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Getting communities back on their feet

Assessing pedestrian safety: the accident scenario approach

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SUMMARY

The analysis of road accidents to the improvement of safety lays on four main complementary methods (Fleury *et al.*, 1991):
- the statistical analysis of accidents and risks, mainly based on the elaboration of the informations of accident statistical reports (that is the most common);
-the detailed analysis of accidents (so called *clinical approach*), based on police accident minutes and on-site visits; that is based on accident informations and other relevant aspects within the study domain (Fleury *et al.*, 1990), and on the evaluation of several samples of the whole population (Brenac *et al.*, 1996); that is a crucial analysis to get a real comprehension of phenomena and solutions, but it is the less diffused, due to the economical load;
- the analysis through accident scenarios. In the 80s the French Institut National de Recherche sur les Transports et leur Sécurité (INRETS) developed the definition of "typical accident scenarios": this technique is based on the analysis of Police accident reports occurred in an area, in order to classify their temporal and casual development, describing the different phases of the crash. Every group of accidents which have particular similarities constitutes a scenario, and for every scenario some solutions are proposed. An example follows of a typical accident scenario involving a pedestrian (see Table 1);
- the cartographic analysis of located accidents (Fleury *et al.*, 1990 ; Maternini, 1994 ; Tira and Brenac, 1999); through this method the so called black sposts can be identified and so possible links among accidents and the urban environement and road layout and management can be assessed.
The poster illustrates an example of a combined approach among the third and the fourth and how an e-tool can help in the representation and analysis of accidents and accident scenarios.

METHODOLOGY DEVELOPED IN THE RANKERS PROJECT

RANKERS (RANKing for European Road Safety) is a research project co-funded by the European Commission in the Sixth Framework Programme (closed in 2008).
It has been designed to gain new knowledge by performing research and empirical studies of the road's interaction with the road user and his vehicle in order to identify optimal road recommendations and predict their impact on safety.
RANKERS pursues the objective of developing scientifically-researched guidelines enabling optimal decision-making by road authorities in their efforts to promote safer roads and eradicate dangerous road sections.
One of the aims of RANKERS project is to address a better understanding of the accident causation scenarios, leading to a significant mitigation of the risk.
The idea is to use the typical accident scenarios and the American crash types in order to study appropriate recommendation to prevent the specific type of accident. The user should be lead to groups of accidents which have particular similarities and provided with some solutions for every scenario.
In particular the aim is to develop this project through a so-called "eBook", where well known recommendations (state of the art) are presented to the users on electronic media.
The accident scenarios are collected in a database, ordered by some characteristics of the accident, which correspond to some fields of the statistical accidents database: localisation of the problem (urban, rural or motorway), kind of intersection, kind of collision, users involved (or more exposed to risk of accident), particular circumstances, age of the pedestrian, consequences.

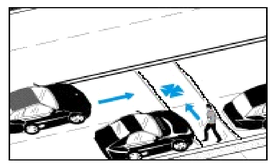
	Driving situation	***Accident situation***	***Emergency situation***	***Collision***
	Young pedestrian, usually accompanied. Urban infrastructure (including residential or secondary streets)	Usually hidden by a parked vehicle, the pedestrian runs across the carriageway, his attention often focused on an objective on the other side of the street	Generally, late braking (other cases: no reaction)	Vehicle/pedestrian collision

