

LOSS LESSONS

VOLUME 2

ALLIANZ GLOBAL CORPORATE & SPECIALTY®

EXPLOSION AND FIRE IN A FELT PREPARATION WORKSHOP

REPORT PUBLISHED BY
ALLIANZ RISK CONSULTING



Occupancy:

Automobile industry
supplier (felt and Trimelt
noise insulation
components)

Property Damages:

€ 1,500,000

Business Interruption:

€ 1,000,000
(additional costs)

CIRCUMSTANCES

On December 3rd, an explosion followed by a fire occurred in a felt preparation workshop where vegetal and synthetic fibers are mixed.

The explosion occurred in a dust filter and associated fiber mixing box at around 5:40 a.m. while the plant was in operation. Flaming material, projected by the explosion, set fire to various machines and to two mass storage areas: bins of felt remnants in the preparation zone and felt reels on racks in the Trimelt preparation zone.

A worker at the scene suffered mild shock from the explosion and was intoxicated by the fumes before managing to leave the building. Evacuation of the plant took place normally.

The sprinkler system was set off and kept the fire from spreading to the rest of the plant. Approximately 60 sprinkler heads were activated, corresponding to a surface area of 500 m². Firemen and employees took action within 15 minutes but it took 3 hours to fully extinguish the fire.

EXTENT OF THE DAMAGE

- Damage to the building comprised the metal framing, 400 m² of roof, metal sheeting, 8 smoke extractors and the concrete wall between the preparation area and the felting line
- Preparation equipment (filter, loader, spinner, sleeve filter, ballot press, transfer ducting, spark-detection system)
- Trimelt preparation equipment (rotary filter, sleeve filter, loader, collection pad)
- Loss of inventory (70 m³)
- Shut-down of the felt plant for repairs for three and a half months

CAUSE OF THE LOSS

The most likely hypothesis is as follows: fire broke out in the felt tunnel the evening before, at around 8 p.m. The selvages produced by cutting the felt are recycled to a tearing machine and then go to the bale press or the mixing box. An ember ended up being recycled to the mixing box and set off the explosion.

A bale that was not touched by the fire was found to be burnt in the center, still in the bale press after the incident, which supports this hypothesis.

WHAT HAS WORSENERED THE LOSS

- Since the compartmentalization between the preparation zone and the storage zone was inadequate, it was unable to prevent the fire from spreading (concrete lower part and metal sheeting on the upper part)
- The massive stocks of raw materials nearby (reaching a height of nearly 7 m, in piles and on racks) fed the fire, thus causing severe damage to the building. The sprinkler system was not up to the task (60 sprinkler heads triggered on a system designed to supply a maximum of 30 heads)
- The plant was equipped with an infrared spark detection system, normally quite reliable, which seems not to have worked
- The filters and mixing box were not equipped with explosion vents

WHAT HAS LIMITED THE LOSS

PROPERTY DAMAGE

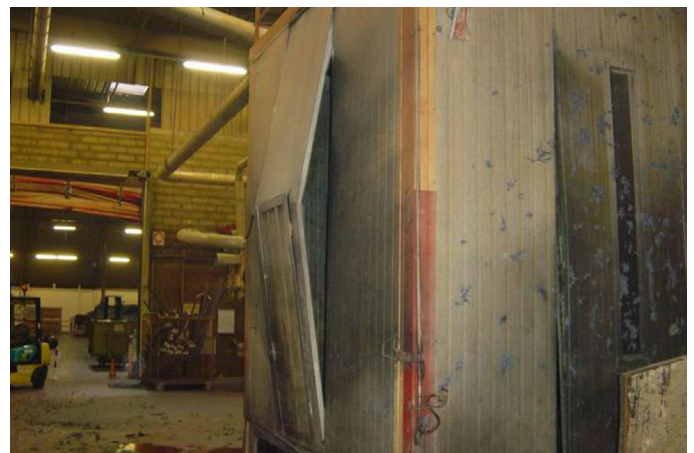
- The immediate triggering of the sprinkler system following the explosion clearly prevented total loss of the plant
- The alert sounded by the site's emergency action team allowed the fire department to intervene quickly (within 15 minutes)

BUSINESS INTERRUPTION

- Due to major efforts by the plant's employees and by the group, Trimelt production was able to resume quickly at the site and the production of felt was provided by internal or external sub-contracting
- The existence of a contingency plan accelerated the resumption of production



Huge stocks of materials in the processing zones that need to be reduced



Mixing box blown out by the explosion

COMMENTS AND LEARNINGS

The occurrence and severity of this type of incidents in plants with similar types of production can be controlled by the following measures:

IMPROVED PREVENTION OF THE RISK OF DUST EXPLOSION

- Installation of purge procedures for the transfer ducts when a fire starts, with systematic verification that they are applied
- A new design for the preparation area intended to reduce the risks of explosion: isolation of the waste products recycling line and elimination of the mixing box
- The use of new types of dust filters with a lower risk of explosion (rotary filters or auto de-plugging filters), installed outdoors as much as possible
- Outfitting of filters and any equipment subject to a risk of explosion with explosion vents directed toward the outside of the building. Installation of equipment that is compliant with the recommendations of the new ATEX directive (European directive 94/9/EC: installation of equipment in areas at risk for dust explosion)
- Regular inspection of the spark detection system
- Limiting the amount of stock kept in processing zones

IMPROVED ORGANIZATION OF EMERGENCY ACTION MEASURES

A number of actions were taken too late (general electric power cut-off). Others were forgotten (gas cylinder carriers left in the building, no supervision of start-up of the sprinkler pumps).

These findings demonstrate the need to organize regular and detailed emergency drills based on:

- A complete emergency plan laying out each function and designating who is in charge of each task
- A reminder sheet for every member of the 2nd-stage emergency team

IMPROVED SAFETY MEASURES

- Programmed monitoring of the sprinkler system: Weekly tests of the pumps must be done with due care. Any decrease of their performance must result in corrective action
- In-rack sprinklers should be installed on racks where the height of the materials stored may impede the action of ceiling-mounted sprinklers
- Upgrade fire cutoff compartmentalization between workshops

QUESTIONS OR COMMENTS?

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Reference LL 02/18/05

Design: AGCS Graphic Design Centre