, and pressing the button *Save*, the fields are automatically filled *construction costs* and *maintenance costs*. In the field Assigns packet is a list (initially empty) package to create. Selecting an item in the list and position the button *Assign*, you can associate the countermeasure to the selected package, a countermeasure can be assigned to more than one package.
WARNING: the package list is initially empty, then you must first create one or more packages and then get back on this field to set it.
The third panel *packages*, contains a list of all created packages, initially empty. To create a new package, you select the button *Create New*: opens a window where you must enter the new package name to be created with the Save button creates a new package for the list. With the button *Edit* you can change the name of the package, with the button *Delete* you can delete the package. Each package can be formed from one or more countermeasures, once a countermeasure is assigned to a package, in the field countermeasures appear the entry relating to this countermeasure. Select the button to eliminate the countermeasure from the package. To move to the next step, select the button "Next".

Figure 28 Association countermeasure and packages

The next section is called *comparison packages* and is composed of two panels and a table.
The panel (which is hidden by default) contains the summary data of the choices made up to this step.
In the second panel *Settings for the economic assessment*, it is possible to make the comparison of the packages created countermeasures. You will have to select the type of indicators to be considered by selecting the radio button Costs/Benefits or the one for Cost/Effectiveness, it must also indicate the interest rate in the text box. Selecting the button *Compare packages,* they will be compared created in the previous step, and the result is displayed in the table below describes.
The table *Package* contains the list of packages created in the previous step. In the field *Package Title* displays the name of the package; in the field *Countermeasures* shows the list of all the counter making up the package; the field *of the realization costs* contains the sum of the costs of realization of all the countermeasures that make up the package; the field *of maintenance costs* contains the sum of the maintenance costs of all the countermeasures that make up the package; in *benefits* there is a value of the allowances provided by applying countermeasures that make up the package in terms of and is automatically filled in when you select the button *Compare plans* in the Panel *Settings for the economic evaluation* ; The Costs / Benefits field contains the relationship between costs and expected benefits and is automatically filled in when you select the button *Compare plans* in the Panel *Settings for the economic evaluation;* in *details* there is a button *Report* to print the row details.
Bottom right is the button *Print Report*, selecting which you can print the processing summary.
WARNING: if processing is interrupted in any of the steps, it is automatically saved in the default project. Then following the procedure described in section 5.2 , you can resume processing from the point of interruption.

5.1.2 Maps

In the panel *Map* by selecting *Add new* you are redirected in Analysis-Map section. For a description of this section (See section 4.3).

5.1.3 Graphics

In the panel *Charts* selecting *Add New* you are redirected in Analysis-Charts section. For a description of this section (See section 4.4).

5.1.4 Tables

In the panel *Tables* selecting *Add New* you are redirected in-Analysis Tables section. For a description of this section (See section 4.4).

5.1.5 Critical elements

By selecting the button "Add new" in the panel *Critical Elements* you start the analysis procedure of the critical elements. The first window that appears "Create new drawing" is common to all types of processing that can be performed. In this module, enter the type of intervention which in this case will be the default on *critical elements*, the title to be given to the development, a description and possibly a filter. The filter can be given directly from the interface by selecting a time interval, accidents considered in the analysis will therefore only those that occurred between the dates indicated, or you can select the filter from the drop-down filter menu. With the button you can add to the list created a filter. Select the "Create" button to create the new process.

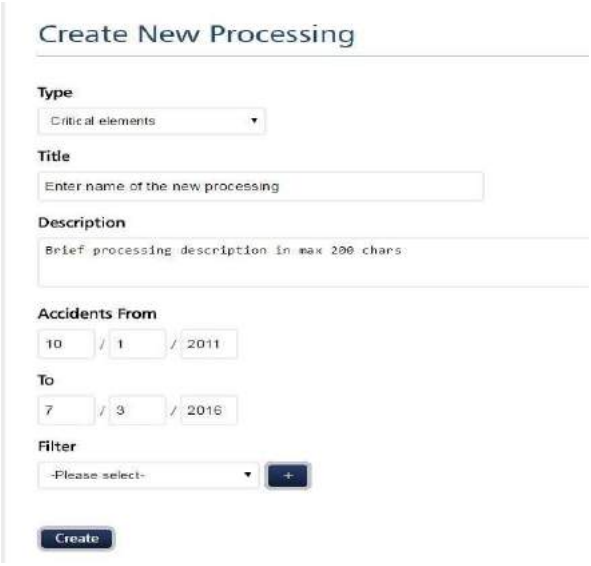


Figure 29 Creating an elaboration of type "Critical Elements"

