Loss Prevention Standards – Asset Class(es)

Travelling Ovens – Property

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Travelling ovens in food production premises can be vulnerable to fire damage. Issues such as breakdowns, faults, over temperature and poor housekeeping can result product igniting, with fire potentially spreading through the premises via conveyor systems, or to other combustible materials in proximity.

This Loss Prevention Standard provides an overview of the main risks associated with travelling ovens, and guidance on reducing the potential for loss and/or damage.

AVIVA

Travelling Ovens – Property

Introduction

Fires in food production businesses can cause catastrophic levels of damage. Even if a fire is bought under control and confined to a small area, the smoke and firefighting water can contaminate wall and ceiling surfaces, machinery and destroy stock and packaging.

Travelling, or continuous ovens, are common in many food production premises. They are an efficient and consistent means of cooking food product, however they have been associated with a number of fire incidents including this bakery fire in London in May 2022.

This Loss Prevention Standard describes the associated hazards in more detail and provides useful risk management guidance to help reduce the potential for loss events. Refer to Aviva Loss Prevention Standard **Travelling Ovens – Fire Detection and Protection** for guidance on the most appropriate fire detection and protection types for travelling ovens in food production premises.

Note: This document is focussed on Property loss prevention in relation to travelling ovens. It is not intended to address Liability exposures. The presumption is that all regulatory requirements, Fire Risk Assessments, and compliance with requirements placed by the local authority having jurisdiction which would include licencing, building permissions, regulations, codes, or standards, have or will be met.

Understanding the Risks

Ignition hazards include:

- **Product ignition**. Products being cooked in the oven or accumulated combustible crumb and waste residue can ignite due to incompatible temperatures, process failure or incorrect cooking methods/error.
- **Fats, oils and grease**. Accumulations of fats, oils and grease (FOGs) in the oven, flues, fans, conveyors etc. can be ignited by sparks or high temperatures.
- **Overheating.** Incorrectly set cooking temperatures.
- **Burning products entering the oven**. Products may already be alight when they enter the oven.
- **Jammed/trapped product**. Products can become jammed or trapped, potentially leading to overheating or an accumulation of goods coming into contact with heating elements and igniting.
- **Safety system failure**. Thermostatic controls, thermocouples, temperature sensors etc., may become faulty and fail to prevent overtemperature.
- **Gas**. Gas leaks, failure of pilot flame safety devices, incorrect gas purging when starting/restarting ovens may result in accumulations of flammable gas.
- **Electrical**. Overheating motors, shorting, malfunction, or overload and static.

The potential for fire propagation can be aided by:

- **Combustibility**. Cooked goods and products may be combustible or feature combustible glazes and coatings. Greasy residues and combustible crumb etc., will accumulate in or beneath oven equipment and flues supporting fire growth. Other combustible goods e.g., materials, packaging etc., may also be located in proximity.
- **Travelling fire**. Fire can spread throughout the premises as conveyors continue moving.
- **Encasement**. Ovens and extraction ducts are typically encased/enclosed. This can hinder firefighting efforts and also can increase the potential for gas or dust explosion incidents.
- **Air**. Traveling ovens typically feature air intake systems, which can support fire propagation.
- **Fire protection**. Lack of, or inappropriately/incorrectly specified fire protection can result in uncontrolled fire development.

Water and Other Fluids

Fire and smoke are not the only concern, water and other fluid related incidents can arise due to:

- Leaks from overhead pipework penetrating oven and/or control cabinets.
- Ingress from blocked or damaged guttering.
- Faults with liquid dispensers i.e. glazes, toppings etc.
- Inadequate containment of flammable liquids such as oils in bunded containers.

Managing the Risks

Business Impact Assessment

Before initiating risk management controls or considering fire detection and protection systems, an assessment of the anticipated/possible financial losses, for both the material damage and business interruption exposures, in the event of a significant or catastrophe loss event should be undertaken. This helps ensure any risk management controls and fire detection and protection systems are sufficient and reflective of the potential loss estimates.

Any proposed changes to business activities, equipment and the premises should also be managed through a formal Management of Change process. This helps ensure all stages of the change are progressed with the minimal exposure to the existing arrangements. These proposed changes should also be discussed with your Property Insurer and Insurance Broker.

Refer to the Aviva Loss Prevention Standards **Material Damage Risk Assessment**, **Business Impact Analysis** and **Managing Change** for further guidance.

