

Chinese Heritage Buildings

Curators of Chinese heritage install invisible smoke detectors to protect ancient temples without marring their beauty.

Chinese heritage buildings

Ancient temples, palaces and mausoleums in China.

Location: Mainland China

Industry

Historic and cultural

Products used

VESDA detectors

The Challenge

Many magnificent Chinese heritage masterpieces have been destroyed by fire. The Qin Dynasty's Efang Palace and Mausoleum of the First Qin Emperor are examples. The Forbidden City (Imperial Palace of the Ming and Qin Dynasty) has been ravaged by several fires in the last few centuries and only a handful of original Ming palaces remain. These buildings and their contents are irreplaceable works of art and the Chinese State Administration of Cultural Heritage is actively encouraging their protection from fire¹.

Largely made from wood that has dried for centuries, these buildings are extremely flammable. Their construction is often intricate with many wooden beams and brackets used to support a large rooftop. This forms a tight enclosure, making it difficult for smoke and heat to escape—any fire might cause the building to collapse and be totally lost. And this can all happen in a very short period of time, making it essential that fires are detected early.

Not only are the buildings highly flammable, their contents frequently are as well. Wooden furniture, painted screens and curtains are ideal fuel for a fire triggered by a cigarette carelessly discarded by a tourist. Aged electrical wires, degraded insulation, incorrect usage of electrical appliances and burning candles all increase the risk of a fire.

Chinese heritage buildings are normally arranged in groups with different rooms connected by covered walkways and corridors. This arrangement allows fire to spread easily to adjacent buildings causing more widespread damage. The buildings are often in mountainous areas where water may be scarce, making it even more difficult to fight a full-blown fire.

And even if a fire is quickly extinguished, smoke and water damage could potentially ruin priceless artefacts.



Customer success story

Traditional point smoke detectors often fail to protect such buildings. The intricate architecture can trap smoke in pockets in the ceiling, preventing it from reaching the detector. On a windy day, the increased air flow in these old and draughty buildings can dilute the smoke further, allowing the fire to grow much bigger before conventional point detectors go into alarm.

Point detectors are also difficult to install unobtrusively as they must face the environment they need to protect and cannot be painted. Their large white surface area conflicts with the intricate artwork normally found in these environments.

The Solution

VESDA very early warning smoke detection systems are ideally suited for the protection of these environments and have already been installed in several Chinese heritage sites, including Shenyang Forbidden City. These systems are ideally suited for such buildings. Their high sensitivity and continuous air sampling capability means the earliest possible warning of a potential fire. The VESDA systems were installed so that the detection points were positioned where the smoke actually went: in pockets in the ceiling or below ceiling level in buildings with very high ceilings.

The VESDA system is hundreds of times more sensitive than a traditional point detector. Even when smoke has been diluted by a draught blowing through the building, or by air conditioning, it will be detected and an alarm raised.

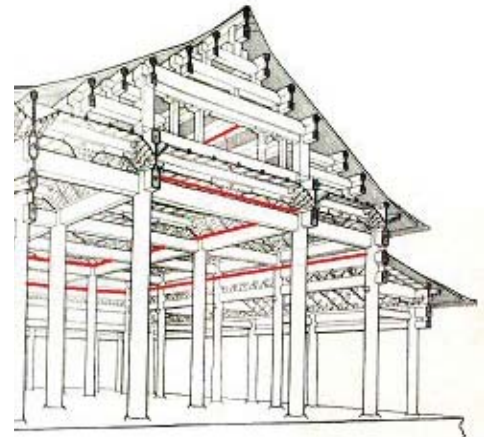
Adjustable alarm levels allow the elimination of nuisance alarms, which is especially important in these public areas to prevent unnecessary panic amongst visitors.

Curators have also appreciated the ability to install the VESDA system so that it is almost invisible. Instead of screwing ugly traditional smoke detectors into intricate carvings and paintwork, the VESDA smoke detectors have been concealed within the building. The pipe network that brings the air samples to the detector is installed on top of ceiling beams. Unobtrusive capillary tubes are then attached to draw air samples into the pipes and back to the detector. The tubes can be placed throughout the environment and can be installed to provide protection of high risk items, for example above altars. The VESDA detector and associated electronics can be hidden in a control room or in a cupboard.

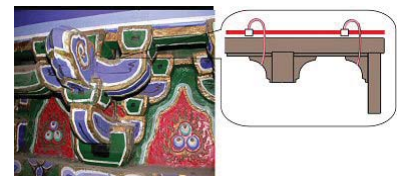
The Result

VESDA smoke detectors are now protecting several Chinese heritage sites. The curators of these sites enjoy the low maintenance requirements of these systems and the lack of false alarms. The tourists enjoy the beauty of the buildings, unblemished by harsh 20th century smoke detectors. The world will enjoy these ancient works of art for many more years.

1. More information available (in Chinese) at: <http://www.china-fire.com/law/law/33.htm>.



The pipes that carry the air samples back to the smoke detector are installed on top of ceiling beams where they are out of sight.



Tiny capillary tubes can be dropped from the pipes and hidden within the decorative detailing. The tubes can even be painted to be completely camouflaged.



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