

Loss Prevention Standards

Engine Powered Mobile Plant

Introduction

In numerous occupancies from ground works, building sites through to the most complex manufacturing risks, diesel powered (internal combustion engine) mobile plant, in many forms, is used on a daily basis to support operations including commodity movement and processing. This equipment can be machinery such as fork lift trucks, loaders, 360 degree telehandlers, shovels, diggers, trommels, shredders, etc.

Whenever we have an internal combustion engine, we have multiple ignition sources. This coupled with combustible fuels; combustible lubrication/oils (flowing through pressurised lines); combustible commodities; dust; poor housekeeping or cleaning regimes; continuity of combustible materials; constant operation; etc. creates the environment for a significant fire hazard. Aviva see numerous such fires and based on how and where the vehicle is used, parked, time of the day and nature of the surroundings, this can result in significant property damage (as well as potential danger to plant operatives), and business interruption impact wider than just the mobile plant itself.



The key to managing this risk is to firstly understand and accept there is an exposure; then to include any mobile plant and equipment in formal fire risk assessments.

Note: This standard relates to the equipment itself and the engine chamber. It does not include the type of equipment and what the equipment processes or moves. As an example, in a waste handling facility automatic fixed fire suppression would also be required for any processing areas where a mobile shredder or trommel is used. A fire in the processing side of the equipment still exposes the site activities to significant property damage, resulting in potentially long-term business interruption and serious financial loss.

Note: Mobile plant is a term used for an independently powered (not fixed electrical mains supply) piece of equipment; regardless of whether it physically moves or is stationary - e.g. equipment that is located in one place all the time but is independently powered and has the capacity to move is considered 'mobile'.

Assessing the Risk

When considering any fire risk assessment there is a definite need to include mobile plant. From a business perspective, this risk assessment should include property values and business interruption exposures and not just your responsibilities for complying with the Regulatory Reform (Fire Safety) Order 2005, in which the risk assessment required is primarily driven by life safety requirements.

Any assessment should:

- Review security and fire protection arrangements to determine whether they are adequate for the risk and assess the need for additional protections
- Include when and where the mobile plant is in use and when it is inoperable or idle
- Record and review the assessment(s) periodically and assure yourself they are fit for purpose

Controlling the Hazard

Management Procedures

All employees should be made aware of the fire risks posed by such equipment (and the response procedures) including when it is in use and when it is idle.

For sites that include any 'burning activities', any mobile plant should not be used to handle or process material in the vicinity of a fire. The exposure to the mobile plant is too great and there is a higher potential for an uncontrolled fire.

Housekeeping:

- At the end of each shift, the mobile plant should be cleaned of all debris and any oil and fuel accumulations. Ideally this should be air blown or water jet cleaned, in:
 - The engine compartment
 - The wheel arches
 - The exhaust areas; and
 - Generally, anywhere where material can accumulate.
- At least once every month the equipment should be steam cleaned or cleaned by high pressure water hose in the engine compartment, brake, fuel and oil tank compartments, etc.
 - This is obviously dependent on the working environment
 - In some cases, the frequency of such cleaning should be increased

Location of mobile plant when not in use:

- Mobile plant should be left outside of any building
- It should be kept at least 15m away from any other item/equipment, other mobile plant, any building or yard storage

Note: The location of the equipment needs to be balanced between the inherent fire risk exposure of the mobile plant itself, and the security/malicious damage exposure caused by positioning it in a more vulnerable position.

Note: Aviva see many fires associated with mobile equipment that start when the unit has been idle for a period. Slow smouldering fires can go undetected for some time before growing.

Fire watch:

At the end of any shift or when mobile plant is not used, it should be observed by a competent individual for at least 30-minutes after use. If the risk factors of the site are such that the potential for fire is greater, then this time period should be increased. The person completing the fire watch period should be trained to use fire extinguishers and/or hose reels and know where the fire extinguishing equipment is located.

Maintenance Activities:

Maintenance of the mobile plant should be completed in an area with low combustible loading or ideally in a predominantly sterile environment, at least 15m away from any main structures and/or assets, and always in accordance with manufacturer's recommendations.

Emergency Response Plans:

The site emergency response plans should consider a fire on or associated with the mobile plant. While life safety should always be the primary concern, with proper training and appropriate fire extinguishing equipment, a formal joined-up emergency response plan should provide a degree of property protection.

