



LIQUID LEAK DETECTION SYSTEMS

# Case Study

## TTK WATER LEAK DETECTION SYSTEM AT DOHA METRO RED LINE, QATAR

### ABOUT DOHA METRO

The Doha Metro is a rapid transit system in Doha, Qatar's capital city, that became operational on 8 May 2019. It will have four lines with an approximate overall length of 300 km and a total of 100 stations.

The Red Line runs for about 40km from Al Wakra in the south to Lusail in the north, with 18 stations along this line.



### PROJECT OVERVIEW

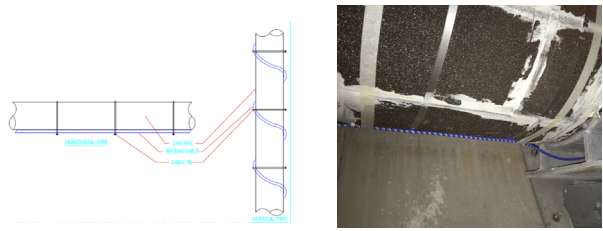
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|----------------------------|--|
| <b>Project</b>             | Doha Metro Red Line  |
| <b>Location</b>            | Doha, Qatar  |
| <b>Application</b>         | Underground Metro Line   |
| <b>Project Type</b>        | New Project  |
| <b>Project followed by</b> | TTK Middle East (Dubai)  |
| <b>Contract Scope</b>      | TTK design and supply; local partner installs, tests, commissions and assures maintenance of the leak detection system |
| <b>Completion Date</b>     | January 2019   |
| <b>Technology</b>          | FG-NET digital monitoring unit<br>FG-BBOX monitoring unit<br>FG-ECS LSZH water sensing cable                           |

### PROJECT REQUIREMENTS

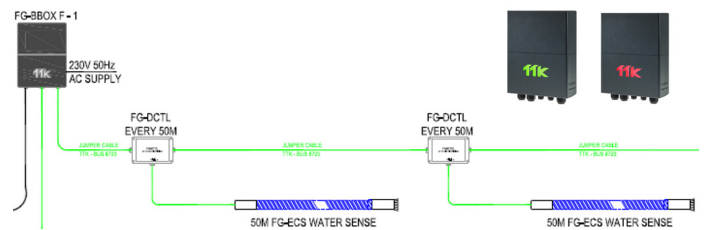
- An efficient water leak detection system capable of detecting multiple simultaneous water leaks with precise location on 13 kilometers of metro tunnel chilled water pipe.
- Cost-saving solution without compromise of technical efficiency.
- Low smoke zero halogen featured material is required.

# TTK's SOLUTION

- To detect at a very early stage and locate a water leak along 13 kilometers of chilled water pipe in the metro red line tunnel, a specific zoning water detection system is studied and adopted on this project.
- A section of 50 meter water sense cable (reference FG-ECS) is fixed on the external core of the tunnel chilled water pipe (positioned at 6 o'clock) on the aluminum cladding by a cable tie (see photo).
- Along the chilled water pipe, an addressable module (reference FG-DCTL) is installed every 50 meters and communicates constantly with the sense cable.
- In the event of a leak on the sense cable, the alarm is triggered on the monitoring panel at station (reference FG-NET), transferred by the addressable module via TTK Bus. Precise information, such as leak time and location, is displayed on an interactive map on the monitoring panel. Within a few seconds this is transferred to the client's site management center.
- In total, 280 sections of 50m length water sense cables are installed for the entire tunnel pipe.
- The quantity of FG-NET monitoring panels is largely reduced by using FG-BBOX – a satellite device for the FG-NET and capable of managing additional sense cables. Monitored by the FG-NET via a standard Ethernet network, the FG-BBOX has the same advanced functionalities as a FG-NET with the ability to detect multiple simultaneous leak locations. All commands and controls are centralised to the FG-NET as the FG-BBOX is not equipped with display. In total, just 5 FG-NET panels and 16 FG-BBOX panels are used to monitor over 13,000 meters of water sense cables.
- Each sense cable used in the Qatar metro red line project is made with special Low Smoke Zero Halogen material (reference FG-ECS LSZH), and emits limited smoke and no halogen when exposed to high sources of heat.
- A similar solution is to be applied on the Qatar Metro Gold Line where TTK is already technically endorsed.



Typical CHW pipe sensing cable installation details

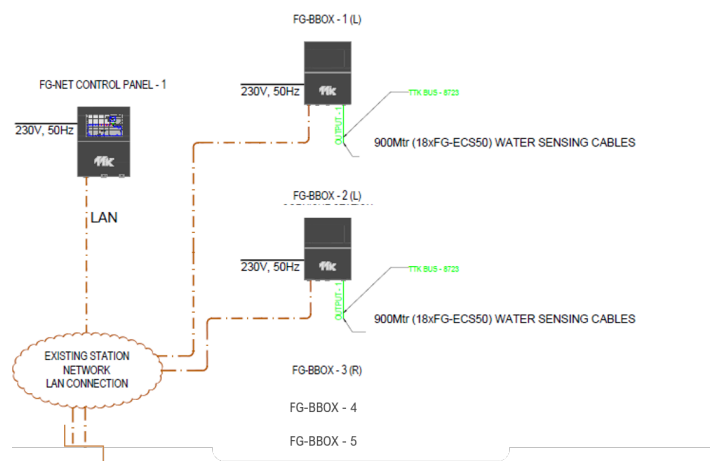


TTK zoning water detection system schematic

FG-BBOX: in normal status (green) and in fault status (red)



FG-DCTL: addressable box



The general working schematics

