ProjectReport

SIMONA

STADTWERKE MAINZ NETZE

Drinking-water pipeline renewed with SIMONA® SPC RC-Line Protective-Jacket Pipes

SIMONA® PE 100 SPC RC-Line Drinking Water Pressure Pipe

The project at a glance

Major relining project (long pipe)

Replacement of a drinking-water pipeline section in an inner city area using minimally invasive long pipe relining

Requirements
Cost-efficient and ecologically compatible pipeline renewal in inner city area

Client
Public utility Stadtwerke Mainz Netze GmbH

General Contractor
SAX + KLEE GmbH, Mannheim
MRA Märkische Rohrleitungs- und Anlagenbau GmbH & Co. KG, Bernau

Planning
UNGER ingenieure Ingenieurgesellschaft mbH, Darmstadt

Technical Consultant
SIMONA AG, Piping Systems Business Unit, Kirn

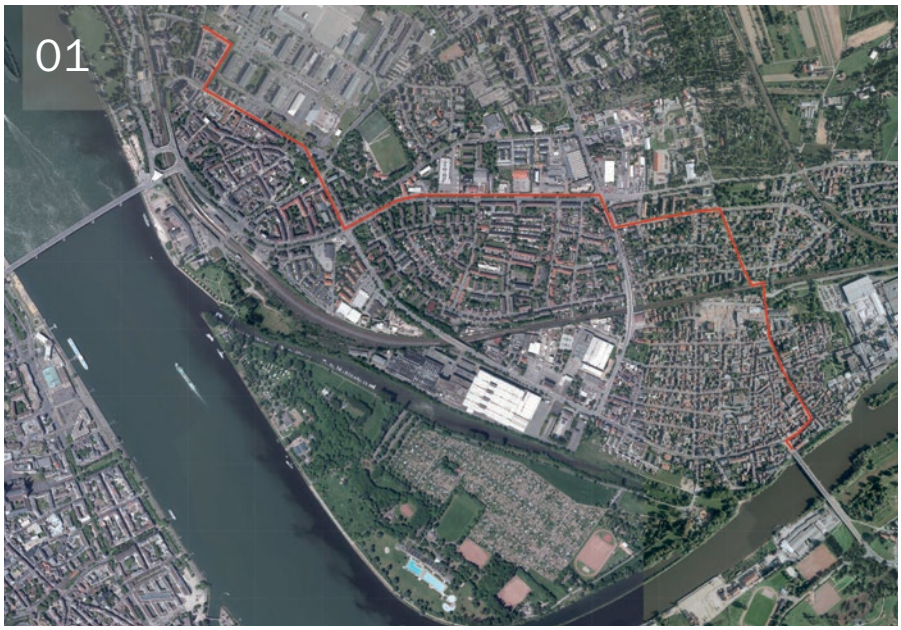
Products used

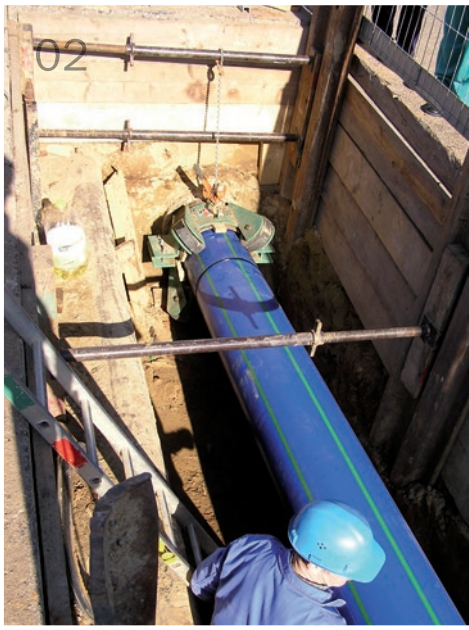
- SIMONA® SPC RC-Line Protective-Jacket Pipes (d 450 mm / SDR 17 / 3,700 m) as per PAS 1075 Type 3

Project duration
4 years

Public utility company Stadtwerke Mainz replaced a 3.7 km-long section of a major drinking-water pipeline with a special emphasis on cost-efficiency and environmental compatibility. The pipeline runs through the districts of Kostheim and Kastel and supplies drinking-water from the Hof Schönau and Petersaue waterworks to localities east of the Rhine. As it runs through the inner city area, there was very little space available for the rehabilitation project.

