

EXAMPLE: HISTORIC BUILDING: 13-15th century monastery used as Museum + Cultural Centre.

The manager of this building wanted to know if the level of safety was comparable to what exists in a more recent building

Construction : 2250 m² in a U-shape, 3 levels, very thick stone and masonry walls, wooden floors, some with tiles, slate roof on massive oak structure. No effective compartmentation because of 2 monumental stairs joining the 3 levels.

The building is accessible on one side only, the other sides are adjacent buildings and a river; the city water supply is only a 3" pipe; The building is equipped with extinguishers, hose reels, a fire alarm system and partial fire detection. Notification to the fire brigade is by the staff.

The fire load is low, except for a library with old books, located in the North wing; this library has a wooden floor and a decorated wooden ceiling, which is also the floor of meeting room at the upper level. This room can receive about 150 persons and has one adequate and one limited exit to stairs.

In the central wing, there is a small restaurant and a kitchen.

Maximum occupancy is 500 persons for meetings or conferences. The building has several exits, but some exit doors turn to the inside.

FRAME -calculations

Actual situation: $R=1.34$ $R1= 3.80$ $R2=0.90$

Conclusion: limited damage can be expected, but the safety of such a large number of persons (500) is not guaranteed.

1st proposition for improvement : Provide a vertical compartmentation in 3 sections, by installing fire doors in the existing walls; extend the automatic detection to the whole building.

FRAME -Result for the central wing: $R=0.46$ $R1=0.93$ $R2= 0.43$ this is acceptable

Result for the library and meeting room : $R= 0.50$ $R1=1.71$ $R2=0.31$

- > this is insufficient : a fire in the library can hamper the evacuation of the meeting room.

Additional proposals :

- provide a local sprinkler system for the library

A new calculation gives $R= 0.25$ $R1=0.90$ $R2 = 0.17$ for the library, which is a good level of safety

- As a temporary measure, the number of people in the meeting room can be limited to the capacity of the smaller stair (less than 100).

This gives $R=0.35$ $R1=1.03$ $R2= 0.30$ for the conference room, which is also an adequate level of safety.