



# H<sub>2</sub>S Corrosion Protection of Wastewater Concrete Assets:

Technical Performance and Environmental Benefits of a Thin Calcium Aluminate Mineral Solution

SIWW - 3.9 Corrosion in Conveyance Systems

April 19<sup>th</sup>, 2022





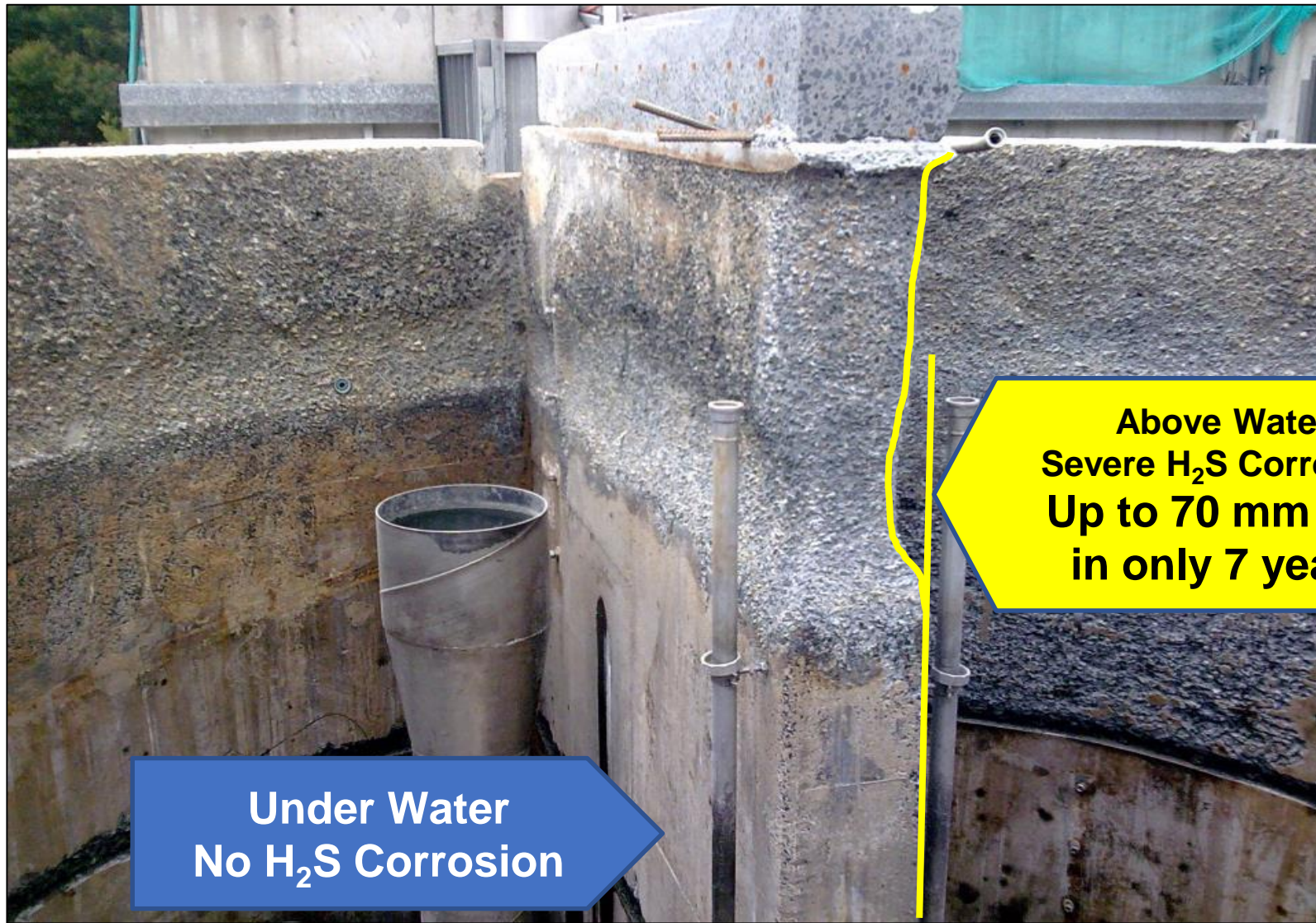
# The Problem

**H<sub>2</sub>S Corrosion is a Severe Problem for WWTP Owners**

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**Above Water  
Severe H<sub>2</sub>S Corrosion  
Up to 70 mm lost  
in only 7 years**

