

The SCOF Monitoring Project arose from the need to more efficiently address leaks coming from the Belgian TSO underground self-contained oil-filled (SCOF) cables. These cables are integrated in 150 kV networks. Oil leaks from these cables were negatively affecting the surrounding environment, causing power outages with high outage time and large OPEX costs for reparation and/or cleaning of the ground.

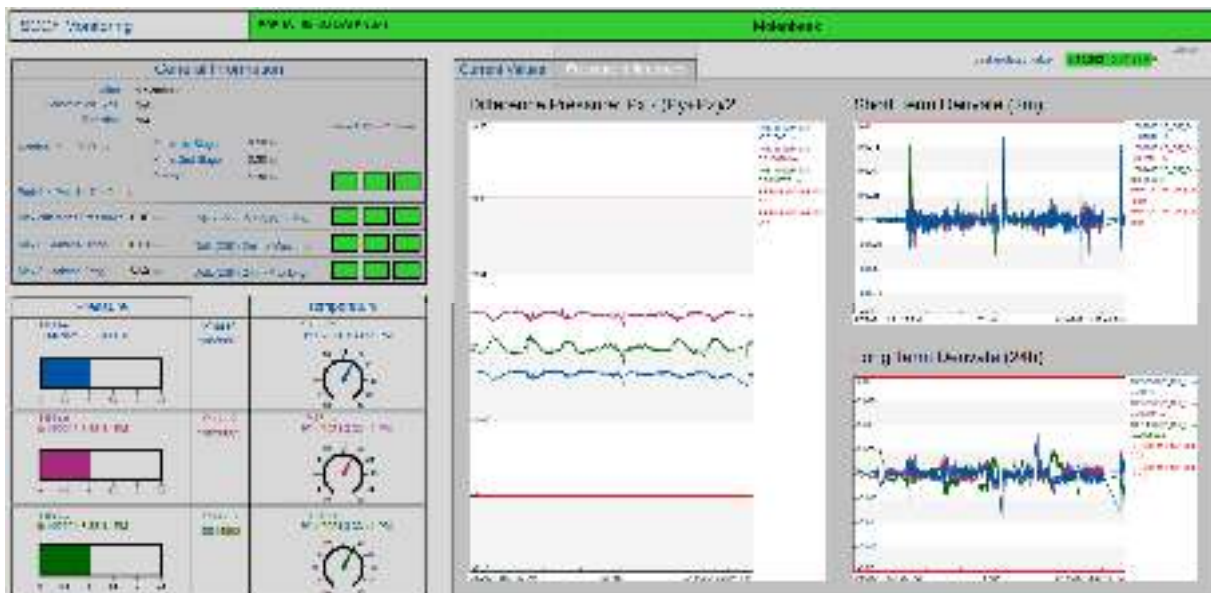
Traditionally, manometers on the hydraulic circuits, which trigger also the alarms of over pressure and under pressure, are installed and transmitted to the dispatching. In case of alarms of under or over pressure the dispatching, the SCOF cable system is de-energized.

In addition, the maintenance team performs periodically manual checks of this oil pressure of at the different hydraulic sections and performs a visual inspections of the hydraulic system. The goal of The Belgian TSO was to improve the entire inspection process in order to make it less time consuming and to predict or anticipate cable failure and oil leaks.

In collaboration with an external partner, the Belgian TSO developed a digital solution to the problem, which included the use of digital sensors, a communication gateway, antenna, deep penetration communication technology and an IoT platform.

The Belgian TSO opted to use their own condition-monitoring platform, called ACC (Asset Condition & Control), which monitors the condition of the different asset types installed on the the Belgian TSO network (over 200.000 unique assets).

This monitoring solution, allowing the digital and remote monitoring of oil pressure in SCOF cables, was installed on five SCOF cables (through 76 sensors installed on 16 joint bays).



This platform allows to visualize and analyze trends in the pressure data picked up by the sensors, and can be accessed by the Asset Manager and maintenance agent on their laptops or mobile phones. Different algorithms have been implemented to detect small/slow leakages (caused by aging) or big/fast leakages (indicated damage by external penetration). In case a

certain threshold is reached (absolute or dynamic) that indicates a possible incident, then the system will generate an alert and sent an email and SMS to the field operator.

#### Conclusion and Advantages:

- The digital monitoring of SCOF cables has reduced the time, cost and danger associated with the manual monitoring of them.
- SCOF cables can now be monitored continuously, enabling the early detection and mitigation of oil leaks and protecting the environment.
- The concept is easy and quickly deployable thanks to the IoT character of the acquisition unit (only need is a mains power supply and a good location for the antenna).
- Analytics, historian and dashboards are integrated in an existing system for condition monitoring, which means there is no need for dedicated software maintenance.
- The operational team receives an SMS when they need to check up on an alert, which is user friendly and has a fast adoption rate.
- Simple and configurable in house algorithms give us flexibility (learning curve)
- Moreover, the use of current assets is optimized.