Location and routing





Project objectives

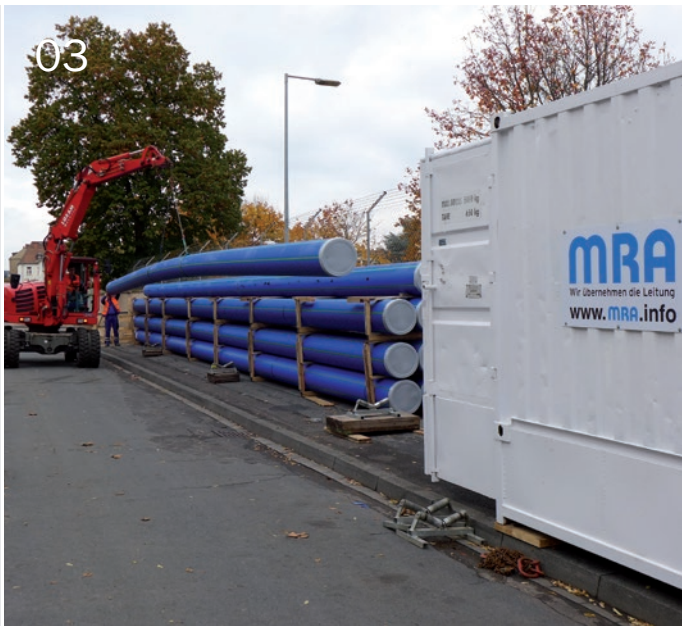
- Economic, durable and permanently tight pipe systems
- Ecologically compatible pipe renewal using drinking-water pressure pipes with special protective-jacket
- Renewal of the pipeline with minimal disruption to the public

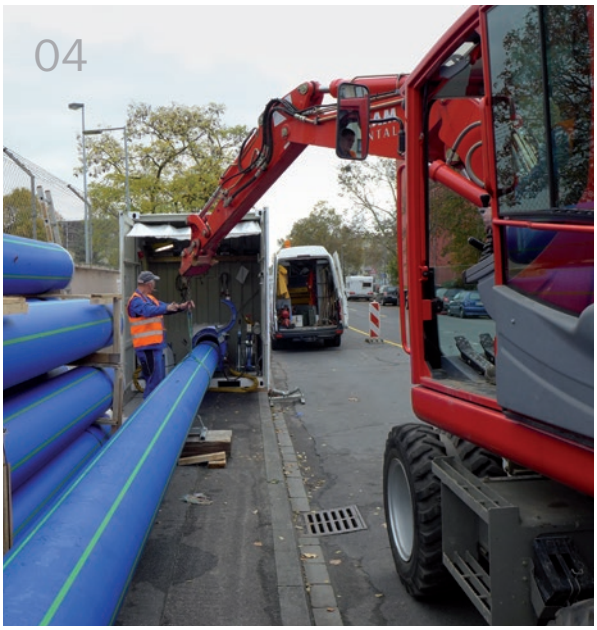
Public utility Stadtwerke Mainz Netze GmbH operates a water pipe network spanning some 1,300 km. One section of the system runs through the districts of Kostheim and Kastel. The existing DN 500 pipeline is a mixture of grey cast iron, ductile cast iron and steel with a retrospectively applied internal cement mortar lining.

Because the approximately 70-year-old pipeline was prone to failure, the company decided to renew it.

01_Overview of routing of water main
02_Insertion of SIMONA® SPC RC-Line Drinking-Water Pressure Pipeline

Cost-effective pipeline replacement using SIMONA® SPC RC-Line Protective-Jacket Pipes





A TÜV (German technical inspectorate) report had revealed beforehand that the entire pipeline no longer met the specified minimum wall thickness and had to be renewed. The pipe's wall thickness was severely reduced in specific areas due to spongiosis (graphite corrosion).

