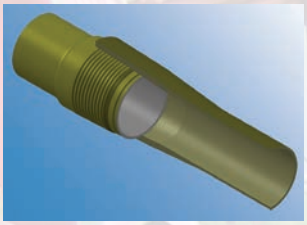

Coil-Lock mechanical joint

Downhole Tubing for Polish Copper Mine
using Bondstrand® 3400 GRE pipe

This project involves a 14 Inch water disposal line installed vertically in a 1000 meter deep mine shaft. The line replaces an old, heavily corroded steel pipeline used for the disposal of water from the mine. The pipeline was divided into nine (9) sections. Every section was custom made to fit the existing support layout. Between every section, a specially designed O-ring expansion joint was installed to compensate for length change due to internal pressure and temperature changes. The line was designed particularly for this application to provide optimal performance.

For the installation, standard pipe lengths of 12 meters were used. The height of the building over the shaft was not high enough to accommodate the 12 meter vertical height, so a hole was made in the roof and the pipe lengths lowered through it ***(Photo 1)***. Everything was installed using the traditional down hole installation method ***(photo 2)***. A special tool (called Rocket Launcher) was made to safely upright the 12 meter pipe ***(photo 3)***.

Photo 1

Photo 2

Photo 3

Project
"KGHM Copper Mine", Rudna - Poland

Client
KGHM Polska Miedź S.A., O/ZG Rudna - Poland

Pipe system
Bondstrand 3400 with Coil-Lock® mechanical joints
Diameter: 14 inch (350 mm)
Quantity: 1000 m

Operating conditions

Operating pressure:	120 bar
Design pressure:	140 bar
Test pressure:	200 bar
Operating temperature:	63 °C
Design temperature:	93 °C

Installation date
2009

The shaft is used for ventilation to the mine. A strong down-draft was present during assembly, which caused the installers to lubricate and install the Coil-Lock keys prior to lifting each joint (Photo 4) into position (Photos 5 and 6).The shaft is only out of service for two shifts (16 hours) on Sunday. Only during this shut-down period a pre-assembled string could be lowered and installed in the shaft.


Photo 4


Photo 5

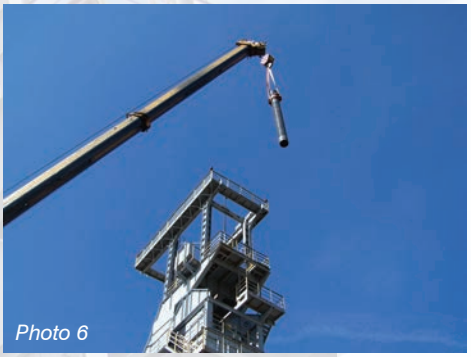
Photo 6

After start-up of the pipeline, safety tests were performed. The results were more than good. The shaft contains a second steel pipeline for the same application and working pressure. When both pipelines were in use, the pump pressure for the GRE line on the delivery side was 8 bar less compared to the steel pipeline, due to the superior flow characteristics of the GRE line.

- Fast and easy installation;
- Mechanically locked for structural integrity;
- Ductile key for uniform distribution of loads;
- Joint designed to be stronger than the pipe wall;
- No Welding Required;
- Double O-ring for reliable performance;
- Only simple tools required;
- Joint can be easily disassembled for pipe relocation;
- Available in integral bell or coupled pipe.

Joint design

The Coil-Lock joint construction offers the following advantages and features:

- Provides ductile redistribution of axial loads across the full length of the joint. This is not possible with long adhesive bonded joints;
- Provides mechanical locking for reliability with minimum stress risers (round key);
- Nylon or pure aluminium key for high ductility and corrosion resistance;
- Tapered threads provide tight fit that is easy to assemble. Only a few rotations of the pipe are required to make the joint due to the taper and large pitch on the thread;
- Joint can be easily inspected for fit at assembly;
- Joint can easily adapt to steel flanges, couplings or other adapters;
- Structural length of the joint is 43% of the length of an adhesively bonded joint of the same pressure rating.

Advantages

- Reduction in installation costs and time;
- Long service life (30 years);
- Corrosion resistant;
- Maintenance free;
- Light weight material;
- About 1/4 the weight of steel.


Guided support


Expansion joint

CH7268 supersedes FP1001 - November 2012