



JUPITER

Jupiter 2.0 and 2.2 Specificities

JUPITER



- Screen “Structure” :
 - Possibility to use the dimensions of a standard building with a rectangular base or including a tower
 - Or use of the dimensions of the building with a dedicated integrated drawing tool.

File ?

Structure type

Select structure type

industrial

Structure shielding

- None
- Mesh
- Continuous

Structure with LPS

Class Pb

Special characteristics

- Meshed bonding network complying to IEC 62305-4
- Building with metal structure or continuous reinforced concrete framework acting as a natural down-conductor system
 - Elements used as natural down-conductors
- Building with metal roof and metal structure acting as a natural down-conductor system
 - Elements used as natural down-conductors

Collection area

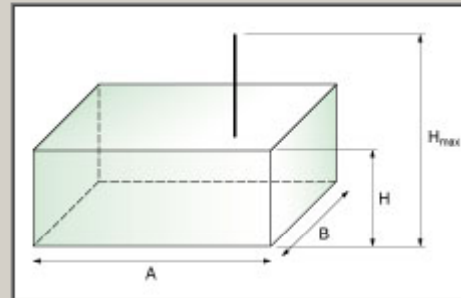
Location factor

surr

Analytic calculation

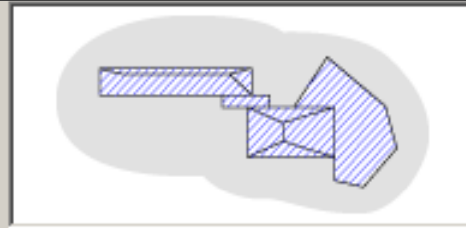
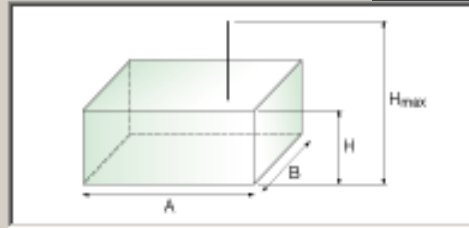
Collection area

A (m)
B (m)
H (m)
H_{max} (m)



OK

Cancel



al down-conductor system

as a part of a building

Data

Collection Area Ad (km²)

Collection area Am (km²)

OK

Structure type

Select structure type

industrial

Structure shielding

- None
- Mesh
- Continuous

Structure with LPS

Class

Pb

Special characteristics

- Meshed bonding network complying to IEC 62305-4
- Building with metal structure or continuous reinforced concrete framework acting as a natural down-conductor system
 - Elements used as natural LPS component.
- Building with metal roof and structure or continuous reinforced concrete framework acting as a natural down-conductor system
 - Elements used as natural LPS component.

Collection area

Location factor

surrounded by smaller objects

Structure as a part of a building

Data

Analytic calculation

Data

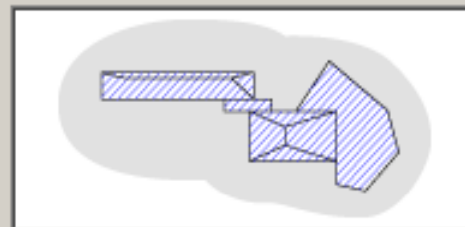
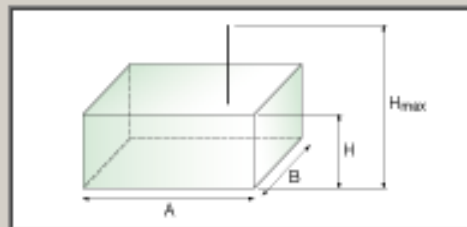
Graphic calculation

Draw

Calculation

Collection Area A_d (km²)

Collection area A_m (km²)