**Under Water  
No H<sub>2</sub>S Corrosion**



# What are the Options Polymer Vs Mineral

# The Options to Protect WW Assets from H<sub>2</sub>S Corrosion

## Polymer Based

- ❑ Epoxy Resin Liners

Other Polymer Options

Polyuera Liner

PVC Plastic Liner

EDPH Plastic Liner

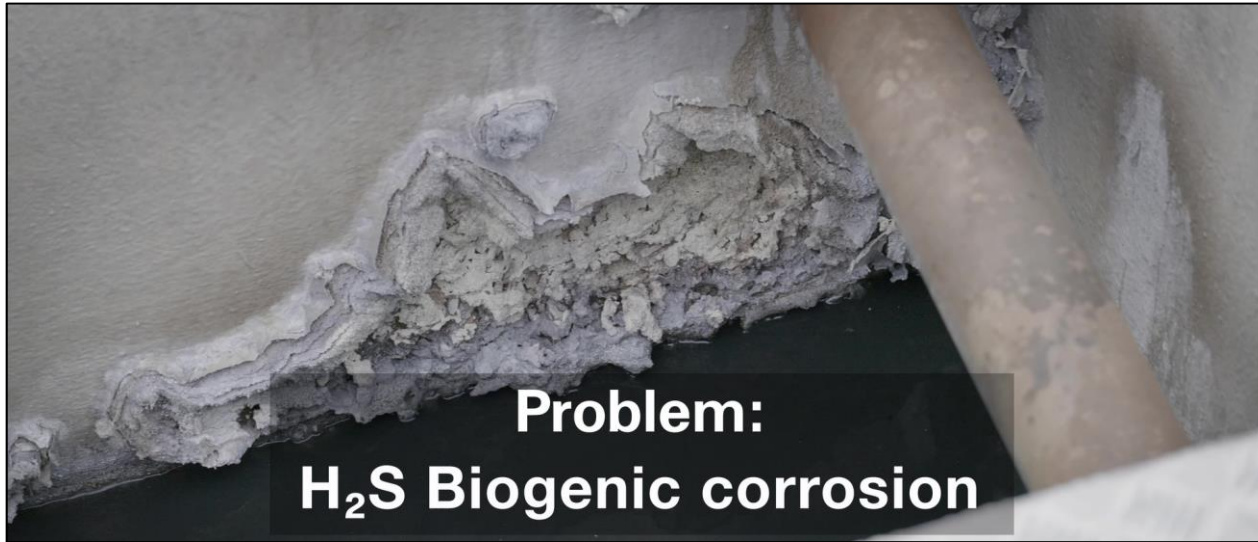
etc...

## Mineral Based

- ❑ Calcium Aluminate Cement Based Liner

Nota: Ordinary Portland Cement (OPC) based mortar is not resisting to H<sub>2</sub>S Biogenic Corrosion

