
Dr. Achala Pallegedara

The general civil engineering practice has it that reinforced concrete structures are designed according to standards, which consider the ordinary loading conditions, and also according to the extreme conditions. However, obtaining the design values for materials and loading under extreme condition is rather difficult and usually it requires numerical or experimental analyses. My contribution in this regards was development of methodology and supporting equipment for experimental quantification of extreme conditions. Within the scope of this project, a small-scale climatic chamber was developed which enabled to simulated oscillation of daily temperature with the extremes caused by exposure to sunshine or the frost while the humidity was also possible to change. Understanding the effect of these conditions, especially their rapid changes, is key factor for assurance of high-quality concrete products. The developed methodology and laboratory equipment can be used also for investigation of combined effects of temperature, mechanical loading and chemicals. The work on this topic which focused on the extreme situations in design and realization of concrete construction broadened my views so that I am now ready to develop safe and durable concrete structures worldwide.


doc. Ing. Petr Štemberk,Ph.D.

Dr. Achala Pallegedara's contribution to the research team was ensured especially with his previous field of study which as the electrical engineering and software development. The research team which is supervised by Dr. Petr Štemberk focuses mainly on understanding concrete under extreme conditions. One of the specialized fields of study of this research team are the extreme conditions in terms of excessive mechanical, thermal and chemical effects. Dr. Achala Pallegedara developed specialized controlling software based on the fuzzy logic which was optimized using the genetic algorithm so that the response of the laboratory equipment was practically instantaneous. The accuracy and on the other hand the robustness of the controlling software is essential when rapid changes occur during the experiment. The climatic chamber which was developed and realized by Mr. Martin Petřík (Ph.D. student) in close cooperation with Dr. Achala Pallegedara is controlled by the developed software and helps to conduct small-scale experiments when the physical changes in the concrete microstructure can be quantified and described numerically by mathematical material models which can be in turn utilized in advanced numerical simulations.