

New Approach for Bridges with Very High Durability

Johannes BERGER

Civil Engineer
Vienna University of
Technology
Vienna, Austria
johannes.berger@tuwien.ac.at

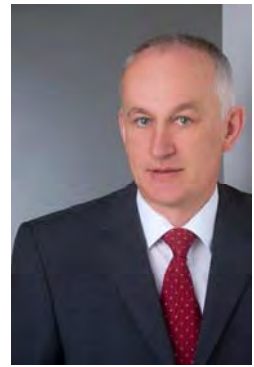
Johannes Berger, born 1981, received his civil engineering degree from Vienna University of Technology, Austria. He works as a university assistant at the Institute for Structural Engineering at Vienna University of Technology.



Johann KOLLEGGER

Professor
Vienna University of
Technology
Vienna, Austria
betonbau@tuwien.ac.at

Johann Kollegger, born 1956, received his engineering education at universities in Austria, USA, Canada and Germany. He obtained practical experience in consulting offices and construction companies and is now head of the Institute of Structural Engineering at Vienna University of Technology.



Summary

Tests have demonstrated that the demands on the ultimate limit state and serviceability limit state for structures can be also achieved without reinforcing bars. The durability of a bridge without reinforcing bars depends in this case only on the durability of the concrete since corrosion is no longer a determining factor regarding the lifetime of the structure. The requirements of the serviceability limit state and the ultimate limit state are fulfilled by providing post-tensioning tendons fitted with strands fully encapsulated in plastic ducts and water-tight anchorages. Since the proposed bridge does not contain any steel, which would be endangered by material-dependent corrosion, there is no need for an insulation of the deck consequently there is also no need for the use of a pavement and edge beams.

Keywords: Durability, Prestressing, Concrete bridge, Large scale tests.

1. Introduction

Frequently the conventional sealing of concrete bridges shows an unsatisfactory serviceability in practice. Imperfect sealing leads to chloride entry into the structure due to bending cracks. If a road passes under a bridge, there is the risk of chloride entry caused by salt fog spread on the surface of the bridge. In addition to the restoration liability of the sealing the pavement requires regular repair work. This periodic repair work causes high costs and affects the traffic flow.

Because of the high cost for the maintenance of bridges in regard to sustainability decisions for building bridges are more and more often made based on life cycle costing. For the infrastructure operators, the establishment of durable and low-maintenance bridges plays an increasingly important role. The aim of the research project described is to develop a technology by which the life expectancy of concrete bridges can be increased and thus simultaneously the frequency of repair work can be reduced.

2. Research program

In order to improve the durability of concrete bridges, the research project “Prestressed concrete bridges without reinforcing steel, sealing and pavement” has been started. To achieve a higher