

CRC-P: Smart Linings for Pipe and Infrastructure Project

Introduction

The Smart Linings for Pipe and Infrastructure Project researched the effectiveness of pipeline liners focusing on four product categories: cured-in-place pipe liners and polymeric spray liners for water mains, and calcium aluminate cement mortars and alkali activated binders (including geopolymer cement mortars) for wastewater assets.

The three and a half year, \$20m project consisted of 35 project partners plus the Cooperative Research Centre (CRC). The CRC Program supports industry-led collaborations between industry, researchers and the community.

WSAA led the overall project with a governance committee made up of representatives from water agencies and water research organisations. Industry representatives, including product manufacturers, suppliers, and installers, were involved and provided expertise and input into the key deliverables.

Key Deliverables

- Australian-based field trials of products.
- Product materials testing and research at Australian Universities.
- Codes of practice for liners.
- Water industry standards for liners.
- Sensors to measure key quality parameters.
- Decision tools to prioritise assets for rehabilitation, select liners and predict the life of installed liners.

Codes of Practice

The [WSA 202](#) Manual for selection and application of cured-in-place pipe (CIPP) and spray liners for use in water pipe contains information and requirements on the design and selection of liners, installation practices, and testing requirements.

Notable inclusions:

- Liner classes as per ISO standards for consistency.
- Data requirements for use of the Monash Pipe

Evaluation Platform.

- Defect tolerances and newly developed non-destructive measurement techniques.

The [WSA 201](#) Manual for selection and application of protective coatings was updated with the outcomes of this project, leading to updates of CAC requirements and the addition of geopolymers to the manual. The manual contains information and requirements on selection of liners, installation practices and testing requirements.

Notable inclusions:

- The introduction of [corrosion classifications](#).
- Expanded guidance on defects.
- New surface preparation requirements.
- New method to determine required coating thickness.
- Defect tolerances and newly developed non-destructive measurement techniques.
- New acceptance testing requirements.

Water Industry Standards

A water industry standard was developed for each of the product types. The standards detail the requirements for products to undergo a WSAA product appraisal and can also be used to specify liner requirements in contract documents. The standards are targeted at utilities, product manufacturers and suppliers.

Notable requirements:

- Water liners require creep rupture testing.
- Wastewater liners are required to meet composition requirements.
- Decision tools use some test results from the standards to determine liner suitability and expected life.

Sensors

Four sensors were prototyped, lab tested and field tested as part of the project:

- [CIPP and spray liner defect measurement](#).
- [Spray liner thickness measurement](#).

- [CAC and geopolymer thickness measurement.](#)
- [Acid permeation measurement.](#)

These sensors are non-destructive (except for the acid permeation sensor) which has been indicated as a preferred technique by the project's water industry representatives. All are included as options for quality measurement in the codes of practice.

Water Liner Decision Tools

The [Monash Pipe Evaluation Platform](#) and is available online. It includes models for pipe prioritisation, pipe failure analysis, liner selection, and lined pipe analysis. Training materials are included under the resources

menu. A [fact sheet](#) with additional details is also available.

Wastewater Liner Decision Tools

The Sewer Rehabilitation & Prioritisation Decision Platform combines a model to select pipes and maintenance structures suitable for lining and a model to determine the coating thickness required to achieve a design life. It also includes predicted strength loss. The excel-based tool is available via [email request](#) for project participants. A [fact sheet](#) with details about the tool is available online.

Project Partners

WSAA would like to sincerely thank the project partners:

Abergeldie Watertech

BASF Australia

Bisley & Company

Calucem GmbH

Central Highlands Water

City West Water Corporation

Coliban Region Water Corporation

Downer Group

GeoTree Solutions

Hunter Water Corporation

Hychem International

Icon Water

Insituform Pacific

Interflow

Melbourne Water Corporation

Metropolitan Restorations

Monash University

Nu Flow Technologies

Parchem Construction Supplies

Sanexen Environmental Services

SA Water Corporation

South East Water Corporation

Sydney Water Corporation

The Australasian Society for Trenchless
Technology (ASTT)

The Water Research Foundation

UK Water Industry Research Ltd (UKWIR)

Unitywater

University of Sydney

University of Technology Sydney

Urban Utilities

Ventia

Water Corporation

Wilsons Pipe Solutions

Yarra Valley Water

Additional Information

For additional information please refer to the [project website](#).

