

A Study on the Influence of Sodium Chloride on Alkali-aggregate Reaction

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1989 Fiscal Year Final Research Report Summary

A Study on the Influence of Sodium Chloride on Alkali-aggregate Reaction

Research Project

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62550346

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Grant-in-Aid for General Scientific Research (C)

Allocation Type

Single-year Grants

Research Field

コンクリート工学・土木材料・施工

Research Institution

Kanazawa University

Principal Investigator

KAWAMURA Mitsunori Faculty of Technology, Kanazawa University, Professor, 工学部, 教授 (20019730)

Co-Investigator(Kenkyū-buntansha)

TORII Kazuyuki Faculty of Technology, Kanazawa University, Associate Professor, 工学部, 助教授 (50115250)

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Keywords

Alkali-silica Reaction / Reactive Aggregate / Mechanism of Deterioration / Fly Ash / Sodium Chloride / Pore Solution / Crack Pattern Analysis

Research Abstract

The summary of the results obtained from the experiments which have been carried out based on the assumption that NaCl is supplied to concrete structures from the surrounding environments is as follows;

(1) From the experiments in which NaCl was supplied intermittently, greater expansions were found to occur in specimens which were continuously immersed in the NaCl solution than those immersed in the solution intermittently.

(2) The results obtained from exposure tests of specimens at the sea coast and in the campus of Kanazawa University are as follows; (a) The degree of damages and expansions due to alkali-silica reaction greatly depends on the supply of salts from the surrounding environments and temperature. (b) Under natural environments, the occurrence of cracking was preceded by the initiation of expansion.

(3) In concretes containing NaCl and a reactive aggregate, the amount of OH⁻ ions consumed by the alkali-silica reaction is small as compared to the concretes containing only the reactive aggregate.

(4) As regards the alkali-silica reaction in concretes with fly ash, the inhibitive effect of fly ash on the alkali-silica reaction is reduced in the presence of Cl⁻ ions.

Research Products (10 results)

All Other

All Publications (10 results)

[Publications] M.Kawamura: "Effects of a Flyash on Pore Solution Composition in Calcium and Sodium Chloride-Bearing Mortars" Intl.J.of Cement and Concrete Research. 18(5). 763-773 (1988) 

[Publications] M.Kawamura: "Effects of a Sodium Chloride and Sodium Hydroxide from the Surrounding Solution on Alkali-Silica Reaction in Mortars Containing Fly Ash" Magazine of Concrete Research. 40(144). 143-151 (1988) 

[Publications] 川村満紀: "外部から供給される塩化ナトリウムのアルカリ・シリカ反応に及ぼす影響" セメント技術年報. 42. 327-330 (1989) 

[Publications] 川村満紀: "塩化物のアルカリ・シリカ膨張におよぼす影響" コンクリート工学年次論文報告集. 11(1). 65-70 (1989) 

[Publications] M.Kawamura: "Influences of the Alkali-Silica Reaction on the Corrosion of Steel Reinforcement in Concrete" Proc.of 8th Intl.Conf.on Alkali-Aggregate Reaction. 115-120 (1989) 

[Publications] M. Kawamura: "Effects of a Flyash on Pore Solution Composition in Calcium and Sodium Chloride - Bearing Mortars" Intl. J. of Cement and Concrete Research, 18(5), pp.763-773, 1988. 

[Publications] M. Kawamura: "Effects of a Sodium Chloride and Sodium Hydroxide from the Surrounding Solution on Alkali-Silica Reaction in Mortars Containing Fly Ash" Magazine of Concrete Research, 40(144), pp.143-151, 1988. 

[Publications] M. Kawamura: "Effect of Sodium Chloride Supplied from the Surrounding Solution on the Alkali-silica Reaction" Proc. of the 42nd General Meeting of the Cement Association of Japan, 42, pp.327-330, 1989. 

[Publications] M. Kawamura: "Effects of Calcium and Sodium Chloride on Alkali-Silica Reaction" Proc. of Japan Concrete Institute Conference, 11(1), pp.65-70, 1989. 

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