

Demonstration test of a newly developed corrosion-resistant concrete manhole in Vietnam, which was adopted in the WOW TO JAPAN (Wonder Of Wastewater Technology Of JAPAN) project by MLIT.

- Hazama Ando corp.
- Global Works Co.,Ltd
- Tokyo City University

Demonstration period : 2021.11.16~2022.5.31

Follow-up survey : On going

Current status and issues of sewerage in Vietnam.

- Environmental pollution caused by wastewater from factories and domestic wastewater



- Traffic congestion becoming chronic
=> Difficult to secure construction sites



Traffic congestion measures:

Adoption of Japanese sewerage laying technology such as jacking method

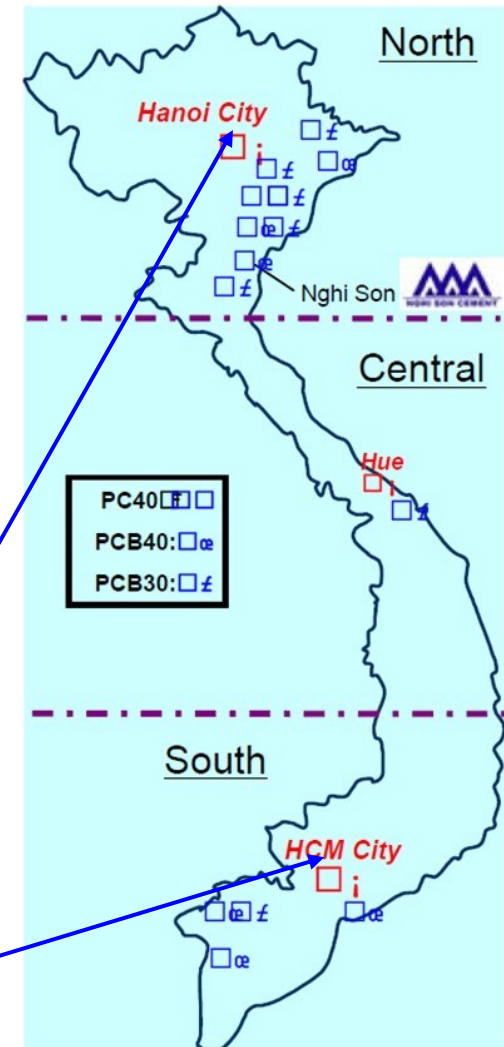


Application of corrosion resistant concrete to manholes in Vietnam

1. Can locally manufactured manholes meet Japanese Standards?
2. Is inhibition by the corrosion resistant concrete effective in Vietnam?

