

**THIN CONCRETE SHELLS REINFORCED WITH GLASS FIBERS.
MANUFACTURING TECHNOLOGY AND MECHANICAL PROPERTIES**

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Pneumatic mould use is an approach with a set of advantages among thin wall structural element fabrication technologies. In the reported work, on the flat surface of a non-inflated pneumatic mould was imposed and smoothed down (forming a thin layer) glass fiberconcrete mix. Before concrete binding, mould was inflated by air forming a moderate curvature shell. After that, concrete was hardened, during concrete hardening air pressure in pneumatic mould was kept constant value. Then, an air in the pneumatic mould was blown out and shell was demolded. Two variants were observed: (a) shell is reinforced by uniformly distributed short glass fibers (concretes with three different fiber concentrations were investigated); (b) shell is reinforced by weft knitted glass fiber textiles (were fabricated in the laboratory). Simultaneously flat material samples were fabricated and experimentally tested. Composite materials elastic moduli as well as tensile strength were obtained. With the goal to predict mechanical behavior of produced thin fiberconcrete shells, a detailed micromechanical investigation for single fiber and few fibers bundle pull-out micro-mechanics was performed numerically (using FEM modeling) and experimentally. Macro-crack opening structural model, based on data sets with information about single fiber and few fibers bundle pull-out micro-mechanics, (was elaborated earlier [1]) was exploited predicting shell load bearing facility depending on opening of a crack in the loaded shell. Theoretical results were compared with the data obtained in experiments.

REFERENCES

1. Krasnikovs A., Kononova O. and Khabaz. A. "Fracture and Post-cracking Behaviour Prediction for Glass and Carbon Fibre Reinforced Concrete Construction Members," *Proceedings of 5th International Conference Fibre Concrete 2009 Technology, Design, Application*, 17th – 18th September 2009, Prague, Czech Republic, pp. 161-166.