Oven Equipment

- Oven equipment should be sourced and installed by approved companies in line with an established procurement policy.
  - ✓ Choose reputable and established brands.
- Second hand equipment should be overhauled as necessary to replace seals etc., thoroughly tested and controls, timers and safety features calibrated before being put into use.
- Ensure gas/oil isolation valves are accessible and located remotely from the oven plant, ideally on an escape route.
  - ✓ Operatives should be adequately trained on emergency isolation procedures.
- Gas or oil pipes should be protected against the risks of impact or accidental damage, and clearly identifiable.
- Gas or oil pipes should not be located directly over, or in immediate proximity, to oven plant.
- Electrically powered oven equipment should feature two high temperature failsafe devices to ensure safe isolation in the event of a thermostat/thermocouple fault.
- Ensure any combustible insulation used within the oven are replaced with non-combustible insulating materials.
- Oven equipment should not be located in proximity to combustible construction elements, including insulated composite panels with a combustible core.
  - ✓ Such materials and panels, where present, should be removed. Where this is not achievable in the short term, ensure at least 3 metres separation between ovens and combustible construction elements.
- Some oven equipment, typically direct fired plant, may produce flammable gases or vapours which can create an explosion risk. This should be adequately risk assessed and explosion relief systems and explosion rated electrical components incorporated where appropriate.
  - ✓ Review any issues with ejected product from conveyors within ovens, typically associated with misaligned belts, motors, obstacles etc., and take appropriate corrective action.

- Install sensors to detect any product falling from belts where possible and implement a standard operating procedure to remove such product from the bottom of ovens prior to ignition.

Conveyor Equipment

Associated conveyor systems should be made of non-combustible materials where available and designed to withstand a fire without collapse. Aviva are aware of an incident involving a plastic conveyor igniting after coming into contact with burning products.

- Ensure the supporting frame and structure is non-combustible.
- The use of intumescent finishes to conveyor supports should be considered if there is a significant risk of collapse during a fire event with resultant damage to critical infrastructure, equipment, fire protections, fire compartmentation etc.
  - ✓ A fire resistance rating of at least 90 minutes (insulation and integrity) is recommended.
- Use non-combustible conveyor belts. If this is not possible, use fire-retardant belts if operating parameters allow them to be used.
- If an enclosure around or over the conveyor is needed, ensure materials are non-combustible.

Refer Aviva Loss Prevention Standard **Conveyors** for further guidance.

Compartmentation

Given the potential for fire to spread to other areas of the premises via oven connected conveyor systems, travelling oven equipment should ideally be located within a fire resisting compartment achieving at least 90 minutes fire resistance (integrity and insulation).

- Penetrations through the compartment wall, ceiling or other voids for pipework, cabling etc. should be fire stopped to provide a commensurate fire resistance as the wall/ceiling, and where necessary fitted with intumescent seals or collars which will seal the opening in the event of fire damage, to also provide a commensurate fire resistance rating as the wall/ceiling.
- Any ducting for air handling/ventilation purposes through the compartment walls/ceiling should be fitted with fire dampers to provide a commensurate fire resistance rating as the wall/ceiling. In the United Kingdom, such dampers should be compliant with LPCB Loss Prevention Standard **LPS 1162 Requirements and tests for the LPCB approval and listing of fire dampers**, which conforms to BS EN 1366, and installed by a contractor approved to install fire dampers to LPCB Loss Prevention Standard **LPS1531 Requirements for the LPCB approval and listing of companies installing or applying passive fire protection products** or other similar UKAS approved third-party accreditation scheme.
- Extraction flues should be double skinned and insulated and provide a commensurate fire resistance as the wall/ceiling where passing through a compartment wall/ceiling.

  Note: Fire dampers are not typically recommended for cooking extraction systems.

- Automatic fire shuttering should be installed to conveyor openings to achieve a fire resistance rating commensurate with the fire compartment wall, floor, or barrier.
- In the United Kingdom, fire shutter assemblies should meet the requirements of **BS EN 16034:2014 Pedestrian Doorsets, Industrial, Commercial, Garage Doors and Openable Windows. Product Standard, Performance Characteristics. Fire Resisting and/or Smoke Control Characteristics** and the testing and evaluation requirements for LPCB approval and listing of fire door sets as detailed in LPCB Loss Prevention Standard LPS **LPCB 1056 Requirements for the LPCB approval and listing of fire doorsets, lift landing doors and shutters or equivalent**.