★ Bac Ninh Province: northern Vietnam

★ Dong Nai Province: southern Vietnam

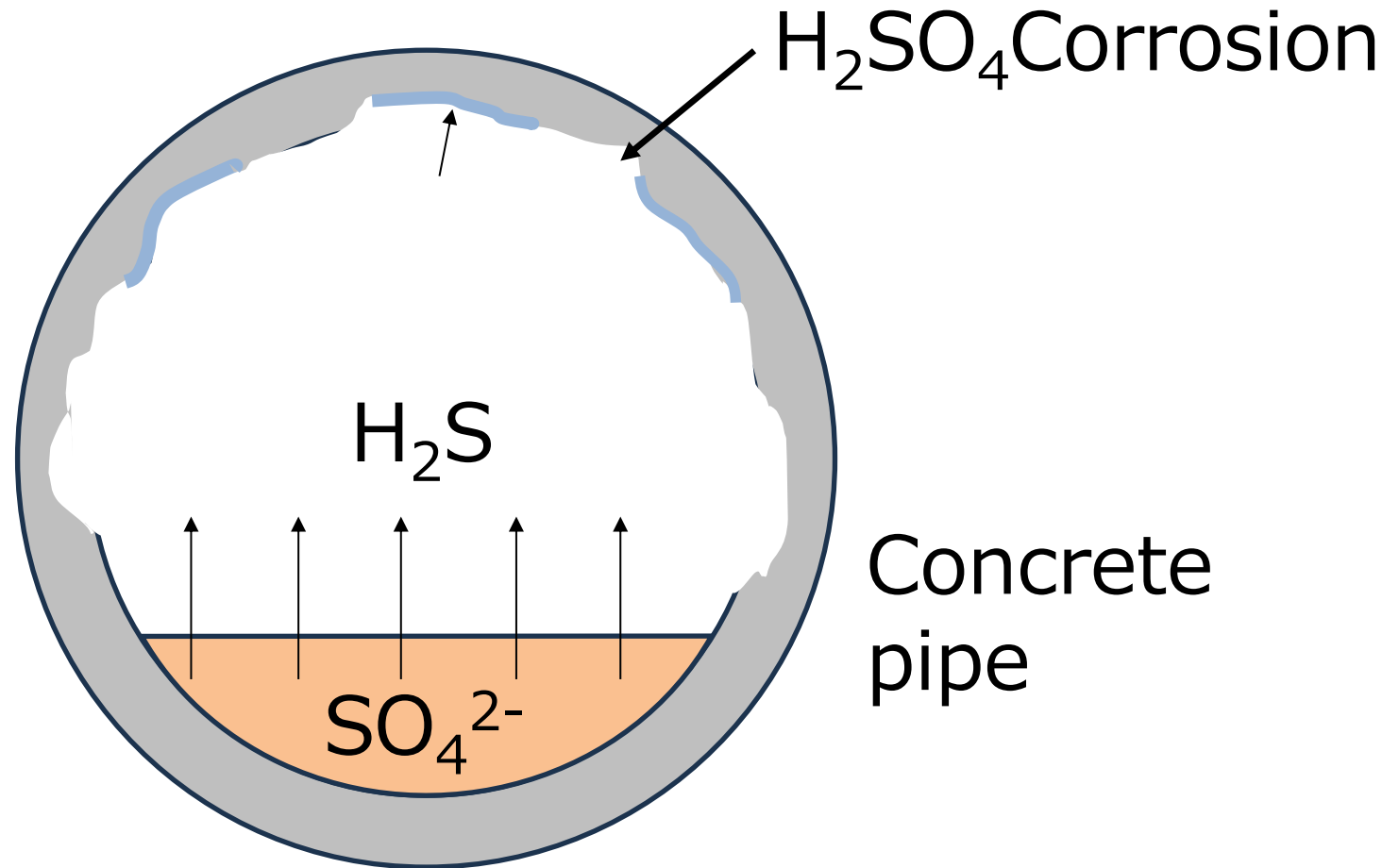


Corrosion of concrete sewage pipe in Vietnam

