

Bikeability Audit in Urban Road Environment: Case Study in the City of Volos, Greece

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ABSTRACT

Promotion of cycling can improve the sustainability level of a city or an urban area. This study presents a methodology that audits the bikeability level of the urban road environment across three selected routes in the city of Volos, Greece. This methodology is a useful toolkit in order to evaluate and improve the bikeability level of the urban road environment and also evaluate existing bikeways. Four suitably trained auditors rode their bikes and evaluated the bikeability level using an audit tool in order to audit specific features that influence bicycling suitability across the road segments and intersections of the selected routes. Furthermore, the auditors graded specific features of the road environment in order to set a bikeability score for each tested route. Finally, this study concludes that the bikeability level of the selected routes was moderate and certain actions are necessary in order to be improved.

Keywords: Audit, Bicycle, Bikeability, Checklist, Sustainability, Toolkit

INTRODUCTION

The promotion of bicycle as a transport mode in urban areas is a main target for many countries around the world who favor sustainable transportation. According to the World Business Council for Sustainable Development, sustainable transportation is the “ability to meet the needs of society to move freely, gain access, communicate, trade and establish relationships without sacrificing other essential human or ecological values today or in the future”.

Bicycle is a sustainable transport mode. It is affordable with benign environmental effects. Promoting the use of bicycle can also benefit non-bicyclists. According to the Federal Highway Administration, “Bicycling and walking conserve roadway and residential space; avert the need to build, service and dispose for autos; and spare users of public space the noise, speed and intimidation that often characterize motor vehicle use”. The use of bicycle as a transport mode in urban areas can address transportation challenges because of its flexibility, speed and

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affordability. Bicycle can be integrated in the supply chain transport network improving business and investments in urban areas and wider in global standards (Gershon & Rajashekharaiyah, 2010). Health benefits of habitual, daily activity as bicycling is well documented (Oja et al., 1998). It is also more cost effective than highly vigorous and structural activities (Sevick et al., 2000). It is important to mention that bicycling may not always be an appropriate solution to transportation problems due to physical and geographic characteristics of an urban area. Planners and city officials can address these concerns with efforts such as good design and enforcing traffic rules. The urban transport network is a large-scale system and every management effort should consider methods of simulation and evaluation that are not time consuming while maintaining accuracy (Celik et al., 2010).

This study refers to the problem of the promotion of bicycle as a transport mode in the Greek cities, emphasizing in road safety issues and mobility problems. The growth of the Greek economy in the past decades raised the use of automobile as the main transport mode in urban areas. Due to that fact, the increase of traffic congestion and environmental pollution raised the need of promoting benign transport modes and intermodal transportation. Bicycle is a sustainable transport mode able to change the Greek cities transportation profile into a more sustainable one.

There are five basic characteristics in order to promote bicycling in urban areas: the bicyclists' road and personal safety and the accessibility, convenience and attractiveness of the urban road environment and bicycle infrastructure. These characteristics can be summarized as the "bikeability" level of a selected route, an urban area or even an entire city.

This study aims to evaluate the bikeability level of the urban road environment across three selected routes in the city of Volos, using an audit tool composed of two checklists:

- Road segment bikeability checklist (see Table 6 in the Appendix)
- Intersection bikeability checklist (see Table 7 in the Appendix)

Four suitably trained auditors implemented this checklist for each road segment and intersection across the routes. Furthermore, they graded specific road features for each road segment and intersection resulting to a bikeability score for each tested route. The primary target of this study was to develop a toolkit that could be used from engineers and city officials who want to upgrade the bikeability level of the urban network in their city. The secondary target was to answer the citizens who raise concerns for the bicycle use in urban areas. Citizens are afraid to ride their bikes in urban roads if they are not provided with bicycle lanes, because they are afraid of their road safety. That is true in urban roads where the vehicle traffic flow or speed is high or moderate. Alternatively, the bicyclists can select routes across local streets, areas with traffic calming measures and pedestrian zones where the vehicle traffic flow and speed is limited. Construction of bikeways creates an important footprint in the road environment and should be implemented with great concern in order to meet other traffic modes mobility needs.

This study presents the use of a bikeability audit tool that includes two checklists for auditing the features of the road segments and the intersections in a descriptive way. The target was not the development of a checklist that includes every possible bikeability urban feature. On the contrary, this study proposes the use of two checklists that refer to basic bikeability features. The auditors use the proposed checklists in order to write a following bikeability report for the tested routes, without being committed to certain answers. The auditors' bikeability analysis is enhanced by grading the bikeability features of each road segment and intersection across the tested routes. The auditors can also ask bicyclists to grade the same bikeability features in order to consider more aspects.

A basic characteristic of the proposed checklists is their adoptability to the length of the tested routes simply by adding or removing

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