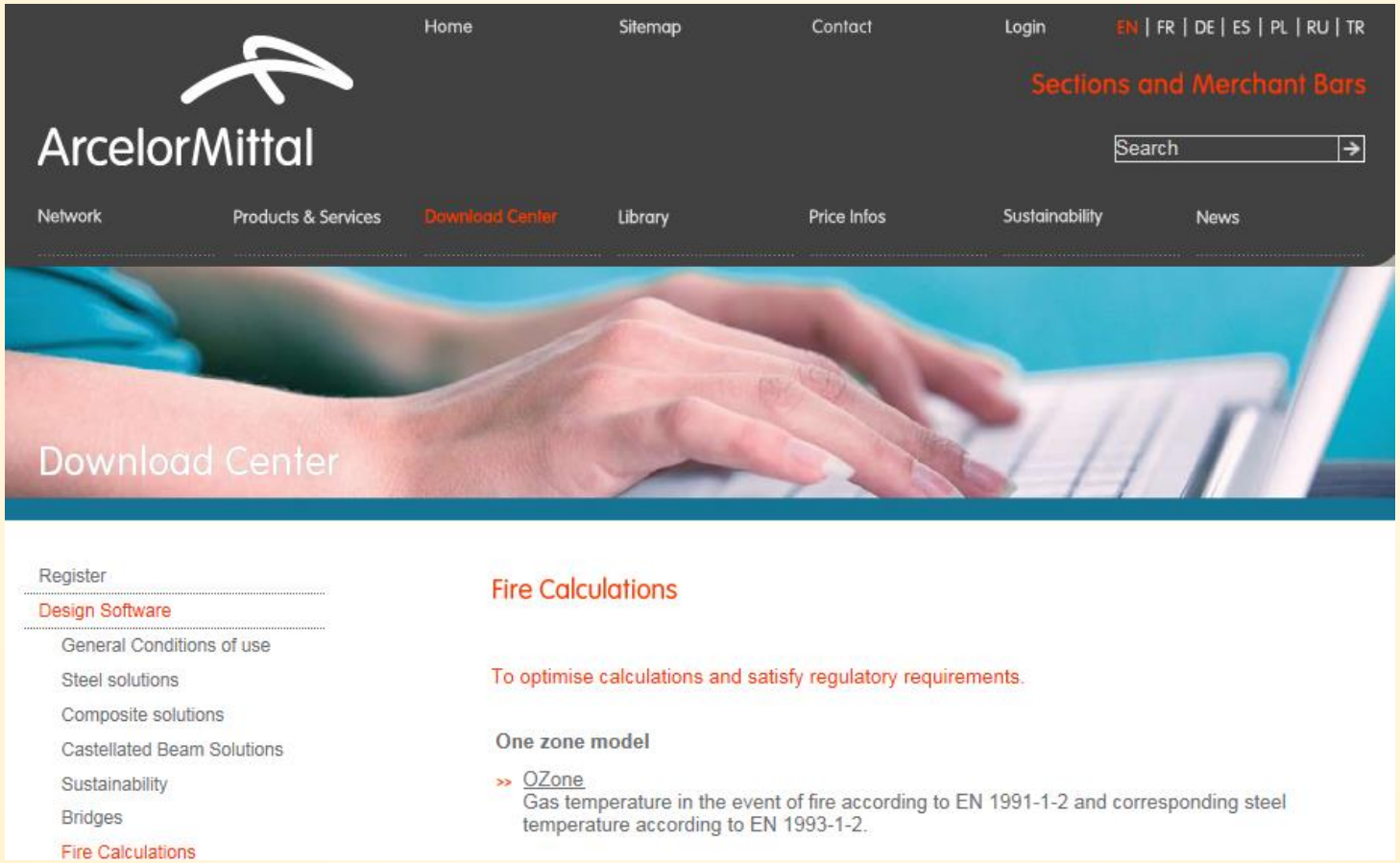
LOCAFI+

Evaluación de la temperatura de un elemento vertical sometido a un fuego localizado
Difusión
Grant Agreement n° 754072

5. Software

5. Software

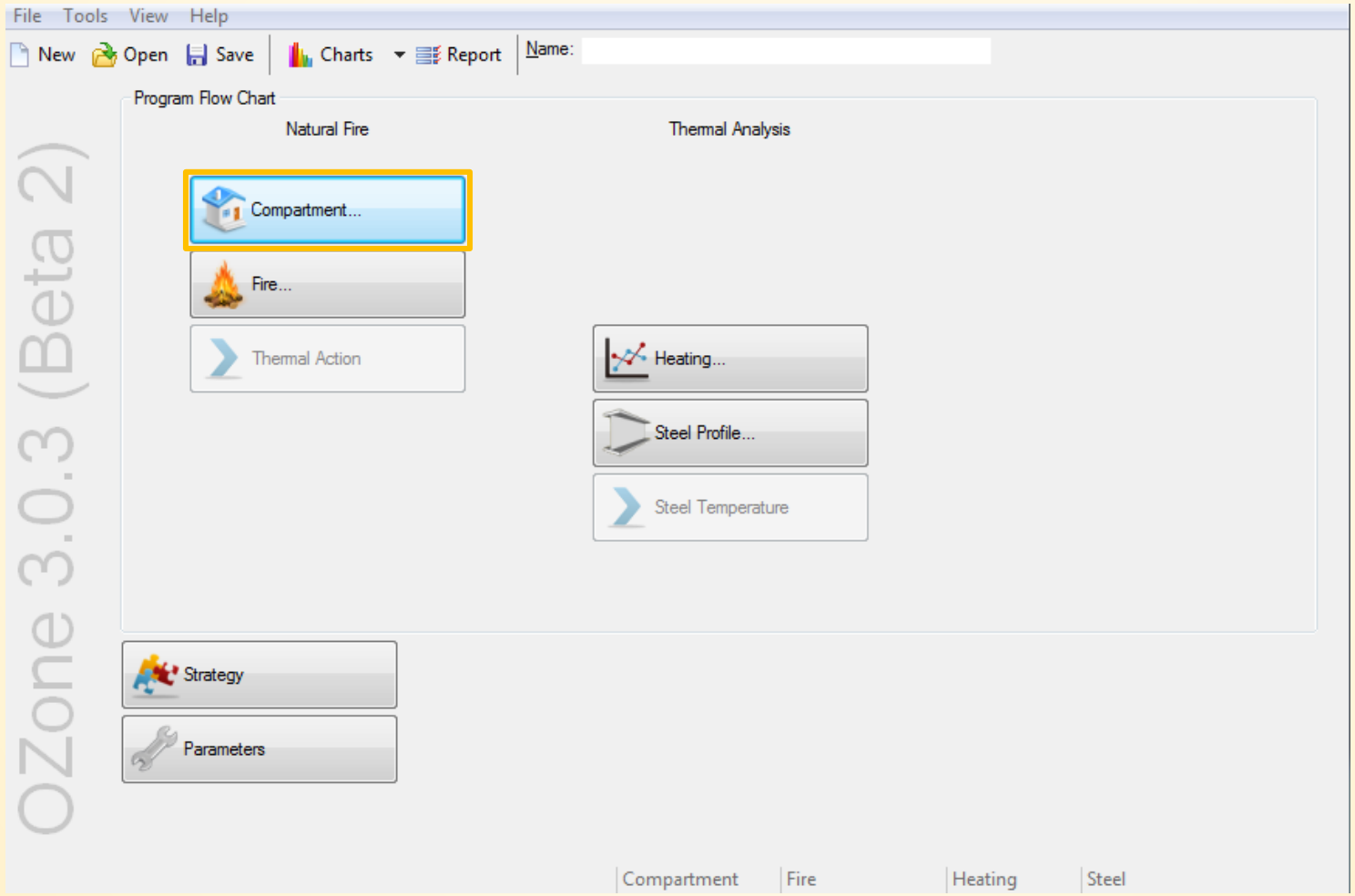
5.1. OZone Fuego de sector



http://sections.arcelormittal.com/download-center/design-software/fire-calculations.html

