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## Cost structure of the highway projects in the Czech Republic

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### Abstract

Despite the general price decrease of construction projects the price of highway projects has tended to rise. Research has shown that building highways in the Czech Republic costs about 30% more than comparable projects abroad, for example in Germany and Austria. This paper will identify possible causes within the process of construction of highways. The paper will also identify the possibilities of cost optimization for the construction process.

The total cost of highways consist of the construction cost (hard cost), the development cost (e.g. design fees, management fees), and the site cost (e.g. purchase of the land). This paper will present an analysis of the total costs of selected sections of the highways recently built in the Czech Republic. The elements that influence the total costs are design parameters of the road (category) and the topography. The output of this analysis is the average cost per one kilometer of a highway divided by the category of the road and the topography characteristics (urban/rural area, flat, hilly or mountainous area). The paper also analyses the additional costs associated with the overall project, especially the cost of the development of the project documents and the purchase of the land. These additional costs can significantly increase the total cost of a traffic project.

The authors summarize the causes of the high costs and at the same time propose methods to reduce these costs. The public sector may use the results to identify ineffectiveness of construction processes in the area of traffic projects in the Czech Republic. The proposed optimization procedures should lead to cost reductions.

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## 1. Introduction

The professional and lay public have been recently ever more often asking questions regarding the quality of construction of the transport infrastructure, its planning, and the total costs related to construction of highway infrastructure in the Czech Republic. Stories are often published in media about building Czech highways is much more expensive than constructing comparable roads abroad. The findings from many conducted studies are that the state administration does not spend taxpayer money economically. These studies have also found that the state projects are uneconomically and ineffectively designed. Thus the end result, the public does not get the added value from the state and must use poor and unsafe transport infrastructure. Lately it has been impossible to find some completed highway section in the Czech Republic where the cost had not been increased in the course of construction. The influence of various lobbying groups can be felt during preparation and realization of highways. Often suspicion of corruption is there. Effective quality and cost control is missing, and public contracts are not sufficiently transparent. Because of these results, the public considers the transport infrastructure as a black hole in the state budget. This paper will identify possible causes of inefficiency within the process of construction of highways and identifying the possibilities of cost reduction.

## 2. Literature review

The issue of cost of highway projects has many studies, especially at the national level [1,5,6]. There are also several studies in the Czech Republic [4,7,9] that relate specifically with the efficiency of the construction and maintenance of the highway project within the life cycle.

Control of costs incurred for the construction and operation of motorways and expressways in the Czech Republic is provided by the Supreme Audit Office (SAO). This is an independent institution which audits the management of state property and the performance of the national budget. In 2012, the Office carried out a detailed inspection and produced the final report No. 12/18 SAO, from which it follows, that savings potential in the process of construction of motorways and expressways in the Czech Republic can be estimated in the range of 12 % to 20 % of the total cost of construction.

The issue of quality and costs of highway projects is discussed in the Proceedings of the Working Group on Anti-Corruption National Economic Council (NERV), published by the Office of the Government of the Czech Republic in 2011. The authors are dealing with increasing efficiency in transport infrastructure projects, the consequences of poor quality of infrastructure constructions, public procurement system, and prevention of corruption and Public Private Partnership method.

The issue of the development of Czech transport infrastructure was further analyzed at the Forum held in the Great Hall of the Palace Žofín in 2013. There were presented the findings critically focused primarily on inefficiency of the Czech highway constructions. It was found that lengthy and uncertain time of designing and engineering preparation is one of the major weaknesses and challenges of infrastructure development.

Few highway agencies use performance measures for cost estimating. The study [3] synthesizes, categorizes, and validates existing performance measures for cost estimating of highway projects to assist with improving estimating accuracy.

A rating system is introduced in [10], that employ life-cycle analysis techniques to provide a quantitative assessment of the environmental and economic sustainability of highway designs. Energy consumption, greenhouse gas emissions, life-cycle cost, and other factors are considered. On the basis of the score received, a design is assigned a label commensurate with the level of sustainability achieved.

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