

# Reduction of Environmental Impact in the PC Structure

## PC 구조물의 환경 부하의 저감

### Application of Low-Carbon Cements to Prestressed Concrete Structures

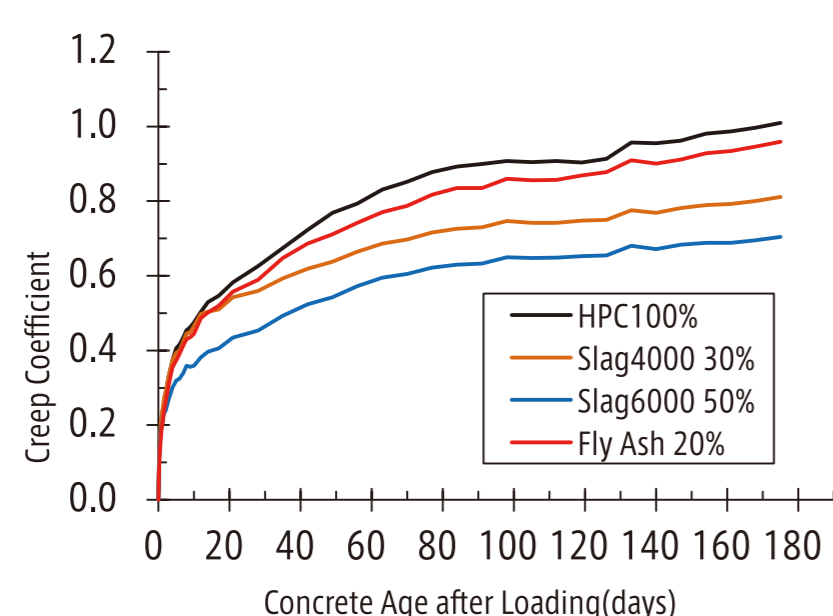
#### Objective

Development of Environmentally-friendly and Highly-durable Prestressed Concrete Structures by Using Supplementary Cementitious Materials (SCMs) such as GGBF Slag and Fly Ash.

The research project aims to propose a design and construction manual for the effective use of SCMs on prestressed concrete structures in March 2016. The manual covers 1) design methods, 2) durability assessment, and 3) construction techniques.

#### Design

- Creep and Shrinkage
- Early-age Strength Properties
- Structural Behaviors



#### Creep Test

#### Durability

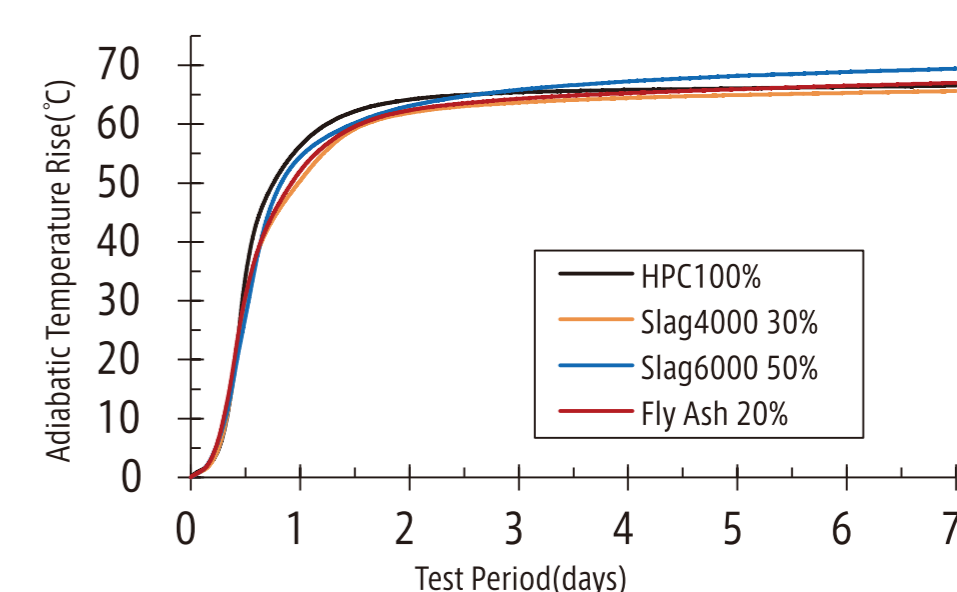
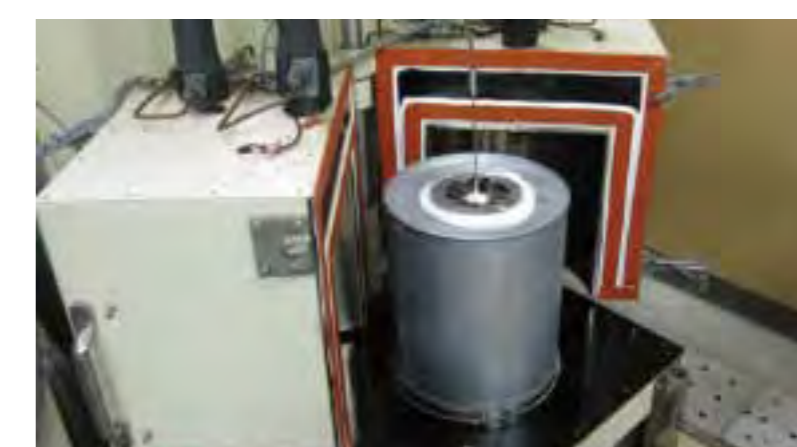
- Resistance to Chloride Ingress
- Resistance to Carbonation
- Exposure Test vs. Accelerated Test



