

Rehabilitation of Concrete Sewer Pipes Using Geopolymer Mortar and Textile Reinforcement

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Civil Infrastructures



INVENTORY OF INFRASTRUCTURES IN REPUBLIC OF KOREA

- Highways: 100,000 km
- Highway Bridges: 30,000
- Rail Bridges: 3,300
- Highway Tunnels: 1,900
- Waterfront Structures: 1,200
- Dams & Reservoirs: 14,200
- Sewer Pipes: 143,000 km

Sewer Pipes and Boxes



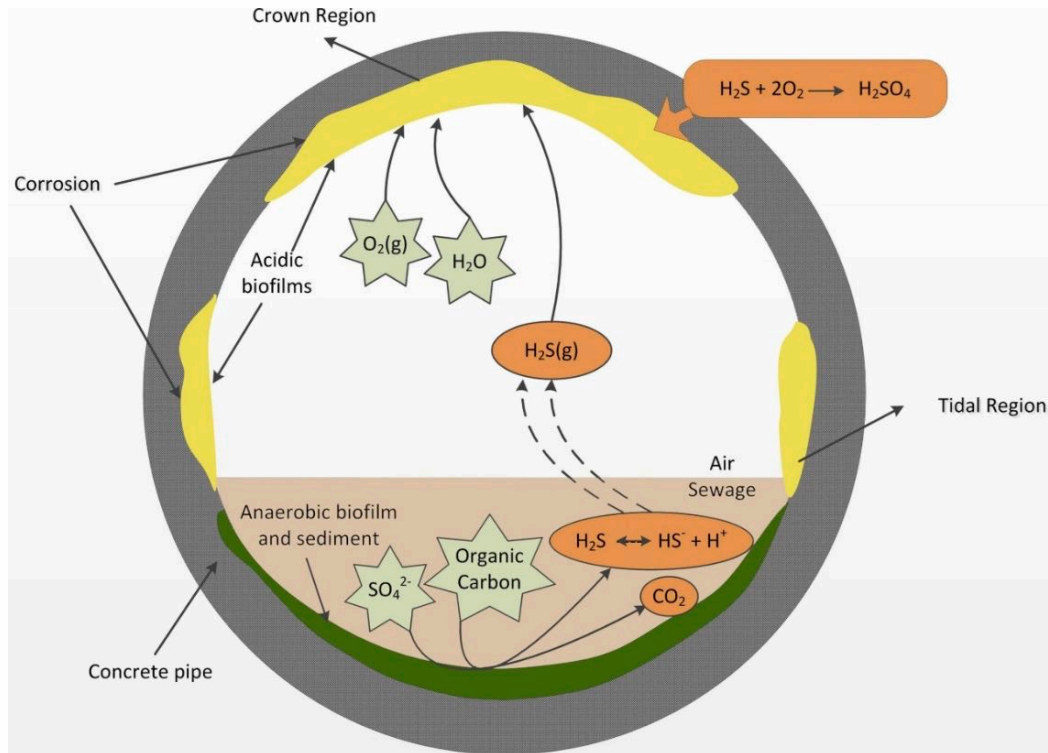
Concrete Sewer Pipes



Concrete Sewer Box

Cement Concrete Sewer Pipes

- Sulfuric acid attack



Source: <https://theconversation.com>

<https://doi.org/10.3389/fmicb.2017.00683>

Application of Geopolymer



Conditioned in 2% H₂SO₄ solution

- Geopolymer concrete pipe



Source: www.rcpa.com.au

Application of Geopolymer

- **Rehab. by geopolymer mortar lining**
 - w/ & w/o short fibers
 - Shotcrete, spray, spin-cast
 - Lining thick. > 38 mm