On the next screen you must set the values to define the type of analysis to be done.
The '*approach for the analysis* has as its default value "unbundled", which is not editable.
Select the *type of road elements:* "Logs" or "Intersections".
Once even made one choice a significance test is performed to see if there is enough data to proceed. Will be displayed so the windows *of the significance tests Outcome*, which lists the accident data in the database, and *accidents to logs / Nodes* (this entry varies depending on the choice made on the type of road elements).
It also shows the window *Method of identification of the critical elements,* which select the statistical criteria used to calculate the annual frequency (Incidents).
Select *Next* to continue or *Exit* to exit.
The next step concerns *the identification of critical issues.*
In this area there is a summary panel that shows a summary of the choices made in previous step and is expandable with the appropriate frets.
Following are two tabs: *All the elements*, where all points, are shown *only the critical elements,* which shows a subset of the foregoing, formed by the most significant critical elements.
In both tabs you see a table with the list of items considered critical sorted by the annual frequency of accidents.
Each element of the list is associated with "Display" button to view the item on the map and "Graph" to see a graph with the values regarding the incidents that occurred on the specific element (some of the values shown in the columns, for example, number of accidents, number of injury accidents, etc.)

Below are three buttons: *Exit*, to exit, *Print Report*, to print the elements of the displayed table, *Save and Close* to save processing and exit the screen.

5.1.1 Causes and countermeasures

By selecting the button "Add new" in the panel of *Causes and countermeasures* you begin the process of analysis of the countermeasures.
The first window that appears "Create new drawing" is common to all types of processing that can be performed. In this module, enter the type of intervention which in this case will be the default on *Causes and countermeasures*, the title to be given to the development, a description and possibly a filter. The filter can be given directly from the interface by selecting a time interval, accidents considered in the analysis will therefore only those that occurred between the dates indicated, or you can select the filter from the drop-down filter menu. With the button you can add to the list created a filter.
Select the "Create" button to create the new process.
On the next screen, *Settings Choosing interventions: analysis of the causes and choices of the countermeasures,* you should set the values to define the type of analysis to be done. In particular, you have to select from the drop down menu *Select the project from which to load the critical elements for the analysis*, processing type "Critical Elements" (created as described in 5.1.5) on which to do the analysis.

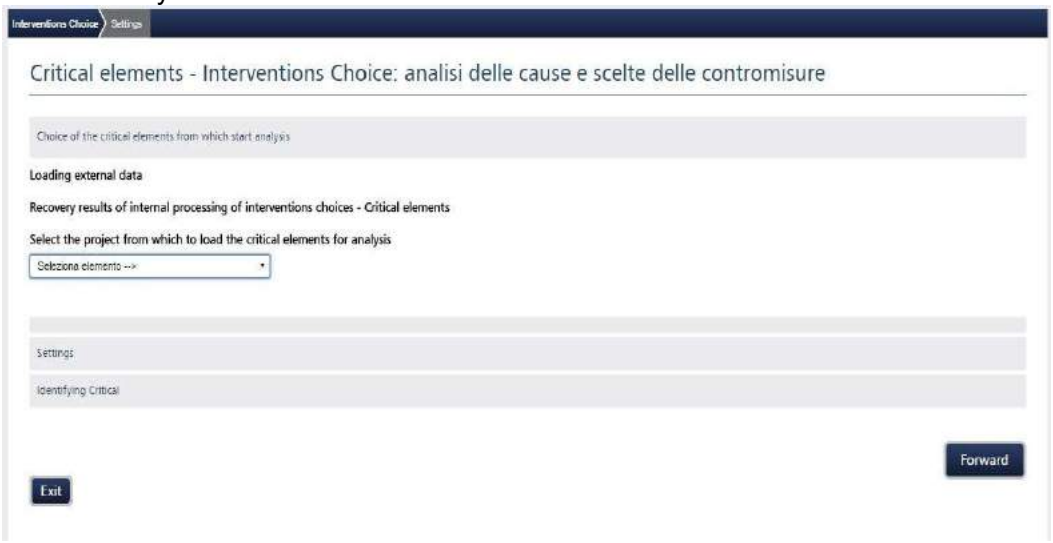


Figure 30 Creating an elaboration of type "Causes and countermeasures"

Select *Next* to continue or *Exit* to exit.
On the next page are two tabs: *All the elements*, where all the elements examined and are shown *only the critical elements,* which shows a subset of the foregoing, formed by the most significant critical elements.
In both tabs you see a table with the list of items considered critical sorted by the annual frequency of accidents.
Each element of the list is associated with "Display" button to view the item on the map and "Graph" to see a graph with the values regarding the incidents that occurred on the specific element (some of the values shown in the columns, for example, number of accidents, number of injury accidents, etc.)
Below it is also a button to print a report of steps taken.
After selecting the item, you want to examine you select the "Next" button to move to the next step.
The next section is related to *the crash type selection* and is composed of two panels and two expandable tables.
The first panel (which is hidden by default) contains the summary data of the choices made up to this step.

