

COST Action TU0604
Integrated Fire Engineering and Response



FAULTY DESIGN OF A SPORT HALL

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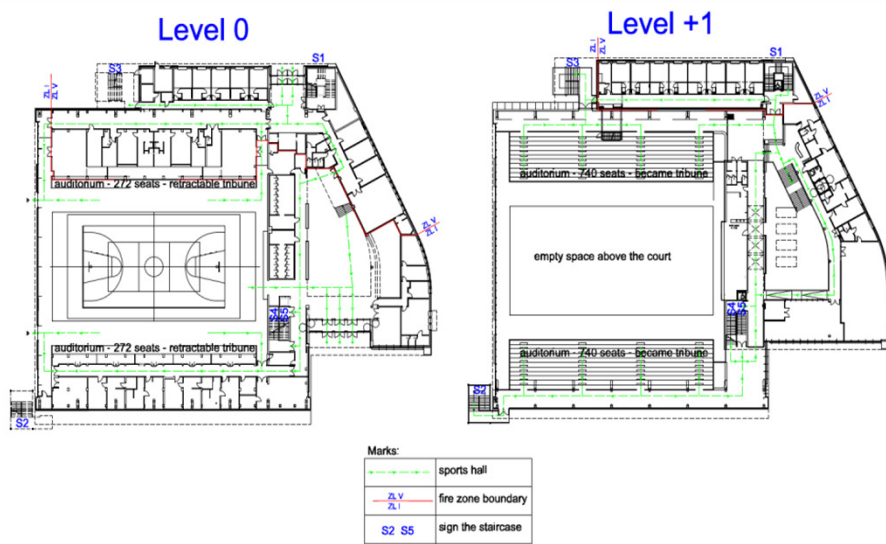
Poland

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GENERAL DESCRIPTION OF THE BUILDING

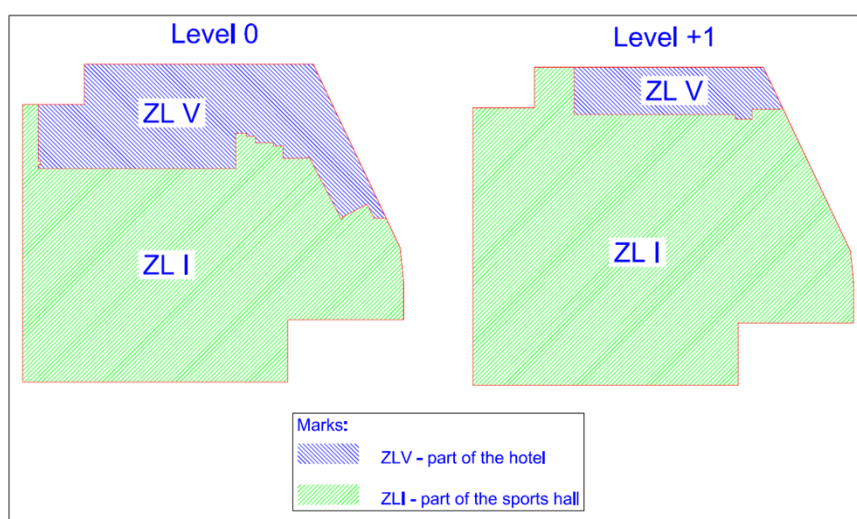
- small town (51 000 inhabitants) - sport - cultural center
- sport hall with social and recreational facilities + a hotel part
- court with the audience for two thousand people
- designed in 2009
- 2 300 users (including the auditorium for 2000 people)
- building height 15.3 m above ground level
- total area is 6116 m² (building area 4300 m²)
- irregular shape - approximately 78m x 65m

GENERAL DESCRIPTION OF THE BUILDING



Plan of the building

FIRE SAFETY ENGINEERING SOLUTIONS USED IN THE FACILITY



Fire zone distribution

FIRE SAFETY ENGINEERING SOLUTIONS USED IN THE FACILITY

Fire zone description

Zone No	Name	Description
Zone I	Sport hall	The main entrance to the building, sports hall with the audience, changing rooms and toilets facilities are under one of the stands some of the rooms, and service loft.
Zone II	Hotel part	Hotel rooms on the ground floor and first floor of the building, communication and ancillary facilities within the zone as well as changing rooms and storage areas functionally connected to the sport located below the one from the stands.

FIRE SAFETY ENGINEERING SOLUTIONS USED IN THE FACILITY

The facility is equipped with the following active fire protection:

- fire alarm system
- audible warning system covering the whole object,
- 10 fire hydrants (6 on the ground floor and 4 on the floor),
- equipment to remove smoke,
- fire electricity breaker covering the entire building.

FORMAL AND LEGAL REQUIREMENTS

Classification based on building's usage and its height

Tab. 3.1. Fire resistance of buildings

Building height	Hazard category for people (ZL)				
	ZL I	ZL II	ZL III	ZL IV	ZL V
1	2	3	4	5	6
low (N)	„B”	„B”	„C”	„D”	„C”
medium-high (SW)	„B”	„B”	„B”	„C”	„B”
high (W)	„B”	„B”	„B”	„B”	„B”
very high (VW)	„A”	„A”	„A”	„B”	„A”

Tab. 3.2. Requirements for the major elements of structure based on the fire resistance class

Fire resistance class of the building	Fire protection classes for elements of the building					
	main supporting structure	roof structure	ceiling slab	external wall	internal wall	roof decking
„A”	R 240	R 30	REI 120	EI 120 (D-I)	EI 60	RE 30
„B”	R 120	R 30	REI 60	EI 60 (D-II)	EI 30*	RE 30
„C”	R 60	R 15	REI 60	EI 30 (D-III)	EI 15*	RE 15
„D”	R 30	(-)	REI 30	EI 30 (D-IV)	(-)	(-)
„E”	(-)	(-)	(-)	(-)	(-)	(-)

Tab. 3.4. Permissible surface of fire zones

Hazard category for people	Permissible surface of fire zone [m ²]			
	In a building with one floor above ground (no height restrictions)	low (N)	medium-high (SW)	high and very-high (W) i (VW)
1	2	3	4	5
ZL I, ZL III, ZL IV, ZL V	10 000	8 000	5 000	2 500
ZL II	8 000	5 000	3 500	2 000

Tab. 3.3. The requirements for building elements forming the fire protection separations

Fire resistance class of the building	Klasa odporności ogniowej			
	fire separating elements walls and ceilings, with the exception of ceilings in ZL	ceiling in ZL	fire doors and other closures of fire	fire door from the fire protection vestibule and into the room and the staircase
„A”	REI 240	REI 120	EI 120	EI 60 E 60
„B”, „C”	REI 120	REI 60	EI 60	EI 30 E 30
„D”, „E”	REI 60	REI 30	EI 30	EI 15 E 15

ACCEPTED WAY OF ASSESSING

In this case, the analysis was focused on the evacuation:

- length of evacuation pass
- length of evacuation access
- width of escape routes (corridors, stairs and landings)
- total and a minimum width of exit from the premises
- total and a minimum width of exit outside the building

DESCRIPTION OF THE PROJECT APPROVAL PROCESS

The investor has asked the independent expert to prepare a document required by the rules "fire safety instruction." Such a document is required in all facilities with a capacity exceeding 1000 m³. ...

ADOPTION OF SOLUTIONS RESULTING FROM THE THEORETICAL ANALYSIS

CONCLUSIONS