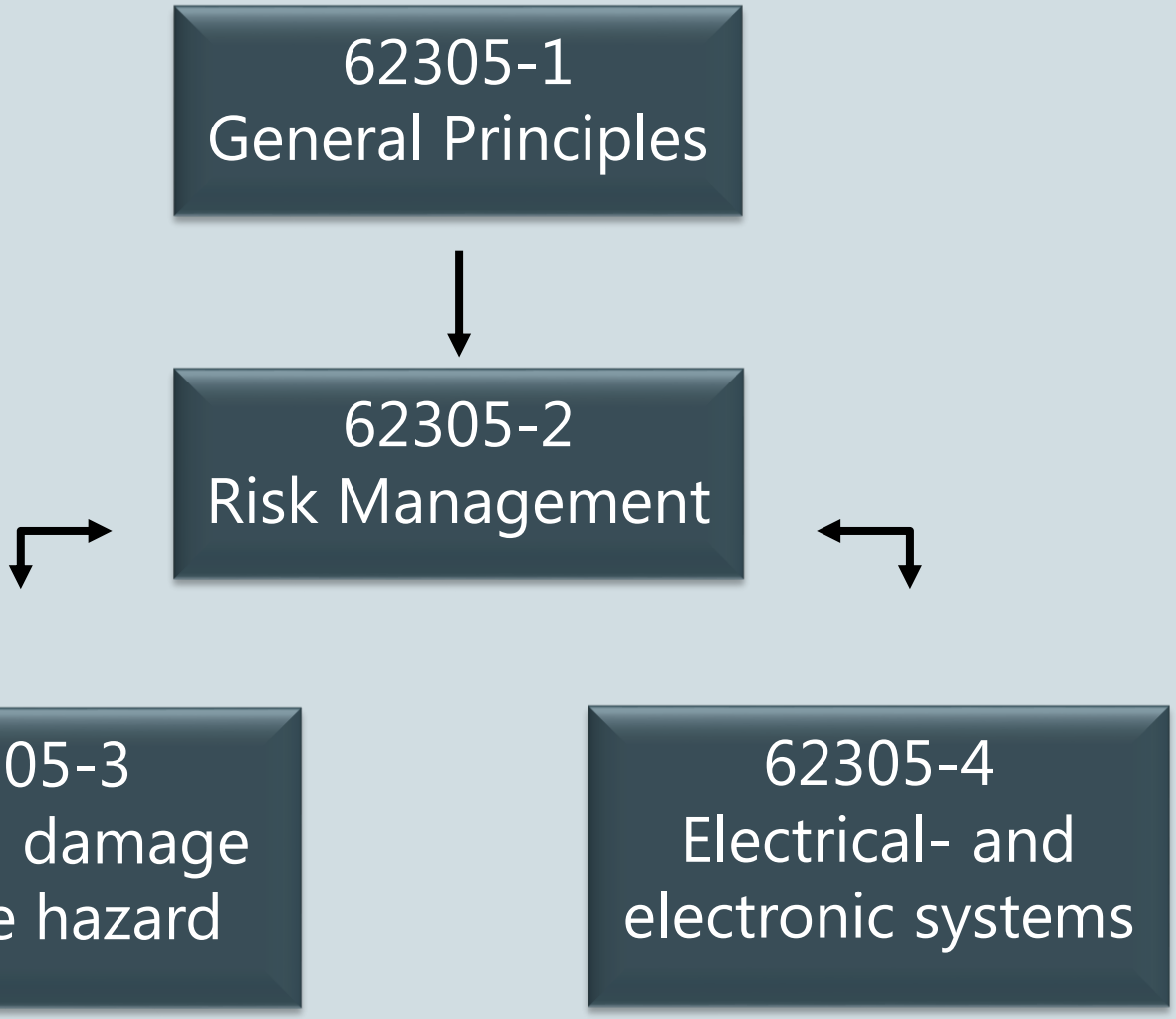
BS EN 62305-2:2012
Part 2: Risk Management