OK



New



Save and exit



Select



Bring to back



Rectangle



Polygon



Circle



Delete



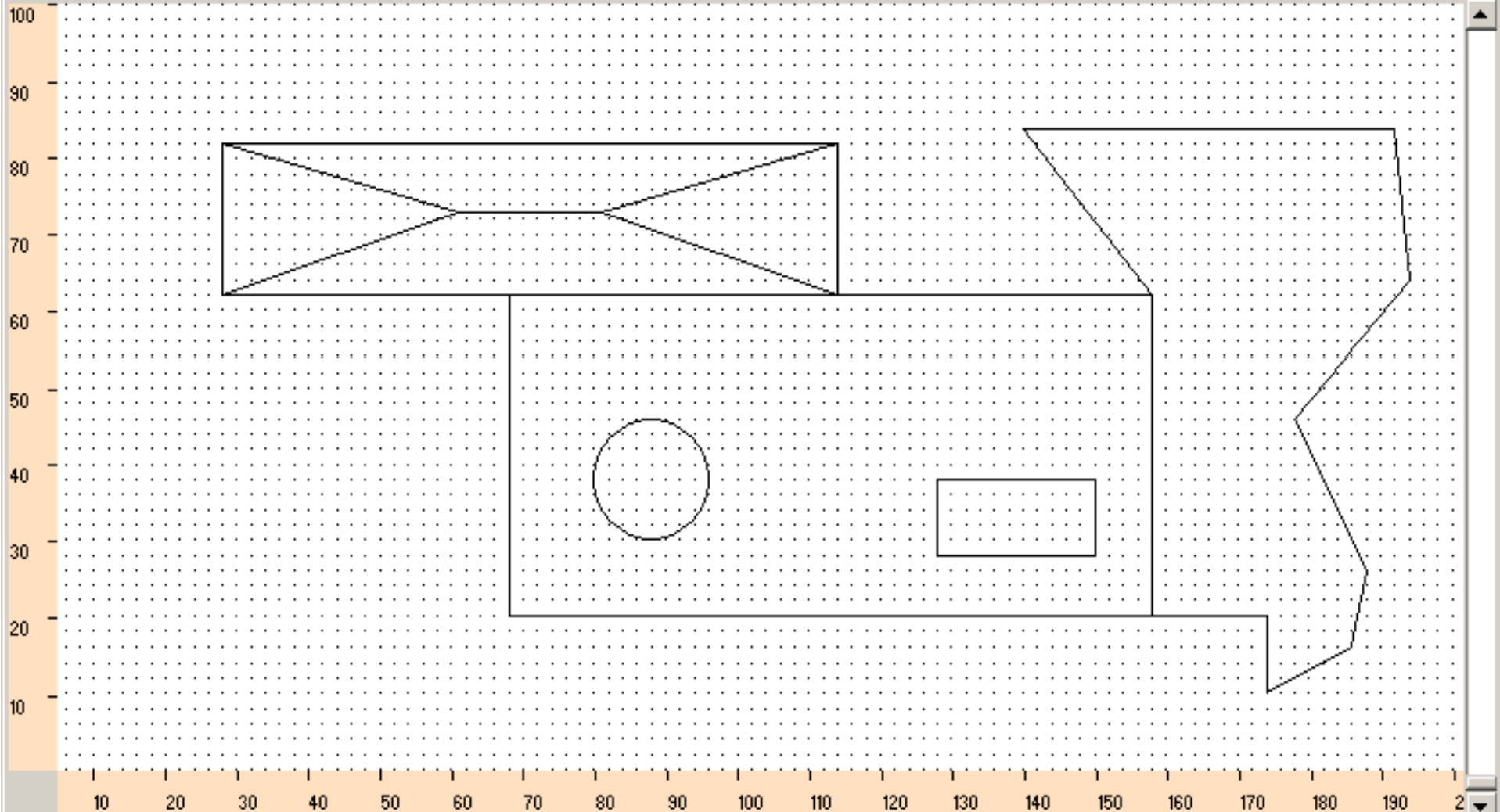
Roof



Zoom



Grid



X: 119 m

Y: 96 m

Definition of the roof shape



New



Save and exit



Select



Bring to back



Rectangle



Polygon



Circle



Delete



Roof



Zoom



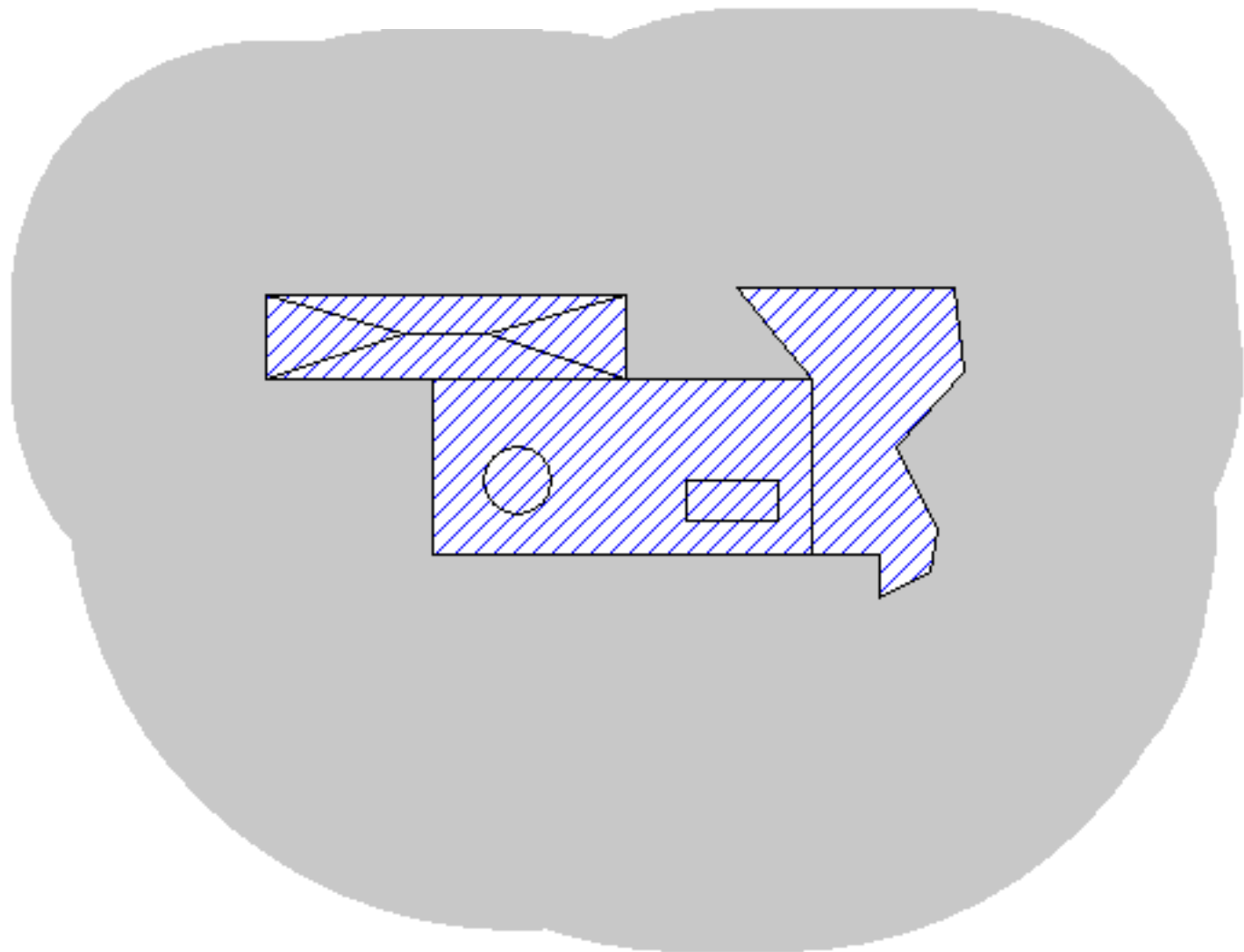
Grid

The drawing area features a grid with X and Y axes ranging from 0 to 100. A large rectangle is drawn with a horizontal ridge roof. A smaller circle is also drawn. A 'Sloped roof' dialog box is open, showing options for 'Horizontal ridge' (selected) and 'Vertical ridge'. It includes input fields for 'Hmin (m)' (22), 'Hmax (m)' (25), 'a (0 - 44 m)' (18), and 'b (%)' (34). A diagram in the dialog shows a red roof with dimensions 'a' and 'b' for the slope, and 'Hmin' and 'Hmax' for the heights from the ground.

X: 119 m

Y: 96 m

Calculation of surfaces Ad and Am



Collection Area Ad (km²):

5,51E-02

Collection area Am (km²):

3,14E-01

Show Ad

Show Am

Export image

Exit

JUPITER



- Screen “Lines” :
 - Possibility to use standard lines (overhead, underground, HT, BT or data)
 - Or use the line as it is (mix underground and overhead, with transformer ...)

Standard line

File ?

Line name

Power aerial



Standard line



Custom line

Select line type

power - aerial

Connected lines

N.	Name
L1	Power aerial
L2	Power mixed
L3	Telecom



Building

Adjacent structure

A (m) 10

B (m) 15

H (m) 8

Location factor

isolated

Characteristics of the connected line

Length (m) 780

Height above ground (m) 6

Shielding none

Shield not bonded to eqp. bar to whom eqp. is connected

Location factor surrounded by higher objects

Environmental factor suburban (h < 10 m)

SPD at line entrance none Pspd 1

Help

New

Delete

Change

OK

Cancel

Description of lines as they are

File ?