As part of the system upgrade, the optimum inner diameter of the pipe network was calculated in advance and it emerged that the pipe cross-section could be reduced. The pipe is routed through the heavily built-up old town centres, necessitating a construction method that would not disrupt traffic or take up a lot of space.

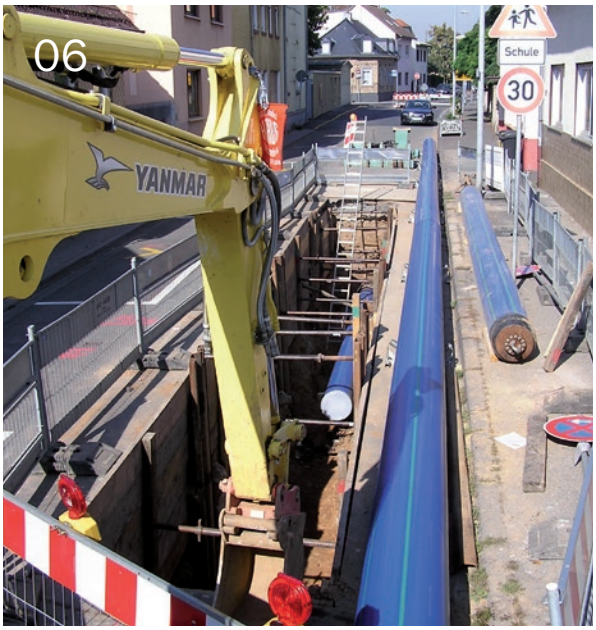
Its positive experience of long pipe relining, even in large dimensions, led the utility company to opt for the minimally invasive pipe relining method.

With minimal disruption during the construction phase, a separate, structurally stable new PE pipe was inserted into the existing pipeline, providing a solution that is therefore not dependent on the residual service life or stability of the host pipe.

Long pipe relining is a technically sophisticated process and requires very accurate preparatory planning. The internal cement coating of the host pipe, which had been applied retrospectively in the 80s and 90s, represented an additional challenge. In the early construction phases in particular the cement layers had not been applied uniformly, making the insertion of the new pipe more difficult.

However, the benefits of a cost-effective, particularly environmentally friendly and time-saving process compensate for these drawbacks.

03_Pipes being transported for welding
04_Welding of SPC RC-Line pipes in welding container



Background Information: Relining Process

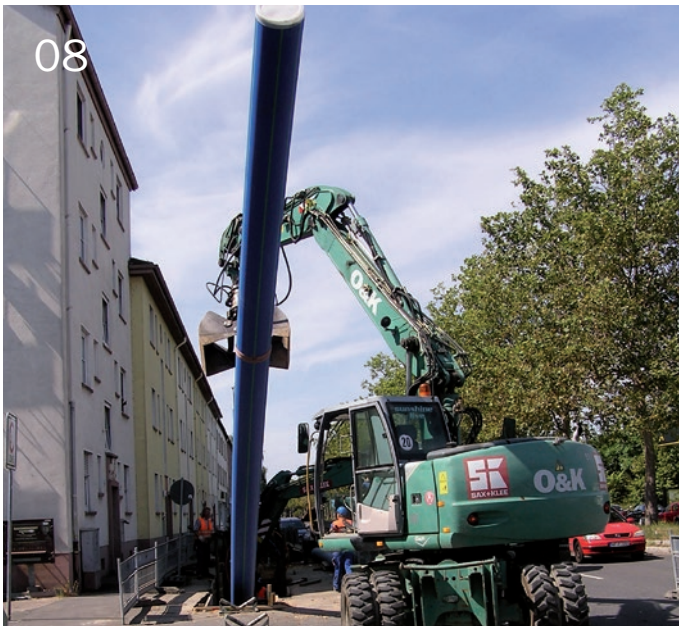
As part of the relining process the existing pipe is not destroyed, but rather a new pipe is drawn into it. Using what is known as the annular gap technique, the new pipe lies on the pipe bottom of the existing pipe after insertion and an annular gap is created between the old and new pipe. This method is used whenever the pipe cross-section can be reduced without causing any hydraulic impairment of the new pipe. If requested, or for reasons of structural stability, the annular gap can be filled with insulating material.