Appropriate fire extinguishers and hoses should be provided around the site, in the vicinity of the mobile plant and in the case of portable fire extinguishers, within the cab of the mobile plant, readily accessible to the operator.

Pertinent training and retraining for drivers should be provided in the areas where mobile plant is being used. In an emergency, consideration should be given to:

- Driving/moving the mobile plant to a safer position, e.g. outside to a sterile area
- Manually shutting down the engine (rather than wait for any automatic interlocks)
- Using appropriate fire extinguishers and where possible hose streams to suppress any fire

Physical Protection: Fire Protection Solutions

For mobile plant:

Where the:

- Exposure/value of the equipment itself is large, i.e. approximately £100,000 or more;
- Or the occupancy is hazardous in nature, e.g. waste storage or handling facilities;
- Or the values exposed by a fire in such equipment is large, e.g. mobile plant less than £100,000 in value, but the mobile plant is used in a building or has to be housed in a building with a value or business importance greater than £100,000; consider the following:

All hot zones or potential hot zones within the equipment should have an appropriately certified [FM Approved](#) pre-engineered, automatically and manually actuated fire suppression system installed. This will be provided with automatic interlocks to shut down the engine. Such systems will provide extra protection for operators to safely evacuate the mobile plant, whilst helping to minimise damage to the mobile plant and surrounding buildings and equipment. Any fire suppression system needs to be installed, tested and commissioned by competent persons, and serviced, maintained and used in accordance with the manufacturer's recommendations. Aviva recommends the use of fire protection solutions designed by the following organisations:

- [Amerex Fire International Ltd:](#)
 - Adam Patchett, Business Manager – Systems, Amerex Fire International Ltd, Unit 55 Springvale Industrial Estate, Cwmbran, NP44 5BD
 - 07714 399629/01633 627000
- [Ardent Ltd:](#)
 - Emma Kirk, Sales Manager, Ardent Limited, Unit 3, Becklands Close, Bar Lane, Roeclyffe, Boroughbridge, North Yorkshire, YO51 9NR
 - 07985 975052/01423 326740
- [Kidde Fire Protection:](#)
 - 1st Floor Stokenchurch House, Oxford Road, Stokenchurch, High Wycombe, Buckinghamshire, HP14 3SX
 - 01494 480410

When considering the fire protection system, the following areas are critical and this is why Aviva have selected the above three organisations:

- The piping type, fixings, fittings, location of nozzles/cylinder, etc.
- Interlocks that need to be provided to shut down the mobile plant
- When the mobile plant is repaired; and how a system can be damaged, compromised or impaired
- Identifying the risk areas to help prescribe the number of discharge nozzles;
 - Belly pan
 - Hydraulic compartments
 - Turbochargers
 - Left engine
 - Right engine
 - Exhaust manifolds
 - Wiring looms, etc.
 - Heat and fuel source
- Based on the nature of the mobile plant and the occupancy;
 - If there is a re-ignition risk then a twin-agent wet chemical and dry chemical system may be required. If not, a dry chemical system may be appropriate
- The stored volume of extinguishing agent(s) should be based on the number of discharge nozzles
- There should be formal/recorded 6-monthly inspection/maintenance of the systems

For the buildings:

In buildings where the occupancy, construction, values or business risk exposure, etc. is such to warrant it, automatic fixed fire suppression/automatic sprinklers should also be provided. This is in addition to any local or spot protection systems within the mobile plant itself.



Security Measures

Mobile plant can present an increased theft risk and can be stolen to order. It can also be stolen to be used as part of other crimes, e.g. ram-raid. The location of the mobile plant when not in use and its arrangements can increase this exposure. In addition, mobile plant is also an attractive target for malicious damage and arsonists.

A formal security risk assessment should always be completed, and the following issues considered:

- What equipment do you have and how attractive would it be to theft?
- Are you aware of any history of theft, malicious damage or arson in your local area?
- Is the mobile plant located within a secure site, in a compound, out in the open, rural or metropolitan area, etc.?
- What key management system is in place (e.g. removing ignition keys and storing in a secure area)?
- Are the security provisions provided such as lights, alarms, fencing, guarding, etc. consistent with the risk?
- Are the fire protection measures provided consistent with the security risk?

Summary

Mobile plant comes in many shapes and sizes. In itself, it poses an inherent fire and security risk. Add that to the type of operations it completes, the nature of its surroundings, its value, the way it is maintained, etc., and the risk factors increase. As a result, the fire and security exposures of mobile plant and the wider implications to any site or buildings where it is used should always be carefully considered. It is worth remembering that all fires start small and a hot spot on a dusty/dirty engine growing in size outside of operating hours, could eventually create an open fire situation that might threaten any site or building.

