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Intrusion detectors prevent theft and damage at Terracotta Warriors Museum

Customer story

Fast and fail-safe alarms provide security at the Emperor Qin Shi Huang's Mausoleum Museum in China

At China's most-visited cultural heritage sites like the famous Terracotta Warrior Museum and Summer Palace, tourists from across the world come face-to-face with history. Behind the scenes, intrusion detectors from Bosch protect the irreplaceable statues, weapons, and jade ornaments against theft and damage.

For operators of museums, galleries, and historic sites, showcasing public exhibits is a double-edged sword: On one hand, they want to provide visitors with a rich experience of history, unobstructed by barriers and obvious limitations. But on the other hand, they also need to ensure the safety and integrity of the rich cultural treasures on display. Achieving this balance is especially important at UNESCO World Heritage Sites like Emperor Qin Shi Huang's Mausoleum near Shaanxi, China. Discovered in 1974, the site is home to a 2,000-year-old army of clay statues, the Terracotta Warriors, guarding the tomb of China's first emperor.

When the outdated intrusion detection system at the Terracotta Warriors Museum required upgrading, several key security challenges emerged: First, the sheer volume of thousands of visitors per day called for fast and fail-safe alarms when exhibits are at risk. Aside from the constant risk of criminals looking to steal exhibits, the biggest threat comes from tourists dropping their phones or cameras into the pits, then overstepping the threshold and potentially causing damage. Second, the installed solution needed to function under extreme conditions, as the pits holding the several thousand clay warrior statues collect large amounts of dust that can deter detectors.



And third, the security system was to remain discrete without interfering with the experience of the life-sized warrior and horse figures. Keeping these factors in mind, Bosch experts deployed a combination of several hundred intrusion detectors across the 16,300-square-meter museum area. For rapid detection of security breaches, the team installed wall-mounted detectors in the pits alongside the clay warriors, supplemented by ceiling-mounted detectors above visitor walkways and open areas.

Integrated on G Series Control Panels, the detectors rely on Microwave Doppler RADAR and infrared technologies – enhanced by First Step Processing (FSP) algorithms – to detect changes in infrared energy and radar signals when a person oversteps a pre-defined security boundary inside the museum and along the perimeter. Eliminating false alarms from dust and other environmental interference, the detectors in the pits use Passive Infrared (PIR) sensors and Microwave Doppler RADAR. As a special feature, ceiling mounted motion detectors deliver accurate intrusion detection although mounted high on the Terracotta Army Museum's vaulted, 4.8-meter-tall ceilings; far exceeding the limits of standard ceiling detectors by more than two meters.





In case of an actual intrusion attempt, the Bosch G Series Control Panels trigger an alarm to the museum's control room within only two seconds. Aside from the exact location of the triggered detector, the security team also receives surveillance camera images from the scene in real-time, made possible by integration with a third-party video security platform. This situational intelligence allows personnel to respond in a rapid and efficient manner.

Outside the public view, the integrated security system also answers another key requirement for museum operators: As a large part of exhibit pieces are stored away at any time – but still need protection from theft – Bosch detectors safeguard the storage facilities that can therefore remain unmanned, saving significant personnel cost. The result is a win-win situation: Museum operators enjoy the peace of mind that comes from knowing that historic exhibits are safe from theft, damage, and intrusion. And visitors receive an up-close-and-personal experience of ancient artefacts without any fences and barriers limiting the experience.



“The cooperation with Bosch is an excellent showcase of modern high-tech protection of historic buildings. Bosch intrusion alarm systems help to upgrade the security level of these unique historic sites.”

Ren Xuxin, Project Manager of Xi'an Terracotta Warriors and Horses Pit Security Upgrade Project