- Fire shutters should only be held open with special devices that release, prompting closure, automatically when the fire alarm and/or automatic fire protection activate.

  Note: Shutters that operate via a fusible link or other similar devices are not recommended due to their delay in operation.

- Modifications may be required to the conveyor system to retract or drop down upon activation of fire detection and/or protection systems to allow full closure of the fire shutters, and retain the integrity of the shutter protection. This should be factored into the design specification.
  - ✓ Ensure arrangements are in place to contain any ejected product safely into non-combustible receptacles.
- Conveyor control and monitoring systems should be provided to prevent conveyed material blocking the operation of any shutters.

Refer to Aviva Loss Prevention Standard **Fire Compartmentation** and **Fire Doors, Fire Shutters and Fire Dampers** for further guidance.

Housekeeping

A high standard of housekeeping can help reduce the potential for ignition and fire spread.

- A formalised cleaning programme to remove residues, crumb, liquids/spills and flammable dust within, on and in proximity to oven, extraction flues and vents, crumb trays and connected conveyor systems should be established.
  - ✓ The frequency of cleaning should be determined following a risk assessment which considers various factors including:
    - The nature of operations.
    - Periods of usage.
    - Amount of residue, dust, waste, spills etc., generated.
    - Ignition hazards.
    - Temperature and heating methods.
    - Original Equipment Manufacturers (OEM), and installer recommendations.

  Note: Consult your Property Insurer and Broker for further guidance relating to policy conditions regarding cleaning regimes.

- Ensure any electrically powered cleaning equipment is suitably fire/explosion rated to help prevent dust explosion incidents.
  - ✓ In Europe this is addressed under Directive 2014/34/EU (ATEX Equipment Directive) and The Equipment and Protective Systems Intended for Use in Potentially Explosive Atmospheres Regulations.
- Clear demarked sterile areas should be established on and around oven and conveyor equipment.
  - ✓ This should extend to at least five metres for any combustible materials e.g. paper documents, packing trays, boxed ingredients etc.
- Flour mixing and other trade processes generating or exacerbating flammable dusts should ideally be undertaken in a separate compartment to the cooking processes with appropriate explosion rated extraction systems.
  - ✓ Where this is not achievable, enhanced ventilation extraction and an increased cleaning frequency may be necessary to manage dust accumulations.
- Essential maintenance activities which include hot works should be controlled in accordance with Aviva Loss Prevention Standard **Hot Work Operations**.
  - ✓ Conveyors should be stopped during any hot works on or near the conveyor system; combustible elements should be fully covered with non-combustible barriers, and where present any hydraulic oils drained.

- ✓ Thermographic cameras should be incorporated into fire watch procedures to help identify hot spots, heat transfer etc. Refer to Aviva Loss Prevention Standard **Thermographic Surveys** for further guidance.

Refer Aviva Loss Prevention Standard **Housekeeping** for further guidance.

Self-Inspection.

- Regular self-inspections of the premises should be completed by responsible persons to ensure compliance with waste storage and housekeeping rules and standards.
- The frequency of inspections will vary depending on the nature of the premises and cooking activities, however at least daily checks and weekly thorough formal inspections should be undertaken.
  - ✓ Ensure the self-inspections adequately address dust accumulations, drips/spills/leaks etc, inappropriate storage, correct equipment functionality.
  - ✓ The use of photographic evidence with such inspections can prove invaluable.

The Aviva Loss Prevention Standard **Self-Inspections** provides useful guidance in this regard.

Maintenance

An appropriate regime of Planned Preventative Maintenance (PPM) is in place for all travelling ovens based on Original Equipment Manufacturer (OEM) instructions and industry best practice.

- Oven equipment should be subject to formal maintenance by a competent person.
  - ✓ Some premises and gas fired oven equipment may be subject to the requirements of the **Gas Safety (Installation and Use) Regulations** (GSIUR), and all work should be completed by a Gas Safe registered person or company. Refer to the Health and Safety Executive for further guidance on gas safety.
- All oven safety features, including any power interlocks, should be regularly specifically tested, calibrated and checked to ensure normal operation.
- Earthing continuity should be subject to at least monthly checks, or more frequently if static discharges could ignite combustible dusts or flammable vapours.
- Adequate spares should be held for any oven and conveyor equipment with potential long replacement lead times, such as complex or specialised gear sets and tensioners, along with spare belting to repair or replace damaged portions of any conveyor system.

Refer to Aviva Loss Prevention Standard **Maintenance Regimes** for further guidance.