Line name

Power mixed



Standard line

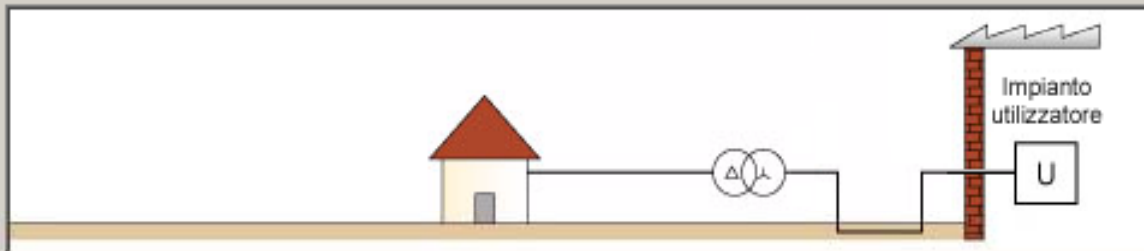


Custom line

Connected lines

N.	Name
L1	Power aerial
L2	Power mixed
L3	Telecom

Input structure's value. Drag and drop icons to arrange the line



Data Data Data Data

New
Delete
Change

<p>Lengths</p> <p>Length (m) : 600,00</p> <p>Useful length (m) : 543,00</p>	<p>Collection areas</p> <p>Due to flashes to a service Ai (km²) : 0,016924</p> <p>Due to flashes near a service Ai (km²) : 0,500000</p> <p>Adjacent structure Ada (km²) : 0,002585</p>
--	---

OK

Cancel

JUPITER



- Screen “Zones” :
 - Simplified treatment of multiples zones

Example : creation of 3 zones

File ?

Zone definition

Multiple zones Single zone

Zone name

Office

Zones list

N.	Name
Z1	External
Z2	Office
Z3	Production

New

Delete

Change

Characteristics

Internal systems

Risk components

Loss values

Zone type

outside
 inside

Presence of persons

Risk of explosion (zone 0)

Help

Special hazard

Low panic level

Risk of fire

ordinary



Risk of fire evaluation

Fire protections

none

manual

automatic

Zone shielding

none

mesh

continuous

Ground surface type

Linoleum

Protection against touch voltage

no protection

warning notices

elt insulation

physical restrictions

soil equipotentialisation

OK

Cancel

Specific and unique tool for calculation of fire risk based on fire brigade data

File ?

Zone definition

Multiple zones Single zone

Zones list

N.	Name
Z1	External
Z2	Office
Z3	Production

New

Delete

Change

Characteristics

Internal systems


Risk components

Loss values

Zone type outside inside

Presence of persons Risk of explosion (zone 0) Help

Special hazard

Risk of fire  Risk of fire evaluation

Fire protections none manual automatic

Zone shielding none mesh continuous

Ground surface type

Protection against touch voltage no protection warning notices elt insulation physical restrictions soil equipotentialisation

OK

Cancel

Risk of fire evaluation

To evaluate specific load

Zone's total a

Specific and unique tool for calculation of fire risk based on fire brigade data

Type of structure (MJ/m²)

- machine shop
- machine shop, turning
- machineries and toolmakers exhibition**
- making of wooden agglomerated panels
- man-made fibre production

Mass material (MJ/kg)

- acetaldehyde**
- acetate polyvinyl
- acetone
- acetylene (in cylinders melted 17 MJ/lt)
- acetylene gas (57 MJ/m³)

Volume material (MJ/m³)

- natural fibre - other
- natural fibre - coconut
- natural rough rubber**
- natural rubber things
- natural rubber, foam blocks

Number of pieces (MJ/pz)

- kitchens chair
- kitchens table (metallic legs)
- kitchens wooden table
- library (a m² surface, content included)**
- metallic writing desk

Double click to remove a line from the table

Elements that concur to determine fire load	Piece value	Area (m ²)	Volume (m ³)	Mass (kg)	Number of pieces	
acetate polyvinyl	21 (MJ/kg)			870		57719270 MJ
acetaldehyde	25 (MJ/kg)			500		
library (a m ² surface, content included)	837 (MJ/pz)				500	
natural rough rubber	28500 (MJ/m ³)		2000			3136916,8! kg
machineries and toolmakers exhibition	90 (MJ/m ²)	3000				

Specific load fire (MJ/m²)

7214,91

Specific load fire (kg/m²)

392,11

Risk of fire

High

OK

Cancel

Help for calculation of Losses

File ?

Zone definition

Multiple zones Single zone

Zone name

Office

Zones list

N.	Name
Z1	External
Z2	Office
Z3	Production

New

Delete

Change

Characteristics

Internal systems

Risk components

Loss values

Manual

Loss values input procedure:

R1

Guide

Lf

2,50E-01

Lo

1,25E-01

Lt

2,50E-02

Loss value calculation - risk 1

Number of possible endangered persons (victims) due to:

physical damages to the structure

30

failure of internal systems

20

touch and step voltages

5

Expected total number of persons in the structure

70

Time in hours per year for which the persons are present in the dangerous place, inside the structure

