
# ALKALI-AGGREGATE REACTION IN CONCRETE

Edited by

Ahmad Shayan

Proceedings of the 10th International Conference on Alkali-Aggregate Reaction in Concrete

18-23 August 1996
Melbourne
Australia

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CSIRO Division of Building Construction and Engineering
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# Preface

Australia was one of the very first few countries that started research in the field of alkali-aggregate reaction (AAR) in the early 1940s, after damage (cracking) reported to some concrete structures in the USA was attributed by STANTON to an expansive reaction between the cement and aggregate phases in the concrete. Although extensive research overseas and at CSIRO in Australia provided greater understanding of the phenomenon of AAR, field cases of damage to concrete structures were few and limited to certain geographical locations, largely in the USA.

In the following decades, increasing numbers of AAR -damaged structures have been identified in many countries around the world, and the early false assumption that AAR was unlikely to occur in certain countries was proven to be wrong. The concern for the damaging effects of AAR is apparent from the numerous publications in this field and the Nine international conferences held on the topic since the mid 1970s, the last being in London in 1992.

Despite extensive research on AAR in Australia in the early days, actual cases of damage to concrete structures only began to be identified in the 1980s; the number increasing considerably towards the 1990s. Given both the reported and recently identified, but unreported, cases of AAR here, a suggestion from the International AAR committee (IAARC) to hold the 10th international meeting in Australia was put to local interest groups before the London meeting. Sufficient enthusiasm and support were expressed for accepting the suggestion of the IAARC, and planning for the 10th meeting in 1996 began

The early prominence of Australia in AAR research makes it fitting that the International AAR Conference should be held here, and it is my hope that the awareness of AAR problems and solutions will be enhanced in our local industry by opportunities to meet with the world's experts in the field.

The 10th IAAR conference has enjoyed considerable support both from the scientific and industrial sectors. The conference proceedings contain around 130 technical papers which will be presented at the conference, and cover the most recent developments in AAR, both in research and practice. The conference is intended to create strong links, and facilitate the interaction between Science, Engineering and Practice. Technical and Trade Exhibitions will also strengthen this link. It is hoped that the delegates will vigorously participate in this interaction and gain the utmost benefit from this highly valuable opportunity.

The gathering together at this conference of so many leading experts is in itself a great success. The sharing of ideas and discussions during the conference, and the bridging of gaps, will further strengthen this achievement. As with other successful conferences, many parties have been instrumental in the success and must be mentioned here and thanked for their efforts.

Various private and public organisations provided the much-needed initial and ongoing financial support which was of great logistical importance and allowed the required activities to proceed at the various preparatory stages of the conference. The list of the Financial Sponsors is given separately, and their generous contributions are gratefully acknowledged

I would like to thank all the authors for their highly valued papers, who have also done an excellent job in preparing their papers on time at various stages of reviewing and amendment. Thanks are due to many local and international colleagues, listed separately, who kindly accepted to referee the submitted papers and helped to improve them where required.

The efforts of the members of the International AAR Committee in providing advice when asked, writing state-of-the-art papers, reviewing other papers and promoting the conference overseas are greatly appreciated..

I sincerely thank the members of the Local Organising Committee and their supporting organisations, whose time and efforts made this conference possible. Particularly, thanks are due to Russell Diggins, conference secretary, for his close attention to all the many tasks demanded of him.

I trust that this collection of papers is of great value not only to the delegates at the conference, but also to those who will venture into the complex areas of AAR research , remediation and management.

Ahmad Shayan
Conference Chairman
August 1996.

# Conference Organisation

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# Financial Sponsors

The following organisations have financially supported the conference from the early stages of organisation and preparation. Their support has been very important for the success of the conference and is gratefully acknowledged.

- Australin Tourist Commission
- Main Roads Department, Western Australia
- Roads and Traffic Authority, New South Wales
- Main Roads, Queensland
- Pozzolanic Enterprises, Queensland
- Ash Development Association of Australia, New South Wales
- Cement & Concrete Association of Australia
- Australasian Slag Association, New South Wales
- CSR Readymix Australia
- European Research Office, United States Army
- A generous loan by the Federal Department of Industry , Trade and Regional Development, through the Institution of Engineers Australia

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The following companies are providing Technical and Trade Exhibits at the conference venue:

- Konoike Construction Company, Japan
- Ash Development Association of Australia
- Master Builders Technology (MBT) Australia, Pty Ltd
- FMC Corporation, Lithium Division, North Carolina, USA
- Fosroc International
- Pozzolanic Enterprises Pty Ltd, Queensland
- Dry Treat (Australia)

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