



Proposal for benchmark study
Full scale warehouse real fire test

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FULL SCALE WAREHOUSE IN STEEL STRUCTURE

Main goal of the test

- experimental investigation on the shape of flames and consequent radiation heat flux

Full scale test was performed with

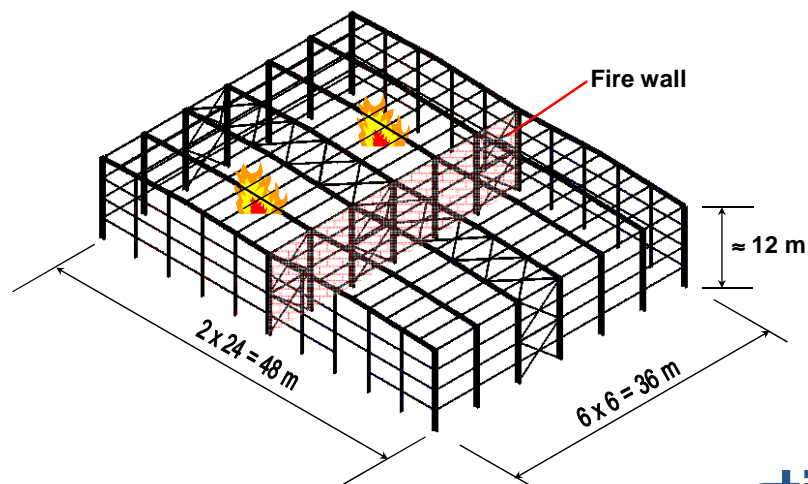
- Storage building occupying an area of more than 1600 m² with two compartments of 36 x 24 m
- Unprotected steel frame
- Height of the building: 12 m
- different types of façade cladding
- Storage ratio: 80% of racks filled with wood racks

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FULL SCALE WAREHOUSE IN STEEL STRUCTURE

Warehouse divided into two fire compartments and one of them subject to fire



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FULL SCALE WAREHOUSE IN STEEL STRUCTURE

The compartment subject to fire with all building components

- structure (hot-rolled members) and envelop (roof and façades)



36 m x (24 m + 24 m)

H = 12 m

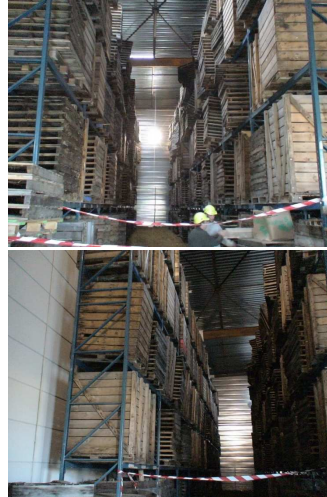
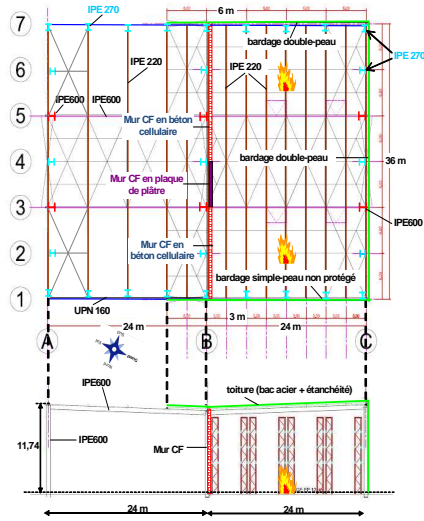


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FULL SCALE WAREHOUSE WITH WOOD PALLETS

Five 8 m high racks filled with wood pallets (310 tons of wood)



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FULL SCALE WAREHOUSE

Ventilation condition:

- Roof: four 3 m x 2 m smoke exhaust vents
- Façade: five 1 m x 2,5 m reduced scale doors



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FULL SCALE WAREHOUSE FIRE TEST

Data recording

- 183 TC of which 87 for structural memembrs
- 2 displacement transducers on fire wall columns
- 38 heat fluxmeters
- 18 cameras

