1.10 Fire research in Romania

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WG 1: Fire Behaviour and Life Safety

Fire research in Romania

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SR EN 1991-1-2:2004/NA:2006

Global capacity of the building or a fire compartment to answer to a normal fire action (nominal fire curve), defined through the minimal performances of main components units of the construction:

- columns, diaphragms, loaded walls,
- beams, floors, terrace roofs,
- loaded and unloaded walls
- bracings, roofs without attique
- curved self supporting roofs without attique
- roof panels and continuous support of the combustible roof covering (excepting simple steel sheet)

The classification of the construction units is made in five fire resistance degrees

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Temperature Analysis

When structural members analysis is based on data presented in tables NA.2.4.1.1 şi NA 2.4.1.2 or other simplified rules, referring to the nominal temperature-time curve, the temperature analysis is made only for the heating phase (without any cooling phase);

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Table 4.1-Limited periods of fire resistance

Nr.	Type of structural elements	Fire resistance degree				
		I	II	III	IV	V
1	Columns	R 150	R 120	R 60	R 30	–
2	Loadbering walls, diaphragms	REI 150	REI 120	REI 60	REI 30	–
3	Interior non loadbering walls	EI 30	EI 30	EI 15	–	–
4	Exterior non loadbering walls	EI 15	EI 15	EI 15	EI 15	–
5	Beams, frames, panes	R 60	R 45 (R 30)	R 45 (R 30)	R 15	–
6	Floors, terrace roofs	REI 60	REI 45 (REI 30)	REI 45 (REI 30)	REI 15	–
7	Braces, Roofs	R 45 (R 30)	R 30 (R 15)	R 15	–	–
8	Self supporting roofs (double curved)	REI 45 (REI 30)	REI 30 (REI 15)	REI 15	–	–
9	Roof covering panels and the continuous support of the combustible covering (except simply steel sheet)	REI 15	–	–	–	–

NOTA 2 _ Bracelet numbers are corresponding for buildings and fire compartments with the fire load density not exceeding 840Mj/m^2, except tall building (more then 28 m), buildings including agglomerated rooms (as defined in Romanian fire code), buildings with occupants not able to evacuate themselves and buildings in which are very important equipments.

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Table 4.2-Limited periods of fire resistance

Nr.	Type of structural elements	Fire resistance degree				
		1	2	3	4	5
1	Columns	R 150	R 120	R 60	R 30	R 15
2	Loadbering walls, diaphragms	REI 150	REI 120	REI 60	REI 30	REI 15
3	Interior non loadbering walls	EI 45	EI 30	EI 15	–	–
4	Exterior non loadbering walls	EI 30	EI 15	EI 15	EI 15	–
5	Beams, frames, panes	R 60	R 45	R 30	R 15	–
6	Floors, terrace roofs	REI 60	REI 45	REI 30	REI 15	–
7	Braces, Roofs structure.	R 45	R 30	R 15	–	–
8	Self supporting roofs (double curved)	REI 45	REI 30	REI 15	–	–
9	Roof covering panels and the continuous support of the combustible covering (except simply steel sheet)	REI 15	REI 15	–	–	–

NOTA 2 _ Bracelet numbers are corresponding for buildings and fire compartments with the fire load density not exceeding 840Mj/m^2, except tall building (more then 28 m), buildings including agglomerated rooms (as defined in Romanian fire code), buildings with occupants not able to evacuate themselves and buildings in which are very important equipments.

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Thermal actions for temperature analysis

- On the national territory the nominal temperature-time curves according to 3.2 may be used or, as an alternative, the use of the natural fire models according to 3.3

3.3 NATURAL FIRE MODELS

- Compartment fires
  - For fire compartments (means rooms) the one-zone model may be used
- Localized fires
  - For localized fires (limited in space) the method given in annex C of SR EN 1991-1-2 may be used

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Thermal actions for temperature analysis(cont)

ADVANCED FIRE MODELS

One of the following models should be used:

- one-zone models assuming a uniform, time dependent temperature distribution in the compartment;
- two-zone models assuming an upper hot layer with time dependent thickness and with time dependent uniform temperature,
- Computational Fluid Dynamic models giving the temperature evolution in the compartment (means room) in a completely time dependent and space dependent manner

Combination Rules for Actions

- For the representative variable action Q1 the quasi-permanent value $\psi_{2,1}Q_1$ shall be used .

Annexes

- Annex A – Parametric temperature-time curves
- Annex B – Thermal actions for external members - Simplified calculation method
- Annex C – Localized fires
- Annex D – Advanced fire models
- Annex E – Fire load densities
- Annex F – Equivalent time of fire exposure
- Annex G – Configuration factor

All annexes informative except Annex E

Annex A (informative) - Parametric temperature-time curves may be used based on a validated computer model. The choice of the parametric temperature-time curves to be used, must be based on a competent fire expert analysis. The results will be compared with the results of the simplified calculation method using nominal fire curve; the *most unfavorable result will be used*