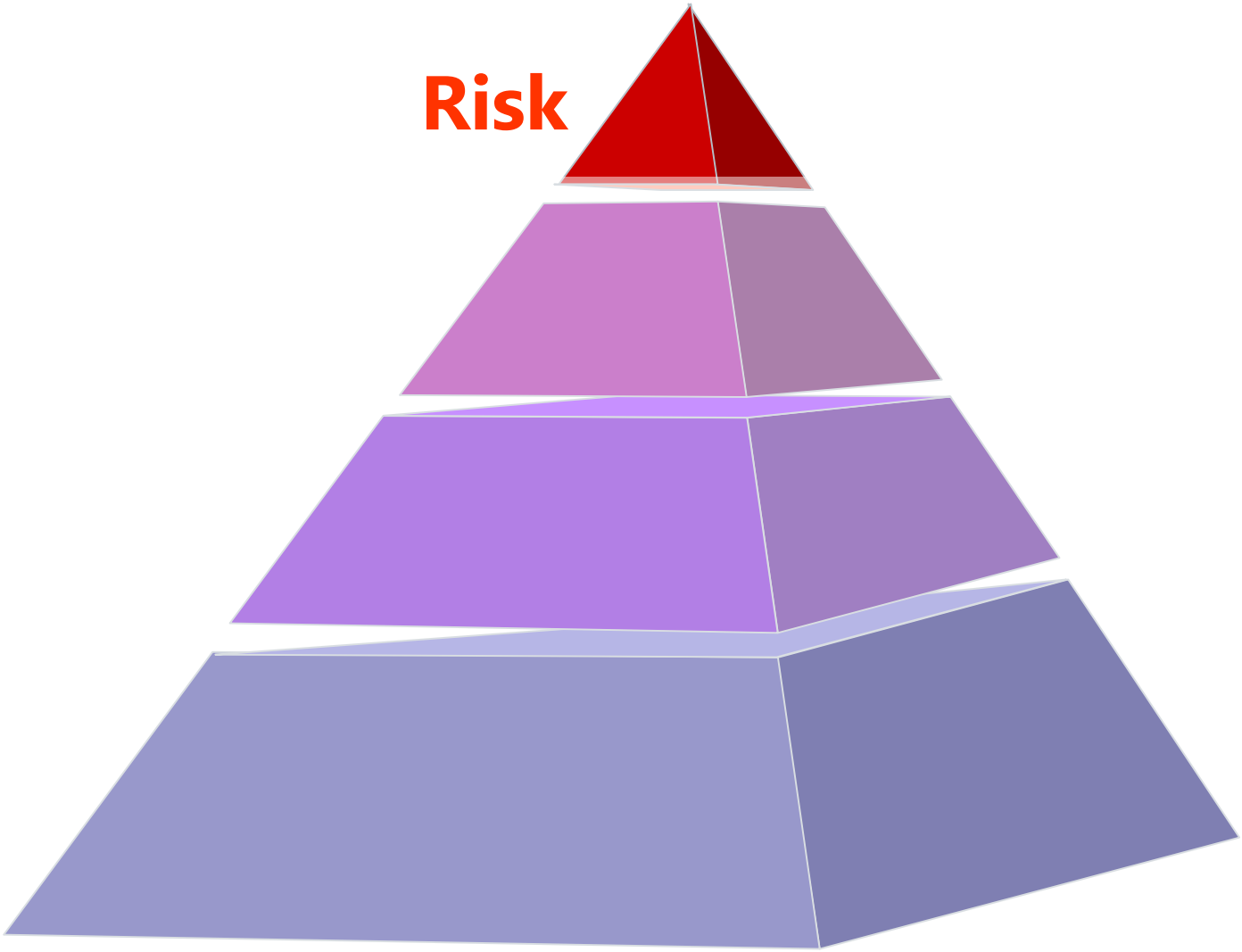
Lightning protection standardisation
BS EN 62305-2



