

## Reducing the risk of Timber fires. A case study

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## Introduction

- This study examines a case of a 'Serious fire' at 27-07-10 in a Timber industry located in industrial area in Northern Greece in a small distance from the City of Thessaloniki .
- This Timber industry was complied with fire safety measures as predicted by the Greek Government Desicion (no 5905/1998) "Industrial Fire protection". (so, it has been supplied with passive protection measures i.e means of escape, emergency lighting and signs , and active measures i.e. fire detection , permanent fire water supply network but with no sprinkler installation).
- The Timber industry was a 9.480 m2 concrete building. Processed materials was raw wooden pine materials and final products was furniture and other wooden constructions.

## Incident Analysis

- The fire has been caused by spark friction originated in the production area below wooden pallets.
- First ignited materials was 'unprotected' wooden pallets and secondary ignited materials was raw pine wooden material.
- These factors were leading to the rapid fire growth and flash over conditions.



## Incident Analysis

- Fire almost immediately spread from first to second ignited materials.
- It was not contained to the room of origin and spread beyond to the whole building.
- Fire Compartments were inadequate to stop the fire , and fire was not been be possible to be suppressed by permanent fire fighting hose reels by industrial fire staff.

## Emergency Response

- The initial call reporting this incident was at 14.06 hours i.e in the middle of working day.
- Timber complex had a trained and equipped Emergency Response Team (ERT) that included 20 members. On the day of the incident; 10 trained emergency responders were immediately available.
- Firefighters from the surrounding fire stations were in 'emergency alert' providing 25 fire vehicles with 60 fire fighters deployed at the scene of fire.
- Fire extinguished after eight (8) hours.

## Incident Analysis

- Almost the whole wooden material and electro-mechanical equipment of industry has been destroyed by the fire.



- Estimated property loss 1.200.000 euro.

- On the other hand, the reinforced concrete, columns, beams performed very well in such a severe fire due to high fire resistance of reinforced concrete.

## Lessons Learned

- It is clear from the above that prevention of fire spread behind the wooden first item ignited would have a significant impact on the reduction of fire losses.
- In this case where the first material ignited is wood, it is considered that ignition and fire spread could be prevented or minimized by treating the timber surfaces with suitable flame retardants.
- Fire data on the effects of flame retardants on wooden surfaces is not available, since the relevant market is quite recent and not particularly widespread in Greece.

## Experimental investigations

Therefore, in order to investigate this possibility, commonly used timbers, untreated and treated were tested and compared using university of Leeds:

- small scale (Cone Calorimeter)
- and medium scale (Enclosed Fire Rig) equipment
- combined with online effluent gas analysis equipment (FTIR).



• Untreated pine into the tests

## Experimental investigations

Analysis involved thermal behavior and toxic species analysis of the samples:

- No ignition and lower toxic emissions compared to untreated samples were observed at 35kW/m<sup>2</sup> (small scale).
- The same behavior was observed in those cases where wooden surfaces located next to ignition source had been treated (medium scale).



• Treated pine into the tests

## Conclusions

- It is proposed that the application of intumescent flame retardants on wooden surfaces located close to ignition sources in the most probable areas for a fire to break out, could be a safe and effective approach in reducing fire losses in industries

## Suggestions

- Performing of more small- and medium – scale experiments, treated with the updated technology of the intumescent paints (different parts of wooden cribs or some other form of samples), and using various ventilation rates to achieve both establishing and documentation of the contribution of intumescent technology in fire suppression, are suggested.

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Thank you all so much  
for your attention!