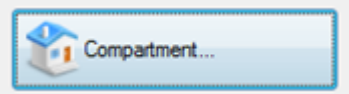
5. Software

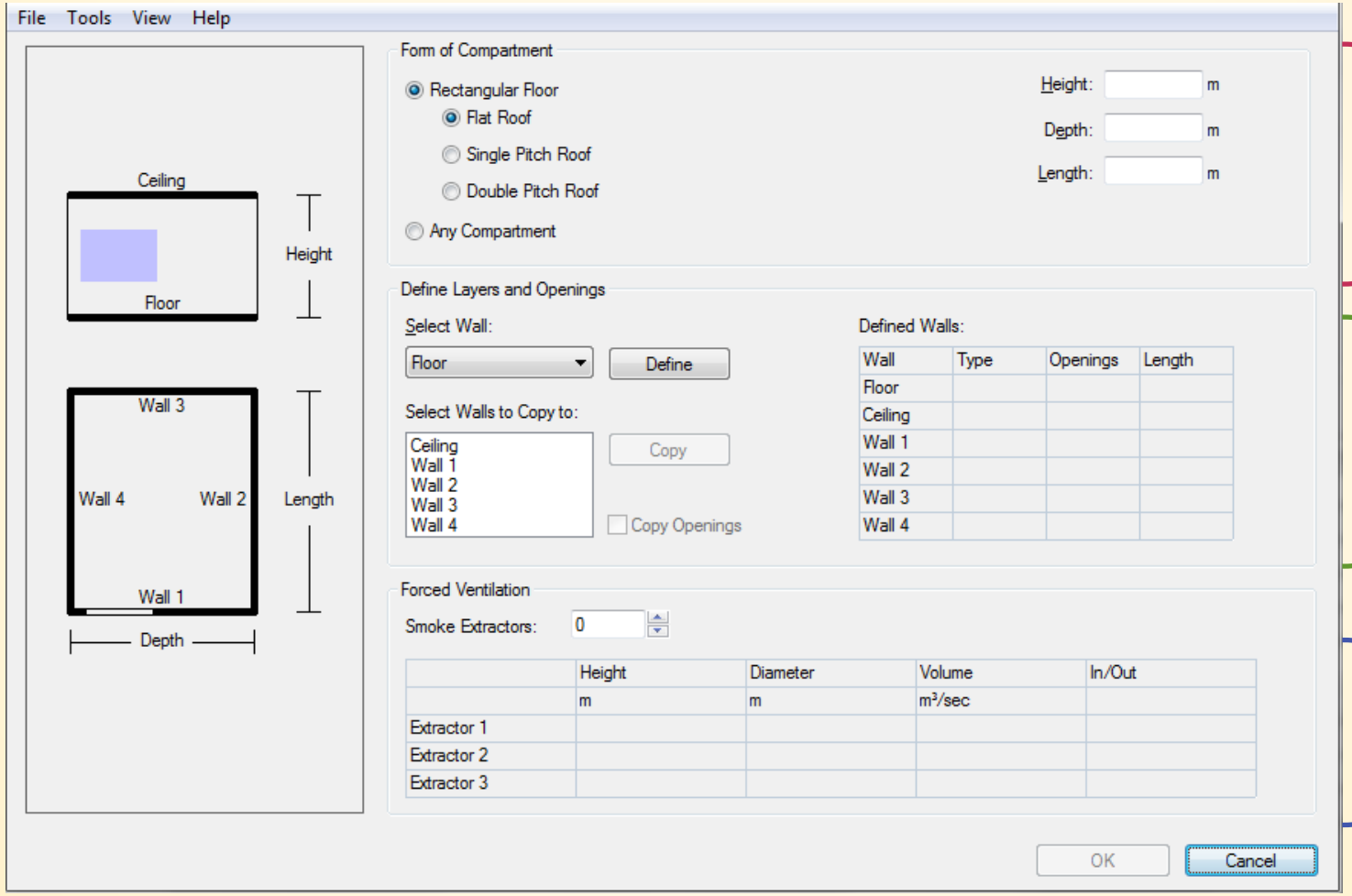
5.1. OZone Fuego de sector



5. Software

5.1. OZone Fuego de sector





Geometría del sector

Propiedades del suelo, paredes y techo

Ventilación forzada (si existe)

5. Software

5.1. OZone Fuego de sector

File Tools View Help

Wall Length: 13 m

	Material	Thickness	Unit mass	Conductivity	Specific Heat	Rel Emissivity	Rel Emissivity
		cm	kg/m³	W/mK	J/kgK	Hot Surface	Cold Surface
Layer 1	Steel [EN1994-1-2]	0.1	7850	45	600	0.8	0.8
Layer 2	Glass wool _Rock wool	6	60	0.037	1030	0.8	0.8
Layer 3	Steel [EN1994-1-2]	0.1	7850	45	600	0.8	0.8
Layer 4							

Propiedades de las capas de cada cerramiento

Inside
Layer 1
Layer 2
Layer 3
Layer 4
Outside

Enter each layer on a single row in the table above (up to four layers). Just click in a cell and edit it's value. If not found in the list of materials you can define your own material, by filling in the apropriate cells. Define your layers starting from Layer 1 (Inside).

Define your openings if any (up to three openings in a single wall). Click in the desired cell and input your values. Start from Opening 1.

To delete or insert a row, right click on a row header and select the appropriate command from the popup menu.

	Sill Height Hi	Soffit Height Hs	Width	Variation	Adiabatic
	m	m	m		
Opening 1	0	4	4.2	Stepwise	no
Opening 2	0	2	1	Stepwise	no
Opening 3					

OK Cancel

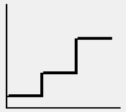
Huecos

Parameters

Temperature Dependent Openings

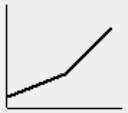
Temperature Dependent: 400 °C

Stepwise Variation



Temperature	% of Total Openings
°C	
20	10
400	50
500	100

Linear Variation



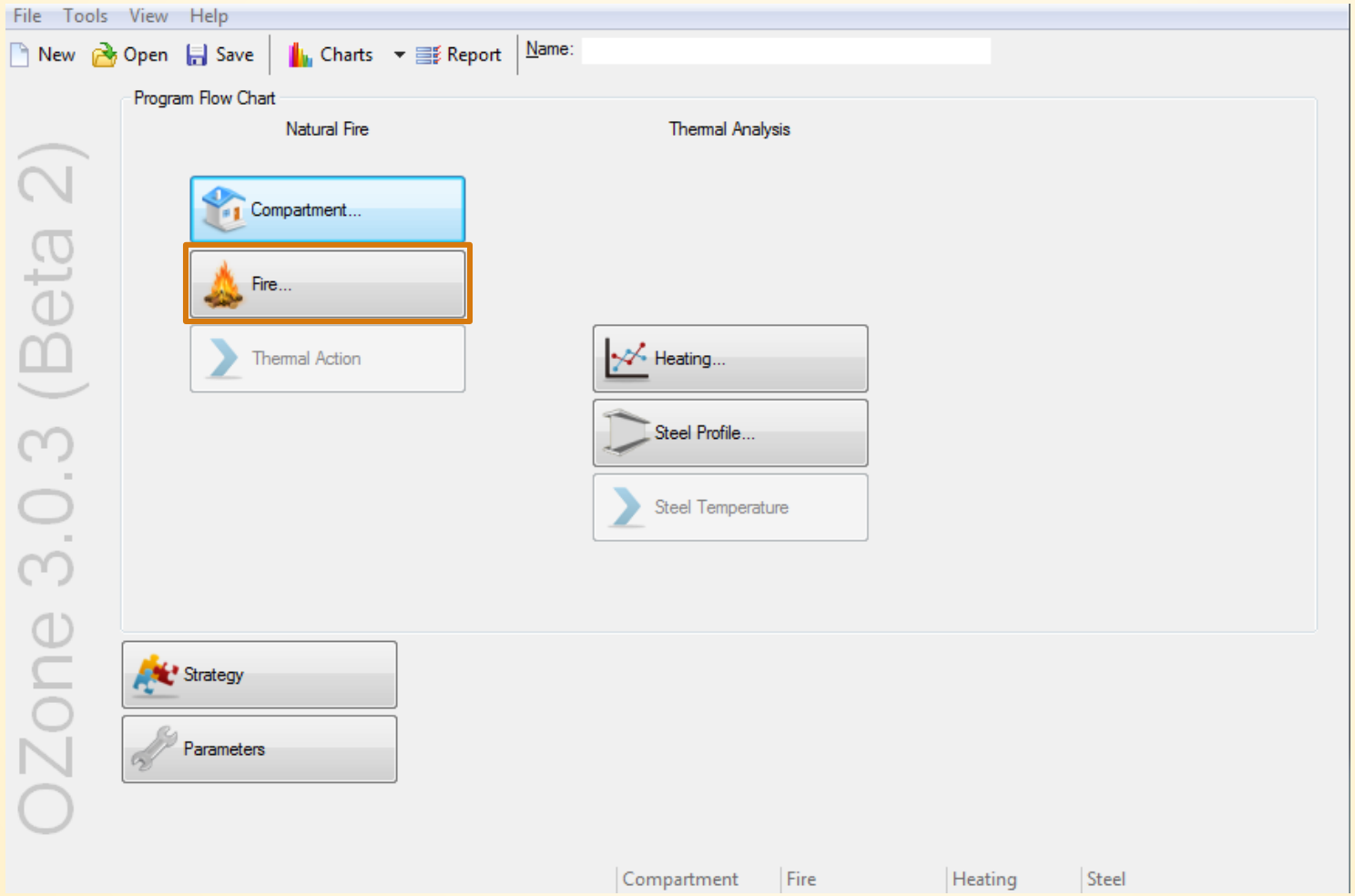
Temperature	% of Total Openings
°C	
20	10
400	50
500	100

