Editorial

In the 21st as much as in the late 20th century, durability of concrete is and remains an important issue in civil engineering. Worldwide, about one cubic meter of concrete is cast per person per year. At the same time, the environmental impact of concrete production, in particular that of cement, has become a global concern. Similarly, premature decommissioning or repair of structures consumes large amounts of energy and raw materials and causes economic losses due to downtime and associated traffic congestion. Consequently, on one hand more environmentally friendly binders are being developed; on the other hand, achieving a long service life, either with traditional or innovative materials, has become even more important. Universities, research organisations and consultants all over the world continue looking for fundamental, applied and practical innovations and improvements of materials, models and methods for describing, preventing and controlling concrete degradation.

In 2007, HERON has published a special issue on Durability of Concrete, with papers reporting on testing for compliance with service life requirements, risk based corrosion monitoring, spatial variability and its effects on service life and repairs costs, historic addition of trass in marine environment and durability aspects of innovative polymer fibre addition to concrete (HERON 2007, Vol. 52, issue 4, available at www.heronjournal.nl).

Now, about five years later, HERON presents another special issue on concrete durability with six papers on new subjects. It contains a contribution describing a practical method for service life design of traditional concrete in chloride contaminated environments, based on a semi-probabilistic simplification of the DuraCrete method and new data on slag cement concrete in marine environment. The second paper reports on a durability study of concrete with a minimum content of cement (well below traditional limits) and a high amount of fly ash, thus aiming at minimal environmental impact, while maintaining durability in aggressive environment. The third paper relates to a study on testing and modelling of chloride penetration into concrete during the early days of its life, which is when concrete is not yet a dense and nearly impermeable material. The next contribution presents an overview of research in the Netherlands into the durability impact of blast furnace slag as a cementing material, based on a tradition of almost a century of use history. The fifth paper reports on measuring the electrical resistivity of concrete over a period of 17 years, highlighting the long term effect of blast furnace slag on transport properties. The last paper reports on issues met when testing dense concrete for accelerated carbonation in a traditional way and proposes a new model for interpretation of such tests.

It is hoped that this special issue contributes to improving the durability of concrete structures, both today and in the future. Support for these studies was obtained from a variety of collectives of industry and government, which is greatly appreciated by the authors. I would also like to gratefully acknowledge the important contribution of six external reviewers to these papers.

Rob Polder, special issue editor