

BorSafe™ HE3490-LS

Successful 'pipe bursting' process

In 2004 the Borealis polyethylene (PE) site in Stenungsund, Sweden, decided to replace part of the 40 year old cast iron firewater system as part of their continuous maintenance plan. After years of use, the old cast iron main suffered from leakage and corrosion. It was decided to study the possibility of using no-dig installation techniques in those sections of the main that were not readily accessible. With a combination of conventional pipe laying and 'pipe bursting' nearly 500 meters of the old main was replaced using PE mains produced from BorSafe HE3490-LS.

The Borealis polyethylene site in Stenungsund where almost 500 meters of the existing mains system was replaced. The 'pipe bursting' method which allows pipe installation without interrupting production was used for the first time at a production plant area.



Selection of material



BorSafe PE 100 material grade HE3490-LS was chosen as the replacement pipe material because it is resistant to corrosion and can be used in a variety of trenchless installation methods (e.g. 'pipe bursting', swagelining, sliplining).

Furthermore pipes made of polyethylene can be fusion jointed which means that there are no secondary jointing materials to deteriorate and leak and that the pipe can withstand high axial and bending loads without joint failure and without the need for expensive anchor blocks.

Trenchless installation methods can produce surface damage in the PE pipe that can initiate crack growth during the subsequent service life. During 'pipe bursting' the PE pipe is especially vulnerable to scoring from the sharp shards of metal from the old main.

Renewing the old system

Where possible the old pipes were excavated and replaced by new PE pipes using direct burial, but in several places this was not possible (e.g. in sections

that run underneath the process equipment). Replacing these sections of the main was obviously the most difficult part of the project.

In these sections it was necessary to carry out closed circuit TV inspections to make sure that there were no unexpected hazards or restrictions. There are many methods to reline old pipes with new PE pipes but these usually result in a reduction in diameter and carrying capacity of the main which was not acceptable in this case. 'Pipe bursting' is the only procedure that involves pulling a new polyethylene pipe through an old pipeline of equal or even bigger size without excavating.

In this technique the old pipeline is shattered as the new pipeline is pulled through, with the broken pieces pushed out into the soil. Pull through speeds of up to one meter per minute can be realised. The size of the pipe that can be replaced by 'pipe bursting' ranges between 50 mm to about 900 mm.



Firewater system design

The new firewater system is designed to operate with a maximum pressure of 16 bar although the normal water pressure is around 10 bar.

The total section of pipeline replaced was 500 m long with different sections of 200 mm, 250 mm and 300 mm diameter.

Benefits and Outlook

Pipes made from BorSafe HE3490-LS PE100 material give a long lasting, corrosion resistant solution with a low friction coefficient. They therefore give a better hydraulic capacity during the whole lifetime of the main. These advantages lead to the expectation of low maintenance costs during many years of service.

This project clearly demonstrated that it is possible to replace old pipes running underneath operational equipment without shutting down the plant, saving both time and money.

In the near future it is planned to also replace the remaining parts of the old firewater main with pipes manufactured from BorSafe HE3490-LS.

Project realisation

- Pipe operated and owned by Borealis
- Pipe producer: Hallingplast
- Civil engineer: Peab
- Contractor: Quickpipe

Borealis and Borouge are leading providers of innovative, value creating plastics solutions. With more than 40 years of experience in polyolefins and using our unique Borstar® technology, we focus on the infrastructure, automotive and advanced packaging markets across Europe, the Middle East and Asia. Our production facilities, innovation centres and service centres work with customers in more than 170 countries to provide materials that make an essential contribution to society and sustainable development. We are committed to the principles of Responsible Care® and to leading the way in 'Shaping the Future with Plastics'™.

Disclaimer The information contained herein is to our knowledge accurate and reliable as of the date of publication. Borealis and Borouge extend no warranties and make no representations as to the accuracy or completeness of the information contained herein, and assume no responsibility regarding the consequences of its use or for any printing errors. It is the customer's responsibility to inspect and test our products in order to satisfy himself as to the suitability of the products for the customer's particular purpose. The customer is also responsible for the appropriate, safe and legal use, processing and handling of our products. Nothing herein shall constitute any warranty (express or implied, of merchantability, fitness for a particular purpose, compliance with performance indicators, conformity to samples or models, non-infringement or otherwise), nor is protection from any law or patent to be inferred. Insofar as products supplied by Borealis and Borouge are used in conjunction with third-party materials, it is the responsibility of the customer to obtain all necessary information relating to the third-party materials and ensure that Borealis and Borouge products, when used together with these materials, are suitable for the customer's particular purpose. No liability can be accepted in respect of the use of Borealis and Borouge products in conjunction with other materials. The information contained herein relates exclusively to our products when not used in conjunction with any third-party materials.

Borstar is a registered trademark of Borealis A/S.
BorSafe and Shaping the Future with Plastics are trademarks of Borealis A/S.

For more information contact:

info@borealisgroup.com | info@borouge.com
www.borealisgroup.com | www.borouge.com
+43 1 22 400 000 | +65 6275 4100