#### Long-term Exposure Test

#### Construction

- Adequate Curing Procedure
- Adiabatic Temperature Rise
- Effects of Low/High Temperature



#### Adiabatic Temperature Rise Test

This research project has been conducted as a collaborative research project with the Public Works Research Institute.

### Minimize Environmental Impact by Wide Use of Precast Members

1. Multi diversion of formworks reduces the amount of formwork wastes
2. Highly durable precast members achieve long service life and lower carbon emission

#### Irabu Bridge

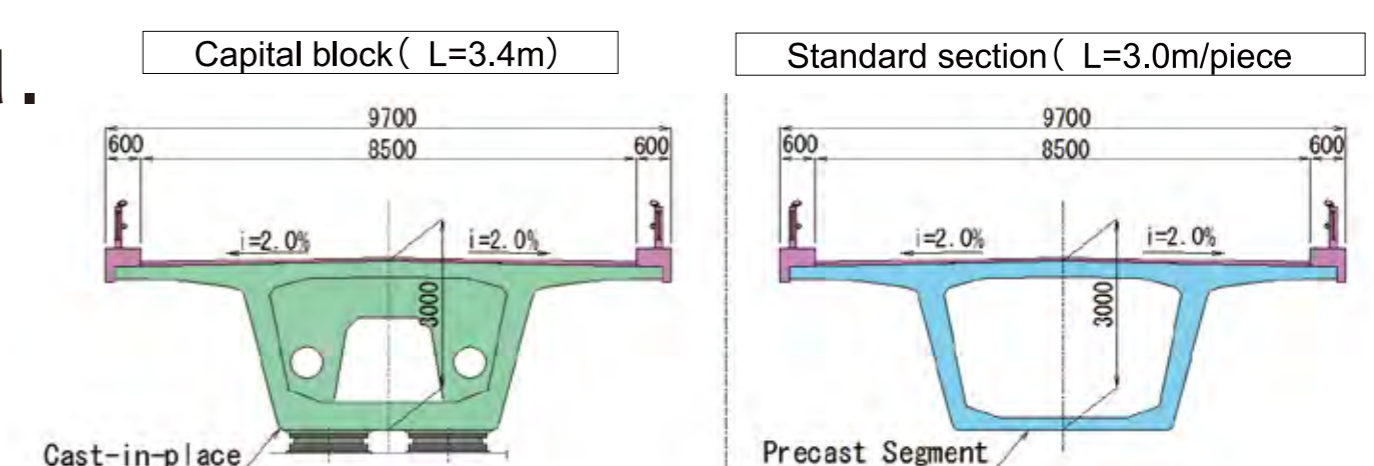
On-site fabrication yard and stock yard is eliminated by utilizing factory made precast members.

All precast segments are fabricated at factory.

Surrounding environment impact is minimized by applying Balanced Cantilever method.

The special erection method can limit the area for segment erection.

- Bridge length : 2185m (Miyakojima side)  
935m (Irabujima side)
- Typical span : 39.9m+64.0m+29@70.0m+49.0m (Miyakojima side)  
49.0m+12@70.0m+44.0m (Irabujima side)
- Structural type : PC 32-span continuous box girder bridge (Miyakojima side)  
PC 14-span continuous box girder bridge (Irabujima side)



Cross-section of main girder



Fabrication of segment at factory



Transportation of main girder along bridge deck



Main girder erection



Completed bridge