# Epoxy Resins often result in premature failure



Everywhere, around the world,  
the same issues





# The Calcium Aluminate Solution

## 30 Years of Field Track Record



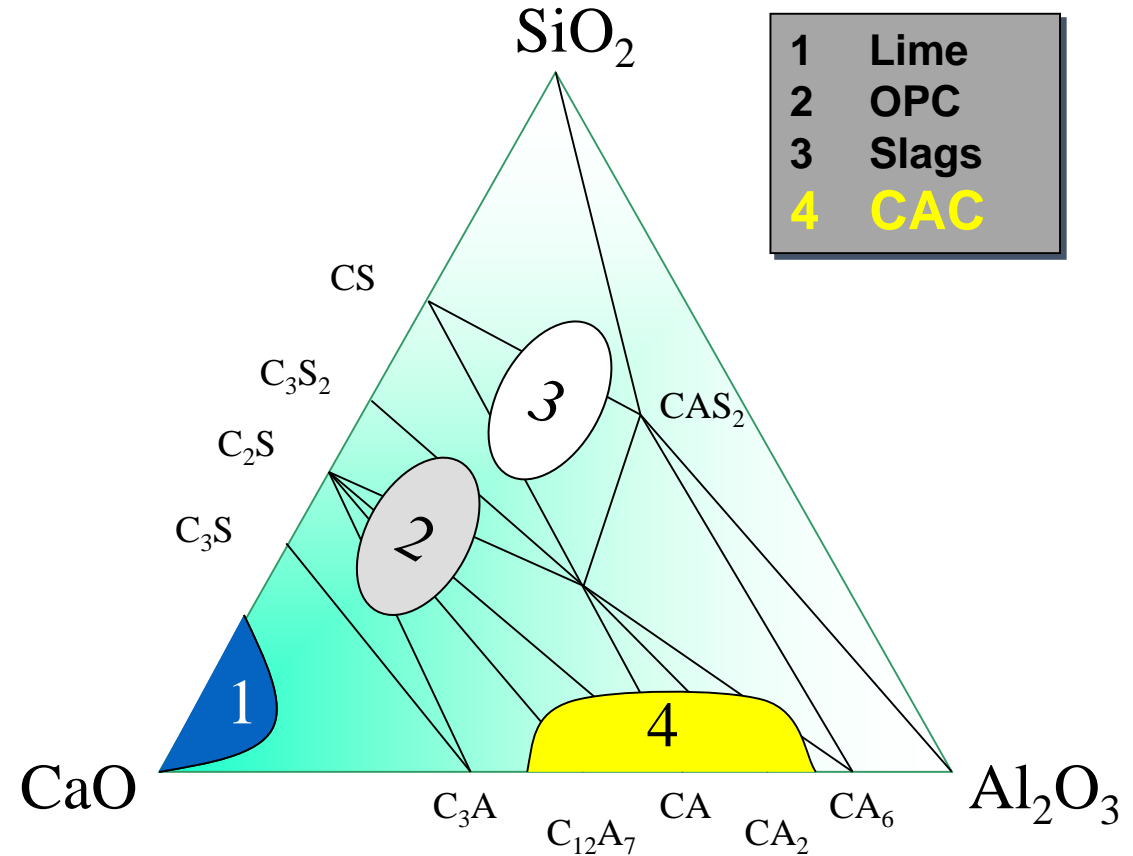
# Calcium Aluminate Cement: The Mineral Solution

## A mineralogy different than OPC

- Main phase: CA

## Some specific properties

- *Refractoriness (fx of  $Al_2O_3$ )*
- *Ions trapping*
- *Reactant for shrinkage compensated mortars*
- **Rapid hardening**
- **Corrosion resistance**



# CAC are Very Resistant to H<sub>2</sub>S Biogenic Corrosion

Specimen after **6½ years** of severe H<sub>2</sub>S exposure  
Two cements, but very different performance

Portland Cement Mortar



**SewperCoat®**  
100% Calcium Aluminate Mortar



# Proven Performance for Rehab of wastewater assets for 30 Years

1991: HRSD Manhole  
Virginia, USA

1st SewperCoat® application in North America, still in service today



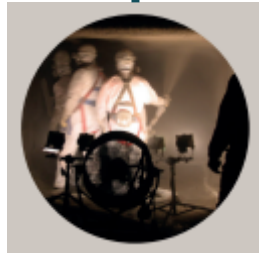
2014: Large Connection Chamber  
Montreal, Canada

Rehabilitation completed within a single 25 hour application



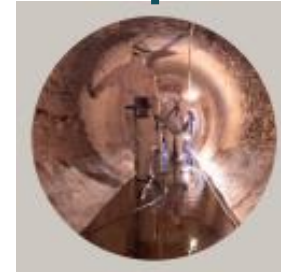
2017: Blue Plains STP Grit Chambers  
Washington DC, USA

World's largest advanced STP selected SewperCoat® as "sole source" for 5 000 m<sup>2</sup> of repairs after 3 years of durability testing



2007: SWOOS Interceptor  
Sydney, Australia

SewperCoat® was selected by Sydney Water after 5 years of durability testing



2016: SIAAP General Interceptor  
Paris, France

Over 23,000 m<sup>2</sup> of SewperCoat® stretching over 4.2 km rehabilitated in 4 months



2021: University Park Sewer Rehab  
Florida, USA  
SewperCoat® was selected by University Park Owners after a thorough market benchmarking

Time





Let's Talk About Innovation !  
What comes from 5 years of R&D...