8760

Cancel

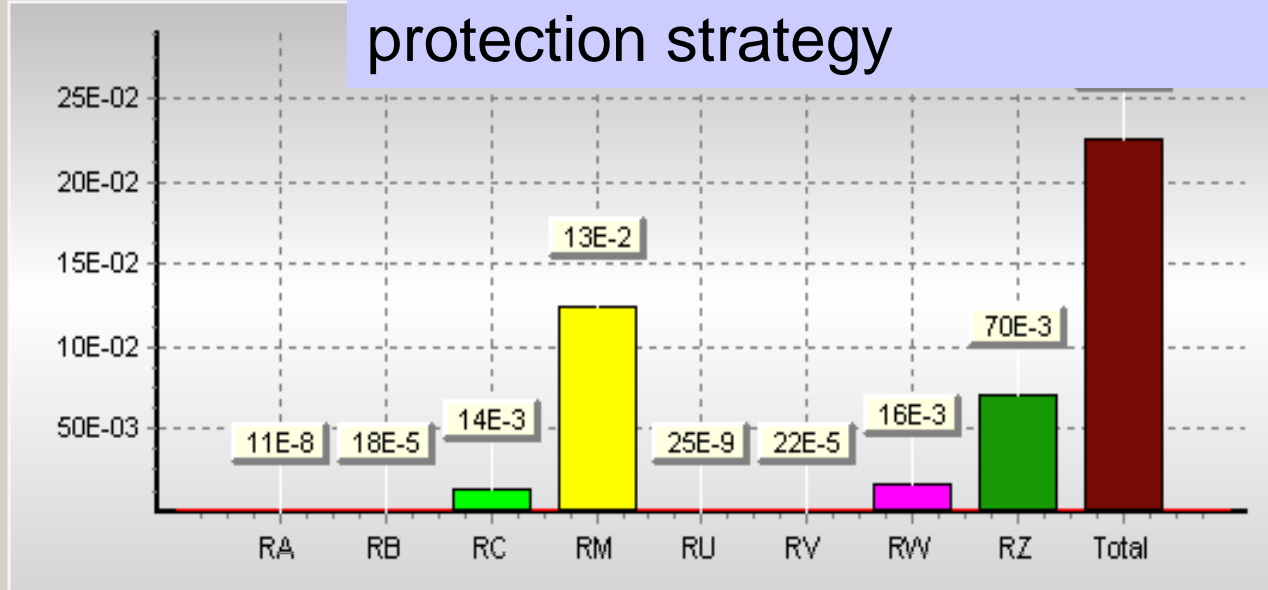
Loss value calculation

OK

Cancel

Easy graphical way to identify the main components of the risk and thus determine a protection strategy

Structure risk



Risk 3

Risk 4

Protection measures

No protection measures

Protection measures needed

Structure and collection area ✓

Connected lines ✓

Zones ✓

Protection measures selection

Economic evaluation

SPD selection

Projects list

Project data

P001 - METALPHA Sa - industrial design -

Structure

Connected lines

Zones

Calculations

Prot. measures

- Lightning flashes frequency
Ng (flashes/year km²): 2
- Structure type: industrial
- Location factor: surrounded by smaller objects
- Shielding: No shield
- Collection area
Dimensions: refer to annex
Collection area Ad (km²): 5,51E-02
Collection area Am (km²): 3,14E-01
- Special characteristics:

Easy graphical way to identify the main components of the risk zone by zone and thus determine a protection strategy for each zone

Total

Z1

Z2

Z3

Z4

Z5

	Z1	Z2	Z3	Z4	Z5	Structure
A	1,10E-07	0,00E+00	0,00E+00			1,10E-07
B	0,00E+00	1,38E-04	4,13E-05			1,79E-04
C	0,00E+00	6,89E-03	6,89E-03			1,38E-02
M	0,00E+00	5,37E-02	7,16E-02			1,25E-01
U	0,00E+00	1,82E-08	7,16E-09			2,54E-08
V	0,00E+00	1,82E-04	4,30E-05			2,25E-04
W	0,00E+00	9,08E-03	7,16E-03			1,62E-02
Z	0,00E+00	5,24E-02	1,80E-02			7,04E-02
Total	1,10E-07	1,22E-01	1,04E-01			2,26E-01

Internal systems: Z2

Name	U	V	W	Z
Power office	4,74E-09	4,74E-05	2,37E-03	3,84E-02
Telecom office	1,34E-08	1,34E-04	6,71E-03	1,40E-02

Selected protection measures

Show risk

Without protection

With protection

Remove protection

Selected case:

Clear all cases

OK

Risk 3

Risk 4

Risk composition

Risk parameters

Protection choice

Automatic

Manual

Economic evaluation

Yes No

Automatic mode to determine a solution based on the user own strategy

Total

Z1

Z2

Z3

Z4

Z5

Double click to select protection measures

	Z1	Z2	Z3	Z4	Z5	Structure
A	1,10E-07	0,00E+00	0,00E+00			1,10E-07
B	0,00E+00	6,89E-06	2,07E-06			8,96E-06
C	0,00E+00	6,00E-03	6,00E-03			1,38E-02
M	0,00E+00					1,25E-01
U	0,00E+00					5,09E-10
V	0,00E+00					4,51E-06
W	0,00E+00					1,62E-02
Z	0,00E+00					7,04E-02
Total	1,10E-07					2,26E-01

Case 1 - Protection measures priority

Double click on a protection measure to modify its level of priority

		Enable
1	LPS	<input checked="" type="checkbox"/>
2	SPD at line entrance	<input checked="" type="checkbox"/>
3	Manual fire protection	<input checked="" type="checkbox"/>
4	Automatic fire protection	<input checked="" type="checkbox"/>
5	Coordinated SPD	<input checked="" type="checkbox"/>
6	Wiring	<input checked="" type="checkbox"/>
7	Withstand voltage	<input checked="" type="checkbox"/>
8	Shielding	<input checked="" type="checkbox"/>
9	Touch and step voltage	<input checked="" type="checkbox"/>
10	Type of surface	<input checked="" type="checkbox"/>

Risk 1

Risk 2

Risk 3

Risk 4

Protection choice

Automatic

Manual

Economic evaluation

Yes No

Selected case:

Internal systems:

Name

Selected protection meas:

Common protection measures:
LPS class: II (Pb = 0,05)

