

INDUSTRIAL “HOW TO INSTALL” SERIES

HIGH VIBRATION ENVIRONMENTS



Introduction

Many industrial applications have fire risks that exist in areas where constant vibration is present. Vibration can be caused by equipment or machinery within the area and may have an impact on the smoke detection system if mounted on walls or structures in close proximity to where the fire risk exists.

Vibration occurs in many situations through a variety of processes and is generally associated with:

- Machinery / Mobile plant
- Conveyors
- Processing equipment
- Etc.

Whilst the above are only a few examples, there are many other causes for vibration which must be considered when installing and mounting Aspirating Smoke Detection (ASD) systems. Damage as a result of direct or referred vibration may occur thus limiting the smoke detection system's life and/or impairing its performance.

Conveyor Environments

Conveyors running within galleries or tunnels are known to create significant vibration. Industries include mining where many conveyors exist, power generation, steel manufacturing and food processing facilities.



Figure 1 – VESDA VLI in Conveyor tunnel

Mobile Plants

Although ASD is widely used in fixed industrial applications it has also been successfully installed on large mining equipment and other mobile plants. In particular;

- Drag Lines
- Shovels
- Hauler trucks
- Agriculture equipment



Figure 2 – Dragline with VESDA detector installed

Some mobile plants will have higher vibration levels than others, e.g. mining shovels, depending upon the size and activity undertaken. Nonetheless, this aspect needs to be considered in design.



Figure 3 – Mining Shovel with VESDA detection

ASD is typically used to provide early smoke detection for this type of mobile plant in areas such as electrical switch rooms, hydraulic areas and other locations that represent a fire risk. The location and positioning of the detector is important to minimise the effects of vibration.



Figure 4 – Detector and Pipes in Roof Space



Figure 5 – Sample pipe in Shovel

Detector Mounting

Regardless of the application, whether in a building or on mobile plant detectors should be mounted on a solid and rigid foundation ideally using backing struts or board. Both the backing struts/board and detector will also need to have suitable rubber vibration mounts installed that will absorb and minimise vibration to the detector.

Vibration mounting equipment is readily available as off-the-shelf items.

Pipe Networks

Subject to the type of application, consideration should also be given to the fixing of the pipe network in vibration areas.

Sampling pipes should be well glued and fixed at intervals closer than would typically be used in standard applications. Expansion joints are also recommended and pipe saddle fixings should be well secured but allow for expansion and contraction.

Robustness

It is essential that when installing any detector in high vibration areas that the detectors are fit for purpose, i.e. have undergone testing such that they can withstand the rigors of the application.

Purpose built detectors such as VESDA's "Industrial" VLI have undergone specific testing, conditioning and approvals to an "IK" rating.

IK is essentially an impact test, and is covered in Standards such as EN 54-20, and UL based on IEC 62262.

The VLI is submitted according to EN 54-20 clause 6.11 (Impact operational) to an impact energy of 0.5 J which is similar to the IEC 62262 requirements.

For more information on how your business can benefit from the Xtralis solution for Industrial Applications, please visit www.xtralis.com/industrial or contact your local office or Authorised Partner for expert advice and assistance with design.