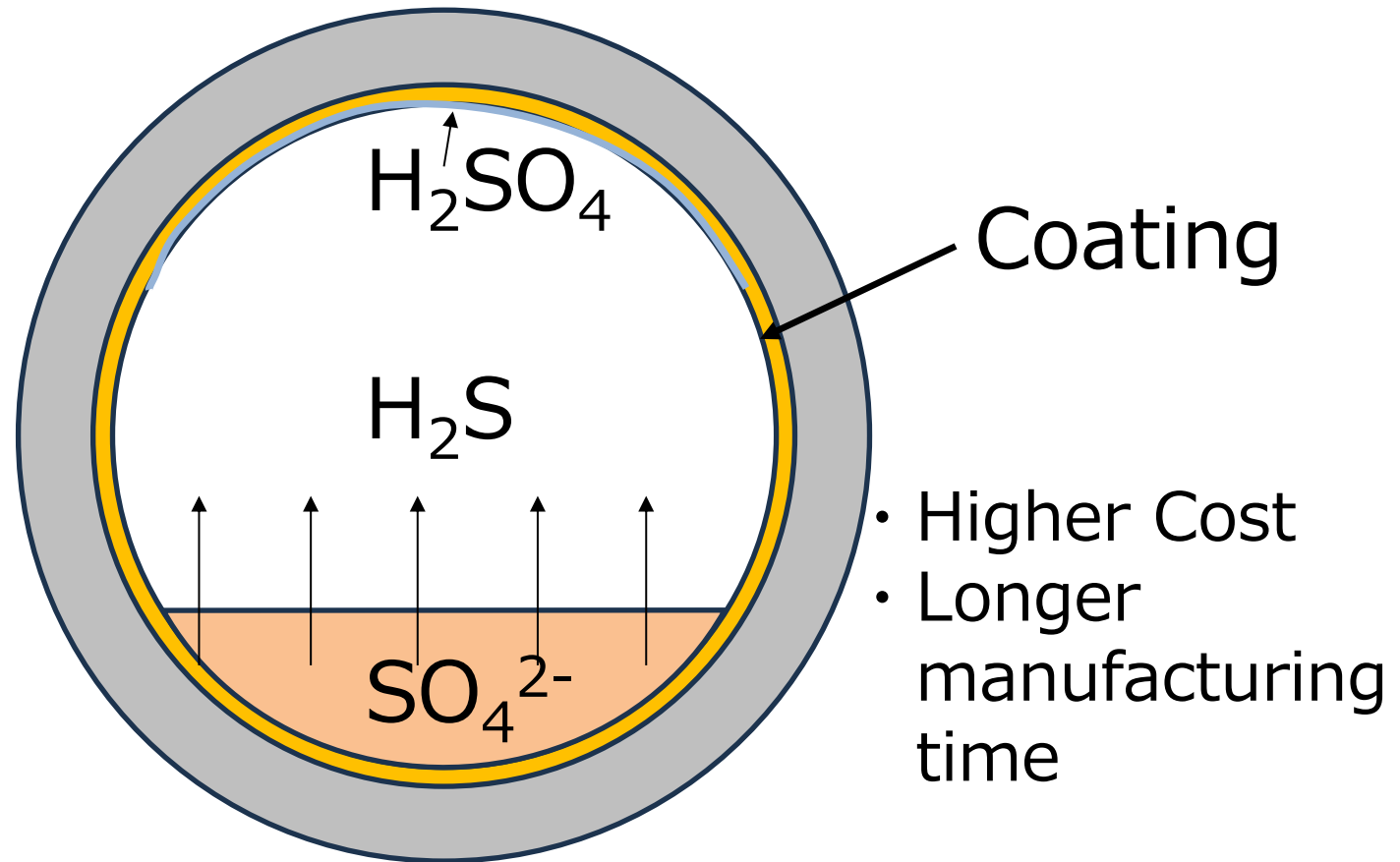


Corroded manholes before replacement

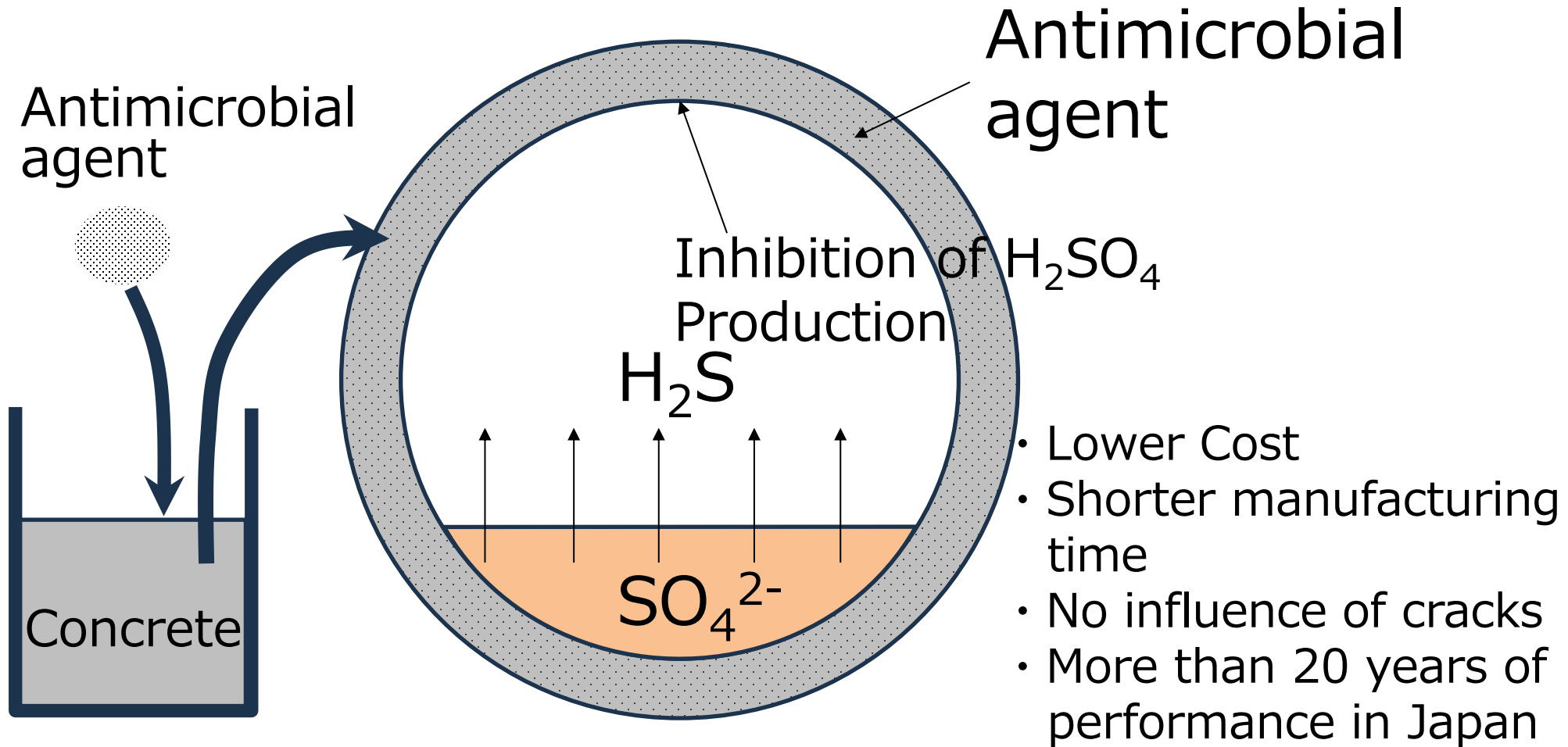
How to prevent H_2SO_4 corrosion of concrete pipe



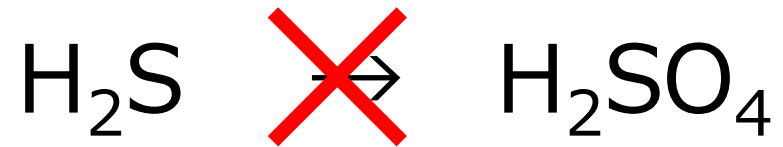
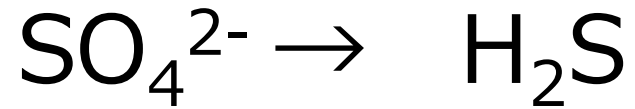
Coating-type lining concrete



