

Innovative and Sustainable Way to Overcome Aging Social Infrastructure of Underground Pipelines

Sekisui SPR Trenchless Pipe Rehabilitation

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Name	SEKISUI CHEMICAL CO., LTD.
Establishment	March 3, 1947
Paid-up Capital	100,000 million JPY
President	Keita Kato
Number of Employees	26,400 (for the term ending March 2022; on a consolidated basis)
Net Sales	1,150,000 Million JPY (for the term ending March 2022; on a consolidated basis)
Ordinary Income	97,000 Million JPY (for the term ending March 2022; on a consolidated basis)
Corporate Headquarters	Osaka Head Office 2-4-4 Nishitenma, Kita-ku, Osaka 530-8565 Japan Tokyo Head Office 2-10-4 Toranomom, Minato-ku, Tokyo 105-8450 Japan
URL	http://www.sekisuichemical.com










Osaka Head Office



Tokyo Head Office

Sekisui managed these domains by 3 companies

Housing and Environmental Infrastructures		Chemical Solutions		
Housing 	Water Infrastructure 	Plant Pipes 	Automotive Materials 	
Refurbishing 	Pipe restoration 	Performance Materials 	IT Related Materials 	Medical Products 
Interiors and Exteriors 	Housing Materials 		Functional Materials 	
HOUSING COMPANY		URBAN INFRASTRUCTURE & ENVIRONMENTAL PRODUCTS COMPANY		HIGH PERFORMANCE PLASTICS COMPANY

- The global Sekisui SPR Group combines technology companies and sales support entities around the world.
- A wide range of products and technical services are offered to assist in the rehabilitation of damaged sewer, stormwater and culvert pipelines.



Common Problems of Existing Sewer Pipeline



Aging pipeline



Crown missing due to gas attack



Open joint due to poor installation



Tree root intrusion



Infiltration of soil causes road surface collapse



Major road collapse

- Prevent accidents
- Minimize inconvenience to public
- Increase life span of pipe
- Reduce carbon footprint



Types of Spiral Pipeline Renewal



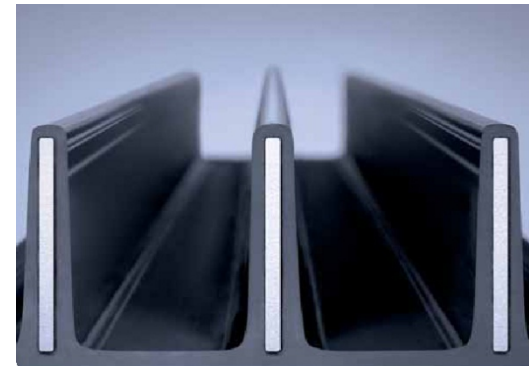
Non-circular



PVC profile



PVC profile with Steel

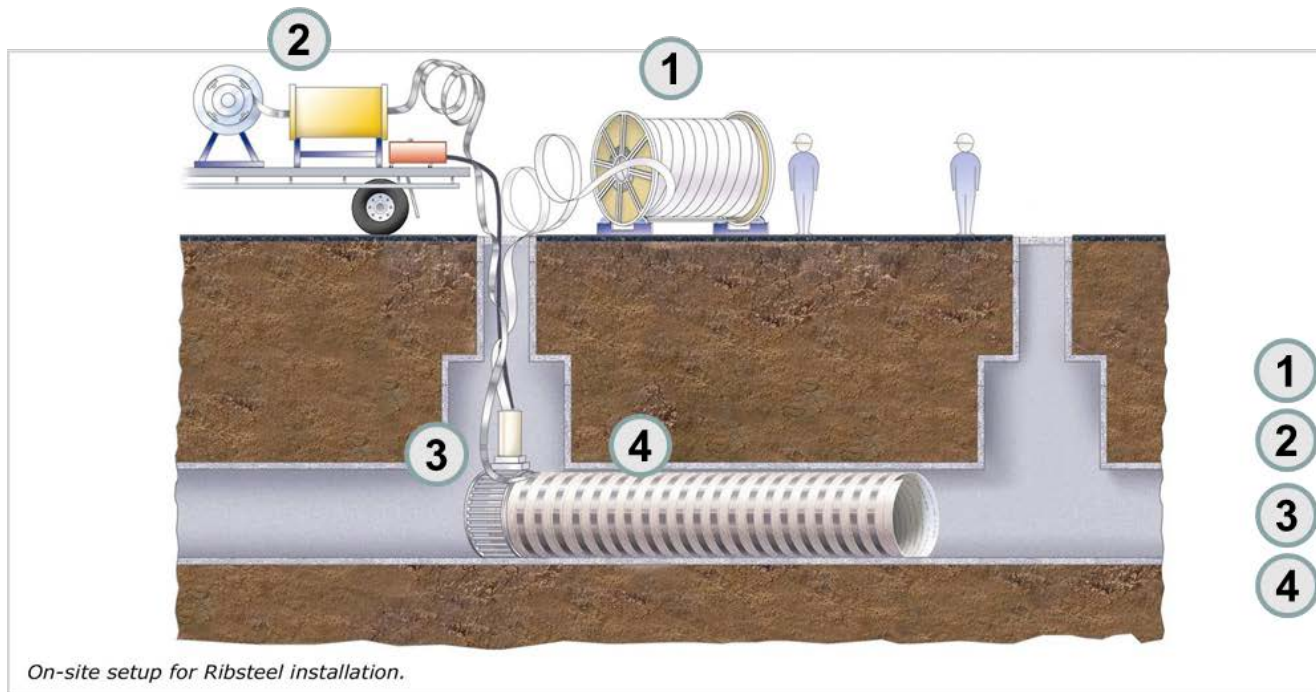


HDPE profile with Steel

Machine Wound Spiral Lining (MWSL)