Time Dependent Openings

Time	% of Total Openings
sec	
0	5
1200	100

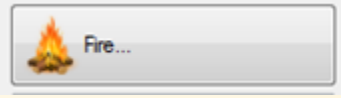
5. Software

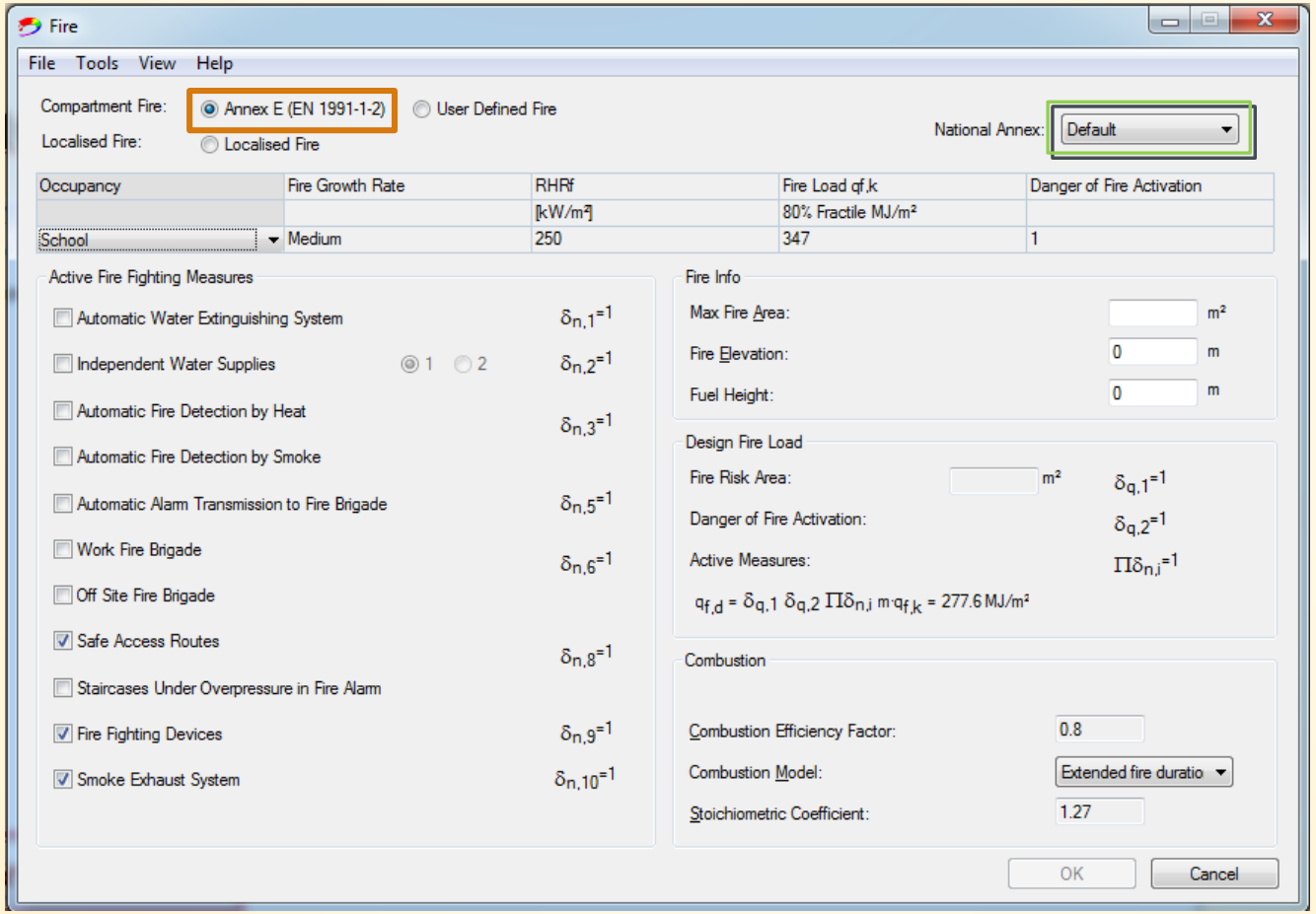
5.1. OZone Fuego de sector



5. Software

5.1. OZone Fuego de sector

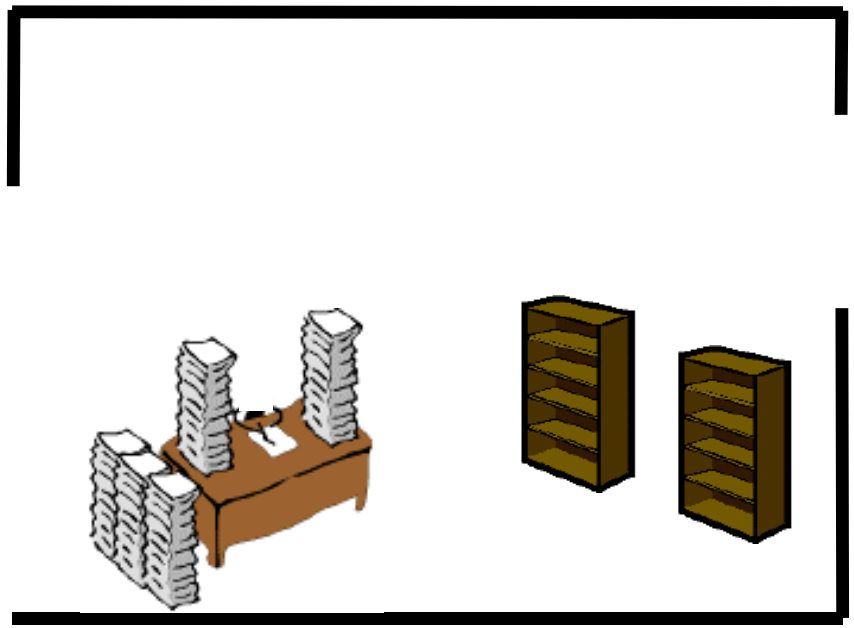




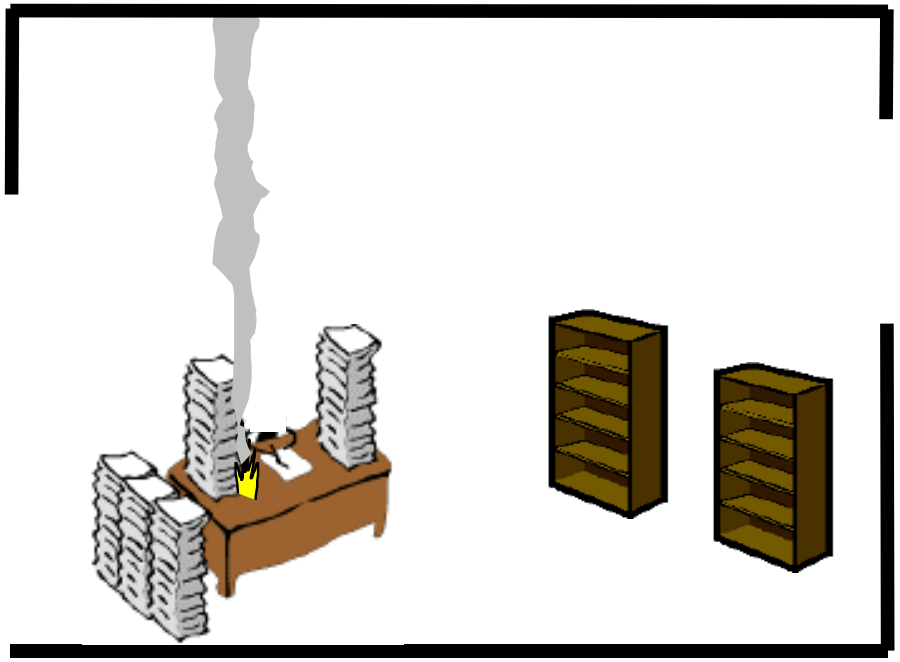
5. Software

5.1. OZone Fuego de sector

