

An insight into the factors that can lead to an incident

Loss type: Fire in a manufacturing facility

The Insured is a single storey manufacturing facility which specialises in the production of plastic sheeting.

Construction

Single storey building constructed of non-combustible materials. Open plan building with minimal separation between production and storage areas.

Protection

No fire detection or sprinklers.

Area of Facility

Production line – vertical gas fired oven which is used to expand the foam.

Cause

Product ignited in the oven due to incorrect tension setting by line operator. Fire escalated rapidly due to operator not monitoring machine adequately.

Extent of Damage

Control panel destroyed (replacement lead time two months), foam expanders destroyed, pre-heat oven belt and post oven rollers contaminated.

Continued

Factors which Contributed to the Loss

Combustibility of the product. Lack of building or local production line sprinkler protection. Lack of remote mechanism interlocked with a fire emergency stop to cut the sheet foam at the entrance to the oven in the event of fire.

Factors which Mitigated the Loss

Fast response and training of the production line operators in the use of manual fire appliances. Twenty CO2 extinguishers, one dry powder extinguisher and one hose reel were used to control the fire. Good housekeeping around the ovens prevented the fire from spreading to adjacent production lines.

Total loss – £295,091

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Loss type: Fire in a multi-tenanted building

The Insured is a chain store which specialises in the sale of sport and fashion shoes. The company occupying the other half of the building, not insured by Tokio Marine Europe, specialises in the sale of DIY products (paints, carpets, wallpapers, tools, etc.).

Construction

Single storey building constructed of steel portal frame with glue laminated wooden roof frame.

Roof of steel deck with non-combustible insulation and bituminous waterproof outer layer.

Walls constructed from concrete block with metallic external cladding and rockwool insulation on one elevation.

Building divided into two sections by concrete block wall extending up to the underside of the roof.

Total under-roof area was 1000 sq m.

Protection

No fire detection or sprinklers.

Area of Facility

Entire facility affected.

Cause

It is thought a fire was set deliberately in a wheeled bin which was stored under the canopy and adjacent to a glazed wall of the store. The fire ignited wallpaper stored against this glazed section and the ensuing fire spread rapidly throughout the store. Fire spread across the dividing wall via the combustible roof and into the insured premises via plastic gutter piping which was routed through the building.

Continued

Extent of Damage

In relation to our Insured, the fire consumed all the laces and soles. The rest of the storage and merchandise suffered smoke contamination or water damage from the hose streams used by the Fire Brigade to tackle the blaze. In relation to the store, the entire contents were destroyed. The building will require demolition and rebuilding.

Factors which Contributed to the Loss

Outside storage of combustible waste in a combustible bin, stored adjacent to the building with no lock and free access to the site.

Two similar fires in bins within the two months prior, including one the day before and no action taken.

High combustible loading of the buildings together with no sprinkler system.

Combustible roof covering, ie. bituminous waterproof outer layer and combustible drainage pipe.

Factors which Mitigated the Loss

Concrete block wall slowed down the fire spread from the store.

Glued laminated wooden roof frame provided good resistance to fire and retained structural strength whilst steel beams deformed and collapsed.

Prompt identification of the fire and notification to the Fire Brigade by residents in the area.

Two fire hydrants outside the facility had sufficient flow and pressure to be utilised for fire fighting.

Other Key Points to Note

Fire Brigade arrived within 20 minutes of the residents identifying the fire and 50 fire fighters tried to tackle the blaze. Fire was first noticed at 22:00 and was not extinguished until 07:00 the next day.

Total loss – £370,000

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Loss type: Fire in a two storey office

The Insured is a manufacturer of hand tools based primarily in a single storey building.

Construction

Single storey building except for the two storey office section (separated by masonry walls to the underside of the roof). Steel portal frame. Roof non-combustible, constructed from steel unlined with Rockwool insulation with a paper backing. Walls either masonry or of a similar construction to the roof. The total under-roof area was approximately 8000 sq m.

Protection

No automatic fire detection or fire protection at this site.

Area of Facility

The fire started in the section of the facility that contained rack storage of finished product and work in progress. It also contained an automated painting line for the hand chisels manufactured on site. Here the components are loaded onto hangers which are transported into a paint booth using a conveyor. The components are then sprayed in accordance with a pre-programmed routine. When the paint colour has to be changed, the robot is de-energised and the paint nozzles lowered and orientated downwards towards a solvent tray. The paint is replaced with a cleaning solvent and the nozzles flushed through. The dirty solvent is collected on a solvent tray (approximately 2 cm in depth – 2 to 5 litres in volume) and drained into a can which is then decanted into a larger container for shipment offsite for disposal. According to the material safety data sheets, the paints have a flash point between 23°C and 55°C, whilst the cleaning solvent (methylethylcetone) has a flash point of less than 21°C.