The second panel *of the Crash Type comparison graph* contains graphs in which are compared the percentage of type crash of a certain type occurred on the element (relative to the total of accidents) with the percentage of the average of the area
The first table is that of the *Crash significant Type* and the second is that of *not significant Crash Type*. The table elements list the types of accidents that occurred on the selected item and are divided according to severity: the significant have at least one fatal accident and non-significant at most injury accidents.
The elements are sorted in ascending order according to the value **PPI**. The element with the lowest PPI is considered the most significant and therefore is automatically selected to be examined in the next step.
Selecting the image button (present in each line) you can see a picture of the relative explanatory crash type.
To move to the next step, select the button "Next".
The next section is called *Determination causes* and is composed of an expandable panel and two tables.
The panel (which is hidden by default) contains the summary data of the choices made up to this step.
The first table lists all the possible causes that may have caused that type of accident. a comment field, which can be directly filled or left blank for future observations at each item in the list is also associated.
The second table lists all the possible causes that may have caused other types of incidents that took place on the item in question. For each entry it is associated with a field indicating the type of event and a comment field, which can be directly filled or left blank for future observations.
You must check off the items that you want to examine the causes in the following procedure. If no entry is selected, the system displays an error message and will not allow to continue.
Bottom left is the button *Print Report*, you can print by selecting the tables. This feature is useful for example if you want to survey: in the comments field you can enter the information (as a reminder) on survey to do (or have done) on the field or leave them blank and fill them directly on the site.
To move to the next step, select the button "Next".
The next section is called *Choice of the countermeasures* and is composed of an expandable panel and two tables.
The panel (which is hidden by default) contains the summary data of the choices made up to this step.
The first table lists for each possible cause, selected in the previous step, a list of all possible countermeasures applicable to eliminate (or reduce) its cause. a comment field, which can be directly filled or left blank for future observations at each item in the list is also associated.
The second table lists for each possible cause, linked to other crash type is not significant, and selected in the previous step, a list of all possible countermeasures applicable to eliminate (or reduce) its cause. a comment field, which can be directly filled or left blank for future observations at each item in the list is also associated.

5.2 List of Projects

Select the tab *of the Project list* to view the list of saved projects

Figure 31 List of saved projects

Each row represents a project; for each project ID is displayed, the date of creation, title and description, the status icon (locked / unlocked), the button with the number of processes related to the project, the field *actions* that contains the button *Select* to access the menu of actions that can be done on the project.
"Default Project", contains all the calculations that are not explicitly associated with a project.
Selecting the button with the number of calculations, the menu opens with all types of processes associated with that project (See Figure 32).

Figure 32 List of the types of processes associated to a project

For each type is associated with a button with the number of elaborations saved for that category. Selecting one of these buttons opens a page containing the panels relative to all the saved calculations, the selected type (See Figure 33).

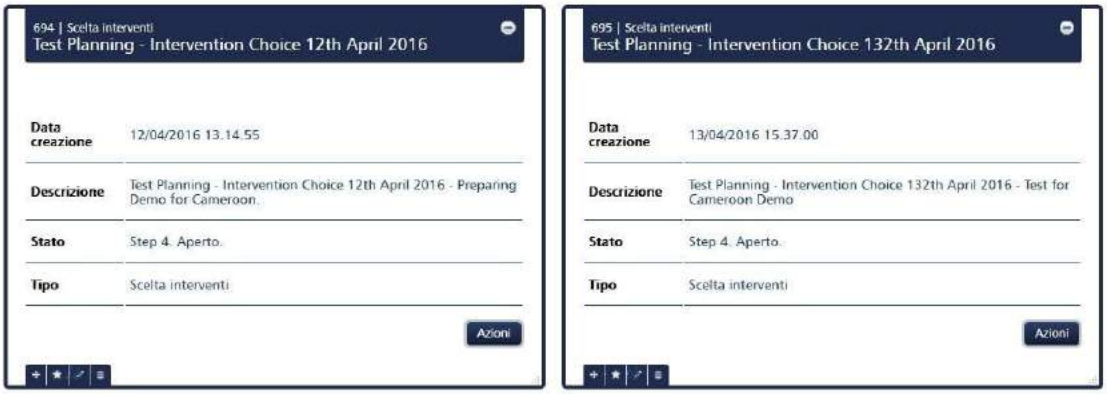


Figure 33 Selection of some panels related to the rescues of the type processing "of interventions Choice"

For each panel (/ Saved processing), the header shows the type of processing and the title, in the content of the panel there are the creation date, description, status, that is, the point at which processing is stopped, the type of processing.
Within each panel are buttons for:

 Reduce icon to the panel.
 Moving the panel.
 Add the panel to a dashboard.
 Modify the content or the title and / or description.
 Remove the panel.

Selecting the button *actions* is display *Continue*, to continue processing from the point where it was interrupted.
Returning to the items in the list of projects by selecting the button *Select* a menu opens with the following items:

- Add processing Use this item to access the window *Create a new drawing* (See section 5.1);
- *Edit* Use this item you can change the name and description of the project;
- *Duplicate* Use this item you can duplicate a project;
- *Delete* Use this item you can delete a project.