

iv2splus INFONET

Verkehrsinfrastruktur, MdZ 1. Call (2012)

QUICKWAY

QUICKWAY - Hochfahrwege aus UHPC

All over the world there is a strong urban growth. It is expected, that the urban population will be double in the next 50 years. It is obvious that the development of the urban traffic will become worst. In order to prevent this scenario, there are big efforts to shift at least a part of the individual transport off the roads by various Personal Rapid Transit Systems (PRT). In the field of public transport there is a trend from undergrounds to the cheaper Automated People Mover systems, which mainly have elevated tracks. However, all rail-guided technologies don't have enough flexibility to overcome the urban traffic problem in a comprehensive manner.

QUICKWAY is an integral solution. It considers Personal Rapid Transit, public mass transport as well as transport of minor goods. The concept is based on additional traffic area in terms of elevated small and slender roadways arranged without level crossings. Drivers driverless vehicles are navigated by a central electronic controlling system. This controller uses information about the current position as well as the desired destination of all QUICKWAY users at the same time and calculates the fastest routes with minimised stops, which finally increases the traffic capacity by more than thousand percent. At stopping points QUICKWAY is linked to the regular roads, which makes it possible to change the traffic system if the vehicle has a driver.

The necessary elevated roadways have to be cheap and durable and need a quick erection. This can be realised by a modular precast construction kit made of UHPC. This research project pursues two objectives: Firstly, to reach that level of QUICKWAY-development, which is necessary to make authorities and investors be positive about QUICKWAY and secondly, to gain the expertise needed for real QUICKWAY projects in the near future. In order to meet these aims, not only technical innovations are treated but also life cycle costs are predicted and social studies about the acceptance of QUICKWAY by the resident population are carried out.

A virtual QUICKWAY project in a real city provides the red line through the entire research work. This procedure should make sure, that realistic parameters and boundary conditions (technical, social and economic ones) are used as the initial point of research, which finally should ensure high quality results.

Based on the quantities collected at the virtual project, fundamentals of the construction kit, consisting of the geometric shapes and structural design tools, are developed. Therefore, theoretical and experimental methods are used. Special attention is drawn to vibrations, torsional behaviour of bent roadway girders, fatigue of cracked UHPC, new joints and bearing details and the coupling of pretensioned tendons. The process chain of production is optimised by time and way with the use of a risk and chance controlled procedure. Single steps of the process such as encasing, concreting and stripping of double curved, thin-walled box girders are the major aspects of the technical investigation of the QUICKWAY production. Production tests in the laboratory provide the verification of theoretical solutions.

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