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# 40th birthday issue

This issue marks (a little belatedly) 40 years of publication of this journal, Cement and Concrete Research. In the opening editorial of the first issue from January 1971, the founding editor Della Roy wrote:

> "The most important (reason for the creation of the journal), was the realization that no appropriate vehicle existed which served as a focus for the increasingly scientific approaches which are now being taken to the problems of cement and concrete. Research reports have been scattered through a dozen or more journals in most of which the work was regarded as peripheral or, in some way, of lower scientific merit"

I think we can safely say that the past 40 years have seen remarkable progress through "increasingly scientific approaches" to cement and concrete. Moreover, the impact factor of the journal, above 2 is very respectable for any journal dealing with a single material, bears witness to the recognition of the scientific merit of such work.

On the other hand cement and concrete have become much more complicated in the last 40 years. 40 years ago virtually all the cement used was a variant of so called "Portland" cement. Nowadays the use of pure Portland cement is very much in the minority (for example less than 25% of the volume sold by the internationally active company Holcim in 2010).

Issues of climate change and sustainable development mean that cement and concrete, as the most used materials on the planet are facing unparalleled challenges: how to improve the environmental impact of cementitious materials which already have the lowest consumption of energy and lowest associated emissions of $CO_2$ per tonne of all commonly used materials.

The distribution of resources in the planet and the high proportional cost of transporting such bulky materials mean that there is no one single solution to this challenge; rather we need to learn how to master an increasingly diverse range of cementitious and supplementary cementitious materials according to local availability and application.

To meet these challenges we need to go further with scientific approaches — conventional empirical studies will take too long. We need to understand the physical and chemical mechanisms, operating on the nano and micro levels, which determine the macroscopic performance of cement and concrete.

In this spirit, I am very pleased to publish the collection of papers assembled for this issue. Five of the papers are reviews relating to different areas of cement hydration which emerged from an International summit on Hydration Kinetics held in Quebec City, Canada in 2009, which are discussed in more detail in the following guest editorial by the organiser of this meeting, Joe Biernacki. These are followed by two commissioned review articles, one on alkali silica reaction and one on rheology. Many of you will know about the excellent work of the Wallevik brothers from conferences, but also know that getting a paper from them is never easy!

The final 7 papers in the issue come from the CONMOD10 conference held in Lausanne, Switzerland last year. The tremendous progress in computing power over the last 40 years has enabled many new approaches to modelling the complex materials which are cement and concrete. This is certainly an area which will see further dramatic developments in the next 40 years and will be essential to our understanding and more efficient use of these materials.

Finally I would like to congratulate Zdenek Bazant and Folker Wittmann who have been members of the CCR editorial board for the whole period of its existence. I am sure they and the whole of the present board will join me in looking forward to the next 40 years of Cement and Concrete Research.

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