Escape of Water/Fluids

- Check building plans for water or steam services running directly over oven plant and divert where possible.
- Tanking the floors of any rooms holding water or steam services directly above the oven plant can help prevent water related damage.
  - ✓ Leak detection should be installed to any water services present that cannot be relocated.
- Regularly check for evidence of water staining to ceilings, which may suggest ongoing water ingress and potential for further water related incidents.
- Check external guttering locations and the potential for blockages and overflowing into the facility.
- Non-combustible drips trays should be installed underneath any oven equipment where flammable and/or hot liquids may require containment.
- Ensure appropriate floor drainage is installed and be subject to regular cleaning to avoid blockages.
  - ✓ Non-return valves should be considered where this potential for water entering the premises from flooded yard areas etc.

  Refer to Aviva Loss Prevention Standards **Escape of Water – Installation and Maintenance, Escape of Water and Other Fluids** for further guidance.

Business Continuity

Every business should have a formal Business Continuity Plan in place. This should be reviewed to ensure disaster recovery and continuity arrangements remain adequate. Any actions generated should be addressed promptly.

Emergency Response

An emergency response plan should be produced specifically developed to outline key responsibilities and actions in an emergency event including breakdowns. The emergency response plan should include best practice responses to all likely property and business interruption risks including fire, breakdown and escape of water and other fluid related exposures.

The emergency response rules should be formally documented, and appropriate training provided.

Other Property Risk Management Guidance

Risk management systems and controls may need to work in collaboration with fire detection and protection systems to produce optimal fire risk management results.

Aviva Loss Prevention Standard – **Travelling Ovens – Fire Detection and Protection** provides further guidance on property risk management.

Key Action Steps

- Ensure a business impact assessment has been undertaken before introducing risk management controls and commissioning fire detection and protection designs. Undertaking a Failure Modes and Effects Analysis can assist with this process.

  Note: Discuss with your Property Insurer and Broker, ideally at concept stage, for further guidance.

- Ensure the travelling oven equipment is located within a dedicated fire resistant compartment.
- Protect any openings to oven compartments, such as door-sets and conveyor hatches etc., with automatically operating fire shutters, providing a fire resistance commensurate with the compartment.
- Adopt pro-active housekeeping regimes to limit the accumulation of combustible residues, waste, dust, fluids etc.
- Complete daily checks and weekly self-inspections to ensure housekeeping expectations are maintained.
- Carry out other hazardous trade processes e.g. flour dispensing, mixing etc., within separate compartments, remote to cooking processes.
- Manage escape of water/fluid risks:
  - ✓ Ensure water services are not installed directly over travelling oven equipment.
  - ✓ Automatic grease or glaze dispensers are bunded to contain spills or emissions.
- Adopt emergency procedures and provide appropriate training to workers and contractors.
- Review Disaster Recovery and Business Continuity plans, ensuring back up arrangements are in place.

Checklist

A generic **Travelling Ovens - Checklist** is available which can be tailored to your own organisation.

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Sources and Useful Links

- LPS 1162: Requirements and tests for the LPCB approval and listing of fire dampers
- LPS1531 Requirements for the LPCB approval and listing of companies installing or applying passive fire protection products
- LPS 1056 Requirements for the LPCB approval and listing of fire doorsets, lift landing doors and shutters or equivalent
- BS EN 16034:2014 Pedestrian Doorsets, Industrial, Commercial, Garage Doors and Openable Windows. Product Standard, Performance Characteristics. Fire Resisting and/or Smoke Control Characteristics
- NFPA 86: Standard for Ovens and Furnaces
- RC36 - Recommendations for Fire Prevention on Bakery Ovens
- HSE - ATEX equipment and explosive atmospheres
- The Equipment and Protective Systems Intended for Use in Potentially Explosive Atmospheres Regulations

Additional Information

Relevant Loss Prevention Standards include:

- **Travelling Ovens – Fire Detection and Protection**
- **Travelling Ovens – Checklist**
- **Fire Compartmentation**
- **Fire Doors, Fire Shutters and Fire Dampers**
- **Heat and Smoke Venting Systems**
- **Sprinkler Systems – How they Operate**
- **Sprinkler Systems – Review of Hazard**
- **Sprinkler Systems – Winter Precautions**
- **Hot Work Operations**
- **Thermographic Surveys**
- **Maintenance Regimes**
- **Water Mist Fire Protection Systems**
- **Conveyors**

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