Building Upon 30 Years of Proven Performance of SewperCoat®



**SEWPER® LINER**

# The Aluminate Technology by Imerys

## SEWPER<sup>®</sup> LINER

- ❑ A radically innovative solution to protect **NEW** Wastewater Concrete Assets
- ❑ Designed for mineral protection of **LARGE – FLAT – DRY** concrete walls...
- ❑ ...and **Precast** Sewer Elements



Choose the Mineral way offering greater durability



A jobsite realized with



# Easy-to-Spray, with the H<sub>2</sub>S resistance of Aluminates



A jobsite realized with



# A Proven Durability



- ❑ 5 mm SEWPER® Liner
- ❑ Provides 20 to 30 years of protection
- ❑ in severe H<sub>2</sub>S corrosion conditions

- ❑ Accelerated H<sub>2</sub>S Corrosion Procedure at Fraunhofer UMSICHT, Germany
- ❑ Benchmarked Vs other technologies





# Advantages Offered by our Mineral Solution over Epoxy

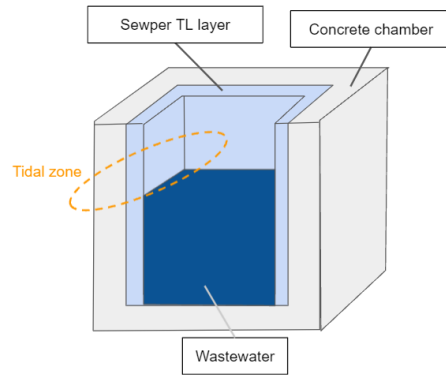
1. Proven Durability
2. Sustainability

As Shown by a Life Cycle Assessment comparing

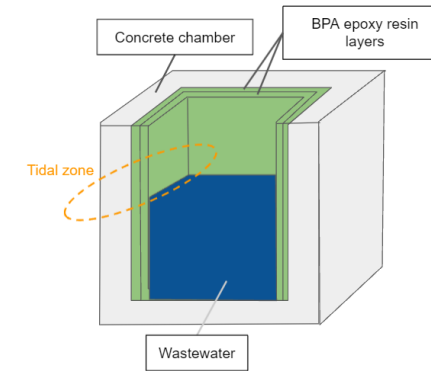
**Calcium Aluminate Solution Vs High-End Epoxy Resin**

# Developing the Full Comparative LCA Study - Scenarios

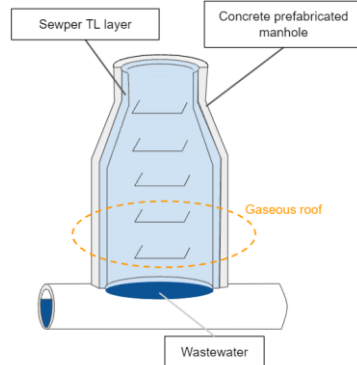
## Scenario 1: SEWPER® Liner on WWTP chamber



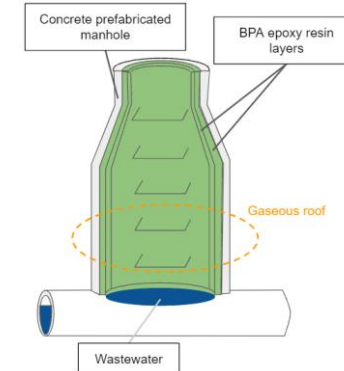
## Scenario 3: Epoxy resin on WWTP chamber



