Study on resin concrete conveyance facilities under sewer conditions

Whole term	2007.6～2012.3	

(Purpose)

Sulfuric acid corrosions of sewer conveyance facilities owing to H_2S gas generation have recently attracted attention. We are not able to constantly monitor most of facilities. Because most of facilities lay underground. Therefore, it is difficult to find corroded facilities at an early date. Once the facilities are corroded and lose its faculty, rehabilitation requires long terms, a large amount of money, and above all, system shutdown in many cases.

From the view point of this background, conveyance facilities which are predicted to be corroded should be made of acid-resistant materials alternative to Hume pipes. Resin concrete has acid resistance and high strength, using the features applied to sewer pipes and manholes. A composition is shown in Table 1. On the other hand, lack of clear applicable criteria results in improper application and handling. The purpose of the study is compiling a technical information material which provides applicable criteria.

(Study content)

The content of this study is shown below.

(1) Long term acid-resistant test

The purpose of this test is to draw an prediction relation for 50 years. For that purpose, we observe degraded behavior for four years. The test includes three tests, the first is a laboratory test, the second is a hot spring test, and the third is an exposure test in sewerage facilities.

The laboratory test is strength assessment in 5% sulfuric acid solution at variable temperature. The hot spring test is strength assessment in hot spring water for confirming past study results and the latest prediction relation. The exposure test is executed in actual corrosive environment for confirming the latest prediction relation and picking out considerations.

Table 1 Composition of Resin Concrete

Materials		Mass percentage
Unsaturated polyester resin		11.0 %
Coarse aggregate	Crushed rock 2.5-5 mm	25.5 %
Fine aggregate	Silica sand 0.8-1.2 mm	25.5 %
	Silica sand 0.2-0.5 mm	23.8 %
Filling materials	Fly ash	14.2 %

(2) Clarifying applicable criteria and compiling considerations at construction phase

We will survey past record of installations and clarify advantages with three inspection shown bellow.

1) Current situation survey (Questionnaire survey)
2) Survey on existing facilities
3) Compiling considerations in designing and construction phase

(3) Inspection on economic efficiency

General price of resin concrete pipes is higher than Hume pipes. However, high-strength and low roughness coefficient of resin concrete pipes could make construction cost lower. The economic efficiency will be clarified with the result of survey on existing facilities and estimation standard.

(Schedule)

The long term test is scheduled at three sewerage facilities and hot spring for four years.

Questionnaires for adopted local government are scheduled

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