Antes del incendio



Ignición

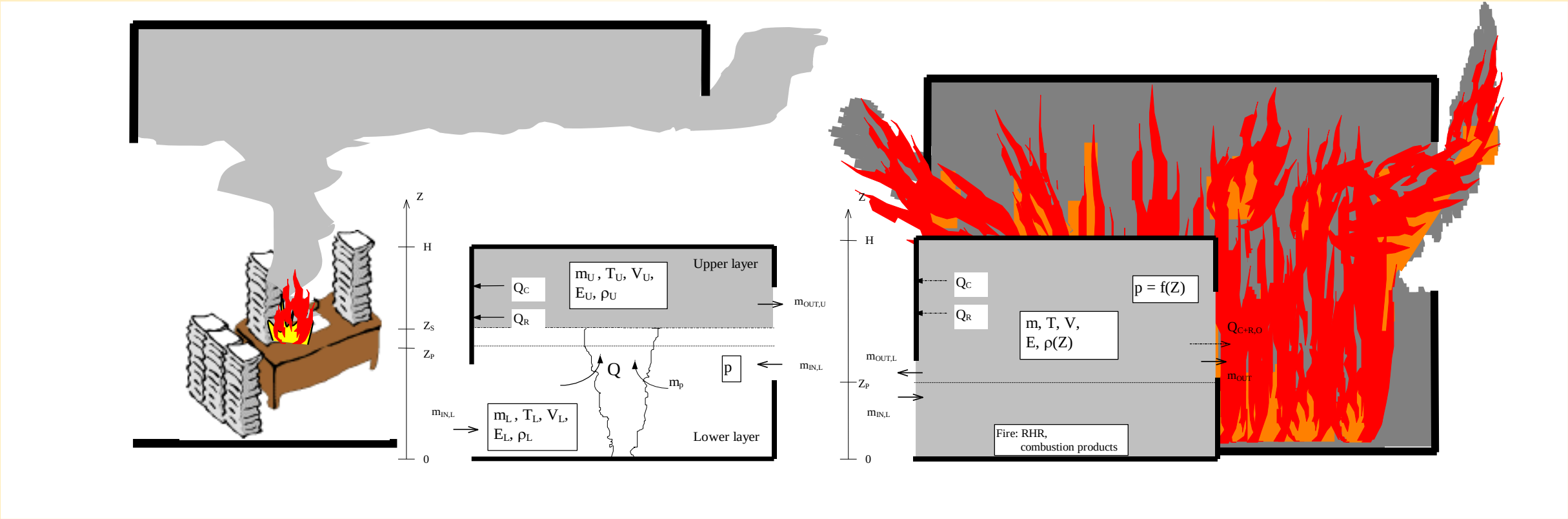


5. Software

5.1. OZone Fuego de sector

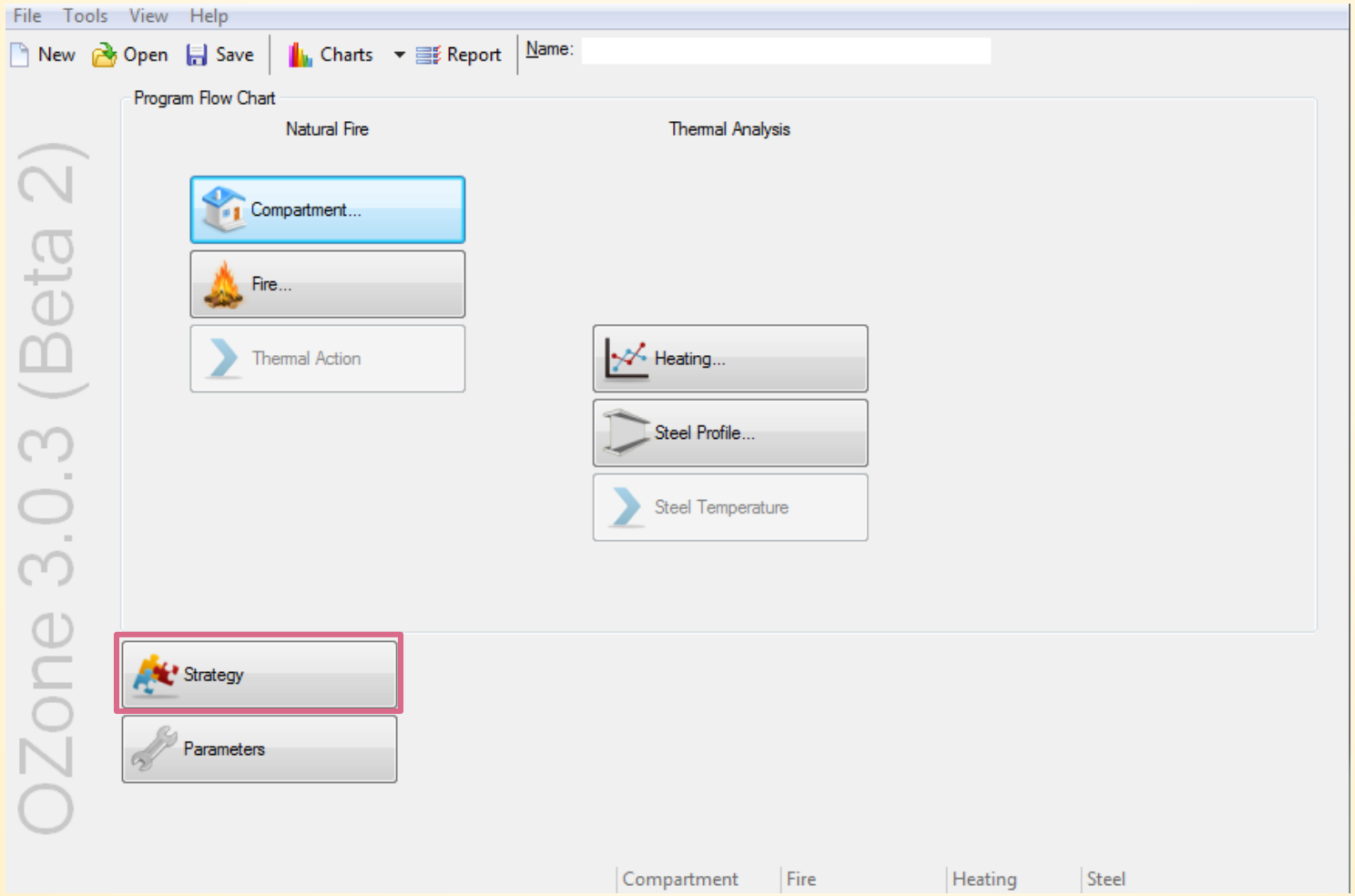
Fuego localizado

Fuego totalmente desarrollado



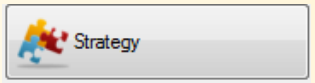
5. Software

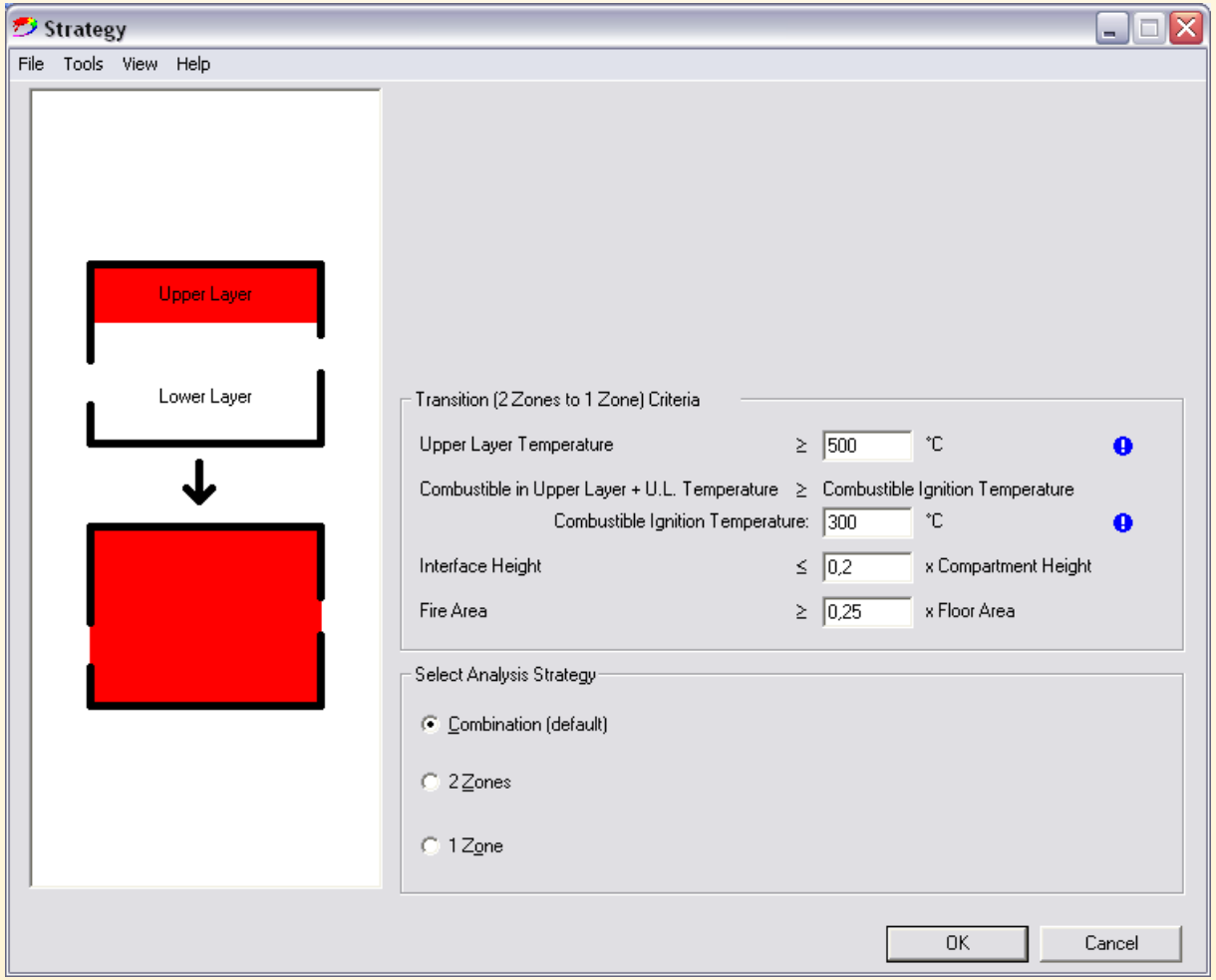
5.1. OZone Fuego de sector



