LIQUID LEAK DETECTION SYSTEMS

Case Study

TTK LEAK DETECTION SYSTEM
In the
GREAT MOSQUE OF MECCA, KSA

About The Project

Masjid al-Haram, also known as the Sacred Mosque or the Great Mosque of Mecca, is the holiest site in Islam and, as of 2025, the largest mosque in the world, with a capacity to accommodate more than two million worshippers. The mosque's current structure covers an area of over 400,000 square meters.

This project involves the implementation of an intelligent water leak detection system to protect critical technical and service areas within:

- The Shamiyah Expansion Buildings (large auxiliary buildings supporting mosque operations),
- The MATAF area (the open central space around the Kaaba where pilgrims perform the Tawaf ritual),
- Associated technical and service facilities.

PROJECT OVERVIEW

Project	Great Mosque of Mecca
Location	Mecca, Saudi Arabia
Application	Mosque
Project Type	Extension
Project managed by	TTK Middle East
Contract Scope	Design, equipment supply, installation and commissioning
Installation Status	In progress
Technology	Digital monitoring units FG-NET, BBOX, water sense cables FG-EC, ECS

The primary objectives are early leak detection, operational reliability, and risk prevention in an environment that operates continuously and cannot tolerate service disruption.

As a manufacturer and solution provider of water leak detection systems, TTK is actively involved in the system design, installation, and phased commissioning of a comprehensive monitoring infrastructure across the site.

TTK's Solutions

Protected Areas

As part of the ongoing works, the following areas are being protected by TTK leak detection solutions:

- Technical rooms (peripheral protection)
- Wet risers (lowest riser levels)
- -Sump pits
- Service trenches carrying:
- Chilled water
- Zamzam water (holy water drawn from the historic Zamzam Well within the mosque complex, supplied to worshippers for drinking)
- Firefighting pipelines
- Storm water drainage

Installation activities are carried out in a phased manner, aligned with site access constraints and the overall construction and expansion schedule.

Equipment Installed / Under Installation

- FG-NET digital control panels
- FG-BBOX satellite devices connected to FG-NET panels
- FG-DTCS locating controllers
- FG-ECS water and conductive liquid sense cables
- FG-EC addressable water and conductive liquid sense cables

System Configuration

- A large number of control panels distributed across multiple zones and buildings

- Approximately 10,000 meters of sense cable planned to provide extensive and continuous monitoring coverage throughout the Haram Makkah facilities

Conclusion

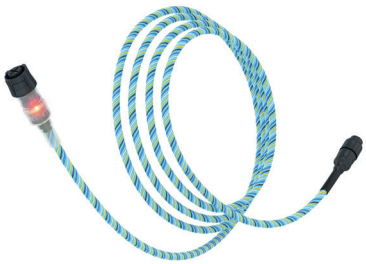
The Haram Makkah project represents one of the largest ongoing installations of TTK water leak detection systems. Through this project, critical technical rooms, wet shafts, extensive trench networks, service buildings, and under-raised floor areas are being systematically protected.

Particular attention is being given to Zam Zam water pipelines and trenches (see image at right), where early leak detection is essential to preserve the sanctity of the holy water and prevent any potential loss. The system has been designed to provide continuous monitoring, clear alarm indication, and accurate leak location identification, supporting faster response and effective maintenance.

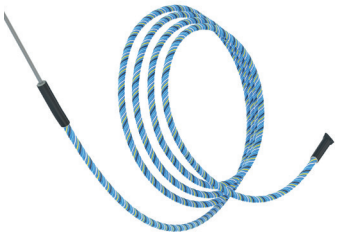
Once fully completed, this installation will demonstrate the scalability and reliability of TTK solutions in highly sensitive, mission-critical environments, while reflecting a careful and coordinated execution approach aligned with the unique requirements of the Haram Makkah site.

FG-NET monitoring control panel

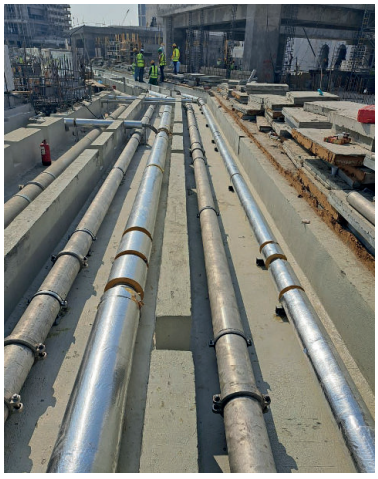
FG-BBOX satellite device



FG-EC addressable water sense cable



Analogue water sense cable: FG-ECS



On-site trench where sense cables are laid beneath the pipelines for continuous monitoring and early leak detection

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