

Ribline Restores 3.3m diameter Siphon

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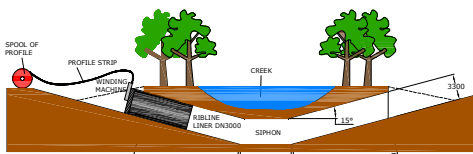
Interflow has overcome a major set of engineering challenges to successfully rehabilitate a 3.3 metre diameter concrete siphon 31.5m long within a very tight time frame in response to an urgent request for its client in Victoria.

The concrete siphon runs below Serpentine Creek in an agricultural area near Bendigo, Victoria. The deteriorated structure required renewal during a short annual maintenance shutdown period.

The project presented a number of challenges:

Firstly, it required Interflow to produce a 3m diameter pipe; the largest spiral wound pipe ever made in Australia. Secondly, it called for an innovative method of making the spiral wound liner negotiate the sharp bends in the siphon.

In addition, the project had added complexities in that the liner had to be capable of being installed in a siphon: a circular pipe laid in a U-shape and featuring 15° inclines and 2 x sharp bends (as shown in the schematic below) and that the entire project be completed within only 6 weeks.



Schematic of the Serpentine Creek Siphon.

For this project Interflow used Ribline®, a structural composite steel reinforced polyethylene spirally wound liner developed by Sekisui Rib Loc Australia. With its high strength to weight ratio, Ribline is ideally suited for large diameter pipe renewal.

Before any work could commence on site a roller cage of 3080mm internal diameter and associated installation equipment was designed, manufactured, and tested. This cage was used to produce the 3m liner and is the largest winding cage ever made.

A flexible Ribline profile was also specially designed and manufactured to enable the liner to pass through the abrupt 15° angle changes in the siphon.

When these items were ready the equipment and Interflow's Ribline crew were mobilised on site.

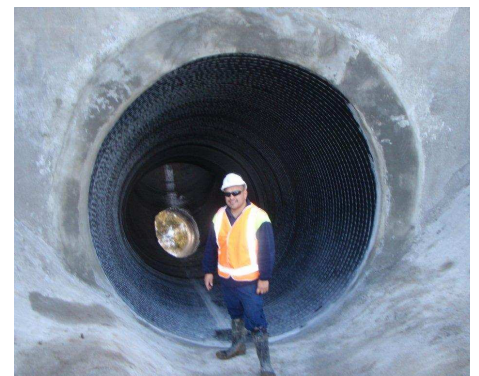
At the start of the installation process the siphon was cleaned and all debris and silt was removed from inside it. The next step was to setup the Ribline installation equipment including the roller cage at one end of the Siphon. Due to the 15° incline of the siphon it was necessary to tilt the machine at the same angle so that the Ribline liner was produced parallel and concentric to the existing siphon as per photo below.



The specially designed profile strip capable of going around a bend was then fed from a spool nearby into the Ribline winding machine. The Ribline winding machine wound the profile strip to produce a 3000mm fixed diameter pipe.

To deal with the reverse angle changes in the siphon it was necessary to install the liner over a number of stages. These involved firstly producing an 11m length of pipe down the incline. The next step was to cut the spiral wound pipe at the winding machine and winch it around the bend, along the bottom of the siphon and up the other side. Then a second, 9m section of pipe was spirally wound until it reached the end of the piece of pipe already in place. The two pieces were then extrusion welded together. The winding machine was then setup on the other end of the siphon the process was repeated. The two segments of pipe were welded together, thus leaving a completely sealed liner.

The final stage involved sealing the ends of the liner and rendering them smooth with the siphon head walls. The annulus between the outside of the new Ribline pipe and the existing siphon was then grouted.



The end result.

Interflow's rapid response and ability to overcome these challenges meant that the client was able to have the asset renewed during the shutdown period and have the system back on line on schedule. This innovative trenchless solution preserved the local environment and was completed in a safe and cost effective way.