APPLICATION OF FIBRE CONCRETE FOR THE BRIDGE OVER LOCHKOV VALLEY IN PRAGUE

J. Kolísko $^1$, K. Dahinter $^2$, P. Mařík $^3$, P. Svoboda $^4$

Abstract

The large continuous frame bridge on the motorway ring around Prague has composite steel and concrete box superstructure. The reinforced concrete deck slab has polypropylene micro-fibers admixture and taper-threaded splicing system for main longitudinal reinforcing bars in order to minimize cracking development.

Keywords: frame-bridge, composite superstructure, fiber concrete, polypropylene microfibers, taper-threaded splicing system, cracks development.

Introduction

Bridge across the Lochkov Valley, of the total length of 425.30 m, is situated on the South-west segment of the Prague Ring Road and crosses the deep valley at a height of 63 m. The whole bridge is in a plan curvature with radius of 747.5 m, in longitudinal slope of 2.4% and transverse slope of 4.0%. The bridge is formed by a strutted frame of span of 157.103 m, with the five spans deck of 70.00 + 79.85 + 99.30 + 93.85 + 80.50 m and variable width from 33.600 up to 35.425 m and the depth in the bridge axis 4.800 m. In the transverse direction the deck slab has variable depth from 220 mm at the edges to 620 mm at the edge stringers. The concrete was also enriched by polypropylene micro-fibers FIBREX 12 of 1,35 kg/m$^3$. Fibers are of 12 mm length and 20 µm diameter, white, from C3H6 polypropylene of density 0,91 g/cm$^3$, with elasticity modulus 3000 MPa and tensile strength min. 500 MPa.

Conclusions

Nearly 6000 m$^3$ of concrete C35/45 XF4 modified by dosage of 1,35 kg/m$^3$ of polypropylene microfibers FIBRREX 12, 12 mm length and 20 µm diameter, were used to produce slab of bridge. Fibers were applied to improve concrete resistance to cracking mainly at plastic stage of concrete. Results of technical inspections and measuring, that

---

$^1$ Jiri Kolisko Assoc. Prof., Klokner institute CTU in Prague, Solinava 7, 16608 Prague, jiri.kolisko@klok.cvut.cz

$^2$ Karel Dahinter, MSc, Ph.D., Consultant – ŘSD ČR závod Praha, dahinter@seznam.cz

$^3$ Pavel Mařík, MSc., Bögl – Krýsl k.s., Zbraslav – Pod Špitálem 1452, Prague, pmarik@boegl-krysl.cz

$^4$ Pavel Svoboda, MSc., Ph.D., SHP-Stráský, Hustý a partneři, Bohunická 133/50, 619 00 Brno, p.svoboda@shp.eu
were made during the concreting of the deck slab, after first stage of hardening of the respective section, were very good. Generally can be said, that cracks occurred after few weeks and were very fine, most of them up to 0,1 mm, the rest up to 0,15 mm, excepting several wider cracks above piers, where also sun shining is effective and also negative moment causing tension stress in concrete of concrete slab. This state of crack is nearly unchanged until now after one year of service of bridge. In spite of general experience, that the dominant favorable effect of short polypropylene microfibers fibers on cracking development is during the first stage of concrete hardening, it seems that this effect lasts also during all following stages of concrete structures’ service-life, for their strength-mechanical properties and of cracks’ width. According to our opinion, the use these polypropylene fibers for deck slab of composite steel and concrete bridges is very useful for minimizing of cracks and prolongation bridge’s service-life, for very small financial amount.

![Cross section of the superstructure](image)

**Fig. 1: Cross section of the superstructure**

**Acknowledgements**

*The article was written with the support of Grant Project GA CR P104/10/2359.*

**References**