5. Software

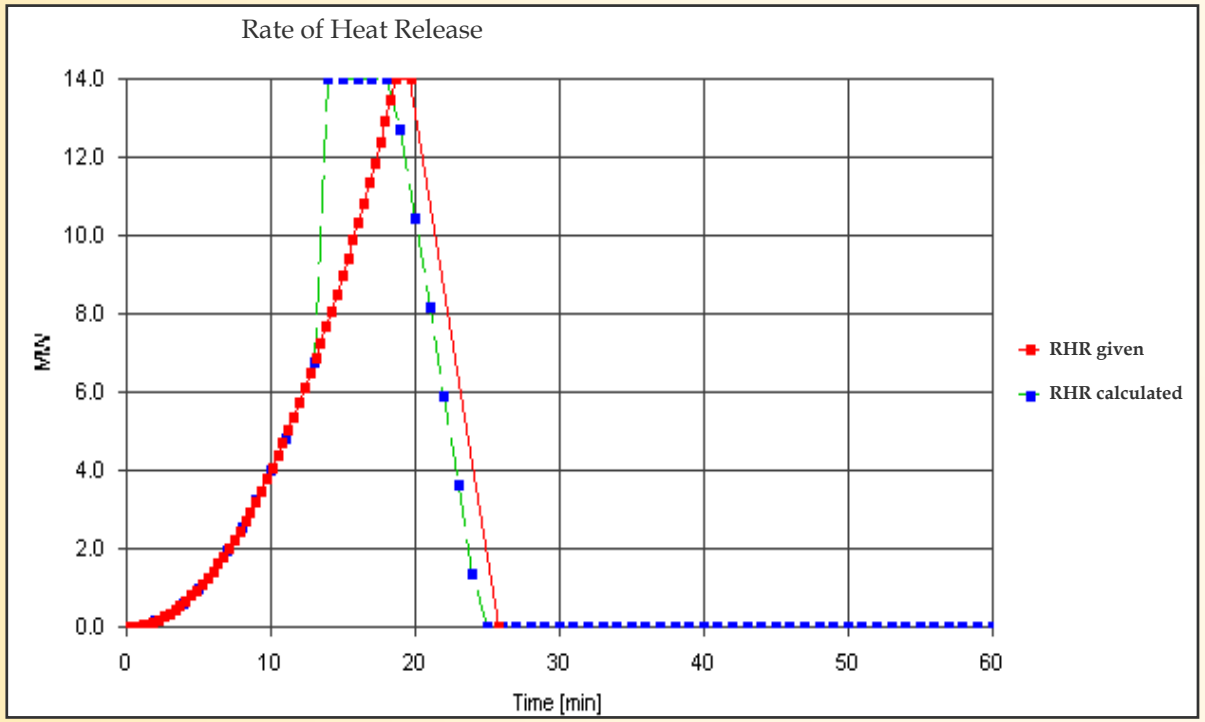
5.1. OZone Fuego de sector

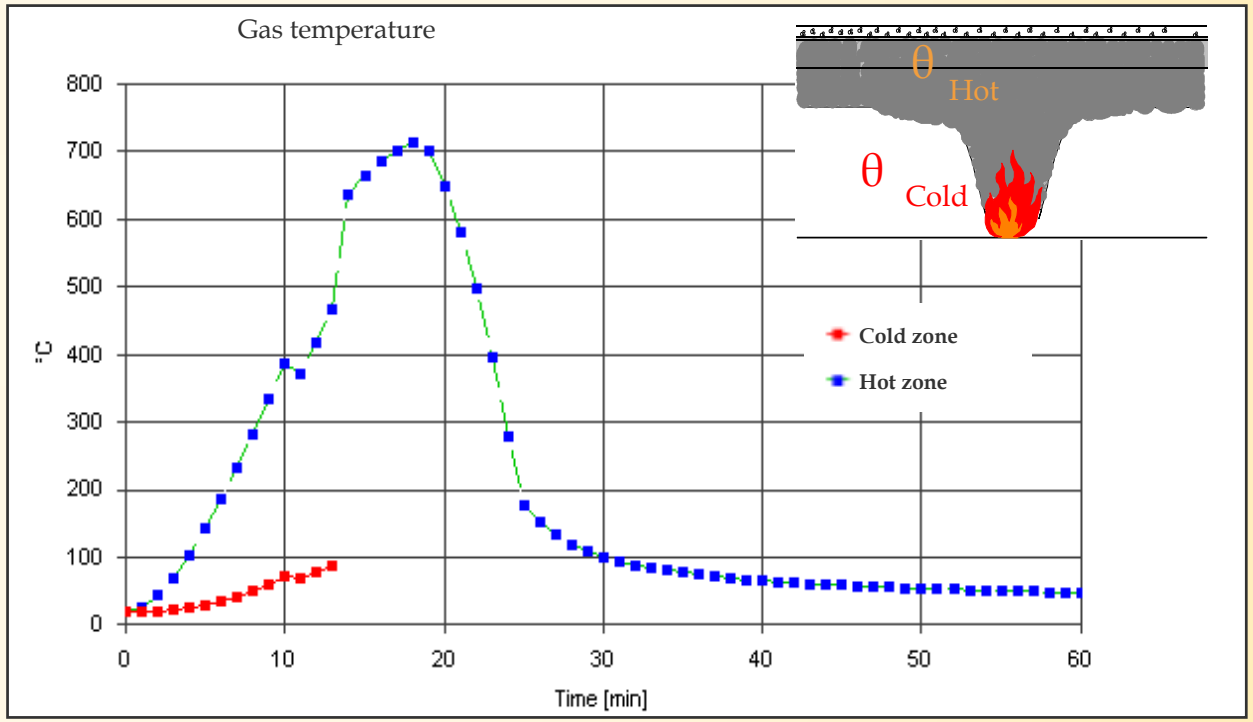




5. Software

5.1. OZone Fuego de sector

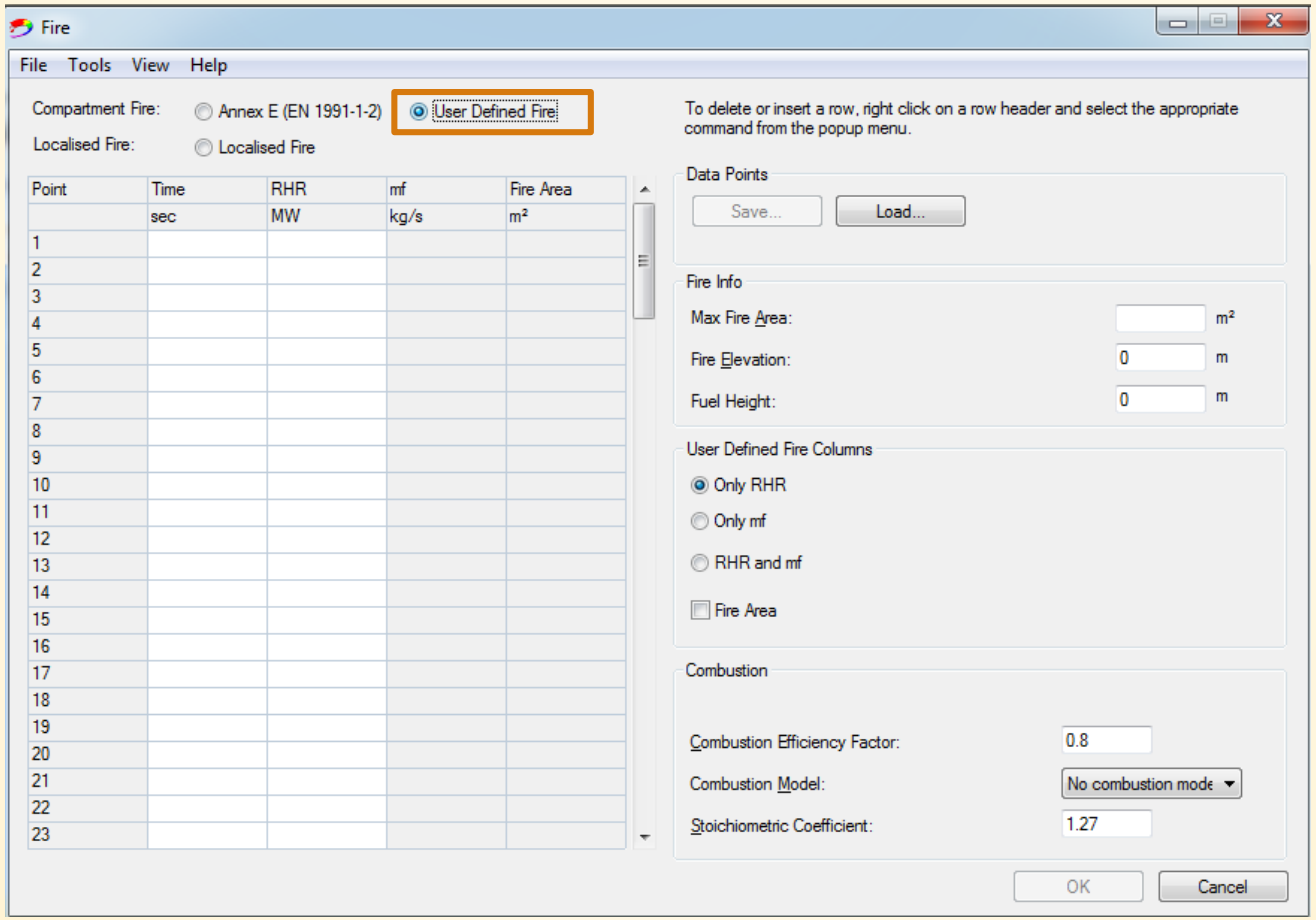




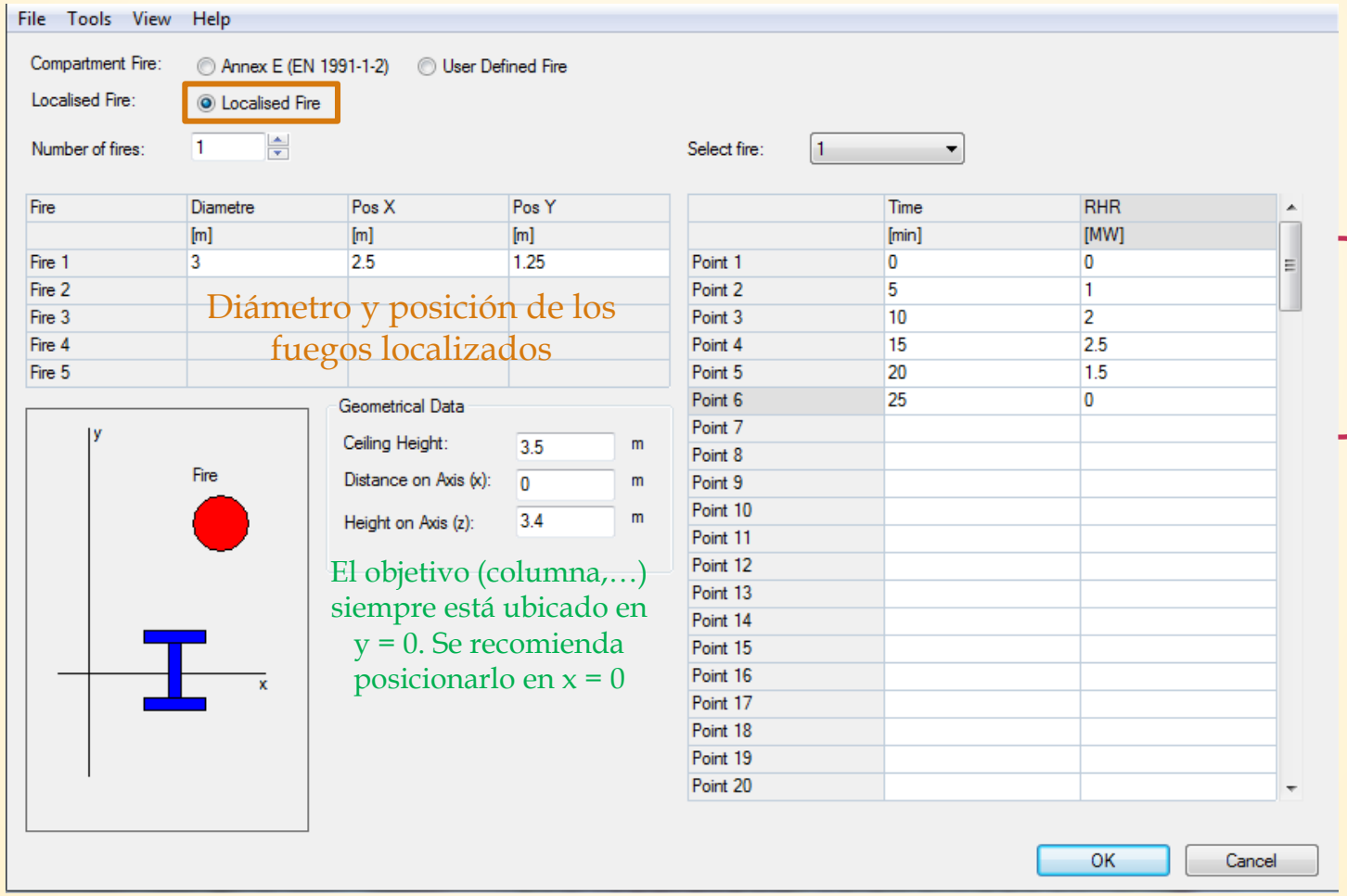
Tras 13 minutos, la temperatura de la zona caliente alcanza 500°C → Cambio de 2 zonas a 1 zona