BS EN 62305 – 2 Insurance Claims

- According to the ABI figures the UK Insurance Industry pays out on average £8.65 Billion a year in Commercial & Domestic claims (2007-2015)
- Of those claims electrical and electronic damage makes up nearly 11% equivalent to £946M
- There is no reason to assume the UK differs that greatly from the EU figures so 31% of this can be 'assumed' to lightning & surge related
- Approximately £295M in paid claims every year
- The UK lightning protection & surge protection industry generates approximately £65m per year in turnover

Risk composition



Handling risks
Risk means suffering damage and loss

Analyse risks

Quantify risks

Total risks

Control risk			Accept risk
Prevent	**Reduce** (take protection measures)	**Insure**	

Determination of the risk for a structure

Sources of damage

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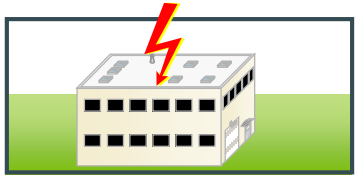
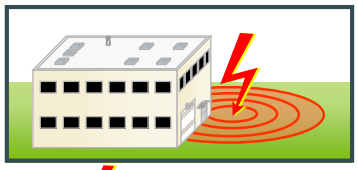
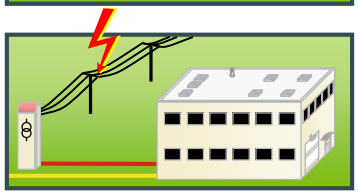
Lightning current is the primary source of damage.
The following sources are distinguished by the strike attachment point:



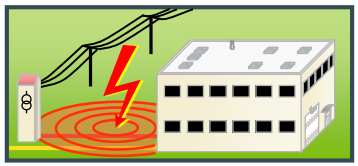
S1: Flashes to a structure



S2: Flashes near a structure



S3: Flashes to a line



S4: Flashes near a line

Types of damage

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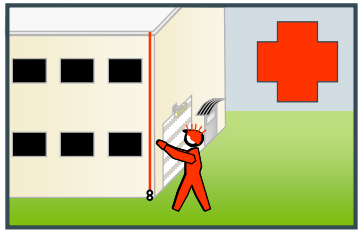
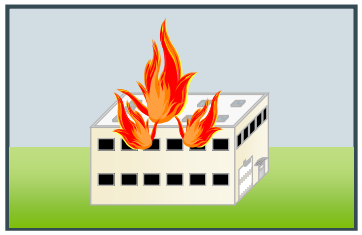
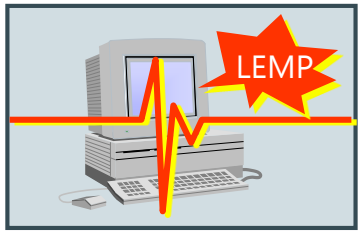
Types of damage which may occur as a result of lightning strikes:



D1: **Injury to living beings due to touch and step voltage – electric shock**



D2: **Physical damage (fire, explosion, mechanical destruction, release of chemicals) due to lightning effects including sparking**



D3: **Failure of electrical and electronic systems due to LEMP**

Types of loss

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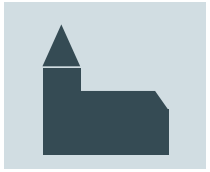
"Each type of damage, alone or in combination with others, may produce a different consequential loss in the object to be protected. The type of loss that may appear depends on the characteristics of the object itself and its content.