Corrosion-resistant concrete pipe



Antimicrobial agent to inhibit H_2SO_4 Production



Agent S: Metal- Metallic oxide

Agent C: Organic acid metallic salt + Metallic Oxide

Strength

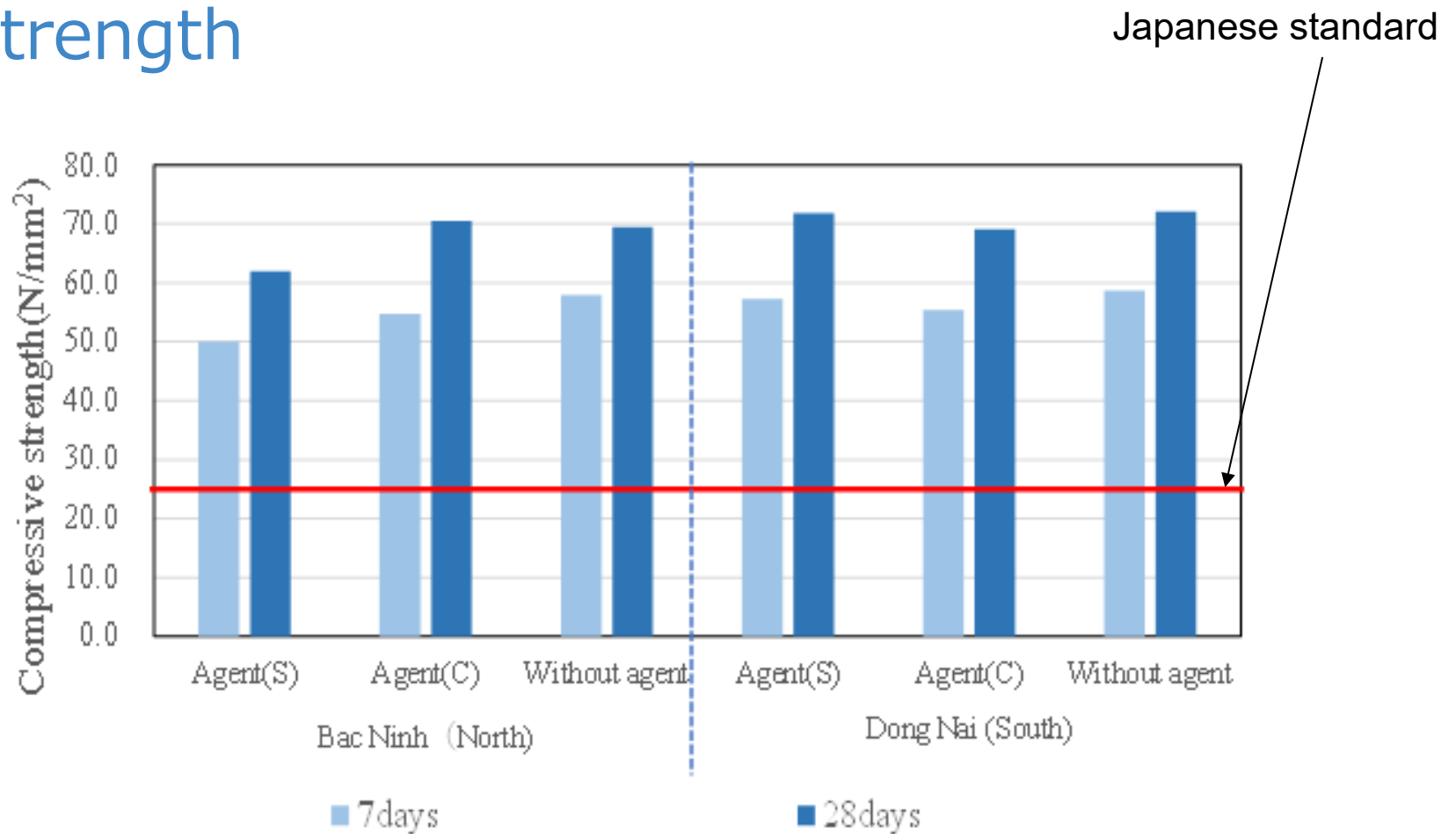


Figure-1 Compressive strength test results

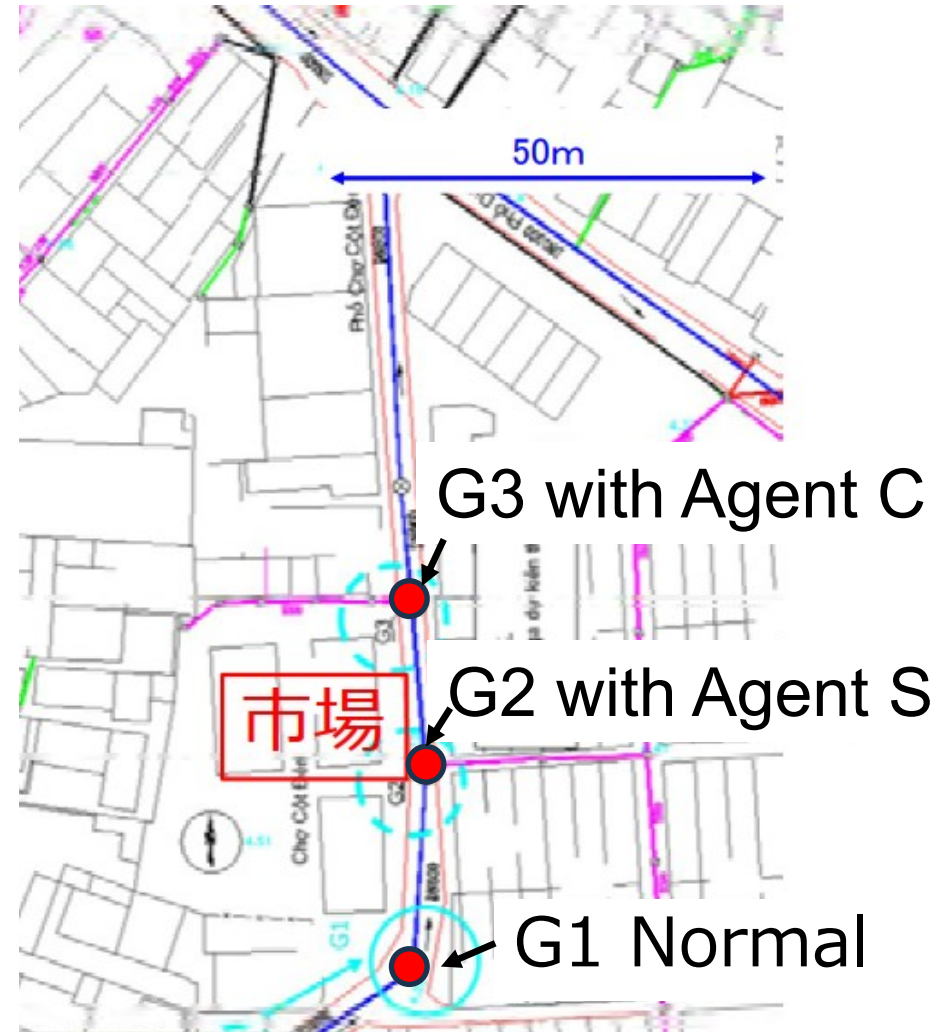
Field Test in Hai Phong -Food Market-



3 manholes were installed inside the market place
on 27-29 Dec 2021



Agent S:
antimicrobial agent distributed in Japan
Agent C:
newly developed antimicrobial agent
considering overseas application.



Test pieces set inside the manholes



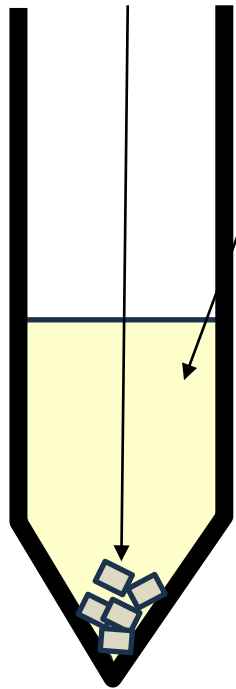
Sampling of microorganisms on test pieces from the test manholes Dec 2022



