

PTV VISUM SAFETY IN THE PROVINCE OF AREZZO: ROAD SAFETY IN THE PLANNING PROCESS



Every day, 3400 people lose their lives on the streets. This is an astonishing figure, a figure that raises awareness of the need to improve road safety. Around the world, this topic is becoming a priority. There are many approaches, but especially on the administrative level, there is a need for new ways to keep pace – with changing traffic behaviour, new scientific insights and innovative technologies.

The availability of high-quality accident data is not a given in many regions, yet accident data and related information are the keys to proactive road safety work. Paolo Vadi also knows this.

With a 12-year experience in road safety, for 6 years he has been in charge of the Office of Sustainable Mobility of the Province of Arezzo in Italy. Thanks to a region-spanning project, he can now access good accident data. "In 2002, the Road

Network Department of the Province of Arezzo established a Road Traffic and Safety Office, whose main task is to identify and analyse the critical points in the network," reports Vadi. Ten years ago, the office started the SIRSS – Sistema Integrato Sicurezza Stradale (Road Safety Integrated System). This is a project in the course of which a high-quality database of geo-referenced accidents involving injuries and deaths

has been created. Each accident is recorded with 76 attributes such as date, time, place, description of place, type of accident, weather conditions, road characteristics and state of the driver (for example under the influence of alcohol or user distraction). For Vadi, this information provides an important basis for the road safety work in his region.

HILLY LANDSCAPES AND THEIR HAZARD POTENTIAL

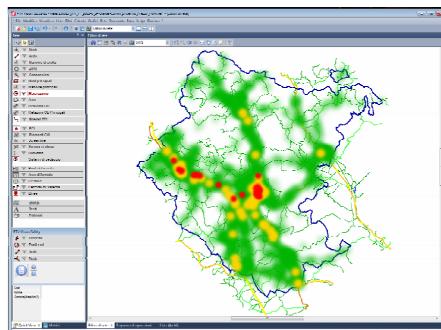
The Province of Arezzo encompasses 3,200 square kilometres; approximately 350,000 people live here. The road network includes approximately 1,300 kilometres and runs through the hilly landscape of Tuscany. Some streets are the result of successive adaptations of Etruscan, Roman and medieval roads. The infrastructure which has arisen in the past twenty years thanks to modern methods, by contrast, represents less than ten percent of the total. "In order to take the right traffic planning measures given these circumstances, it is essential for us to know the distribution of the accident points", says Vadi.

The region counted approximately 1,200 accidents each year between 2001 and 2011. Approximately 30 accidents each year were fatal. "Yet we see that the requirements of the Italian National Plan for Road Safety and those of the European Community are catching on", according to Vadi. "Since 2001, fatal accidents have declined significantly".

In order to do more, however, road safety must be taken into account as early as during the strategic planning of the traffic infrastructure. Previously, most road maintenance measures were decided reactively. For Vadi, this is the wrong approach. He was seeking an innovative approach and found it in new technologies.

ROAD SAFETY IN STRATEGIC PLANNING

For its strategic traffic planning, the Province of Arezzo uses PTV Visum software. "The idea was to bring together the planning in PTV Visum and the accident data from the SIRSS project, and to evaluate the aspect of road safety even during the planning process", says Vadi.



In PTV Visum Safety, heat maps highlight particularly dangerous roads and junctions.

This was possible thanks to a new module in PTV Visum, PTV Visum Safety. In addition, the Province of Arezzo used speed data from TomTom to get a deeper understanding of the accident situation and causes by providing real-world behavioural data about estimated speed limit observance rates and speeding risks at black spots.

"The use of traffic planning software as an analytical tool for road safety rather than as an isolated tool offers advantages when it comes to data consistency", says Michele Giuliani of TPS srl, which assisted with the case study in the Province of Arezzo. "The transport model includes data about the traffic volume as well as structural data. Both can be used as additional information and be incorporated into the analysis without additional data handling". In addition, thanks to PTV Visum Safety, the road safety data can be imported very easily into the transport model. "Without having to worry about an additional data source or another system, for example, the traffic planner can analyse the black spots in PTV Visum and assess them according to different accident types – both in strategic as well as in operative planning", explains Giuliani.

FROM THE FIRST OVERVIEW TO BLACK SPOT MANAGEMENT

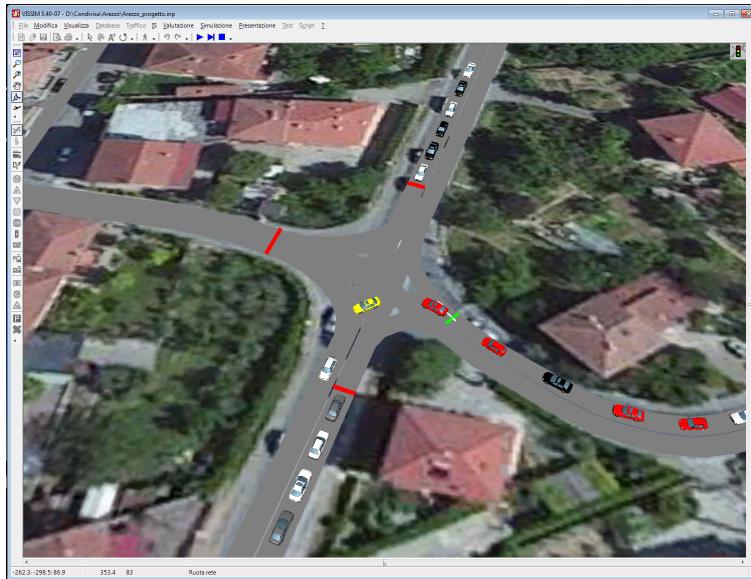
In the first step of its analysis, the Province of Arezzo got an initial overview of the data: With the Safety module in PTV Visum, so-called heat maps show where the critical points in the road network are. Places with an especially high accident rate (e.g. more than 20 accidents within 50 metres) are displayed in red. Using different filters and parameters, this view can be differentiated further and set according to specific accident categories.

In order to find the black spots for the region under examination, the Province of Arezzo used a multi-step approach: "First, the use of a bigger buffer size of 100 metres was used to catch whole complex intersections such as big roundabouts", explain Vadi and Giuliani. After creating these first black spots at sites with more than 10 accidents within that area, the remaining accidents were analysed for additional black spots generation using an iterative process with a decreasing capture buffer size and number of accidents". As a result of the procedure above, a list of the top 100 black spots was created for Black Spot Management (BSM) purposes.

During the process of identifying critical black spots, one intersection named SR71 km 130+085 (Castiglion Fiorentino / Via del Palazzuolo) was singled out for further in-depth analysis. Contributing factors to the accidents were assessed in order to find the potential causes. The main accident type was "Frontal collision" and "Frontal-lateral collision" inside the intersection regulated by fixed signal control. "The result of our analysis was that the main cause of accidents recorded in this intersection was the disregarding of the priority rules for conflicting turns", says Vadi.

"Our primary resolution approach has been to change the signals in the intersection from 3 stages to 4 stages. We expect that the separation of the conflicting turns will lower the accident rate". Both the current and the new scenario have been simulated in PTV Vissim on a microscopic level in order to verify their feasibility and avoid creating potential congestion.

And how would the Province of Arezzo sum up the case study? "There is a real benefit to improve road safety work and strategic and operational transport planning within only one system", says Vadi. "With this new approach we hope we will be able to significantly shorten the time from an accident situation arising to mitigation efforts on the road." Within the next release, PTV Visum Safety will also include accident prediction modelling (APM) capabilities, making it possible to assess safety indicators for planning scenarios. ■



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