Machine Wound Spiral Lining (MWSL)



- ① Profile Spool
- ② Roll Former & Steel Coil
- ③ Winding Machine
- ④ SPR™ ST Liner

Spiral Pipeline Renewal (MWSL) Video



- High-stiffness stand-alone structural liners
- Diameters from 200 mm to 3000 mm
- Short installation time and competitive technology
- Installation in live flow possible
- Long installation lengths possible



Background:

Sewer lines in Delhi were badly corroded and was resulting in flooding and road sinks.

MWSL was chosen as one of the preferred technologies.



Challenges:

- 1) Traffic Management, being one of the most populated cities in the world,
- 2) Short Working Hours, as work was limited to night hours
- 3) Sewers were in extremely bad shapes
- 4) Site Access, as few locations were in very narrow and congested lanes



Achievement:

Despite the limited working hours and challenging conditions

The job was completed successfully.

MWSL was the fastest amongst all solutions and required least by-pass pumping and traffic diversion



Design

ASTM & ISO Standards

- **Structural Solution**
(Fully deteriorated pipe condition)
- **Stand-alone Solution**

5. Design

Pipe External Pressure Capacity

$$q_i = \frac{C}{N} \sqrt{\left[32 \times R_w \times B' \times E'_s \times \left(\frac{E_L I}{D^3} \right) \right]}$$

Where:

C =	1.00
N =	2
R _w =	0.67
B' =	0.63
E' _s =	7 MPa
$\frac{E_L I}{D^3}$ =	Long Term Ring Stiffness:
	= 7634 N/m/m

$$q_i = 425.50 \text{ kPa}$$

Design Check

$$q_i > q'_i = \text{OK}$$

$$\text{ie. } 425.50 > 198.35 = \text{OK}$$

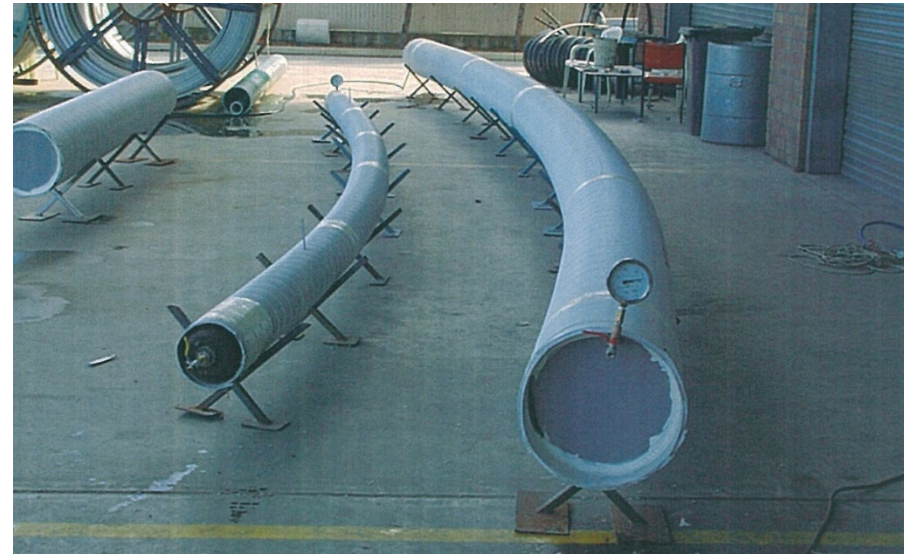
Actual Factor of Safety

$$N_{\text{actual}} = (q_i \times N) / q'_s$$

Testing and QC

ASTM & ISO Standards

- Internal Pressure & Vacuum Test
ASTM D1697
- Chemical Resistance
ASTM D543
- Mechanical Properties
ASTM D2412



Independent Assessments

- Material quality audit.
- Review of quality system.
- Product testing.
- Structural design (ASTM 1741)
- Audit of installation instructions and site installation.



Product Certificate

This is to certify that the following product has met the requirements detailed below

SPR™ ST Lining System

For the manufacture and supply of lining strip and associated winding equipment for the renovation, using spirally-wound pipes, of circular gravity sewers with diameter range 450mm to 2500mm

Sekisui Rib Loc Australia Pty Ltd

587 Grand Junction Road
Gepps Cross
Adelaide 5094
South Australia

This product meets the requirements set out in WRc Assessment Schedule PT/464/0720-AS.

Assessor:	<i>K Adams</i>
Director:	<i>[Signature]</i>
Issue Date:	31/07/2020
Expiry Date:	31/07/2025
Certificate Number:	PT/464/0720



Globally recognized in Trenchless Industry



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India: Excellence Award for Innovation

A new frontier, a new lifestyle.

SEKISUI CHEMICAL Group

– produce a better world with creative technologies.

<https://sekisui-spr.com/asia-contact/>

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