Continued

Cause

From the operator statements it would appear that static electricity accumulated in the solvent can and discharged suddenly to the robot base resulting in a spark. This ignited the waste solvent in the can which allowed the fire to spread to the solvent tray and adjacent rack storage.

An alternative theory is the solvent tray was also not grounded or the grounding was inadequate and the static charge accumulated in this piece of equipment.

Extent of Damage

The fire consumed the rack storage in the immediate fire area and the entire automated paint line.

It also destroyed a number of lathes located in the area.

The building structure in the fire area required demolition and rebuilding.

Where the roof collapsed due to structural steel failure, this caused structural damage to the adjacent areas, in particular the two storey office block.

Smoke spread throughout the remainder of the facility to varying degrees.

Factors which Contributed to the Loss

Provision of adequate bonding and grounding together with regular resistance checks would have eliminated the ignition source for this fire.

The installation of spot sprinkler protection in the spray booth would have helped to control the initial fire and limit the spread.

Locating the spray booth in an area cut off from the rest of the facility by one hour rated fire walls would have prevented the fire and smoke from spreading to the adjacent production and storage areas.

Factors which Mitigated the Loss

Facility was constructed from non-combustible materials.

The processes on site were largely non-combustible, except for the paint spraying operation.

The part of the facility where the paint spraying operation was located was segregated from the offices.

Rapid notification to the Fire Brigade and their subsequent timely response.

Total loss – £4,166,405

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Loss type: Explosion and fire in a foundry

The Insured is a foundry and casting operator based in a single storey plant.

Construction

Construction could be considered as light non-combustible, except the refurbished area of the plant which is constructed using polyurethane foam insulated sandwich panels. Internal partitions surrounding auxiliary equipment for the furnaces are constructed with concrete and all penetrations are well sealed.

Protection

No fire protection installed.

Area of Facility

Pouring furnace for the small product line.

Cause

Cracking of the furnace refractory lining allowed molten metal to contact cooling circuit pipe work resulting in failure of this pipe and a release of water into the furnace leading to an explosion.

Extent of Damage

Complete loss of the small product line including the control panels, control room and supporting auxiliary services.

Continued

Factors which Contributed to the Loss

Lack of a refractory monitoring programme including use of infrared survey equipment to identify hot spots which are indicative of refractory failure.
The storage of combustibles close to the furnace contributed to the fire after the spillage of molten material.

Factors which Mitigated the Loss

A programmed shutdown was imminent to replace the furnace refractory and consequently some spare components were already on site. Rapid response of the site personnel and Fire Brigade resulted in a short duration fire.

Total loss – £60,000

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Loss type: Loss of dockside loading crane

The Insured is a user of cranes on a clinker and limestone unloading dock.

Construction

Not applicable.

Protection

Not applicable.

Area of Facility

Port.

Cause

Impact of a cargo vessel with a dockside crane causing its sudden displacement and subsequent collapse.

Extent of Damage

Complete loss of the dockside loading crane.

Continued

Factors which Contributed to the Loss

The wind direction was perpendicular and towards the dockside. Smaller rebound buffers in this section of the dock and uneven manoeuvring by the dock tugs. The vessel only contained ballast and was therefore sitting high in the water – this allowed the upper section of the hull to contact the crane legs.

Factors which Mitigated the Loss

None.

Total loss – £560,000

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Loss type: Fire in an entertainment venue

The Insured is a bar and entertainment venue based in a single storey building.

Construction

Predominantly non-combustible building shell with combustible wooden floors.

Protection

Fire detection only.

Area of Facility

Front elevation of the facility.

Cause

At this point in time, it would appear that the fire was electrical in origin and started either in the neon sign above the front door or the electrical installation servicing the neon sign.

Extent of Damage

The front facade will require replacement along with a section of the timber flooring which ties into the facade. The supporting steel framework for the facade and the section of roof immediately above the facade may also require replacement.

Continued

Factors which Contributed to the Loss

Combustible wooden construction. Lack of electrical testing although facility had been completely rewired in 2003.

Factors which Mitigated the Loss

Rapid identification of the fire by door security personnel with prompt notification to the Fire Brigade by site management. Good evacuation procedures for people within the venue and a four minute response time by the Fire Brigade.

Total loss – £117,000

An insight into the factors that can lead to an incident

Loss type: Flood in basement area of facility

The Insured is a manufacturer based in two main buildings built close to a river.

Construction

Two main buildings covering a total surface area of approximately 5000 sq m. One built in 1983 and one in 2002. The older building has a basement which covers approximately 1500 sq m. Buildings are of steel frame construction with infill walls of profiled metal sheet complete with Rockwool insulation. Roof is constructed of metal sheeting overlaid with felt and bitumen.

Protection

Not applicable.

Area of Facility

Only the basement areas were affected by the flood.

Cause

Heavy rain led to the overtopping of the nearby river which resulted in flooding to the surrounding area. This river is located 22 metres distance from the plant and has a normal water level 3.6 metres below the level of the ground floor of the plant. In addition, the local storm water drainage system drained into this river. Consequently, the rising water levels caused the drainage system to back up. This resulted in manhole covers lifting in the basement area and releasing water from the system.

