

Combining safety with responsibility:

A practical example

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the original

solutions

Special Straub pipe couplings for the
wastewater treatment facility in Singapore:

An individual solution for the future.

Since 2001, Singapore, a city spreading over 650 km², has been planning and constructing a new centralised wastewater treatment facility. Connection problems arose when it came to joining the over 3-metre diameter sewerage tunnels into the distribution system. Due to construction tolerances, the axes had been shifted by up to 45 mm, and the ends of the pipes had been deformed by initial efforts to connect them up. To ensure that the construction schedule was not put in jeopardy, it was necessary to quickly find a new connection solution.



Four 3.6 m diameter couplings were installed.

Singapore: A pioneer in wastewater management

Singapore is one of the cleanest cities in Asia. As long ago as the end of the 19th century, the first structures were put in place for emptying chamber pots every morning. The first sewerage works started operation in 1910 and additional sewerage installations were added over the course of the years. In 2001, the city administration passed a resolution to replace the various ageing sewerage works, which were distributed across the island, with two new modern facilities: Changi on the east and Tuas on the west side of the island. This was partly to meet increasing demand and partly to reclaim land for the construction of new homes on the cleared sites. The wastewater systems, which had been completely separate up to this point, were connected by a new pipe system leading to the new facilities.

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Problems with construction tolerances during connection to the new installation

The wastewater influent tunnel to the Changi Water Reclamation Plant is almost 4 metres across. This made it virtually impossible to avoid a certain construction tolerance, and at the point of link-up to the installation, there were axial deviations of up to 45 mm. Following initial attempts at welding, the engineers from the company coordinating the project, CH2M HILL of Washington DC, quickly realised that it would not be possible to stay on schedule using conventional means to connect the sewer infeed to the installation. There was also the risk that the heat generated by the welding process would destroy the internal cement coating. Exacerbating the problem of bridging the axial offset was the fact that the extremely uneven pipe ends and tensions in the pipe system also had to be taken into account. Thus, a problem had developed that threatened progress on the construction of the entire facility.

The challenge:

■ In the course of discussions, the idea came up that the problem could possibly be solved with a type of pipe clamp. An enquiry was sent from the headquarters of CH2M HILL to Straub Werke AG in Wangs, Switzerland. From the very outset, however, it was obvious that the situation would need close on-site inspection. A few days later, engineers from Straub Werke AG visited the Changi construction site and analysed the connection problem. It was evident that it would not be easy to create a permanently flexible and tight joint. The compensation of the axial offset, in conjunction with the eccentricity of the pipe ends, presented a major challenge to the Straub Werke AG engineers. Since the pipes had already been securely installed, it was necessary to come up with materials that could be applied on site.

tested safe material-independent

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Extreme deformation and a big gap between the pipe ends.



1230 kg Sikadur 30, 20 kg Sikafloor 156 (primer) and 20 kg Sikagard 63N (coating) were used to build up the pipe ends.



Shearing protection to absorb 60 tonnes of tension.



Changi Water Reclamation Plant under construction.

The solution:

Possible approaches to a surface build-up were discussed at the headquarters of Sika, a Zurich-based construction chemicals specialist. This resulted in the suggestion that the axial offset and deformation could be compensated for by applying a number of Sikadur 30 plastic coatings to match the outer diameters of the pipe ends to one another. First, however, it was necessary to carry out tests in a neutral laboratory to demonstrate and guarantee the adhesion and elasticity values of the intended coatings.

«After carefully evaluating all options, we decided to use 6 numbers of Straub Couplings, to make the final connections for the welded steel raw sewage influent pipes. The couplings, operating at 8 bar pressure, have never leaked. We are very pleased with the couplings. The service provided by Straub Coupling personnel was also very satisfactory. I would not hesitate to consider Straub Couplings for future projects.»

Gordon A. Nicholson, Changi Water Reclamation Plant Project
Project Director, CH2MHILL Singapore Pte Ltd



ing stations, and tested and approved just 7 months after the initial request had been made. In the end, the project was not delayed. The wastewater treatment facility in Changi started operations at the end of 2005.

To ensure perfect adhesion, the pipes were initially sandblasted and primed. It was then possible to apply a number of coats of the reinforcing adhesive and to protect the inside and outside of the entire pipe joint with a special preservative coating as corrosion-proofing. This was carried out on site by Sika Singapore PTE.

In parallel with the adhesion tests, STRAUB Tadco Inc., the Toronto subsidiary, was commissioned with doing the calculations for dimensionally accurate Straub pipe couplings. Since the pipes were already installed, the opening variant, STRAUB-OPEN-FLEX with a plastic-coated casing, was chosen. This could be readily positioned around the pipe joint and tightened. The internal rubber collar with edge seals allows these couplings to compensate for temperature-related changes in length, creating a reliable seal to the required test pressure of 8 bar.

With the professional knowledge of the various specialists involved and the experience of the Straub Werke AG engineers, the Straub couplings were successfully installed in the pump-

connected fast material-independent

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Project: New construction of a wastewater treatment facility in the city-state of Singapore. Connection of the influent pipes to the pumping station.

Task: To find a solution that would provide a permanent connection for pipe ends deformed by previous attempts at connection and overcome a tolerance-related axial shift in the 4-metre diameter pipes.

Solution: The axial offset and deformation were compensated by the application of plastic coatings on the pipe ends. By matching the outer diameters, it was possible to permanently connect the pipes with specially manufactured, plastic-coated STRAUB-OPEN-FLEX pipe couplings.

Advantages: The professional expertise of a number of different specialists made it possible to find a fast, permanent solution to the problem. The dimensionally accurate STRAUB-OPEN-FLEX pipe couplings could then easily be placed on the installed pipes and secured in place. As a result, the construction of the water reclamation plant was not delayed.

Project Partner:

Lum Chang
 Building Contractors Pte Ltd
 1 Selegie Road #05-01
 Paradiz Centre Singapore 188306
 Tel: +65 6273-8888
 Fax: +65 6311-0909
 Website: www.lcbc.com.sg

Kongsberg Technology (S) Pte Ltd
 47 Jalan Pemimpin, #04-06
 Sin Cheong Building
 Singapore 577200
 Tel: +65 6258 0556
 Fax: +65 6258 5901
 Website: www.kongsberg.ws

Athical Engineering Pte Ltd
 No. 20 Gul Crescent
 Singapore 629529
 Tel: +65 8663 3378
 Fax: +65 6863 3398
 Website: www.athical.com

Sika Services AG
 Tüffenwies 16
 CH-8048 Zürich, Switzerland
 Tel: +41 44 436 42 86
 Fax: +41 44 436 46 86
 Website: www.sika.com

Our solutions – your added value

Every day, we provide our customers with the ideal solution for pipe connections that have to meet the most stringent requirements. Particularly in the case of specialised, demanding challenges, you benefit from our many years of experience and our in-depth expertise. You obtain more than perfected hi-tech products from us. We provide you with support and advice on technical matters, engineering and documentation, and we accompany your project from the first exploratory talks to successful completion on site. Flexible, fast, safe and reliable.

You can rely on it: our solutions are your added value.



Straub Werke AG

Rohrverbindungen
 Straubstrasse 13
 7323 Wangs, Schweiz
 Tel. +41 81 725 41 00
 Fax +41 81 725 41 01
www.straub.ch, straub@straub.ch

an *OAliaxis* company