

WORKSHOP-INFORMATION

CHARGE

Participation in the Workshop is free of charge.

REGISTRATION

For registration, please use the online registration form at:
www.rub.de/for1498.

Availability of seats is limited. Therefore, early registration is recommended.

For further information, please contact:

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LOCATION

IBZ - Beckmanns Hof – Ruhr University Bochum
Universitätsstraße 150 – 44801 Bochum, Germany



www.rub.de/for1498

MEMBERS OF DFG FOR 1498

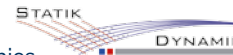
RUB RUHR-UNIVERSITÄT BOCHUM

Institute for
Building Materials



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Institute for
Structural Mechanics



Federal Institute for
Materials Research and Testing

Bauhaus-Universität Weimar

F.A. Finger-Institute
for Building Materials



Institute of Concrete
Structures and Building
Materials



DFG FOR 1498

Coordinator: Univ.-Prof. Dr.-Ing. R. Breitenbücher
Institute for Building Materials, Ruhr University Bochum, Germany

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DFG FOR 1498

ALKALI-SILICA REACTION (ASR)

IN CONCRETE STRUCTURES DUE TO
SIMULTANEOUS CYCLIC LOADING AND
EXTERNAL SUPPLY OF ALKALI

INTERNATIONAL WORKSHOP

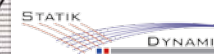
COMPUTATIONAL MODELING OF ALKALI-SILICA REACTION

RUHR-UNIVERSITY BOCHUM

9. APRIL 2014



RUHR-UNIVERSITÄT BOCHUM



Bauhaus-Universität Weimar



Bundesanstalt für Materialforschung und -prüfung

PROJECT DESCRIPTION

The Alkali-Silica-Reaction (ASR) is the leading cause for long-term deterioration of concrete structures. ASR results in an expansion of a gel in and in the vicinity of aggregates, which eventually may lead to severe cracking and to loss of structural integrity. ASR induced deterioration is, even after decades of scientific investigation, still subject to intensive research since not all questions are resolved by now. An example is the effect of combined external loading in association with external alkali supply, which considerably promotes ASR in concrete structures such as road pavements or offshore wind energy facilities. The objectives of the collaborative DFG project FOR 1498, since its start in October 2011, is to investigate the effects of the ASR in concrete structures caused by simultaneous cyclic loading and external supply of alkali by means of experimental, numerical and analytical methods. These methods constitute the basis for the development of computational models to simulate ASR action under complex scenarios and to predict the durability and integrity of ASR affected concrete structures.

WORKSHOP:

COMPUTATIONAL MODELING OF ALKALI-SILICA REACTION

The workshop aims to bring together experts to debate and discuss the state of the art and recent advances in computational modeling of alkali transport and ASR induced damage in concrete. The topics of discussion in the workshop will encompass various modeling strategies ranging from micromechanics based models, meso-scale models to macroscopic phenomenological approaches including new paradigms in scale-bridging techniques, multi-physics models and multi-level methods. Experimental aspects in computational modeling such as calibration and validation will also be discussed. The workshop should serve as a platform for the exchange of ideas and constructive criticisms thus advancing our understanding of ASR especially through computational models.

PROGRAM – 10:00 - 16:30

- 10:00 **Opening**
Prof. G. Meschke
Ruhr University Bochum, Germany
- 10:10 **Introduction to the ASR research group:**
DFG FOR 1498
Prof. R. Breitenbücher
Ruhr University Bochum, Germany
- 10:30 **Macro- and meso-scale modelling of ASR in cement based materials**
Prof. D. Gawin
Technical University of Łódź, Poland
- 11:15 **Meso-scale modeling of ASR-damage supported by experiments**
Prof. E. Schlangen
Delft University of Technology, The Netherlands
- 12:00 *Lunch*
- 13:00 **Multilevel modeling of transport in intact, micro-cracked and fracturing porous materials: Application to ASR in Concrete**
J. J. Timothy, MSc., N. N. Minh, MSc., Prof. G. Meschke
Ruhr University Bochum, Germany

PROGRAM – 10:00 - 16:30

- 13:45 **Concrete deterioration due to ASR: A multiscale damage model based on analytical homogenization**
R. Esposito¹, MSc., Prof. M. A. N. Hendriks²
¹Norwegian University of Science and Technology, Norway, ²Delft University of Technology, The Netherlands
- 14:30 *Coffee Break*
- 15:00 **A micromechanical model for ASR anisotropy**
Dr. L. Charpin¹, Prof. A. Ehlacher²
¹Espace Innovation et recherche du groupe (EDF R&D), France, ²Laboratoire Navier, Université Paris-Est (UPE), France
- 15:45 **Transport process and chemical reaction in siliceous rock particle at the beginning of ASR**
Dipl. Chem. C. Jehn, Prof. F. Schmidt-Döhl,
TU Hamburg-Harburg, Germany
- 16:30 **Closing**
Prof. G. Meschke
Ruhr University Bochum, Germany