5. Software

5.1. OZone Fuego de sector

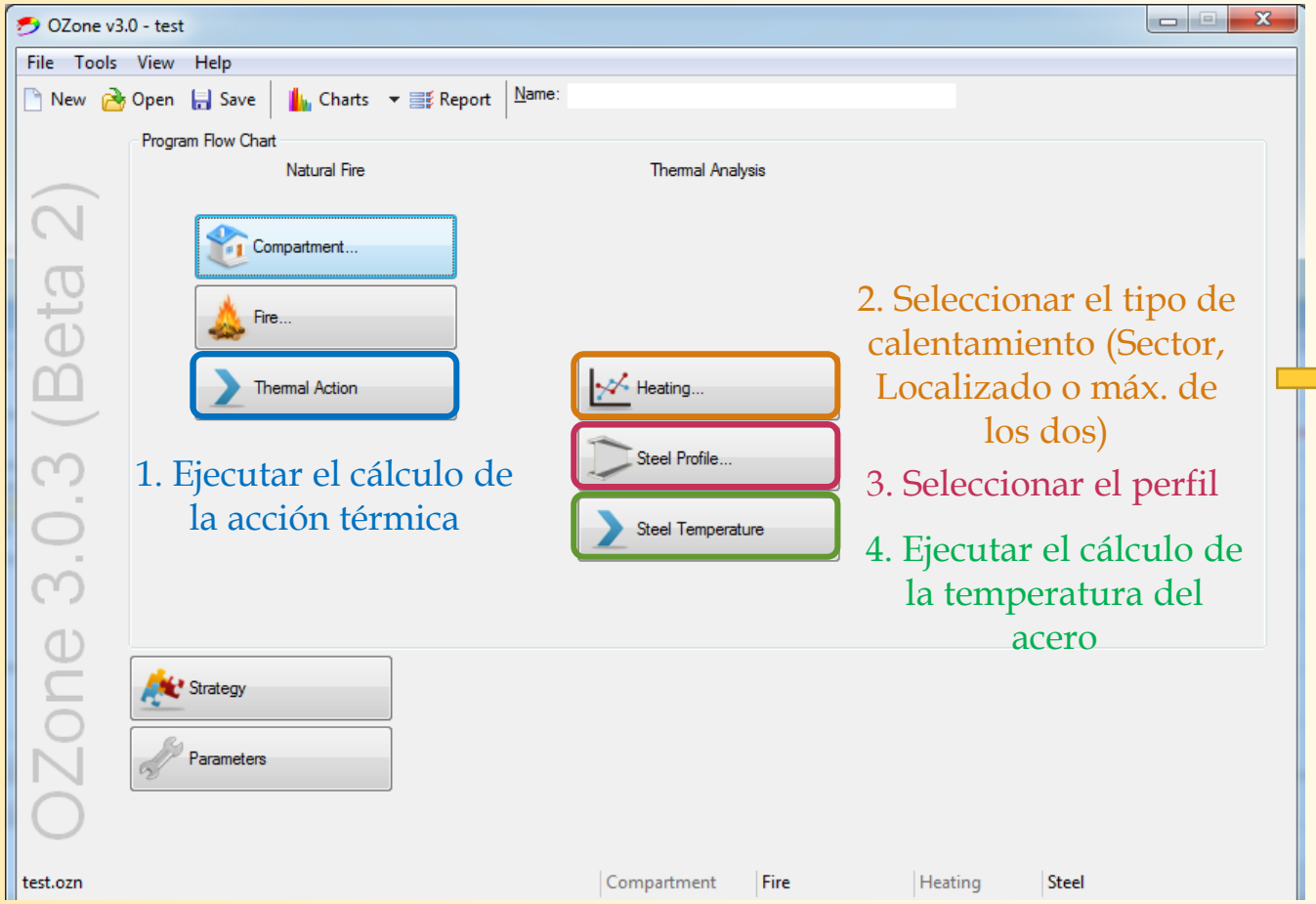


5.2. OZone Fuego localizado



5. Software

5.2. OZone Fuego localizado



1. Ejecutar el cálculo de la acción térmica

2. Seleccionar el tipo de calentamiento (Sector, Localizado o máx. de los dos)

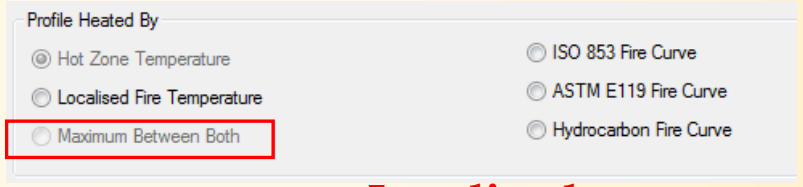
3. Seleccionar el perfil

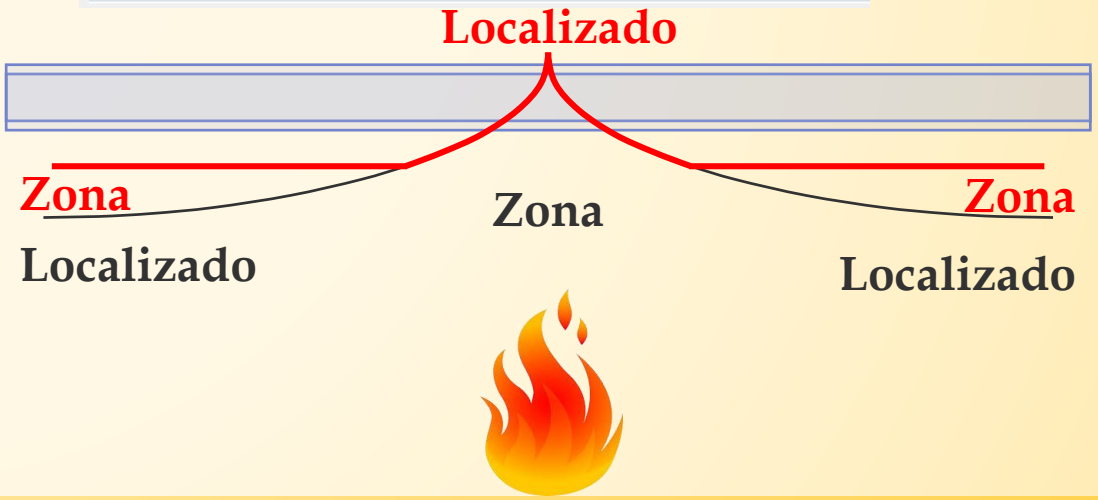
4. Ejecutar el cálculo de la temperatura del acero

EN 1991-1-2 § 3.3.2 (4)

Para calcular de forma más precisa la distribución de temperatura a lo largo del elemento, en caso de un fuego localizado, se puede considerar una combinación de resultados obtenida mediante un modelo de dos zonas y un fuego localizado.