Continued

Extent of Damage

Compressors and low voltage switchgear will require cleaning and drying. The electrical back-up generator was submerged in water and is currently undergoing inspection to ascertain the degree of damage. The electrical transformer needs to be replaced. The tanks containing plasticizer have been contaminated and will require draining, cleaning and refilling. Also with the inflow of water, the tanks started to float and the pipe connections were damaged. This resulted in the release of 15t of plasticizer. The cardboard boxes containing polycarbonate granules collapsed with the resultant loss of containment.

Factors which Contributed to the Loss

The presence of a basement which was used for the storage of raw materials as well as the location for some production critical utilities, including the electrical distribution system.

The occurrence of local climate phenomena.

The heavy rainfall in the preceding weeks which resulted in the soil becoming saturated and thereby reduced the ability to absorb further rainfall.

The fact that the rainstorm occurred during the weekend when the facility was unattended.

There was a very late notification by the meteorological office of the impending storm with significant rainfall.

Factors which Mitigated the Loss

The short duration of the rainfall which allowed the flood water to recede relatively quickly.

Other Key Points to Note

Some flooding of this site occurred in the late 80's (but with lower damage percentages) and as a result, regular cleaning of the river took place and the river embankments had been reinforced. This was a very unusual rainstorm and caused the river level to rise dramatically from the normal of 1.1 metres to 4.63 metres in less than 11 hours. The corresponding flow increased from 333 litres per minute to 5,550 litres per minute.

Total loss – £690,000

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Loss type: Flooding and windstorm damage

The Insured occupies a number of small buildings operating as a solar farm.

Construction

There are a number of small buildings on site constructed from concrete blocks with single skin profile metal roofs.

Protection

Not applicable.

Area of Facility

Buildings containing electrical equipment and a number of solar panels.

Cause

Heavy rain during the night led to water accumulating on the site. The heavy winds also caused a number of solar panels to become detached from the supporting frames.

Extent of Damage

Water accumulated to a level of 0.4 metres above the floor level in two buildings containing the electrical inverters and as a result 18 units (9 per building) received substantial water damage.

51 solar panels became detached from their supporting structures and received irreparable damage. In addition, 20-30 panels were dislodged from the supports and will require realignment.

Continued

Factors which Contributed to the Loss

The fixing of the panels to the supporting structure relies on friction only, ie. no mechanical fixing. This is the standard design for the panels and a query has been raised with the manufacturers as to the adequacy and wind testing undertaken. Ventilation panels for the buildings are located at low level and there is no dedicated drainage from the floor void in each building. Lack of any flood emergency response plan.

Factors which Mitigated the Loss

The electrical inverters are located on a steel grating within the buildings and there is a substantial void beneath this grating. This void accumulated the water and therefore had the effect of reducing the water depth around the inverters. The equipment suppliers and installation contractor provided a good response to the incident. This was particularly in relation to checking and verifying each panel and the associated electrical equipment so that the undamaged sections could be restarted quickly.

Other Key Points to Note

This intensity of rainfall is very unusual in this geographical area.

Total loss – £164,000

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Loss type: Roof collapse

The Insured is a single storey manufacturing facility which is concerned with the injection moulding of plastic products.

Construction

The first section of the site is constructed using a steel truss roof in a 'sawtooth' shape made of fibrocement panels with mineral wool insulation. Walls are brick or concrete. The second section of the site is constructed from a steel frame with an inverted roof incorporating mineral wool insulation. Walls are brick or concrete.

Protection

Fire detection, with internal hose reels and extinguishers.

Area of Facility

The production area in the first section of the site.

Cause

Prior to the loss there were significant snowstorms which caused the build-up of snow within the 'V' section of the roof. This snow was not cleared and heavy rainstorms followed. The snow acted like a sponge and absorbed some of the rainfall which increased the loading on the roof further until a point at which the roof collapsed inwards.

Continued

Extent of Damage

The damage is mainly confined to the production area in the first section of the site. 1000 sq m of roof collapsed and a further 1000 sq m has been seriously damaged. Two injection machines and associated robots have been damaged along with an overhead crane. 30 pallets of raw material were contaminated and approximately 260 moulds have been affected.

Factors which Contributed to the Loss

The shape of the roof caused the snow to accumulate in significant depth. Also the site did not have a procedure in place to monitor the depth of snow on the roof and implement a clearing process above a certain depth.

Factors which Mitigated the Loss

The rapid response of the security guards, Fire Brigade, broker, Tokio Marine Europe underwriter and loss adjuster, in the middle of the Christmas holidays in implementing a variety of measures to limit further collapse/damage and to quickly start the drying and cleaning process.

Other Key Points to Note

Significant snowstorms in this geographical area are not unusual.

Total loss – £1,670,000