PTV GROUP
the mind of movement

SUCCESS STORY

# Increasing safety in the Italian province of Arezzo

TRAFFIC SAFETY IN THE PLANNING PROCESS

## PROJECT GOAL

In order to avoid fatal accidents, the Arezzo region in the Italian Tuscany is strategically considering the aspect of road safety already during infrastructure planning. For this purpose, they rely on PTV Visum Safety.

## RESULTS

The province is now getting an overview of black spots in the road network and was able to identify an intersection where accidents happen frequently. Particularly interesting: Most of the accidents can be traced back to the same type of accident and the same cause - and can be solved with a simple measure.

Worldwide, the topic of traffic safety 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 behavior, 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 is aware of that. He has a 12-year experience in road safety. For the last 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 analyze the critical points in the network," reports Vadi.

Ten years ago, the office started the SIRSS – Sistema Integrato Sicurezza Stradale (Road Safety Integrated System). During this project, a high-quality database of georeferenced 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). For Vadi, this information provides an important basis for the road safety work in his region.

HILLY AND HAZARDOUS

The province of Arezzo encompasses 3,200 square kilometers; approximately 350,000 people live here. The road network includes approximately 1,300 kilometers and runs through the hilly landscape of Tuscany. Some streets are the result of successive adaptations of Etruscan, Roman and medieval roads.

## PTV VISUM SAFETY AT A GLANCE

- Identify accident black spots and visualize them for users and decision makers
- Analyze causes of accidents and link them to other factors, e.g. speeding
- Plan countermeasures and evaluate their effectiveness
- Consider traffic safety already during strategic infrastructure planning

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 spots", says Vadi.

The region counted approximately 1,200 accidents each year between 2001 and 2011. Approximately 30 accidents each year were fatal. "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 already during the strategic planning of the traffic infrastructure. Traditionally, 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.

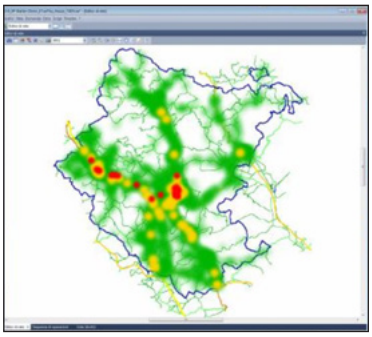
### SAFETY MEETS STRATEGIC PLANNING

For its strategic traffic planning, the Province of Arezzo uses PTV Visum software. Speed data from TomTom was used to get a deeper understanding of the accident situation and causes by providing real-world behavioral data about estimated speed limit observance rates and speeding risks at black spots. "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 already during the planning process", says Vadi.

"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 analyze 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.

### BLACK SPOT MANAGEMENT

In the first step of its analysis, the Province of Arezzo got an initial overview of the data using so-called heat maps that show where the critical points in the road network are. Places with an especially high accident rate 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 meters was used to catch whole complex intersections such as big roundabouts", explain Vadi and Giuliani.



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

After creating these first black spots at sites with more than 10 accidents within that area, the remaining accidents were analyzed for additional black spots generation using an iterative process with a decreasing capture buffer size and number of accidents".

## TOP 100 BLACK SPOTS

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 was singled out for further indepth analysis. Contributing factors to the accidents were assessed in order to find the potential causes. The main accident type was "Frontal collision" and "Frontallateral 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.

"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."