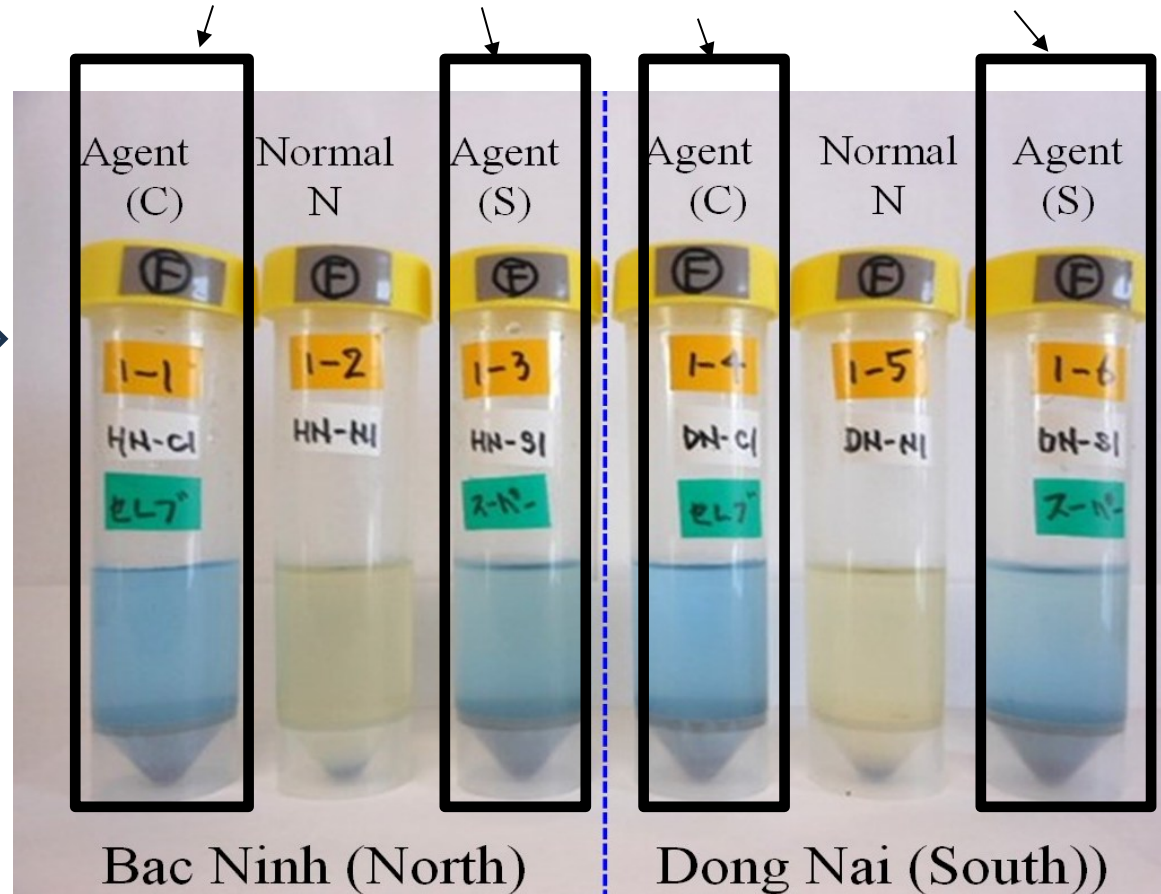
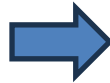
Anti-microbial Performance

Inhibition of bacterial activity + elution of cement

Powder of test Concrete



- Solution (pH 2.5)
 - Sulfur oxidizing bacteria
 - Nutrients
 - pH indicator
- 1hr



