



### » IFAB

IFAB is one of the most experienced fire protection consultancy and testing companies for rail applications in Europe. IFAB's engineers are the correct partners when it comes to fire safety aspects in all kinds of rolling stock applications, such as locomotives, light rail vehicles, double deck coaches, high speed or special rail vehicles. IFAB is also an accredited fire test laboratory with own fire testing facilities which ensures that all testing services are provided with the highest quality following the respective standards. IFAB's team has been involved in fire protection for over 1000 rail vehicles so far.

### » WHY HOT SMOKE TESTS?

Hot smoke testing in rail vehicles is used as functional proof procedure for the positioning of fire detectors. The assessment of correct detector positioning should latest be done during commissioning of the applied fire detection system. Pretesting of possible detector positions is recommended, as it helps to design the fire detection system correctly and potentially also to optimise the number of necessary detectors. The primary objective is to measure response times of detectors with standardized test procedures. There might be also some other objectives like locating the fire which is essential for triggering automatic on board fire suppression systems or shutdown of HVAC systems. Hot smoke tests are the most practical and realistic way to test fire detection systems in rolling stock.

### » METHODOLOGY?

Smoke detectors are usually used in passenger or staff areas with a typical design fire caused by vandalism. For testing such fire detectors which work on smoke criterion, artificial smoke is produced by a special generator inside the vehicle. The physical properties for the smoke are given by using a special device to produce thermal lift of the smoke. The test itself is non-destructive and does not cause any harm to persons or to the vehicle. IFAB's test equipment fulfils ARGE-Guideline requirements. The response times of detection systems are measured in order to assess pass and fail criteria. It is very important to ensure that all possible vehicle operating scenarios are tested, e.g. HVAC on/off, doors open/close, as such conditions have different impacts to smoke movements. Other detection methods, based on e.g. temperature or flame criterion, may be used in combination with smoke detection. These can be assessed either experimentally or partly by using CFD in addition. IFAB is able to test such detection systems using different fire scenarios.

### » WHERE?

IFAB can carry out tests worldwide in real vehicles with its mobile testing equipment.

IFAB's fire engineers carry out the tests completely according to the test protocols prepared in advance. A final report is delivered after testing. IFAB has so far carried out smoke tests in 12 different countries.

### » OPTIMIZATION AND COSTS?

Sometimes the performance of the detection systems can be optimized by using IFAB's design services. The purpose is to find best possible locations and technologies for detecting design fires. Reducing the number of detectors can lead to major cost savings in larger projects. It may also lead to reduction of integration works, which are often challenging in refurbishment projects. IFAB uses its own test databank, analytical studies and numerical simulations (CFD) in order to find the optimal locations and number of fire detectors.



Smoke tests in over 50 different rail vehicles



Demonstration of hot smoke



Hot smoke in real vehicle

## ■ FIRE SAFETY SERVICES

CONSULTING

CONCEPTS

FEASIBILITY STUDIES

RISK ANALYSIS

CFD (FIRE, SMOKE, EVACUATION, VENTILATION, SUPPRESSION)

PERFORMANCE BASED DESIGNS (FIXED FIRE FIGHTING SYSTEMS)

TENDER PREPARATION AND EVALUATION

FIRE TESTING (LABORATORY OR FULL SCALE)

SMOKE TESTING

APPROVAL SERVICES

FIRE INVESTIGATIONS

SEMINARS, TRAINING

RELIABILITY ENGINEERING

## ■ FOR

TUNNELS & METRO

RAIL

BUILDINGS & INDUSTRY

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