



Smoke Detection on Trains

Minimize asset loss from
arson

Ensure passenger safety
from fire

Reduce service disruption
caused by overheating
electrical equipment

Monitor smoke levels for
passenger comfort

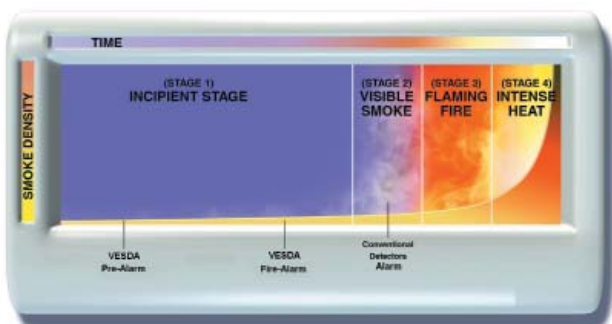
VESDA[®]
by  **xtralis**[™]

Trains—a unique fire engineering challenge

The challenge

Whilst the fire load of a typical passenger rail car is low, the possibility of arson or electrical fires is high. The loss of life and property damage caused by a fire in introduced materials can be potentially tragic. Such losses can be minimized by ensuring the earliest possible detection of a fire, thus allowing appropriate action to be taken.

Passenger railcars represent a unique challenge for engineers designing a fire detection system. Traditional point-type smoke detectors are not suited to trains. High levels of dust and lint frequently cause them to false alarm. Also, the high airflow in a rail car dilutes smoke, making the detection of low levels of smoke difficult for these detectors that passively wait for smoke to reach them.



Fire Growth Curve

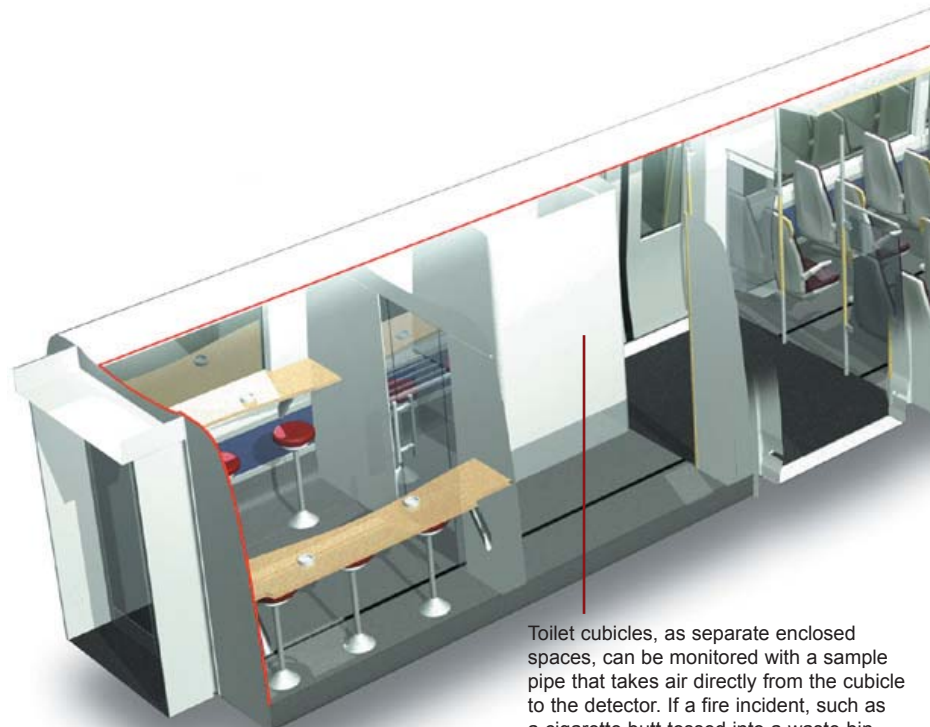
VESDA detectors offer multiple alarm levels. This allows the widest possible window of opportunity to detect and manage fire threats.

The VESDA solution

A VESDA very early warning smoke detection system, contained within the HVAC system on a passenger rail car, is the ideal solution for smoke detection on trains.

VESDA—the world's leading aspirating smoke detection system—provides the earliest possible warning of a potential fire event by detecting smoke particles at the incipient stage of fire. (Refer to Figure below). Detection at this early stage enables proactive investigation of the source of the smoke. Action can be taken before the fire escalates. Loss of life from smoke inhalation can be prevented. A safe evacuation can be managed.

An additional benefit of very early warning is the protection of service provision. With the overheating of dense electrical and switching systems being a common cause of service disruption, detecting the very low levels of smoke produced by such overheating allows action to be taken before service is disrupted.



Toilet cubicles, as separate enclosed spaces, can be monitored with a sample pipe that takes air directly from the cubicle to the detector. If a fire incident, such as a cigarette butt tossed into a waste bin, does occur the train driver will receive the earliest possible warning of the risk.

Integrating smoke detection with the HVAC

Placing aspirating smoke detection in the plenum of the HVAC system offers many advantages:

- Installing the detector within the plenum ensures a relatively stable operating environment, with constant temperature and humidity.
- The return air filter* of the HVAC system removes dust and lint from the air before it reaches the smoke detector. This reduces maintenance.
- The HVAC system acts as a turbo-charged smoke delivery system. This ensures that air samples are collected from all areas of the rail car.
- Access to the detector is simple. Opening the HVAC plenum allows direct access for maintenance.
- The smoke detection system is completely concealed and one less target for vandals

Reducing the cost of ownership of smoke detection on trains

Programmable sensitivity enables the detector to reliably distinguish between low level risks and real threats to service continuity, property or life. The cost of responding to alarms is reduced without compromising safety.

For example, suspected cigarette smoking or other threats to passenger comfort, might be verified during a routine inspection. High levels of smoke might activate emergency procedures.

VESDA detectors have a built-in self-health check. Fault indicators will indicate when maintenance is required, saving on the cost of routine preventative maintenance.

Easy integration of the smoke detector into the train management system (TMS/TOS) via the HVAC interface.

Specific sampling points can be placed where there is a high fire risk, such as in switch cabinets

The high airflow of a train salon dilutes smoke, making traditional point detectors ineffective. By placing an aspirating smoke detector in the HVAC plenum, the airflow brings the smoke to the highly sensitive detector. This also removes the need for a pipe network to support the detector, reducing installation costs.

Faults and alarms can be relayed to the driver interface in the engine cab. The VESDA detector generates an incident log that can be later used for investigation purposes.



*Each application requires validation.

Why VESDA?

VESDA high sensitivity aspirating very early warning smoke detection systems lead the world, with over 185 000 detectors installed worldwide.

Comprehensive product range—meets varied application needs

Fault tolerant and reliable—reduces false alarms and cost of ownership

World's widest sensitivity range—VESDA can trigger a response appropriate for the level of fire threat

Recognized as the global benchmark technology—have confidence that you are getting the latest, proven technology

Why Xtralis?

Global sales and service network—support wherever you need it

Dedicated team of Applications Engineers—from ideas to system validation

Custom solutions—our OEM team can design a solution for your application

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