Line1: Power aerial
SPD at line entrance: level II

Line2: Power mixed
SPD at line entrance: level II

Line3: Telecom
SPD at line entrance: level II

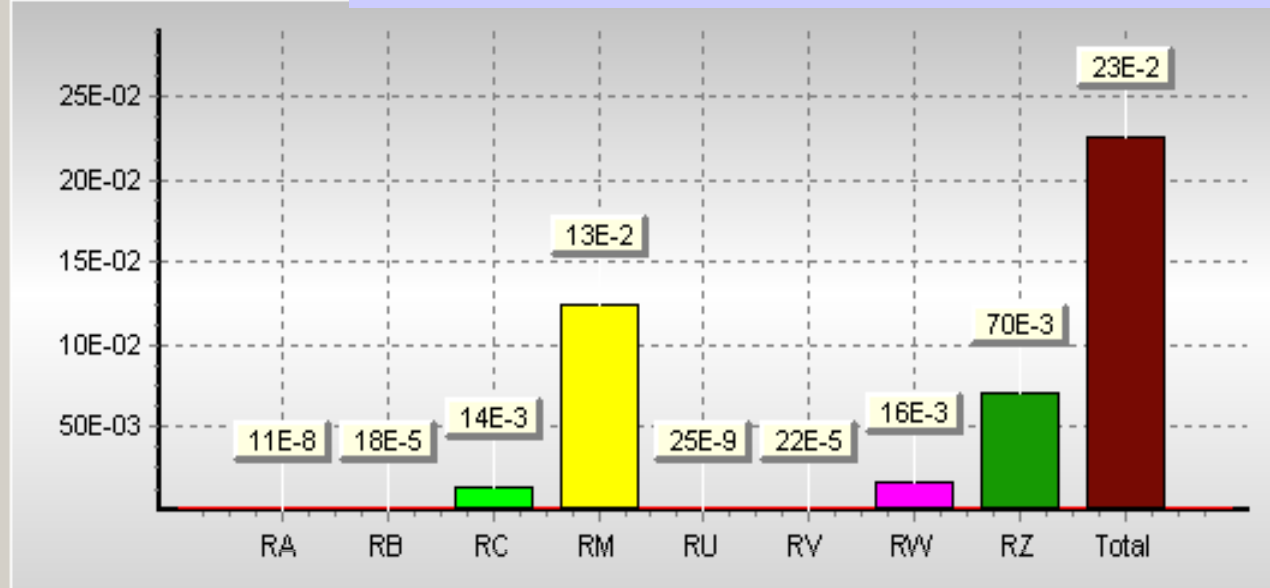
Show risk

Without protection

With protection

Possibility to optimize the solutions based on economic risk

Structure risk



Project data

P001 - METALPHA Sa - industrial design -

Structure

Connected lines

Zones

Calculations

Prot. measures

- Lightning flashes frequency
Ng (flashes/year km²): 2
- Structure type: industrial
- Location factor: surrounded by smaller objects
- Shielding: No shield
- Collection area
Dimensions: refer to annex
Collection area Ad (km²): 5,51E-02
Collection area Am (km²): 3,14E-01
- Special characteristics:

- Risk 1
- Risk 2
- Risk 3
- Risk 4

- Protection measures
- No protection measures

Protection measures needed

Structure and collection area ✓

Connected lines ✓

Zones ✓

Protection measures selection ✓

Economic evaluation

SPD selection

Projects list

Input structure and protection measures economic values

Structure and contents value

Protection measures cost

Case 1

Case 2

Case 3

Case 4

Case 5

Zone	Loss without protection (€)	Loss with protection (€)	Protection cost (€)	Zone saving (€)
Z1 - External	0,00	0,00	0,00	0,00
Z2 - Office	0,00	0,00	0,00	0,00
Z3 - Production	0,00	0,00	0,00	0,00
Total	0,00	0,00	0,00	0,00

Common protection cost (LPS and/or SPD at entrance line) (€)

Total saving (€)

Case	Annual protection cost	Saving (€)
Case 1	To evaluate	To evaluate
Case 2	To evaluate	To evaluate
Case 3	To evaluate	To evaluate
Case 4	To evaluate	To evaluate
Case 5	To evaluate	To evaluate

Selected case

[Help](#)

Determination of the complete cost of the LPS based on a price list that the user can modify

Structure and contents value

Protection measures cost

Case 1

Zone
Z1 - External
Z2 - Office
Z3 - Production
Total

Price list

To modify a cost input the new value in the corresponding cell

Description	Unit of measure	Cost (€)
LPS		
meshed air-termination (installed)	m	21
down-conductors (installed)	m	25
type B earth termination	m	70
vertical earth termination (deep-driven and connected)	each	60
platform renting (18 m height)	h	47
platform renting (34 m height)	h	54
platform renting (42 m height)	h	64
scaffolding renting	h	3
equipotential bonding bar	each	300
equipotential connections	each	15
MEASURES TO REDUCE THE CONSEQUENCE OF FIRE		
fire extinguishers system	m ²	0,35
fire hydrants system	m ²	0,3
manual alarm installation	m ²	0,5
manually operated extinguishing installation	m ²	1,15

OK Cancel

Case 5

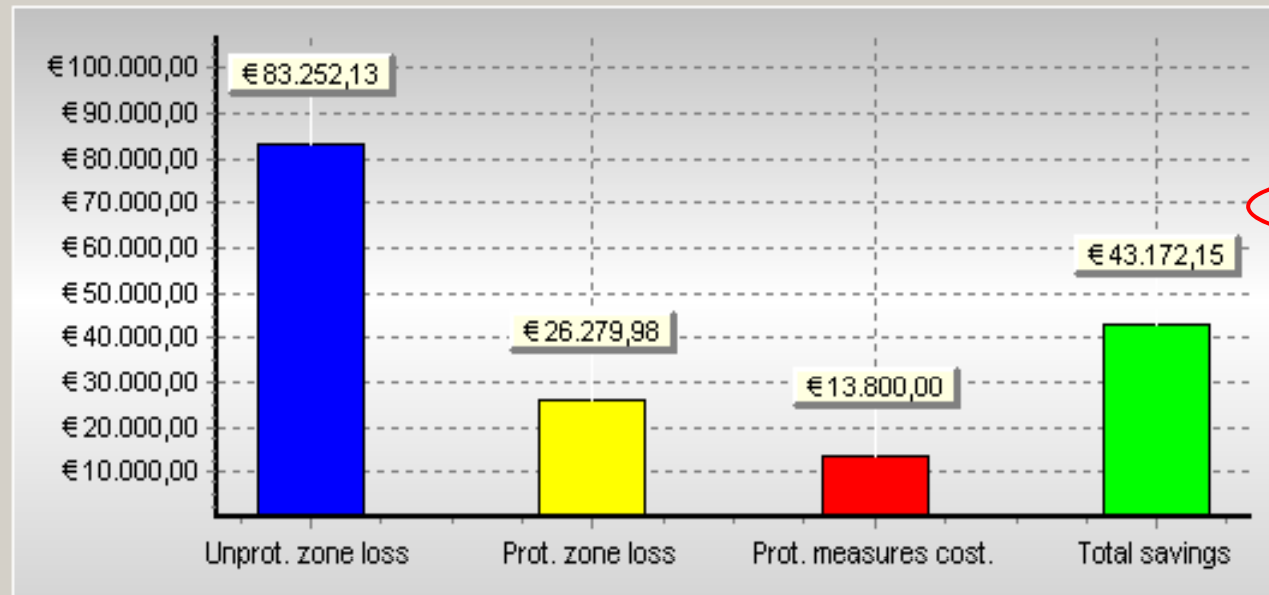
one saving (€)	0,00
	0,00
	0,00
	0,00
	0,00
	0,00