Source: Milliken Infrastructure Solutions



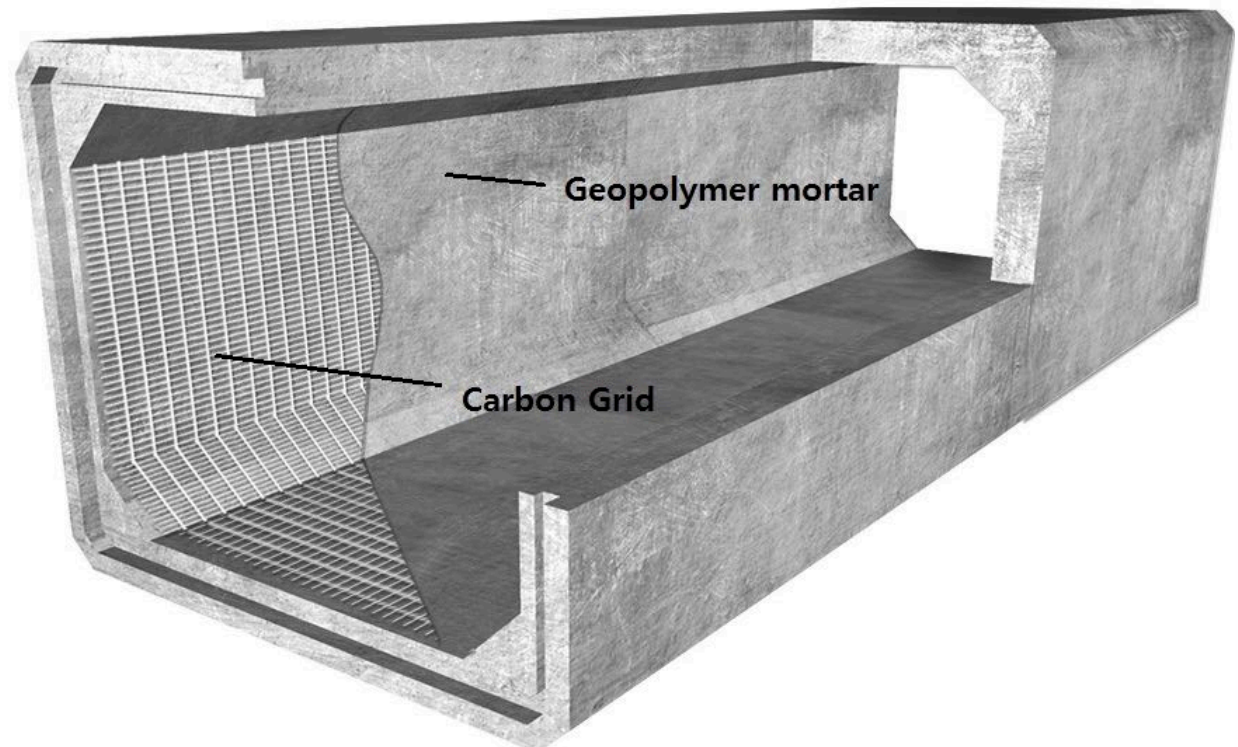
©GeoSpray Mortar

Rehabilitation of sewer pipes & boxes



Carbon Textile Grid

- **Geopolymer mortar + textile lining**
 - For large diameter: shotcrete, spray
 - For small diameter: spin-cast
 - Lining thickness can be reduced.





Eurostars Program



- A joint program between Eureka network and EC, co-funded from the national budgets of Eurostars participating countries
 - Fund: EC (25%) + Each country (75%)
- Participating countries: 36
 - *Austria, Belgium, Bulgaria, Canada, Croatia, Cyprus, Czech, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Israel, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovak, Slovenia, Spain, South Africa, **South Korea**, Sweden, Switzerland, Turkey, UK
- Bottom-up: **No thematic restriction**
 - : Projects must result in a marketable product, process or service.
- Consortium: Min. two countries. **Must include an SME**



KOREA INSTITUTE of CIVIL ENGINEERING
and BUILDING TECHNOLOGY

Thank you for your attention.

감사합니다 Natick
Danke Ευχαριστίες Dalu
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Спасибо Dank Gracias
谢谢 Merci Seé
ありがとう Obrigado