Committee Report: JCI-TC141A
Technical Committee on Functions and Techniques for Controlling of Air Voids in Concrete

委員会報告：JCI-TC141A
コンクリート中の気泡の役割・制御に関する研究委員会

Yukio HAMA, Dr. Eng.: Muroran Institute of Technology
濱　幸雄，博士（工学）：室蘭工業大学
Hidehiko OGATA, Dr. Eng.: Tottori University
緒方　英彦，博士（農学）：鳥取大学
Daisuke HAYASHI, Dr. Eng.: Kajima Corporation
林　大介，博士（工学）：鹿島建設
Minoru ABA, Dr. Eng.: Hachinohe Institute of Technology
阿波　稔，博士（工学）：八戸工業大学
Noboru YUASA, Dr. Eng.: Nihon University
湯浅　昇，博士（工学）：日本大学
Daiki ATARASHI, Dr. Eng.: Shimane University
新　大軌，博士（工学）：島根大学
Contact: jci-web@jci-net.or.jp
Keywords: air void structure, air content, workability, freezing resistance, air entraining agent, shrinkage reducing agent, transportation, vibration compaction

Abstract
Air voids in concrete are generally known to affect the workability, the mechanical properties of hardened concrete, and the freeze-thaw resistance. However, recent studies have pointed out the use of materials like moderate-heat fly ash cement joins and/or breaks air voids, resulting in decrease in the freeze-thaw resistance, and the use of shrinkage reducing agents makes it difficult to maintain an appropriate air content. They thus have renewed our appreciation of the need for technology to control/manage the behavior of the air voids. This committee comprehensively reviewed the roles and effects of the air voids and the technology to control/manage the amount and quality of the air voids through literature search and experiment-based studies.

1. Introduction
Air voids in concrete are generally known to affect workability at stage of execution of work, the mechanical properties of hardened concrete, and the freeze-thaw resistance. In particular, in order to control damage to concrete due to freezing and thawing, it is crucial to create a mechanism to reduce the pressure caused by the movement of unfrozen water that accompanies a generation of crystals by entraining minute air voids in concrete. However, recent studies have pointed out that in concrete made of moderate-heat fly ash cement, which is widely used as dam concrete, the air voids entrained in the concrete join together, break, and then decrease the freeze-thaw resistance.[1), 2)] Moreover the use of shrinkage reducing agents makes it difficult to maintain an appropriate air content.[3), 4)] They thus have renewed our appreciation of the need for the technology to control/manage the behavior of air voids. Therefore, JCI-TC-141A “Technical Committee on Roles and Control of Air Voids in Concrete (hereafter referred to as Air Void Committee) was set up with the aim to comprehensively review the roles and effects of the air voids and the technology to control/manage the amount groups: a working group for survey and research of the roles of air voids in concrete (hereafter referred to as Role WG), a working group for tests and evaluation of air void structures in concrete (hereafter referred to as Evaluation WG), and a working.....

URL: http://www.jci-net.or.jp/j/jci/study/tcr/tcr2016/TC141A.pdf