Case	Annual protection cost	Saving (€)
Case 1	To evaluate	To evaluate
Case 2	To evaluate	To evaluate
Case 3	To evaluate	To evaluate
Case 4	To evaluate	To evaluate
Case 5	To evaluate	To evaluate

Selected case **case 1** Help

OK

Economic evaluation



- Risk 1
- Risk 2
- Risk 3
- Risk 4

Protection measures No protection measures

Protection is cost effective

Structure and collection area ✓

Connected lines ✓

Zones ✓

Protection measures selection ✓

Economic evaluation ✓

SPD selection

Projects list

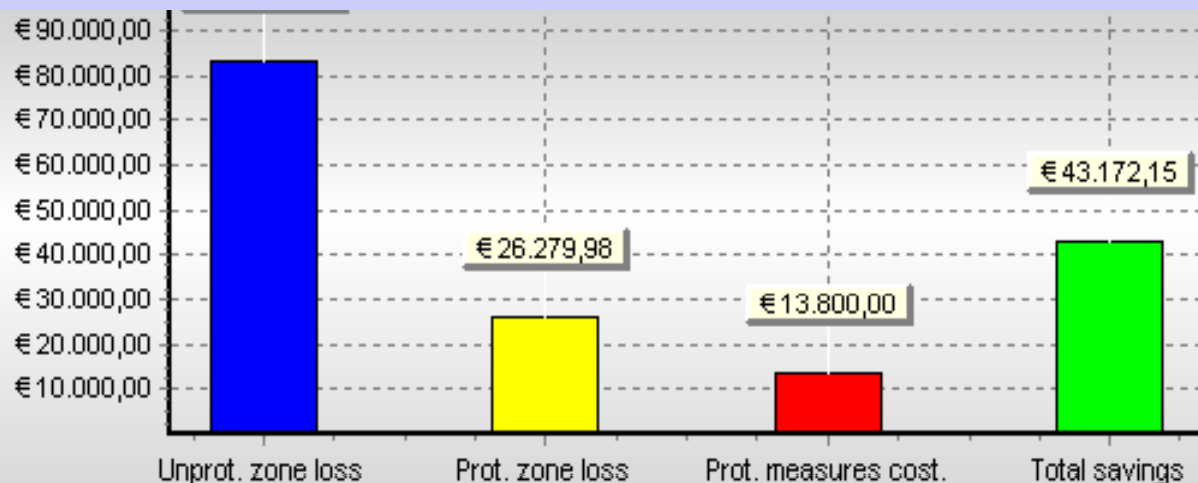
Project data

P001 - METALPHA Sa - industrial design -

Structure Connected lines Zones Calculations Prot. measures

- Lightning flashes frequency
Ng (flashes/year km²): 2
- Structure type: industrial
- Location factor: surrounded by smaller objects
- Shielding: No shield
- Collection area
Dimensions: refer to annex
Collection area Ad (km²): 5,51E-02
Collection area Am (km²): 3,14E-01
- Special characteristics:

Additional tool : selection of SPDs based on EN 62305-4
(possibility to use this tool even if no risk performed previously)



Project data

P001 - METALPHA Sa - industrial design -

Structure

Connected lines

Zones

Calculations

Prot. measures

- Lightning flashes frequency
Ng (flashes/year km²): 2
- Structure type: industrial
- Location factor: surrounded by smaller objects
- Shielding: No shield
- Collection area
Dimensions: refer to annex
Collection area Ad (km²): 5,51E-02
Collection area Am (km²): 3,14E-01
- Special characteristics:

Risk 3

Risk 4

Protection measures

No protection measures

Protection is cost effective

Structure and collection area ✓

Connected lines ✓

Zones ✓

Protection measures selection ✓

Economic evaluation ✓

SPD selection

Projects list

First step : define the electrical installation

Electrical system :

Power system :

Line to neutral voltage (V) :

Power is supplied by a transformer HV/LV with earth electrode in common with the building ? Yes No

Safety coefficient for equipment :

Is the line that supplies the installation shielded ? Yes No

Section (mm²) :

Material :

The connected line is : a cable insulated from the soil or in air
 a cable with the screen in contact with the soil

Distance between the structure and the closest earthing point of the screen (m) :

Input minimum impulse withstand voltage of installed equipments (V) :

Conductor section (mm²) :

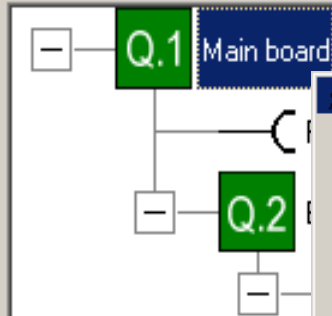
Current I_{cond} that flows in each line conductor (kA) :

Information about internal systems supplied by the line for which coordinated SPD has been selected

Zone	Name	Wiring	Uw (kV)	SPD level	ks2
Z3	Power production	Loop area in the order of 50 m ²	2,5	III	1,0

OK

Second step : define of the main panel board and distribution panels



Board (3° level)

Name of board (3° level):

Distance between the Board (2° level) and the Board (3° level) (m):

Entering line characteristics

Type of line: Loop area in the order of 50 m²
 Loop area in the order of 10 m²
 Loop area in the order of 0,5 m²
 Shielded cable R ≤ 1 ohm/km
 Shielded cable 1 < R ≤ 5 ohm/km
 Shielded cable 5 < R ≤ 20 ohm/km

All routing inside a shielded zone
 Ks2 =

Metal continuous conduit

The Board (3° level) how many boards (4° level) supplies ?

Does the board supplies directly (without intermediate boards) any final circuit ? Yes No

Final circuits characteristics

All the final circuit have the same withstand voltage ? Yes No

Number of different withstand voltage

	Withstand voltage (V)	Type of line.	L max (m)	Wiring
Circuit 1 :	<input type="text" value="2500"/>	<input type="text" value="F - N"/>	<input type="text" value="12"/>	<input type="button" value="Data"/>
Circuit 2 :	<input type="text" value="4000"/>	<input type="text" value="3F + N"/>	<input type="text" value="27"/>	<input type="button" value="Data"/>