Table 1 *A prototypical accident scenario to pedestrian*

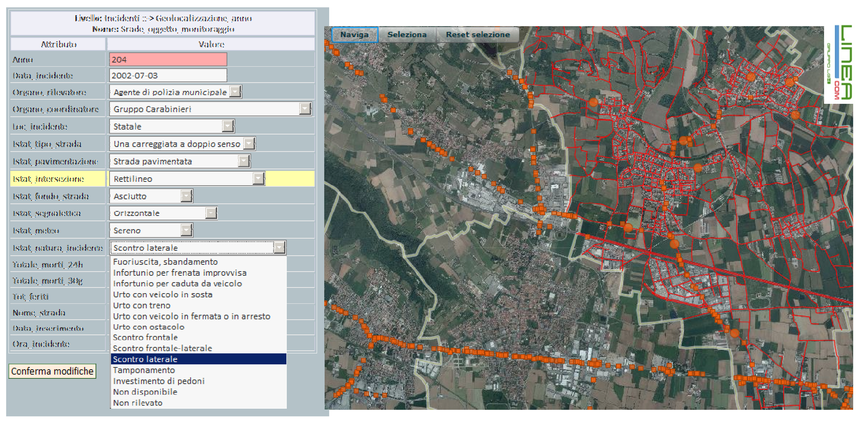


Figure 1 *– Accident location and a web-GIS structure*

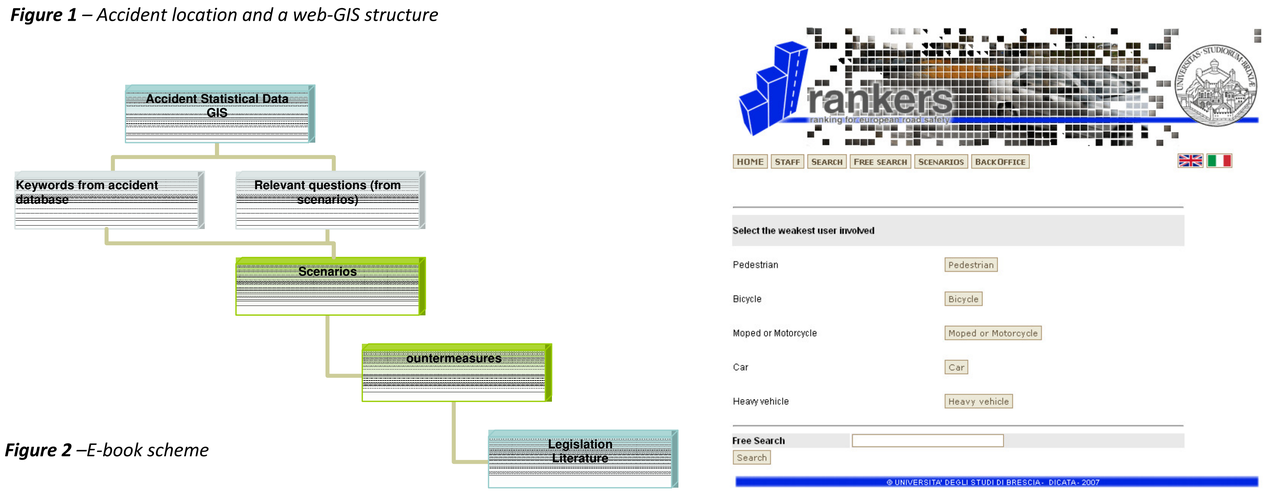


Figure 2 *–E-book scheme*

THE TOOL

This configuration has been developed through a web system, a so called e-book, which can be used by technicians and local authorities in order to find which potential accident can occur in their specific situations and to find the relative countermeasures.
The e-book proposes a list of specific keywords (that are identical to the ones from the statistical database) that may describe, either the more frequent accident situation, or a present road situation: localisation of the problem (urban, rural or motorway), kind of intersection, kind of collision, users involved (or more exposed to risk of accident), particular circumstances, etc. The user can choose a restricted or an extended selection of the scenarios. In the first case the e-book provides only the scenarios where all the keywords are present, while in the second selection system all the scenarios with almost one of the keywords selected are given.
Every combination of these keywords leads to a list of scenarios. If the users want to specify some other aspects that are not linkable to the statistical keyword, other relevant questions can be selected (road specific context, manoeuvre of the users, view obstructions, etc.). In this way the scenarios given are more suitable to the specific situation.
A list of scenarios appears to the user, who can select the most suitable ones to his specific context. Clicking on the scenarios he can obtain some countermeasures associated (articles, web-sites, images laws, guidelines). The countermeasures are the results of a deep research on the accident scenarios causation and on the experience of the research group.

SOME CONCLUSIONS

The positive aspects of the e-book are: the possibility to introduce informations other than those given by the statistical agencies, the easy change of these conditions, the possibility to prove and trial, the availability of a set of countermeasures, the presence of an accident scheme.
Countermeasures are given on purpose in a set as the "best solution" doesn't exist. Every practitioner has to assess the precise location and accident dynamics he has to confront with, and no tool can substitute his work and responsibility. The possible solutions are also referred to different fields of actions: physical measures, training measures, enforcement, planning solutions, etc..
The broad set of types is given to allow administrative authorities to choose one or more kind of solutions. In any case the proposed method is an easy one to show and to correct dangerous factors for pedestrian accidents and it stimulates an interesting discussion on the efficacy of countermeasure against road accidents. That's the reason why the tool is not free available on internet!

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