## Scenario 2: SEWPER® Liner on precast manhole



## Scenario 4: Epoxy resin on precast manhole



# Full Comparative Life Cycle Analysis - First results

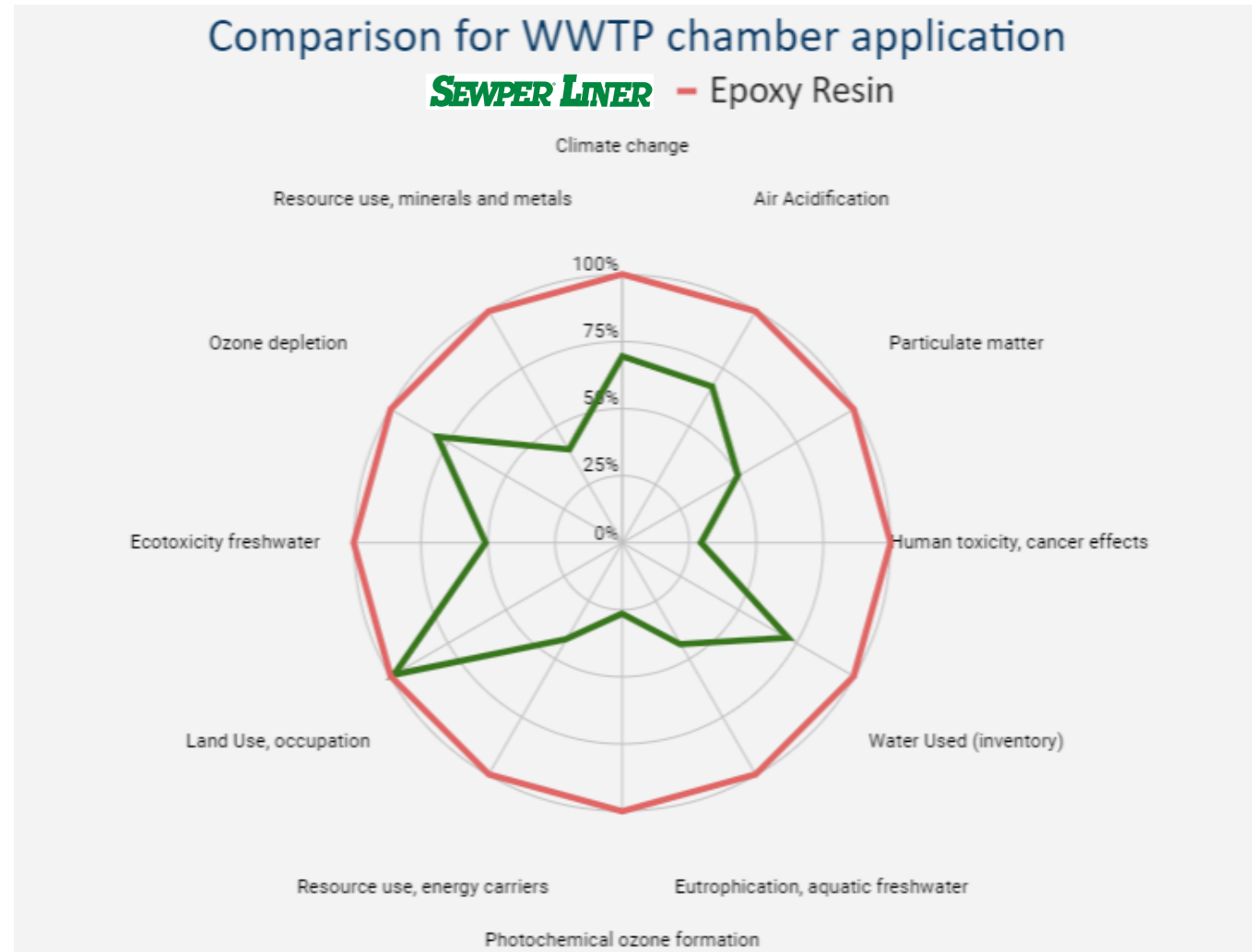
## REFERENCE DOCUMENTS

ISO 14040:2006 standard: Environmental management – Life cycle assessment – Principles and framework

ISO 14044:2006 standard: Environmental management – Life cycle assessment – Requirements and guideline

As per Standard, the study is being validated by an external panel (June 2022)

Environmental impacts are much lower for SEWPER® Liner Vs epoxy resin





# Conclusion



# Conclusion

- ❑ For durable H<sub>2</sub>S corrosion protection, we recommend WWTP Owners to protect “concrete with concrete” !
- ❑ **SEWPER<sup>®</sup> LINER** by Imerys provides
  - ❑ Decades of Service Life
  - ❑ Ease of application
  - ❑ No VOC / No toxicity
  - ❑ Improved environmental footprint Vs epoxies

Come to see us at  
Booth B2-P15

**Come to see us  
at Booth B2-P15**

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