Board or circuit properties

Delete

Clear all



Data not complete
 Data complete

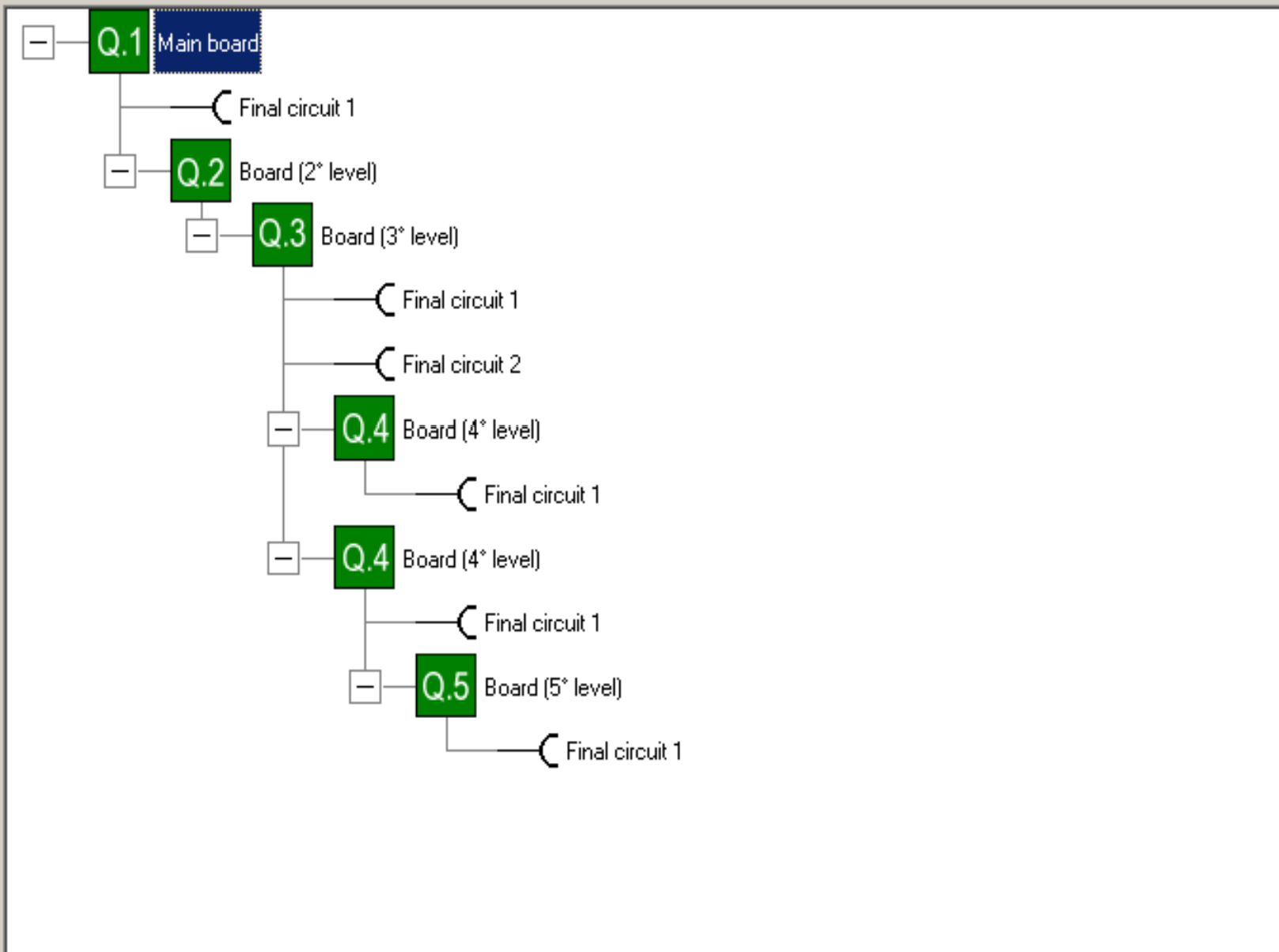
Automatic drawing of the electrical scheme based on previous steps

Board or circuit properties

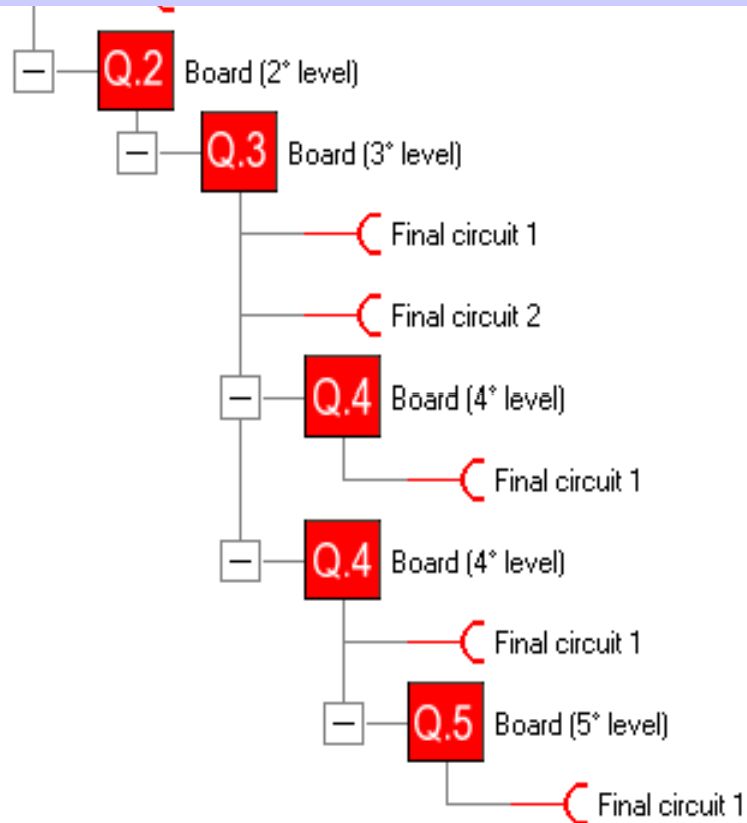
Delete

Clear all

-  Data not complete
-  Data complete



Red panel or equipments are no protected, blue panels are protected by SPD installed in the panels (or in front of equipment) and green panels are protected by an upstream SPD (protection distance)



