

10th INTERNATIONAL CONGRESS ON TRANSPORTATION RESEARCH



ICTR 2021

September 1-3 Rhodes, Greece

Feasibility study of pedestrian bridge construction in urban arterials in Athens

Maria Oikonomou

Transportation Engineer, Researcher

Together with: Natalia Vraka, Antonis Chaziris and George Yannis



National Technical University of Athens Department of Transportation Planning and Engineering

Introduction

- 20% of fatal road accidents in European countries include Vulnerable Road Users, most of them aged 65 or older
- An effective way to reduce road accident risk for pedestrians is to reduce conflicts with motorized traffic through pedestrian bridge constructions
- The scope of the present research was twofold:
 - Evaluate the selected methodological framework
 - Identify hazardous locations and estimate safety effects from pedestrian bridge constructions in urban arterials in Athens





Background

- Pedestrians prefer active crossings compared to waiting passively. However if safer crossings exist, they prefer them compared to faster ones (Zhuang and Wu, 2011)
- In junctions with high traffic volumes pedestrian bridge constructions can be a viable intervention (Elvik, 1997)
- Various studies show significant differences in the attitude towards pedestrian bridge use among different countries
- However, some common factors affecting their use (ease of use, security, length, waiting time, gap, location) can be identified





Methodology

Identification of hazardous locations in urban arterials in Athens:

- Quality control method
- Estimation of upper and lower bounds for accident risk for each examined location
- Safety evaluation of pedestrian bridge constructions:
 - Before and after, with large comparison groups
 - Using chi-squared and Odds ratio tests, to identify whether differences in accident figures were statistically significant





Hazardous locations

- A total of 45 road segments in 11 urban arterials in Athens were evaluated, using the quality control method
- 16 segments were identified as hazardous (increased accident risk, at a 95% level of significance)
- Each segment was further examined (including a field visit) in order to assess the feasibility of pedestrian bridge construction





Before and after study

A total of 6 pedestrian bridges were evaluated in terms of their safety effects

- Kifisias av. (OAKA)
- Poseidonos av. (Faliro station)
- Alipedou (Piraeus)
- P. Ralli (UNIWA)
- Katechaki av. (Mesogeion)
- Veikou (Park)

Changes in the level of road safety were studied for three different periods (1, 2, 5, years), using three comparison groups (whole arterial, municipality, Attica region), and three statistical tests (two x² tests, odds ratio)





Before and after study

- A significant decrease in the number of accidents involving pedestrians was observed for one pedestrian bridge (P. Ralli)
- However, an increase in the number of accidents involving pedestrians was identified in Kifisias av. (for specific time periods).
- Concerning the total number of accidents, significant reductions were observed in three cases (Poseidonos, Katechaki, Veikou - 5 year time frame)
- However, some increases were also observed (Kifisias, P. Ralli, for 1 and 2 year time frames)





Conclusions

- The three statistical tests (two x^{2,} odds ratio) provided similar results, validating the appropriateness of the selected methodology
- 16 out of 45 road segments were identified as hazardous. 4 of them were deemed suitable and an additional 4 as candidate for pedestrian bridge constructions
- Safety effects from pedestrian bridge construction were not uniform among the examined cases. Additional parameters (not available in this study) need to be examined





Future research

- Updating the results of the present research with more recent accident data. Expanding the time frame allows for more robust comparisons
- Examining additional parameters affecting the safety levels, such as traffic conditions, modal split, pedestrian volumes, as well as geometrical and functional (i.e. speed) characteristics, which were not available for this study.







10th INTERNATIONAL CONGRESS ON TRANSPORTATION RESEARCH



ICTR 2021

September 1-3 Rhodes, Greece

Feasibility study of pedestrian bridge construction in urban arterials in Athens

Maria Oikonomou

Transportation Engineer, Researcher

Together with: Natalia Vraka, Antonis Chaziris and George Yannis



National Technical University of Athens Department of Transportation Planning and Engineering