Checklist

A generic Engine Powered Mobile Plant Checklist is presented in Appendix 1 which can be tailored to your own organisation.

Additional Information

- [FM Approval Standard: 5970 – Heavy Duty Mobile Equipment Protection Systems](#)

Further risk management information can be obtained from [Aviva Risk Management Solutions](#)

Please Note

This document contains general information and guidance and is not and should not be relied on as specific advice. The document may not cover every risk, exposure or hazard that may arise and Aviva recommend that you obtain specific advice relevant to the circumstances. AVIVA accepts no responsibility or liability towards any person who may rely upon this document.

Appendix 1 – Engine Powered Mobile Plant Checklist

Location	
Date	
Completed by (name and signature)	

	Engine Powered Mobile Plant	Y/N	Comments
1.	Have all items of 'mobile' plant/equipment been identified and recorded on a formal register? <ul style="list-style-type: none"> • Manufacturer? • Model? • Value? • Owned or leased, etc.? 		
2.	Has a competent person(s) completed a fire risk assessment including this equipment? <ul style="list-style-type: none"> • Is it up to date? • Does it take into account different times of day/year and the changing activities of the mobile plant? • Does it take into consideration the mobile plant in operation and when idle? 		
3.	Has a competent person(s) completed a security risk assessment including this equipment? <ul style="list-style-type: none"> • Is it up to date? • Does it take into account different times of day/year and the changing activities of the mobile plant? • Does it take into consideration the mobile plant in operation and when idle? 		
4.	Are risk assessments updated when new equipment is received? <ul style="list-style-type: none"> • Even if the equipment is temporary? 		
5.	Are all employees aware and trained on the fire/security hazards associated with the mobile plant?		
6.	As part of the day to day operations, are 'burning' activities completed? If yes then is the mobile plant prohibited from being within 15m of these activities?		



	Engine Powered Mobile Plant Contd.	Y/N	Comments
7.	<p>Is there a formal and secure key management system?</p> <p>Keys should not be left in the mobile plant when not in use.</p>		
8.	<p>Is all mobile plant cleaned (air or water jet) at the end of each shift?</p> <ul style="list-style-type: none"> • Engine compartment? • Wheel arches? • Exhaust areas? • Generally, anywhere where material can accumulate? <p>Is this formally recorded?</p>		
9.	<p>Are regular inspections of mobile plant and equipment completed, e.g. pre-shift?</p>		
10.	<p>Is all mobile plant deep cleaned (steam or high pressure jet wash) at least monthly?</p> <p>Is this formally recorded?</p>		
11.	<p>Is the mobile plant observed by a trained/competent individual for at least 30-minutes at the end of each shift?</p> <ul style="list-style-type: none"> • Or when it is idle? i.e. like a hot work fire watch. 		
12.	<p>When not in use is all mobile plant left outside of any building?</p> <p>If the security and arson/malicious damage risk isn't exacerbated, is there a 15m clear separation distance between it and:</p> <ul style="list-style-type: none"> • Any buildings/structure? • Any yard storage? • Any other mobile equipment? 		
13.	<p>Is maintenance on the mobile equipment completed in a largely sterile area physically detached from any main site activities?</p>		
14.	<p>Is the mobile plant inspected and maintained in accordance with the manufacturer's recommendations?</p>		

	Engine Powered Mobile Plant Contd.	Y/N	Comments
15.	<p>Are all operators formally trained to use the mobile plant, also trained to:</p> <ul style="list-style-type: none"> • What to do in an emergency? • Shut down the engine/equipment in an emergency? • Move the mobile plant to a safer location? • Use portable fire extinguishers and hose streams to tackle a fire on the mobile plant? 		
16.	<p>Are the items of mobile plant protected with an automatically and manually actuated FM Approved fire suppression system?</p> <p>Is this interlocked to shut down the engine before extinguishing agent release?</p>		
17.	<p>Are any fire suppression systems inspected, tested and maintained in accordance with the manufacturer's recommendations?</p>		
18.	<p>Are automatic fixed fire suppression/automatic sprinkler systems provided within any buildings?</p> <p>Can these appropriately protect the activities/processes associated with the mobile plant?</p>		
19.	<p>Additional comments:</p>		