Remove SPD

Safety coefficient verification

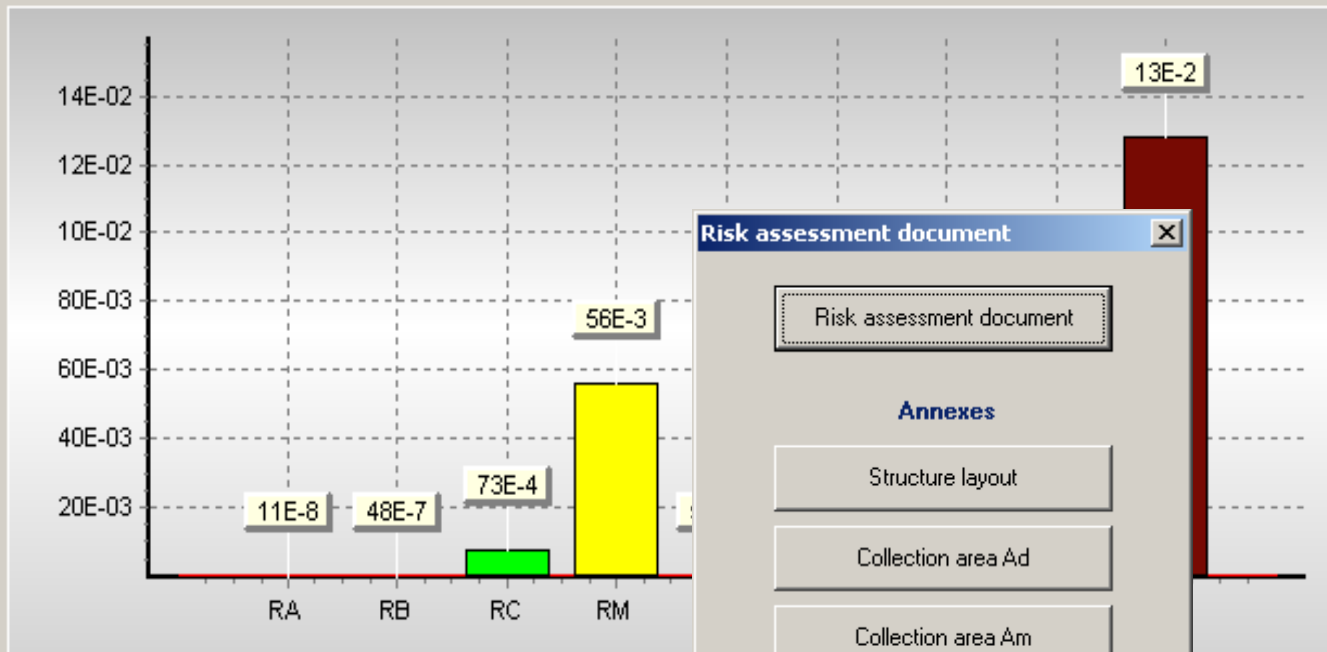
Circuit protection verification

Remove all SPD

- NOT protected
- Protected
- SPD installed

Legend

Structure risk



- Risk 1
- Risk 2
- Risk 3
- Risk 4

Protection measures No protection measures

Protection measures needed

Risk assessment document

Risk assessment document

Annexes

- Structure layout
- Collection area Ad
- Collection area Am
- SPD installation

Exit

- Structure and collection area ✓
- Connected lines ✓
- Zones ✓
- Protection measures selection ✓
- Economic evaluation ✓
- SPD selection ✓

Project data

P001 - METALPHA Sa - industrial design -

Structure

Connected lines

Zones

measures

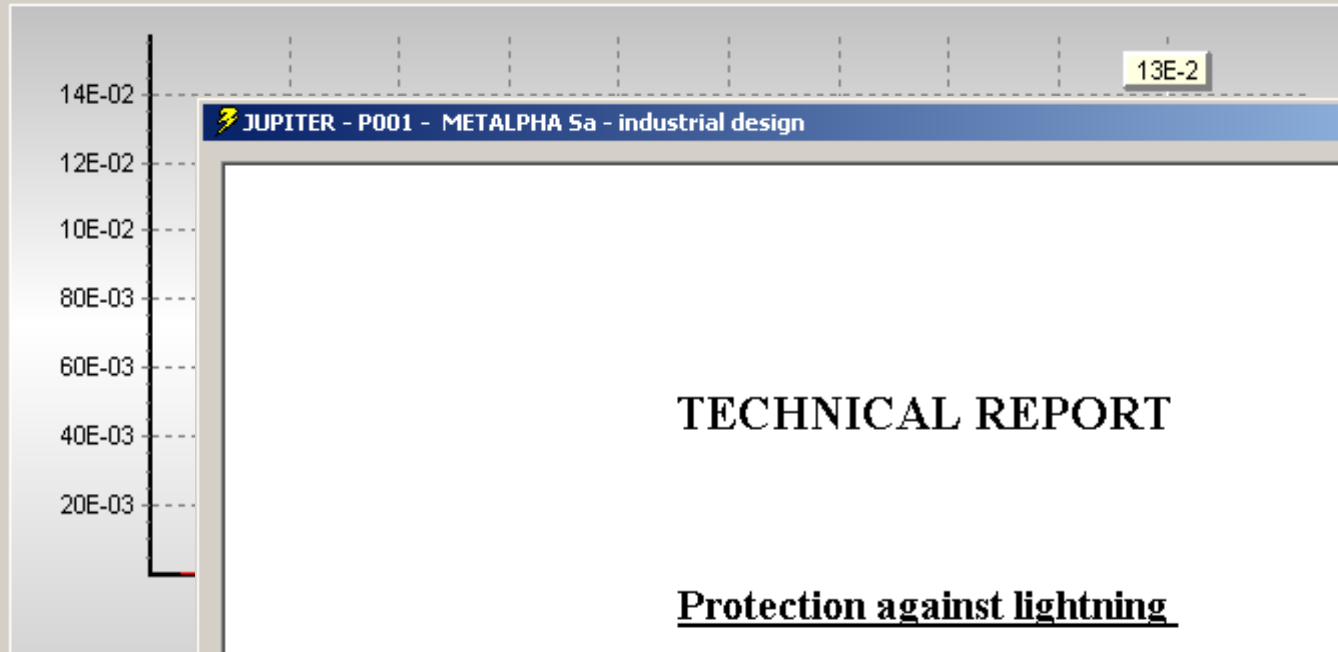
Selected protection measures: case 1

Common protection measures:
LPS class: II (Pb = 0,05)

Zone Z2: Office
Fire protections: Automatic
Zone Z3: Production
Internal system: Power production
Coordinated SPD: level III

Projects list

Structure risk



Risk 1

Risk 2

JUPITER - P001 - METALPHA Sa - industrial design

TECHNICAL REPORT

Protection against lightning

**Risk assessment
selection of protection measures**

Save Print Close

protection
asures

es needed

ction area ✓

nes ✓

✓

s selection ✓

uation ✓

SPD selection ✓

Projects list

Project data

P001 - METALP

Structure

Selected prote

Common prote
LPS

Zone Z2: Office
Fire protections: Automatic
Zone Z3: Production
Internal system: Power production
Coordinated SPD: level III