【様式４】

“Technical Research and Development for Road Policy Quality Improvement”
Study Summary

No.	Title	Principal Researcher
No.30-7	“Research development on quality and durability attainment system for concrete structures in various regions utilizing curing techniques and admixtures”	Yokohama National Univ. Prof. Akira HOSODA

It is aimed that quality and durability attainment system for concrete structures is established considering various kinds of environment and severe condition of limited material resource. Curing techniques and admixtures will be fully utilized.

1. Backgrounds and Objects

This research is aiming at extending and improving the quality and durability attainment system for concrete structures which had been already established by the principal researchers, et al. before this research project is applied. The system will be extended in many regions in Japan and will be improved considering various environmental actions and severe condition of limited material resources.

In this research, curing techniques and admixtures will be utilized to achieve quality and durability attainment of concrete structures. Cracking mitigation system for durable RC slab in Tohoku region will be deeply investigated and the research results will be implemented into the guideline of Tohoku bureau of MLIT.

Trial construction in whole regions in Japan of quality attainment by MLIT will be supported by this research project, and the lecture materials for the support are provided in a website.

2. Activities in Research Period

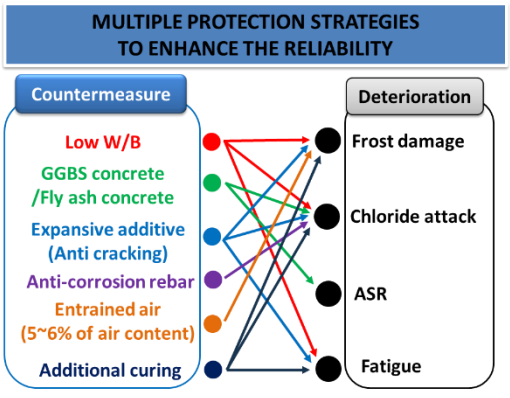
(1) Establishing crack control system for durable RC slab subjected to de-icing agent
(2) Experimental investigation for the effects of curing method on scaling resistance of RC slab
(3) Establishing system for surface water absorption test to evaluate the effect of curing on quality of concrete
(4) Analysis of inspection data of NATM tunnel concrete in Tohoku area
(5) Analysis of construction record database of Yamaguchi prefecture utilizing machine learning
(6) Verification of the effects of “construction condition check sheet” and “visual evaluation method” in trial construction in Hokkaido
(7) Picking up the tasks for extending the proposed quality and durability attainment system to whole Japan

3. Study Results

Some of the main results obtained in this research are explained.

The guideline for durability attainment of RC slabs in Tohoku bureau of MLIT was published in 2019 June, and the research results of this study for crack mitigation were implemented. Crack mitigation method was improved in this research and implemented into the revised guideline published in 2021 June.

The researchers in this project have been engaged in consulting the trial constructions of quality attainment in all



the areas in Japan since 2020, and the lecture materials have been developed and collected in the web site. http://hinshitsukakuhoch.web.fc2.com/

4. Papers for Presentation

・Rasul Mehboob, **Akira Hosoda**, Koichi Maekawa, "Prediction of maximum thermal crack width of RC abutments utilizing actual construction data and study on influential parameters using neural networks", CONSTRUCTION AND BUILDING MATERIALS 260 2020, November

・Arifa Iffat Zerin , **Akira Hosoda** , Satoshi Komatsu and Hironori Ishii, "Full Scale Thermal Stress Simulation of Multiple Span Steel Box Girder Bridge Evaluating Early Age Transverse Cracking Risk of Durable RC Deck Slab", Journal of Advanced Concrete Technology (JCI), Vol.18, pp.420-436, 2020, July

5. Study Development and Future Issues

The guideline of Tohoku bureau in which the results of this research were implemented will be utilized not only in Tohoku but also in other regions in Japan.

During the three years of this research project, several new guidelines have been published utilizing "construction condition check sheet" and "visual evaluation method" developed by us (Shikoku bureau, Niigata prefecture, Gumma prefecture). This system will be further prevailed and utilized. The researchers in this project have been engaged in consulting the trial constructions of quality attainment in all the areas in Japan since 2020. It is expected that the quality attainment system will be the standard system in the near future.

6. Contribution to Road Policy Quality Improvement

Two representative examples in which the research results were implemented into practice are introduced.
(1) Based on the research results, transverse cracking of RC slab could be prevented in Fudaigawa-Ohashi bridge (4 span steel girder bridge). Details of the joints of RC wall barriers were improved and propagation of cracking from the joints into RC slab could be prevented. These crack mitigation measures whose effects were verified in real structures have been implemented into the guideline of Tohoku bureau.

(2) It was revealed by analyzing the inspection data of Tohoku bureau that quality of NATM tunnel lining concrete were improved according to the quality attainment system proposed by us. Longitudinal cracking at the crown part was remarkably reduced, and spalling of concrete near the construction joints has been remarkably reduced. The results of the analysis of inspection data has been implemented into the guideline of Tohoku bureau.

7. References, Websites, etc.

"Quality and Durability Attainment Channel" http://hinshitsukakuhoch.web.fc2.com/