



PIPELINE LEAK DETECTION SYSTEM FOR PROPYLENE PIPELINE



The Scenario

Sinochem is one of the leaders in global refining sector with annual crude refining capacity of 27MT per year. Propylene (or Propene) is a refining by-product and is one of the most important raw materials for a wide variety of products. It is a highly flammable product and it typically transported at high pressure and so effective environmental and safety management are key considerations for the design of a propylene pipeline.

Client Requirements

Sinochem needed to design and implement a leak detection system for a 4km overhead propylene pipeline. The pipeline ran from the wharf area to a tank storage area. Sinochem required a comprehensive, real-time detection and full integration of the leak detection system with its process and monitoring control system.



Figure 1: Details of pipeline and sensing cable within propylene plant

What Did We Do?

Bandweaver proposed a leak detection system based on its FireLaser Distributed Temperature Sensing (DTS) systems. The principle of measurement is since in the event of a leak the high-pressure propylene will cause a temperature drop in the surrounding area. The DTS sensing cable will be able to rapidly measure any leak and locate its position to within 1m.

For this particular installation the sensing fibers were incorporated into the protective outer layer of the pipeline at the 3 and 6 o'clock positions.

In the event of a leak in the pipeline, the propylene will be trapped within the protective layer where the lower temperature leakage will be rapidly detected and alarms will be activated accordingly.

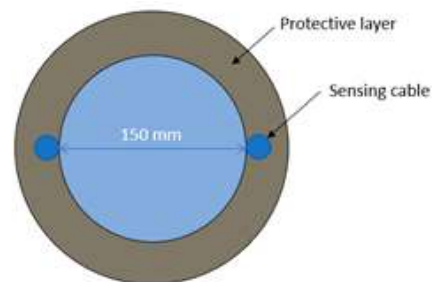


Figure 2:
Incorporation of
sensing cable into
pipeline
construction

The diagram, right shows the configuration of the fiber optic sensing cables. As can be seen, for this particular configuration 3 optical channels of the Fir have been utilized to provide complete coverage.

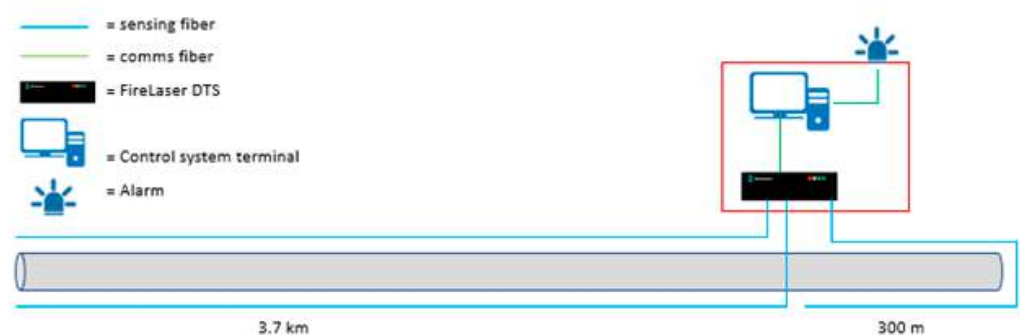


Figure 3: System architecture of pipeline monitoring system

Benefits to the Client

The DTS based pipeline monitoring system has been installed since 2016 and has been providing Sinochem with a reliable and effective leak detection system that provides full coverage of their pipeline. The benefits of a fiber optic based pipeline leak detection system, include the following:

- Measurements from every 10 seconds and so the leak will be rapidly detected and alarms sent to the maintenance and operations team
- Precise location of the leak to within 1m and so it can be located rapidly, isolated and repaired thus minimising potential safety issues
- Fiber optic cables are passive sensing elements with no moving parts that are immune to electromagnetic emissions and are corrosion resistant. The cables are extremely long life (30 years plus design life) with an extremely low cost of ownership to the custodian of the asset.

All of the above leads to less downtime, great productivity and improved safety. Such smart monitoring systems are increasingly becoming part of today's pro-active asset maintenance strategies.