



#### Investigation of accident modelling data in Greece

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Με τη συγχρηματοδότηση της Ελλάδας και της Ευρωπαϊκής Ένωσης



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## Introduction

- Road traffic injuries are a leading cause of death for people of all ages and the number of road fatalities in several countries remains unacceptable
- However, budgets for road safety measures are limited, and decision makers and road safety stakeholders worldwide have to decide about the most effective use of available funds
- Quantitative road safety analysis methodologies have been developed over the years, to enhance evidence-based decision making
- Common ground of most such methods is the necessity of high quality data on:
  - road crashes and casualties
  - infrastructure geometric characteristics (e.g. curve radius, lane width, etc.)
  - traffic attributes (e.g. AADT, synthesis)







**CAR CRASH** Accidents on the road



# Scope of Study

- Investigation of the availability and accuracy of accident modelling data in the primary (nonmotorway) rural road network of Greece through three short case studies:
- Case study 1 on the availability and accuracy of crash data in rural non-motorway roads in the sub-region of Viotia
- Case Study 2 on the availability of traffic data in rural non-motorway roads in the sub-region of Viotia
- Case study on the reliability and accuracy of geometric design data obtained through common Open GIS Data Platforms, evaluated on a segment of Patras-Pyrgos twolane highway





- The Hellenic Statistical Authority maintains the official road accident database in Greece, used in the study
- Data collected by the Police in standardized templates and checked and codified by the Hellenic Statistical Authority
- The database includes road accidents in which at least one involved road user was injured (slightly/seriously) or killed





- Data for all injury road accidents in the sub-region of Viotia were considered for the five-year period 2011-2015
- In 51% of total injury accidents there was no indication of the road on which the accident occurred.

Year	Total Accidents	Unknown Road	Unknown Road (%)
2011	118	57	48%
2012	92	53	58%
2013	101	55	54%
2014	75	35	47%
2015	65	32	49%
Total	451	232	51%





- In a further 9% (42/451) of total injury accidents, although the road code was available, the specific location of accidents was unknown and was not included in the database.
- Only for 39% (177/451) of total injury accidents both the road code and the road station was recorded.

Year	Accidents – Known Road	Known Road – Unknown Station	Known Road – Unknown Station (%)
2011	61	9	15%
2012	39	14	36%
2013	46	8	17%
2014	40	8	20%
2015	33	3	9%
Total	219	42	19%





- Further investigation in 14 specific rural roads whether basic infrastructure characteristics of the crash database coincide with the actual characteristics of each site
- Considered characteristics were:
  - presence of intersection
  - curve or straight segment
- In 46% (23/50) obvious discrepancies between the crash database and the actual conditions were identified, indicating a possible miss-location of the crash

Year	Accidents – Known codified	Matching of infrastructure characteristics (accident	(%)
	Road and known Station	database and road coding)	
2011-2015	50	27	54%





# Case Study 1: Crash Data - Results

- The findings overall indicate that only approximately 20% of available crash data in rural non-motorway roads is potentially usable for purposes of safety analysis and modelling that requires precise crash location.
- Detailed screening and in depth crash data investigation is required prior to using crash location information for road infrastructure safety management in Greece.





# Case Study 2: Traffic Data

- No official national database in Greece for traffic data
- Regularly updated datasets exist only for some urban areas and for toll-operated motorways (not always available to researchers and practitioners)
- Traffic data on national and/ or regional rural roads are collected on a per-case basis by regional road authorities, commonly using spot traffic counts.
- The lack of traffic data is an important obstacle in road infrastructure safety research and safety analysis



# Case Study 2: Traffic Data

- Investigation of traffic data availability was performed in the national and regional road network of the sub-region of Viotia
- Over the last five years prior to the study, four spot traffic counts surveys were identified, each covering a 12h per day period (8am to 8pm) for a period of three days (in 2014) for both directions of travel.
- Traffic synthesis data were also available.







## Case Study 2: Traffic Data - Results

- Data potentially useful for road safety analyses, after suitable elaboration to estimate the AADT.
- Yet, the available traffic data cover a very small fraction of the road network in Viotia sub-region, limiting the scope of the analyses





# Case Study 3: Geometric Data

- The development and application of accident prediction models and road safety assessment techniques is closely related to the availability of geometric design data:
  - horizontal and vertical alignment,
  - cross section elements
  - roadside conditions
  - other road features and equipment
- The correlation of geometric design data with crash data, while also considering exposure (i.e. traffic data) is a fundamental element of quantitative road safety analysis.





## Case Study 3: Geometric Data

- Examination of the road axis of Patra-Pyrgos National Road in the area "Vrachneika"
- Comparison of road geometry data retrieved from OPEN GIS sources to the actual data as derived from a detailed topographic survey at scale 1: 500





# Case Study 3: Geometric Data

- Small differences (commonly less than 1m) were found in the comparison of the horizontal alignment → horizontal alignment data derived from the Open GIS sources can potentially be used to build a road geometry database for road safety analyses.
- Street surface elevations obtained from Open GIS applications have very large deviations when compared to actual surveyed elevations (1m-over 10m) → accurate information for vertical alignment and road elevations cannot be effectively collected from Open GIS data sources





# Conclusions

- Approximately ~ 80% of injury crash data on rural non-motorway roads in Viotia case study was identified with either missing or largely inaccurate crash location information
- Existing traffic volume data on the rural nonmotorway road network are not readily available and derived from scarce spot counts performed several years ago
- Geometric design data are not readily available. Limited data can be retrieved from Open GIS sources (yet with largely inaccurate elevation information)





# Conclusions

- Limitations of study:
  - Focus only on the rural non-motorway road network.
    Motorways and urban roads are not considered.
  - The 14 selected roads of case study 1 may not be representative of the road network of Viotia
  - Crash data accuracy and traffic data availability in Viotia may not be representative of the entire road network
- Despite the obvious limitations, the study highlights the significant efforts required to improve road safety data availability and accuracy in Greece:
  - improve training of Traffic Police for crash recording,
  - equip Traffic Police with GIS equipment for crash location identification,
  - systematic traffic data collection,
  - improve the national road network registry and include road infrastructure geometric data









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