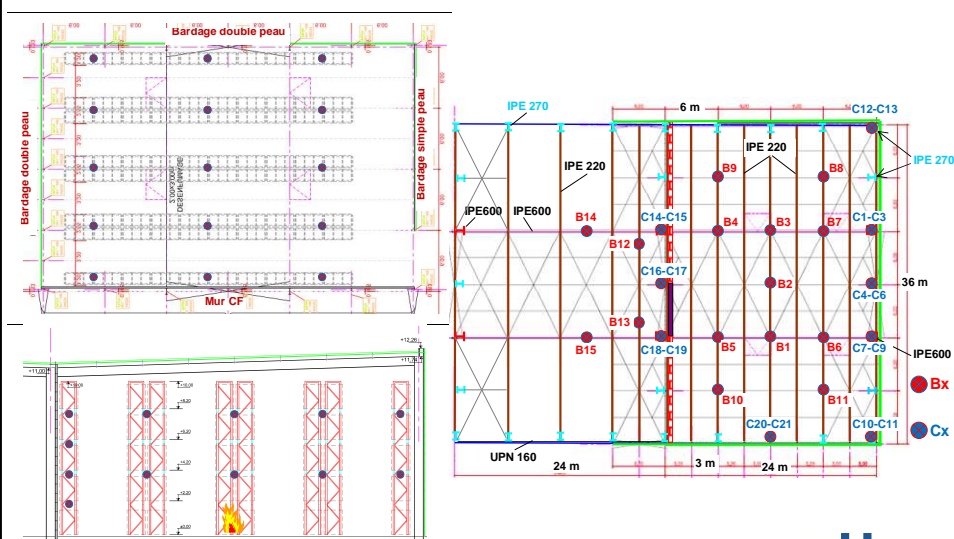
Detailed experimental results

- Videos
- Excel files
- Test report in French

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THERMAL COUPLES




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CHRONOLOGY OF THE FIRE

 <p>CAM_3H-2m_1min28" après allumage</p>	 <p>CAM_3H-2m_7min32" après allumage</p>
a : Allumage des palettes	b : Développement du feu 7 min après l'allumage avec chute de débris
 <p>CAM_3H-2m_10min00" après allumage</p>	 <p>CAM_4H+4m_~22min après allumage</p>
c : Propagation du feu à la rangée D (par rayonnement) au niveau inférieur	d : Effondrement de la rangée de racks E vu par la caméra placée entre les rangées D et E


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CHRONOLOGY OF THE FIRE

<p>7.5 min</p> 	<p>11 min</p> 	<p>15 min</p> 
<p>18.5 min</p> 	<p>21.5 min</p> 	<p>21.5 min</p> 
<p>25 min</p> 	<p>30 min</p> 	<p>35 min</p> 


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CHRONOLOGY OF THE FIRE




35 min



40 min



61 min

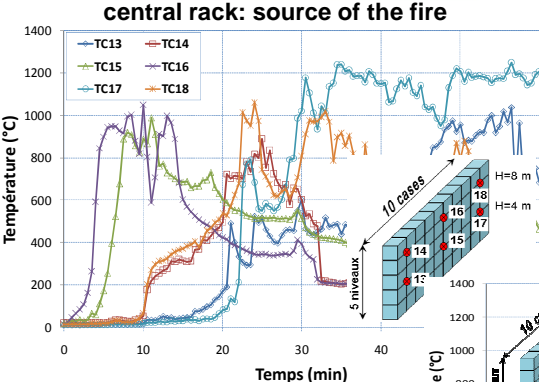


65 min

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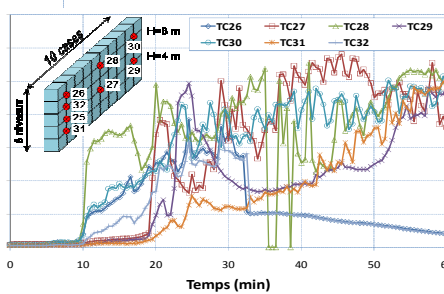
GAS TEMPERATURE

central rack: source of the fire



Temps (min)

rack close to façade



Temps (min)

central rack: source of the fire diagram: 10 cases, 5 niveaux, H=8 m, H=4 m, sensors 12-18.

rack close to façade diagram: 10 cases, 5 niveaux, H=8 m, H=4 m, sensors 26-31.

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