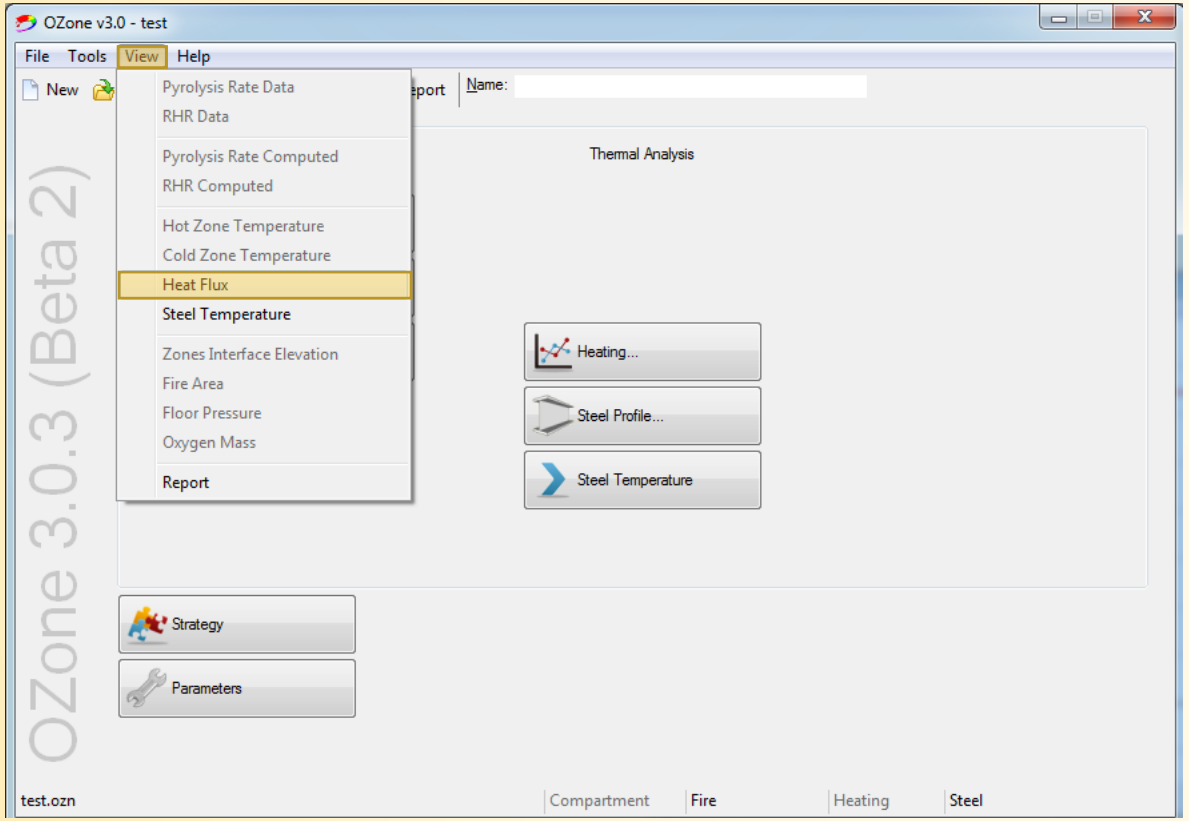
NOTA El campo de temperatura en el elemento se puede obtener considerando el máximo efecto en cada posición dado por los dos modelos de incendio.