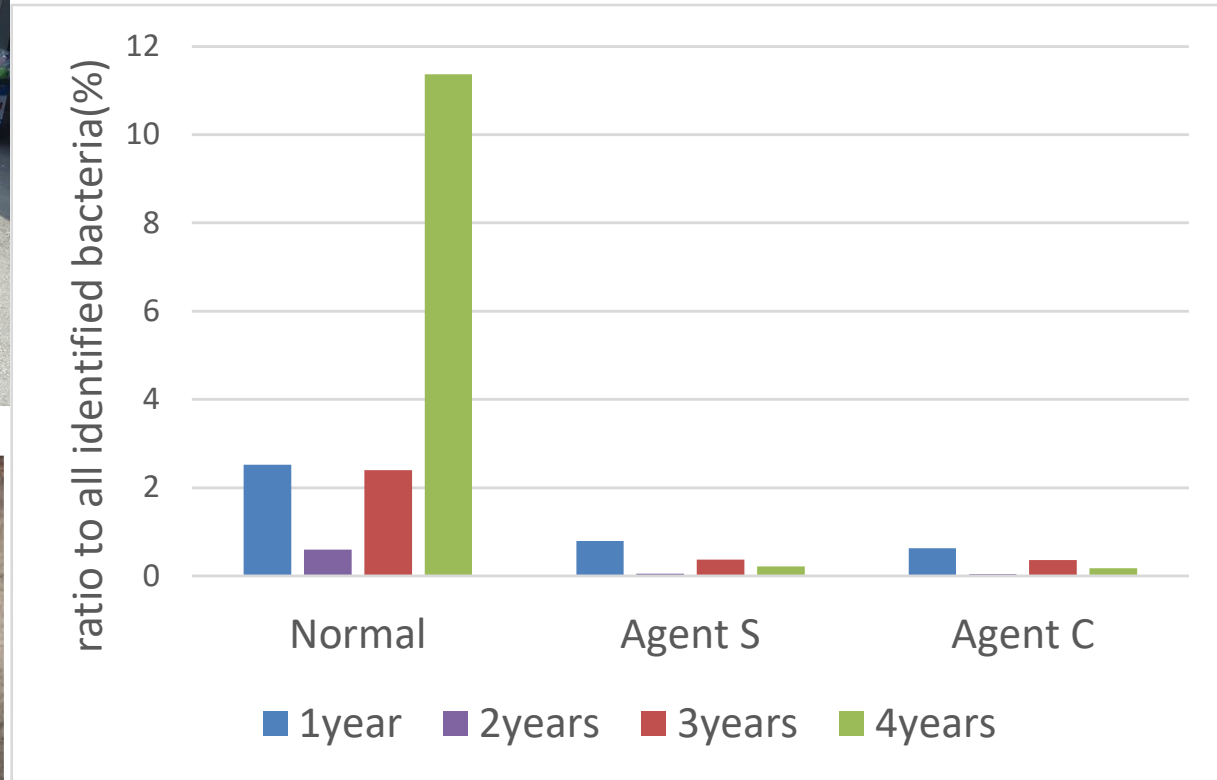
Microbial community on the manhole wall

Microbial community 12 month after the installation ratio to all identified bacteria

existence ratio (%)			Genus	Characteristics
Normal	Agent-S	Agent-C		
1.7289	0.5605	0.4311	<i>Thiobacillus</i>	chemosynthetic autotrophs
0.0035	0.0016	0.0004	<i>Thiovirga</i>	chemosynthetic autotrophs
0.0007	0.0023	0.0024	<i>Thioclava</i>	facultative autotrophic
0.0009	0.0041	0.0006	<i>Thioalkalimicrobium</i>	halophilic, basophilic, chemosynthetic autotrophs
0	0.0016	0.0032	<i>Thioalkalivibrio</i>	halophilic, chemosynthetic autotrophs
0	0.0005	0.0020	<i>Thiomonas</i>	acidophilic, facultative autotrophic
0	0.0002	0	<i>Thiohalophilus</i>	halophilic, chemosynthetic autotrophs
1.73	0.57	0.44	Total	

Microbial community on the manhole wall

Microbial community from 1 to 4 years after the installation



G1:Normal



G2:Agent S

Contact addresses for antibacterial agent

Technical Institute: Technical contact.

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Corporate profiles are available. Please refer this QR code.



Corporate profiles