Application

- Predominantly inner-city areas to minimise disruption to daily life and traffic
- Can be used to replace supply and waste disposal piping

05_Towing head and centring device
06_Relining in confined urban conditions

Construction work



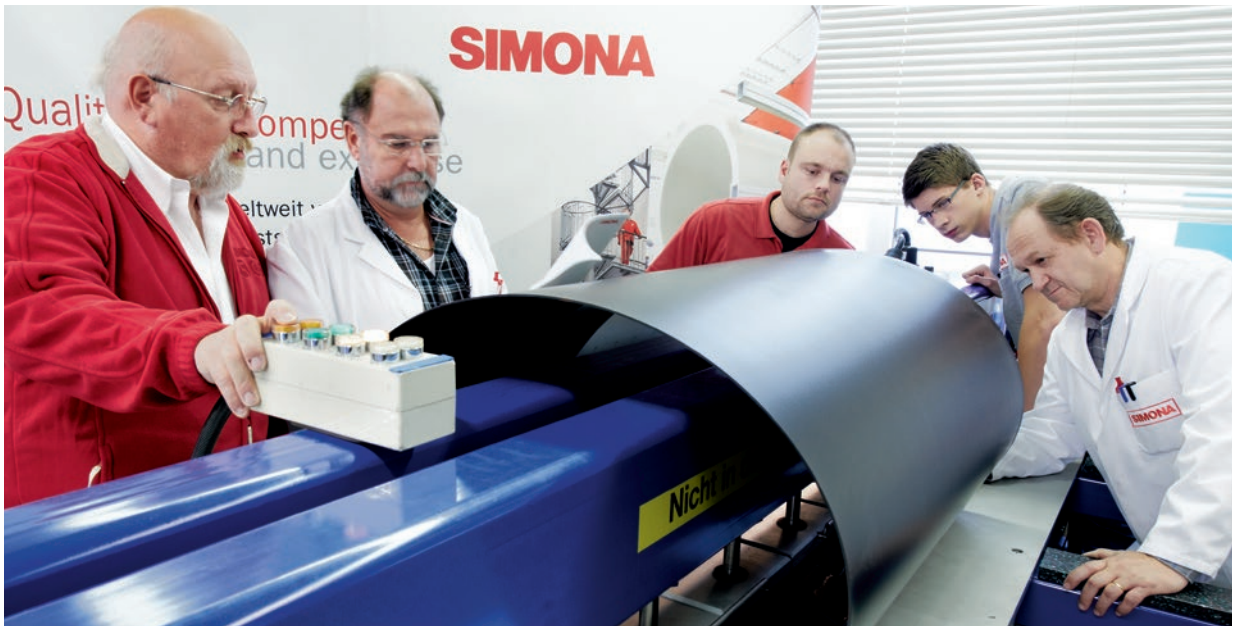
In November 2010 work began on the first construction phase. The work was performed during the months of September to April, when consumption is lower.

The entire renewal project was completed in 2014 using SIMONA® SPC RC-Line Pipes d 450 x 26.7 mm, which provide an effective inner diameter of 396.6 mm following installation.

The decision to employ long pipe relining with SIMONA® SPC RC-Line Protective-Jacket Pipes to renew a major water pipeline section through a densely populated urban area offered significant benefits and will be seen as pioneering for future pipe replacement projects.

07_The plastic pipes are highly flexible and can therefore be drawn into narrow trenches
08_Pipe insertion along the B40 federal highway

Consulting and information service



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We provide project planners and customers with technical and commercial advice regarding choice of products and material and the most economic pipe-laying method. We look forward to assisting you with all technical queries relating to your project, e.g. installation, structural calculations or joining technology.

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