

Preventive Measures and Mechanisms of Concrete Deterioration due to ASR under Marine Environments

メタデータ	言語: jpn 出版者: 公開日: 2022-05-23 キーワード (Ja): キーワード (En): 作成者: Kawamura, Mitsunori メールアドレス: 所属:
URL	https://doi.org/10.24517/00057347

This work is licensed under a Creative Commons Attribution-NonCommercial-ShareAlike 3.0 International License.



1991 Fiscal Year Final Research Report Summary

Preventive Measures and Mechanisms of Concrete Deterioration due to ASR under Marine Environments

Research Project

Project/Area Number

02650333

Research Category

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 Kanazawa Univ., Faculty of Technology, Professor, 工学部, 教授 (20019730)

Co-Investigator(Kenkyū-buntansha)

IGARASHI Shinichi Kanazawa Univ., Faculty of Technology, Research Associate, 工学部, 助手 (50168100)

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

Project Period (FY)

1990 – 1991

Keywords

Ettringite / Expansion / Exposure Tests / Opal / Alkali-Silica Reaction / Pore Solution

Research Abstract

The results obtained in this fiscal year are divided into the two categories, i. e. the one on the reaction products and expansion behavior in opal-bearing mortars immersed in NaCl solutions and an artificial sea water, exposed to a marine environment.

The major results obtained in the former experiments are summarized as follows ;

- (1) Great amounts of Ca (OH)₂ in all mortars with the opal were dissipated during the immersion in 1 N NaCl solution.
 - (2) Great amounts of the chloride-bearing ettringite was found in the portions as well as in voids in opal-bearing mortars immersed in 1 N NaCl solution for longer than one year. It is likely that the greater the expansion of mortars, the greater the amount of ettringite found in the mortars.
 - (3) The concentration of NaCl solution in which mortar specimens were immersed, greatly influenced the expansion of mortars with relatively low alkali/opal ratio. However, in the range of high alkali/opal ratio, the concentration of the NaCl solution little influenced the expansion of the mortars.
- The following new findings were obtained in the latter experiments which have been successively carried out for these several years.
- (1) Rapid expansions occurred on the exposed surfaces in reactive aggregate-bearing concrete specimens with the unit cement content of 450kg/cm³. This fact suggests that spray of sea water is influencing the expansion of the concrete due to the alkali-silica reaction.
 - (2) There is found a trend that the less the alkali content in the concretes, the greater the expansion of the concretes exposed to the marine environment.

Research Products (8 results)

All Other

All Publications (8 results)

[Publications] 川村 満紀,鳥居 和之,五十嵐 正巳: "海洋環境下におけるアルカリ・シリカ反応によるコンクリートの膨張とひびわれ" コンクリート供試体によるアルカリ骨材反応判定試方法に関するシンポジウム論文集. 1-6 (1991) ▼

[Publications] 川村 満紀,杉山 彰徳,竹内 勝信: "NaCl溶液中におけるオパール含有モルタルの膨張挙動と細孔溶液の組成" コンクリート工学年次論文報告集. 14. (1992) ▼

[Publications] M.Kawamura M.Igarashi K.Takeuchi: "Relationships between Alkali/Opal Ratio,Expansion and Pore Solution Composition in Opal-Bearing Mortars Immersed in NaCl Solution" Proc.of 9th International Conference on alkali-Aggregate Reaction in Concrete. (1992) ▼

[Publications] M.Saito M.Kawamura: "Effects of Sodium Chloride on the Hydration Products in the Interfacial Zone between Cement Paste and Alkali-Reactive Aggregate" Proc.of International Conference on Interfacial in Cementitious Composites. (1992) ▼

[Publications] M. Kawamura, K. Torii and M. Igarashi: "Expansion and Cracks Caused by Alkali-Silica Reaction in Concrete under a Marine Environment" Proc. of JCI Symposium on Test Method for Determination of Alkali-Aggregate Reactivity in Concrete by Using Concrete Specimen. 1-6 (1991) ▼

[Publications] M. Kawamura, A. Sugiyama and K. Takeuchi: "Expansive Behavior and Pore Solution Composition of Opal-Bearing Mortars in NaCl Solution" Proc. of the JCI. 14. (1992) ▼

[Publications] M. Kawamura, M. Igarashi and K. Takeuchi: "Relationships between Alkali/Opal Ratio, Expansion and Pore Solution Composition in Opal-Bearing Mortars Immersed in NaCl Solution" Proc. of 9th International Conference on alkali-Aggregate Reaction in Concrete. (1992) ▼

[Publications] M. Saito and M. Kawamura: "Effect of Sodium Chloride on the Hydration Products in the Interfacial Zone between Cement Paste and Alkali-Reactive Aggregate" Proc. of International Conference on Interfaces in Cementitious Composites. (1992) ▼

URL: https://kaken.nii.ac.jp/report/KAKENHI-PROJECT-02650333/026503331991kenkyu_seika_hokoku_

Published: 1993-03-15