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# HOBAS Jacking Pipes to Enlarge Doetinchem's Sewer Main

Netherland's Frosty Spell Could not Freeze Construction Works



Despite the extremely frosty temperatures (-15° C) during construction works at the beginning of the year 2010, the municipality Doetinchem in the Netherlands was able to complete the extension of its overloaded sewer main with HOBAS CC-GRP Jacking Pipes. The round 57,000 inhabitants can now count on a flood-free sewer for at least five decades.

Several floods proved that the capacity of the DN 1250 concrete sewer main of Doetinchem was not sufficient during heavy rainfalls. The municipality of Doetinchem therefore decided to insert a second main for a 304 m section next to the existing sewer. Since the existing pipe had to remain in service parallel to the new line and due to various other obstacles in the residential area, trenchless construction was found the best solution. Soil conditions – sand and medium to coarse gravel – would have made the drainage of ground water and sheet pilings necessary if the sewer would be constructed by open trench. This and to prevent disturbances to residents and traffic disruptions were further matters of consideration for the municipality.

It was up to the engineering company Witteveen and Bos to choose an adequate material for the job and the unique attributes of HOBAS CC-GRP Jacking Pipes that are ideally and inherently suited for trenchless installation methods convinced them. The comparably light wall construction of HOBAS Products proved to be advantageous for the limited space on site. Their smooth outer surface creates little friction allowing lower jacking forces and their long service life were the main convincing factors in their decision making process.

Thanks to the centrifugal casting process, relevant pipe properties such as stiffness can be exactly determined to suit planned drive lengths and therefore required jacking forces. This allows an optimization of costs by weighing up material against installation costs. HOBAS Benelux conducted the calculations taking into account the contractor's requirements regarding intermediate jacking stations and wall-thickness. An alternative to the originally planned three separate drives of 160, 60 and 85 meters was hence found in a single drive length over the full 304 m with one intermediate station while the location and height of the pipeline ends would remain in the same place as would also the deepest point of the route. After about 245 m the route follows a slight vertical curve. The nominal stiffness 32000 N/m<sup>2</sup> was chosen for the DE 1499 mm jacking pipes based on the wall friction of 5 kN/m<sup>2</sup> - the pipes' radius has no effect on the maximal allowable





jacking force on the pipe. To keep friction during the installation process as low as possible the HOBAS Pipes were supplied with injection holes for bentonite lubrication.



protecting jacking equipment and of course the drill master and his construction team from the cold. The frosty conditions demanded a great deal of the team and the equipment, yet the installation progressed steadily and, thanks to the pipes' easy handling, 18 m of pipe per day were managed whatsoever.

The contractor Strukton Infratechniek BV completed the installation of the relief sewer in early March. A very short construction period has been achieved despite the cold so that with only little disruption Doetinchem can rely on a safe sewage discharge for at least 50 to 100 years.

Overview	
Year of Construction	2010
Construction Time	2 months
Total Length of Pipeline	305 m
Diameter	De 1499
Pressure Class	PN 1
Stiffness Class	SN 32000
Installation Method	Jacking/ Microtunnelling
Application	SewerLine®
Client	Municipality Doetinchem
Planner	Witteveen and Bos
Contractor	Stukton Infratechniek
Advantages	Low wall thickness, corrosion resistance, long life advantages of trenchless installation, smooth surface, low friction, high allowable jacking force

Preparations for jacking commenced in January 2010 so that it was likely that there would be no more frost by the time the jacking pits and equipment were ready. Temperatures, however, fell again and halting construction works was not an option. Since CC-GRP Pipes are insensitive to extremely low (and high) ambient temperatures the challenge lay in