

Corrosion control measures for sewerage structure

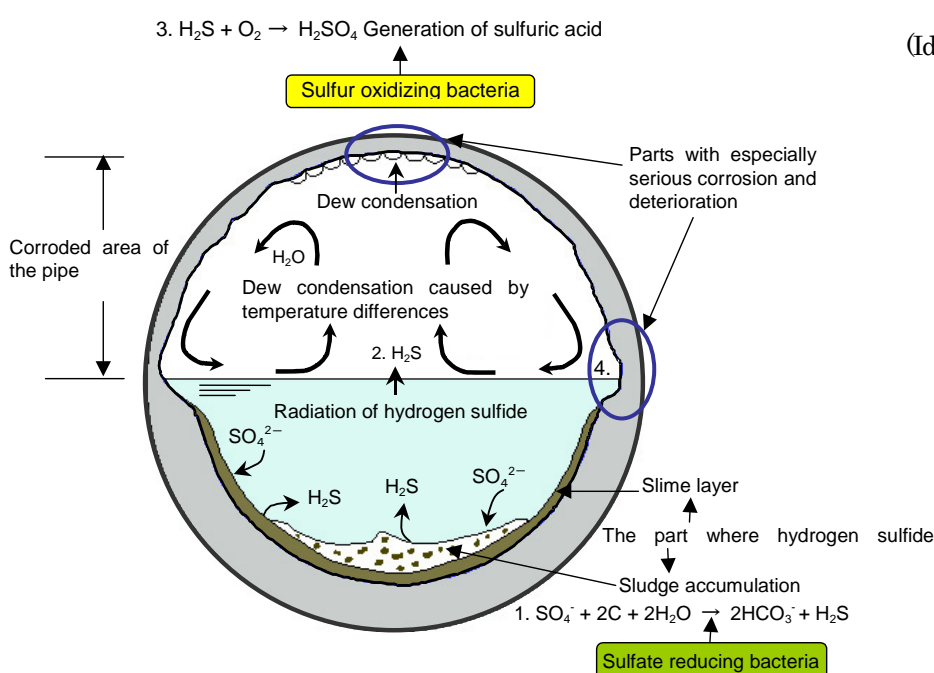
— Technologies for corrosion prevention and protection —

Japan Sewage Works Agency (JS) published a technology evaluation report on corrosion control measures for sewerage structure in March 2001, after the thorough discussion by Technology Evaluation Committee.

Concrete corrosion and deterioration of sewerage system facilities

Mechanism of concrete corrosion in sewerage system facilities

- 1) Production of hydrogen sulfide (H_2S) from sulfate (SO_4^{2-}) by sulfate reducing bacteria in wastewater and sludge under anaerobic condition.
- 2) Emission of hydrogen sulfide gas from liquid to gas phase.
- 3) Generation of sulfuric acid from hydrogen sulfide when sulfur-oxidizing bacteria are present in aerobic condition in dew condensation of sealed concrete structures.
- 4) Deterioration of concrete as a result of the reaction of sulfuric acid against concrete components.



Concrete corrosion is taking place here
(Identification of corroding conditions and parts)



A test result has shown that where average concentration of hydrogen sulfide is 100 ppm, the corrosion and deterioration of concrete will progress by 6 - 8 mm per year.

Measures against concrete corrosion

For measures against concrete corrosion, there are technologies as listed below:

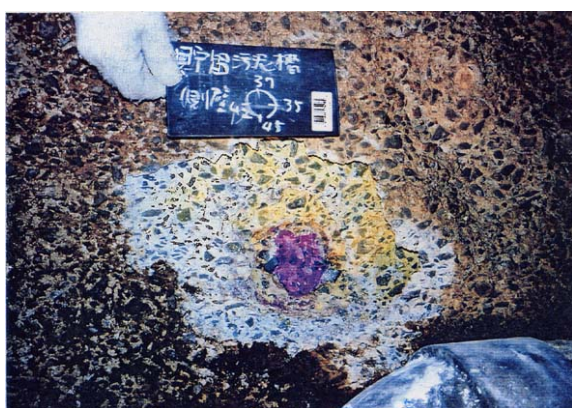
Classification of measures	Strategies	Practical methods
Corrosion prevention	<ul style="list-style-type: none"> - Inhibiting sulfide formation. - Inhibiting hydrogen sulfide production. - Inhibiting sulfide acid production. 	<ul style="list-style-type: none"> - Prevention of anaerobiosis by injecting air, etc. - Construction of appropriate structure to prevent disturbances in flow. - Oxidation and immobilization of sulfide by chemical addition. - Inhibition of bacterial activity by chemicals
Corrosion protection	<ul style="list-style-type: none"> - Perfection concrete from sulfuric acid by lining. - Using materials highly resistant to sulfuric acid. 	<ul style="list-style-type: none"> - Coat-type lining, sheet-lining, buried frames, etc. - Sulfate resisting cement mortar and concrete*

*JS has made joint research with private companies since 2000.

Comprehensive measures are important!

☆It is important to select and combine appropriate technologies to prevent and protect concrete corrosion to be applied to various corroding conditions and facilities.

☆In repairing existing facilities, unlike newly constructed facilities, it is important to diagnose corrosion and deterioration, remove corroded and deteriorated parts (chipping), recover the chipped face, and set up temporary facilities and consider the operating method for existing facilities during the construction period.



Diagnosis (Example)



Repair (Example)