AZ NKFI ALAPBÓL MEGVALÓSULÓ PROJEKT

BUDAPESTI MŰSZAKI ÉS GAZDASÁGTUDOMÁNYI EGYETEM
Építőmérnöki Kar - építőmérnöki képzés 1782 óta
Építőanyagok és Magasépítés Tanszék

Nemzeti Versenyképességi és Kiválósági Program, B alprogram: Anyagtudományi, technológiai nemzeti program
BME *konzorciumvezető*, **SW Umwelttechnik Kft., ÉMI Nonprofit Kft., MC Bauchemie, CRH Mo. Kft.**

NVKP_16-1-2016-0019, *"Development of concrete products with improved resistance to chemical corrosion, fire or freeze-thaw"* 2017 márc. 1. – 2020 febr. 28.

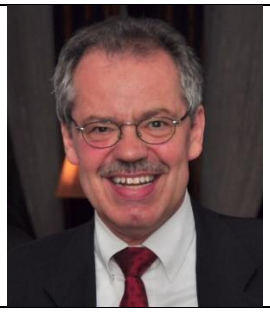
16 Sept. 2019 (Monday), BME Kmf. 85., 14.15 to 17.00

Projektvezető: Prof. Balázs L. György, tiszteletbeli elnök (***fib***)
Projekt altéma felelősök: Dr. Lublóy Éva, Dr. Salem G. Nehme, Dr. Kopecskó Katalin
Fagyállóság altéma felelős: Dr. Salem G. Nehme

Assoc. Prof. György Stocker, Head of Dept. — **Welcome**

Prof. György L. Balázs, Project Coordinator — **Introductory words**

Prof. Harald S. Müller — Freeze-thaw resistance of concrete
– New findings on the mechanisms and prognosis of the degradation –



Prof. Dr.-Ing. Harald S. Müller, President of *fib* in 2015 – 2016, e-mail: hsm@mpa.kit.edu
KIT – Karlsruhe Institute of Technology, Karlsruhe, Germany
Prof. Müller received his academic education in civil engineering at the University of Karlsruhe. After several years of working primarily in consulting business in Berlin, he became a full Professor for Building Materials and Concrete Structures at his alma mater in 1995 (today: Karlsruhe Institute of Technology, KIT). His major research subjects are creep and shrinkage, service life design, durability, sustainability and rehabilitation of concrete structures. By the end of 2017 he became a Prof. Emeritus. Harald Müller is an elected member of the National Science Foundation of Germany. He is Honorary President of the fib, Honorary Member of the ACI and Foreign Member of the Russian Engineering Academy. As a founder and managing partner of the SMP Engineers of Constructions Ltd he is mainly involved in the analysis, rehabilitation and strengthening of concrete structures.

Short summary of presentation: One of the most relevant environmental exposures for concrete structures in moderate climate zones such as Northern and East Europe is the frost attack. Even though the knowledge about the governing mechanisms has tremendously increased, some key aspects related to their time-development are not yet sufficiently understood. Consequently, no generally accepted model allowing to predict the degradation and spalling behaviour is available. Based on an experimental study using Nuclear Magnetic Resonance (NMR) techniques, the water transport behaviour in hardened cement paste and mortars at different water/cement ratios and different temperature exposures during a freeze-thaw attack was investigated. The obtained results constitute the basis for the development of a reliable physically based frost damage model. Even though the model was validated for hardened cement paste and mortar only, it represents a physically sound approach to describe in principle for the first time the development of the frost damage process in structural concrete. Hence, the model allows for a performance based service life prediction for concrete subjected to frost attack.

Péter Schaul, PhD student — **Numerical simulation of freeze-thaw resistance of concrete**

Discussion

Closing