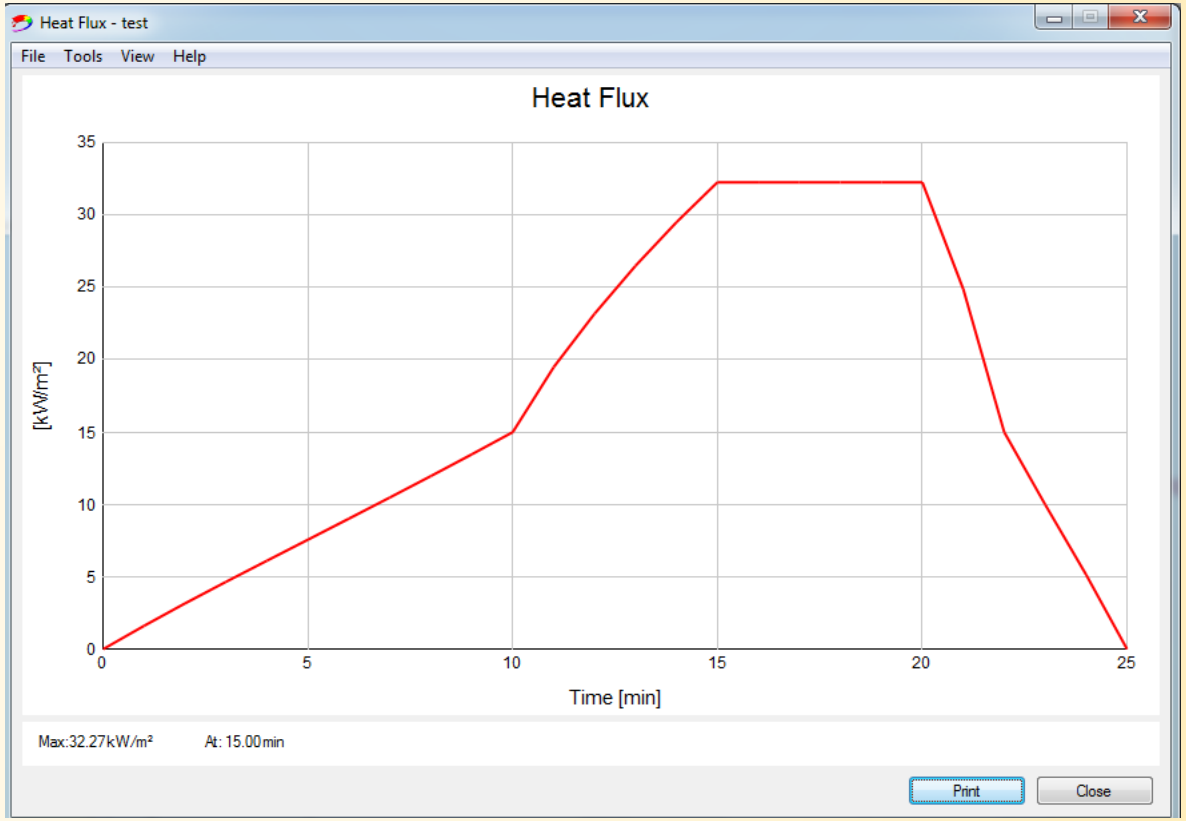




5. Software

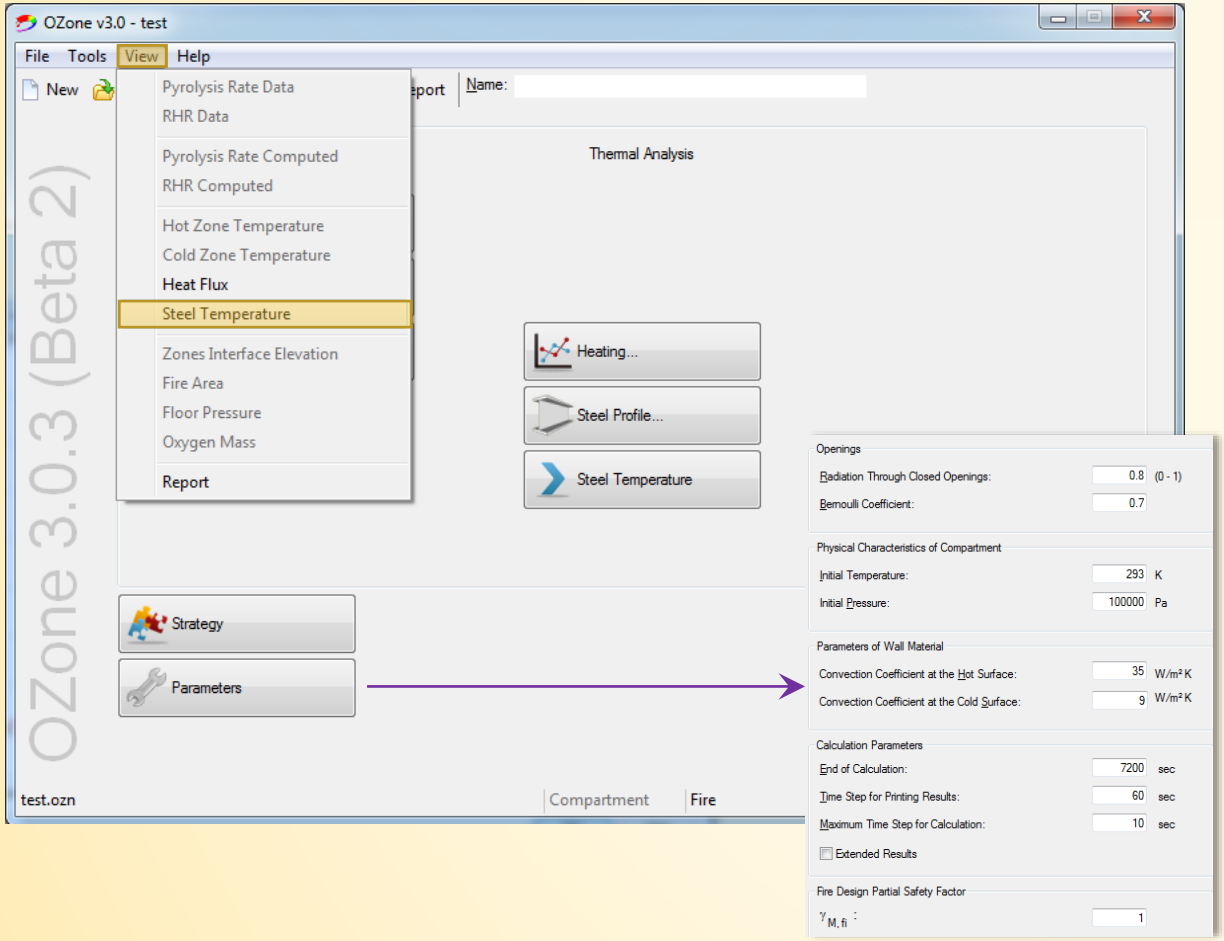
5.2. OZone Fuego localizado

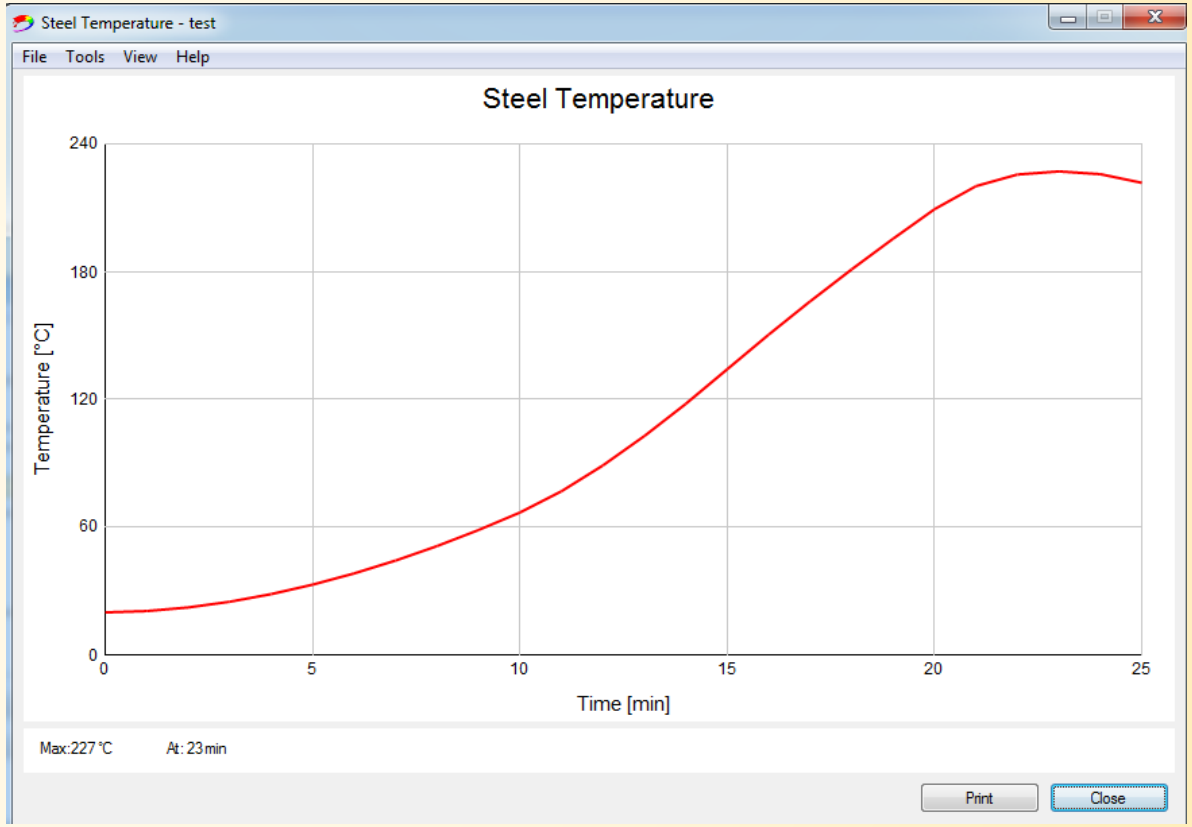




5. Software

5.2. OZone Fuego localizado

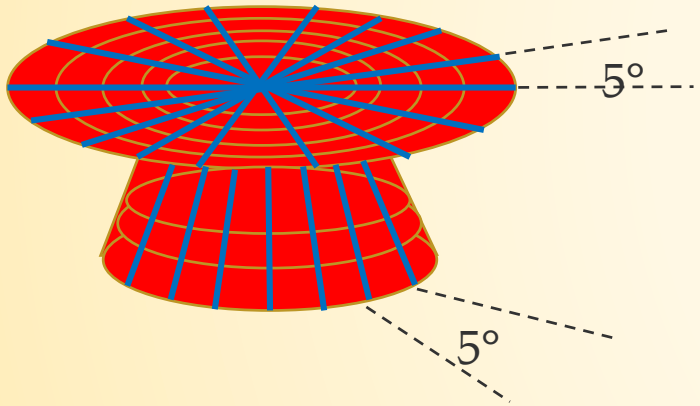




5. Software

5.3. SAFIR Fuego localizado

Llama cilíndrica
(impacta contra el techo)



- Se ha implementado en SAFIR un método geométrico (intercambio de calor directo entre superficies finitas).
- Esto genera una distribución no uniforme de temperatura en las secciones analizadas.
- Cada foco del incendio viene definido por su posición (x, y, z), forma (cilindro o cono), posición del techo en altura, evolución del diámetro con el tiempo, evolución del RHR con el tiempo.
- En caso de varios focos de incedio, se suman sus contribuciones y se limita a 100 kW/m^2

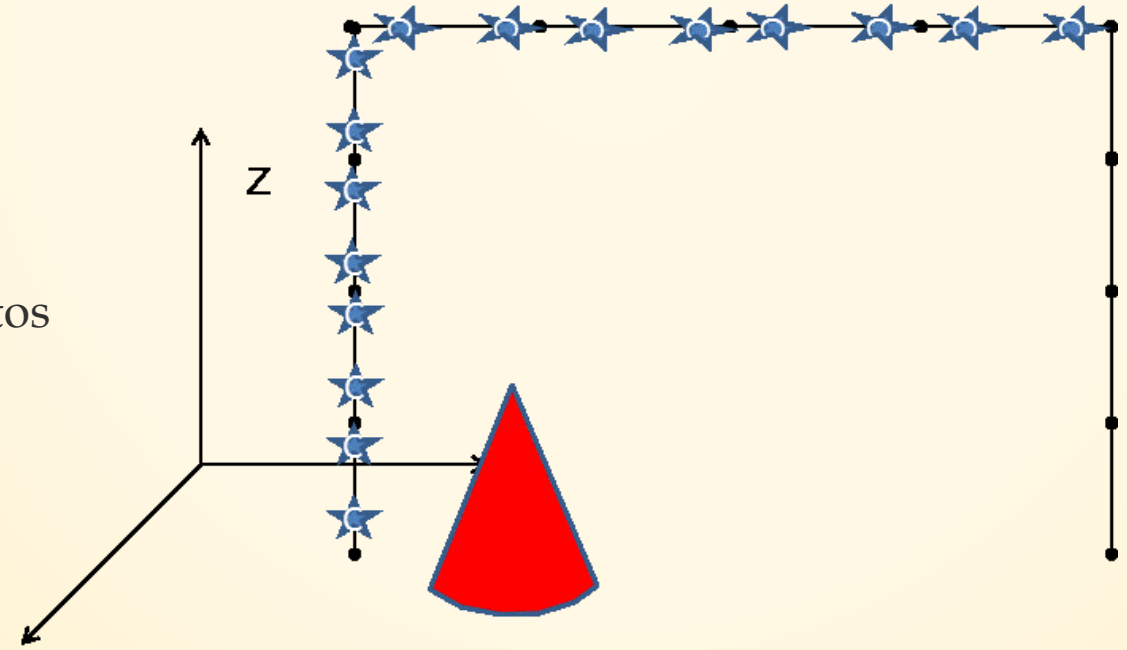
Franssen, J.-M., & Gernay, T. (2017). Modeling structures in fire with SAFIR®: Theoretical background and capabilities. Journal of Structural Fire Engineering, 8(3), 300-323.

5.3. SAFIR Fuego localizado

- Se lleva a cabo un análisis térmico 2D en cada punto de Gauss para cada elemento finito barra (or lámina).

Esta viga posee 4 elementos finitos => 8 puntos de Gauss

Esta columna posee 4 elementos finitos => 8 puntos de Gauss

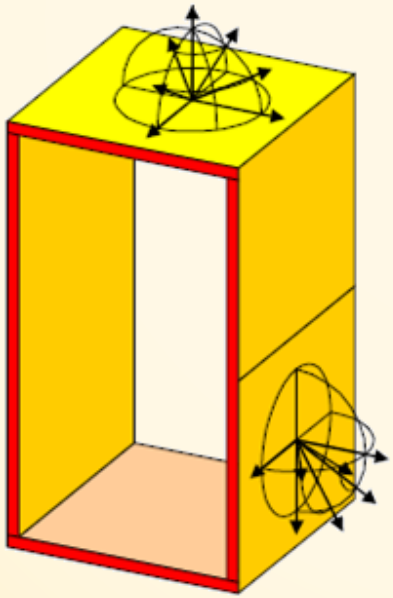
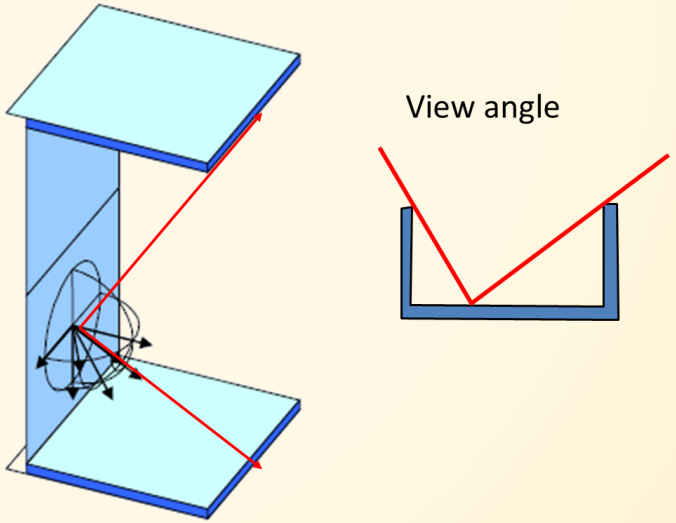


Esta columna no se calienta

5.3. SAFIR Fuego localizado

- En una sección cóncava, el ‘efecto sombra’ se considera automáticamente si ésta se encuentra fuera del fuego.

Forma convexa



Forma cóncava