Florida: Drinking water across 290 kilometres and 42 bridges

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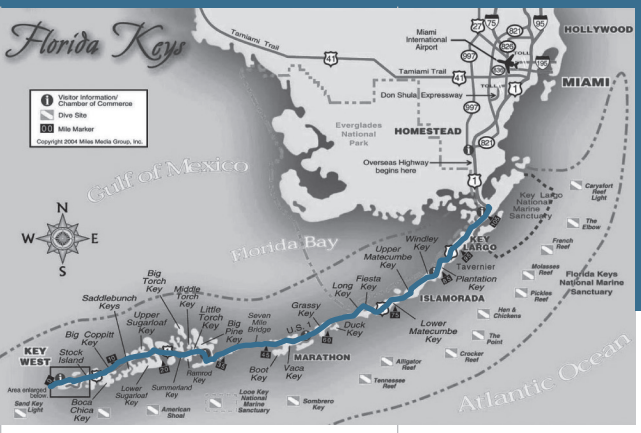
SOLUTION



The 290 km long group of islands known as the Florida Keys are connected by 42 bridges.

The salty, moist air and high temperatures produce a corrosive climate which has led to corrosion damage on the old drinking water supply pipes, especially around the joints.

When being exchanged, the old couplings were cut open lengthwise on both sides and the resulting half shells were then removed.

The challenge

The 25'000 inhabitants of the southernmost island-Key West, are supplied with drinking water via a pipeline. This Pipeline is mounted on the side panels of the bridges and laid underground on the island. Four booster pump stations and a number of water reservoirs ensure reliable supply conditions and compensate for fluctuations in pressure and volume. Since water is continuously being removed on the individual islands, the diameter of the pipe decreases from 941 mm at the beginning to only 609 mm on Key West. The salty, humid air and high temperatures throughout the year produce a corrosive climate that has led to corrosion damage on the old drinking water supply pipes, especially around the joints.

Important criteria for arriving at a decision
Continuous and preventative renovation also had to be taken into account because the pipes that are currently installed had to remain usable. Until now, the individual six to twelve metre lengths of pipe were connected with non-separable double sealing ring couplings from another manufacturer.

The solution

Due to the design of the coupling which allows it to be installed easily on existing pipes, the STRAUB-OPEN-FLEX 4H offered by Straub Werke AG scored above all other pipe joining options. This design consists of two half shells and a separated rubber collar that can be individually placed over the pipe ends and then attached using tensioning screws. Thanks to this simple procedure, the contracting body was able to save considerable costs. An investigation of the situation showed that replacing the old couplings with new ones of the same type would have required relaying whole pipe sections using heavy construction machinery.Compared to the installation of the Straub solution, this would have generated extremely high additional costs. A further requirement of the client was that only one lane of the road could be blocked for a maximum of eight hours. Also, the disruption to the supply of drinking water had to be minimized.

The simple assembly of the STRAUB-OPEN-FLEX 4H allowed six couplings to be exchanged in eight hours. During this process, the actual assembly of the couplings took only 20 minutes each with most of the time being taken up with dismantling the old couplings and cleaning work.

Another key feature which enables the Straub coupling to be installed quickly and easily is that all parts are self contained. There are no loose screws, nuts or washers that need to be assembled by the installer. In addition, the entire coupling is very light and easy to handle. Due to the unique design of the sealing lips located on the edge of the Straub gasket material, a low torque of only 65 Nm is required to tighten the screws on each coupling. This low torque ensures that the existing pipe, which has already been weakened by corrosion is not overburdened. The existing installed couplings achieved their sealing effect using axial pressing forces requiring a torque of up to 120 Nm. This high torque had a negative effect in the lifespan of the coupling seals.

A special and advantageous specification
The progressive sealing effect is an important characteristic of the STRAUB-OPEN-FLEX 4H. The special cross-section of the sealing device is designed so that it becomes more and more effective with increasing internal pressure in the pipe. Because of this - and due to the elasticity of the sealing material, it was not necessary to grind down the seams of the spiral soldered pipe. The housing and seals are made from robust galvanized steel. It is designed for an operating pressure of 14 bar (200 psi), test pressure of 21 bar (305 psi) and an operating temperature of -20 to +80 °C. The special insert strip allows for a gap of up to 80 mm between pipe ends. The coupling is able to compensate for an axial shift of up to one percent of the pipe diameter and misalignment of up to two degrees.

Simple and fast assembly
When being exchanged, the old couplings were cut open lengthwise on both sides and the resulting half shells were then removed. After the pipe ends had been cleaned, the insert strips and the sealing collar, which had been treated with soft soap, were attached over the location of the joint. Then the two half shells of the housing were placed around the pipe and tightened using tangential screw plugs. Finally, wax tape corrosion protection was applied to the coupling and the pipe. The functional demonstration, a requirement of the pipeline operator, using special testing apparatus concluded the assembly process.

Solutions provider for pipe couplings
Detailed talks regarding the project to replace the corroded pipe couplings initiated in December 2006. Working with the client as a solution
provider and partner, Straub developed a coupling specifi cally for this application. Due to the signifi cant width of the newly designed coupling, Straub had to acquire special machinery and tools in order to manufacture the components. The experience Straub's engineers have in this area meant that project support could be provided from engineering across manufacturing and assembly all the way through to commissioning. Delivery of the couplings to the client took place in September 2008. The installation of the couplings began that same autumn.

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Then the two half shells of the housing were placed around the pipe and tightened using tangential screw plugs.

Finally, wax tape corrosion protection was applied to the coupling and the pipe.

Our modular PLUS Add-on programme for the Florida project:

- The most effective solution
- Perfectly matched components
- Flawless operation

As individual as you: The modular add-on programme PLUS

Wherever the partnership starts, STRAUB will support you with its efficient project management and commitment to maintaining and safeguarding the highest quality standards. Beyond this, we offer additional optional services to suit you. We will support you in every process of your project with the right PLUS module, and harness the required skills with the bigger picture in mind.

The result: The right pipe system solution with noticeable added value for you.

Perfectly matched components

Module: System procurement

The most effective solution

Module: Situational analysis

Module: Pre-Engineering

Module: Engineering

Flawless operation

Module: Installation / Commissioning

Module: Service and maintenance

For more information on the modules, please visit www.straub.ch

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