Study on The Basic Investigation for The Commercialization of Acid Resistant Concrete Made from Sewage Sludge Slag

Whole term	2004.7～2007.3	

(Purpose)

As a measure to promote an effective use of sewage sludge slag, there has been the development of "acid resistant concrete" made from the fine powder of sewage sludge slag and alkali material (water glass) as main raw materials. To evaluate the performance of this new concrete, its field test has been conducted during the period from 2000 to 2003 under the research title of "The collaborative study on the performance of acid resistant concrete and mortar" (hereinafter referred to as "Former collaborative study". As a result, compared with the conventional concrete, it was confirmed that this new concrete had much better durability in the harsh environment of acid and high-temperature soil. At the same time, however, it was found that the corrosion in the ground-level boundary was inevitable for this concrete. In this study, aiming at a further expansion of the concrete's versatility, we will carry out the basic study necessary for the commercialization of this concrete while solving two problems shown below.

（1） Considering its application to RC structure, the rust resistance of reinforcing bar in the acid resistant concrete will be studied to collect the related information.

（2） The application method of anticorrosive coating will be clarified.

(Result)

The period of the collaborative study is three years from 2004 to 2006. Like in the former collaborative study, the exposure test using the combined test specimens of acid resistant concrete, polyethylene resin sheet and reinforcing bars is progressing in the acid and high-temperature soil of Obama town of Nagasaki Prefecture.

☆Outline of the exposure test

Test 1： Observation of the deterioration progressing state of test specimens" when anticorrosive covering (resin sheet) is applied or not applied

⇒Through the exposure test of test specimens in which the protective covering region of their ground-level boundary section is divided into more than one section, the appropriate treatment region will be clarified.

Test 2： Confirmation test for the rust generation to reinforcing bars when covering thickness is changed.

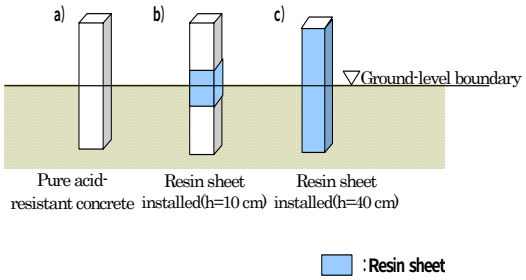
⇒This is conducted to confirm the anticorrosive performance of reinforcing bars considering the future application of the concrete to RC structure.

Test 3： Confirmation test for the influence blocking performance of resin sheet" using test specimens whose six surfaces are covered with the resin sheet

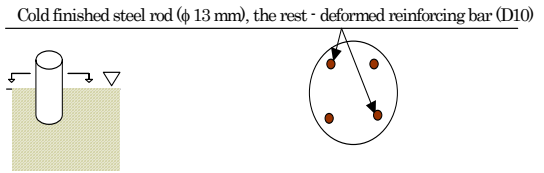
⇒As the basic test for applied resin sheet, its influence blocking performance needs to be examined.

☆Overview of the test specimens

Conceptual diagram of test specimen for Test 1 (Size: 100x100x400 mm)



Conceptual diagram of test specimen for Test 2 (Size: ϕ 100x200 mm)



*Two types of concrete: acid-resistant concrete and conventional concrete
*Reinforcing bar covering thickness: 2 sizes - 10 and 20 mm
*As to the quality of reinforcing bar, the same test specimen contains cold finished steel rod and deformed reinforcing bar.
* Three exposure periods: 6, 12 and 24 months
=>For each of the above-mentioned conditions, three test specimens were prepared (a total of 36 test specimens)

(Summary)

Examining the intermediate test result at an exposure period of 6 months in the year 2004, we will conduct the exposure tests shown below in order to "evaluate the durability and deterioration" of the new concrete as well as examine the "product cost and application areas" as the basic study for its commercialization.

Test 1： By continuing the above-mentioned exposure test for a total period of three years, the appropriate coating treatment region will be clarified.

Test 2： By reviewing the testing method (see the test specimen on the right of the above figure), the anticorrosive performance of reinforcing bar will be evaluated through a two-year exposure test.

Test 3： By removing the test specimen after it was exposed for one year, the influence blocking performance of the resin sheet will be examined.

Collaborative research organizations：Japan Iinstitute of Wastewater Engineering Technology
Teihyu Corporation

Persons involved in the research：Ryuichi Takahashi, Takashi Kirihara, Nobuo Tsuda and Seijiro Matsumoto

key words	effective utilization of sewage sludge; acid resistant concrete; deterioration suppressing measure for concrete