The following types of loss shall be taken into account:

L1: loss of human life;

L2: loss of service to the public;

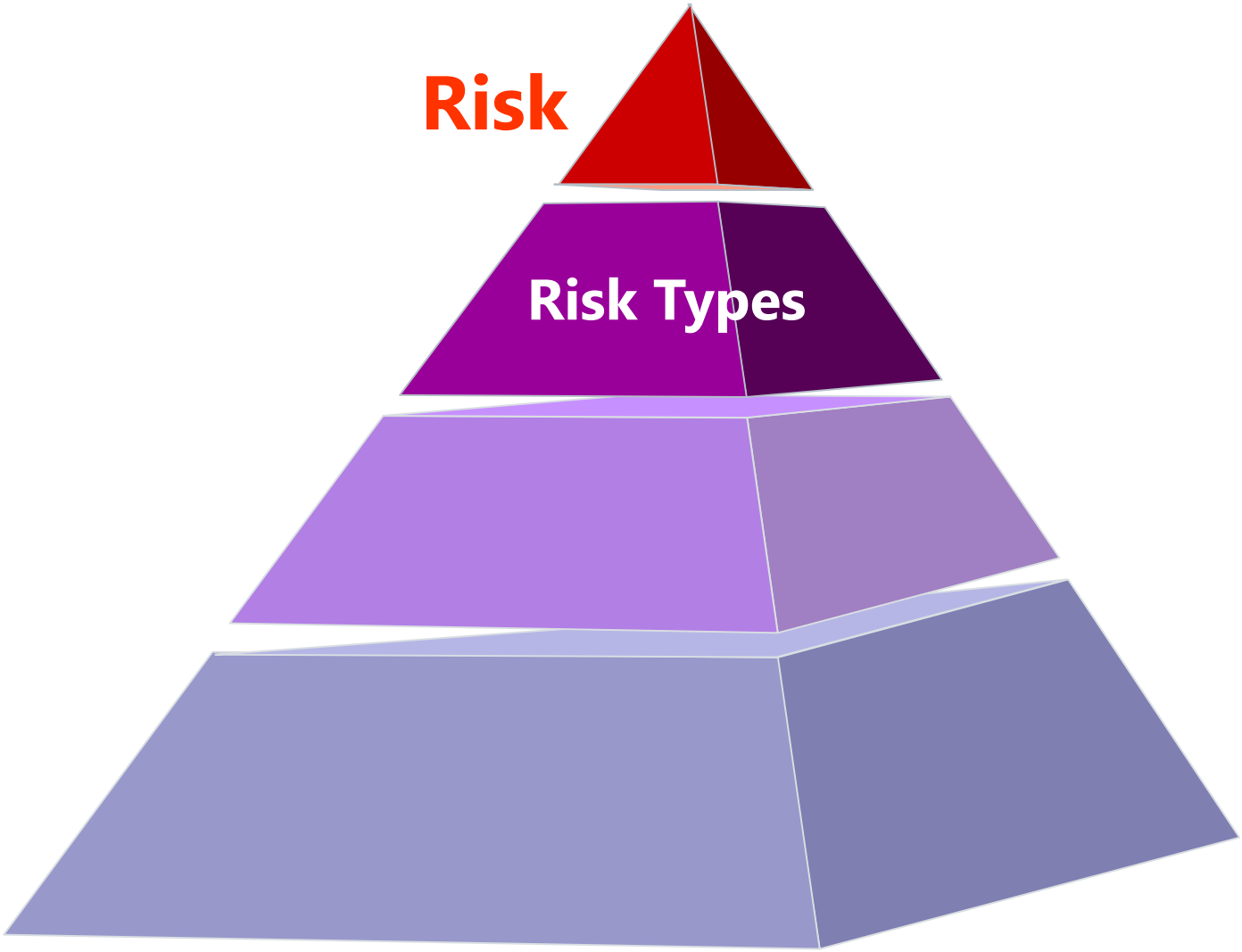


L3: loss of cultural heritage;

L4: loss of economic value (structure and its content, service and loss of activity).

Types of loss L1, L2 and L3 can be regarded as loss of social values, type of loss L4 can be regarded as economic loss.

Risk composition



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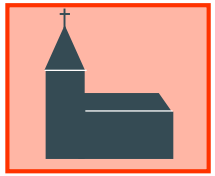
The interaction of the factors previously discussed result in the following risk of damage. These have to be evaluated for a structure

R_1: risk of loss of human life; **10^{-5}**

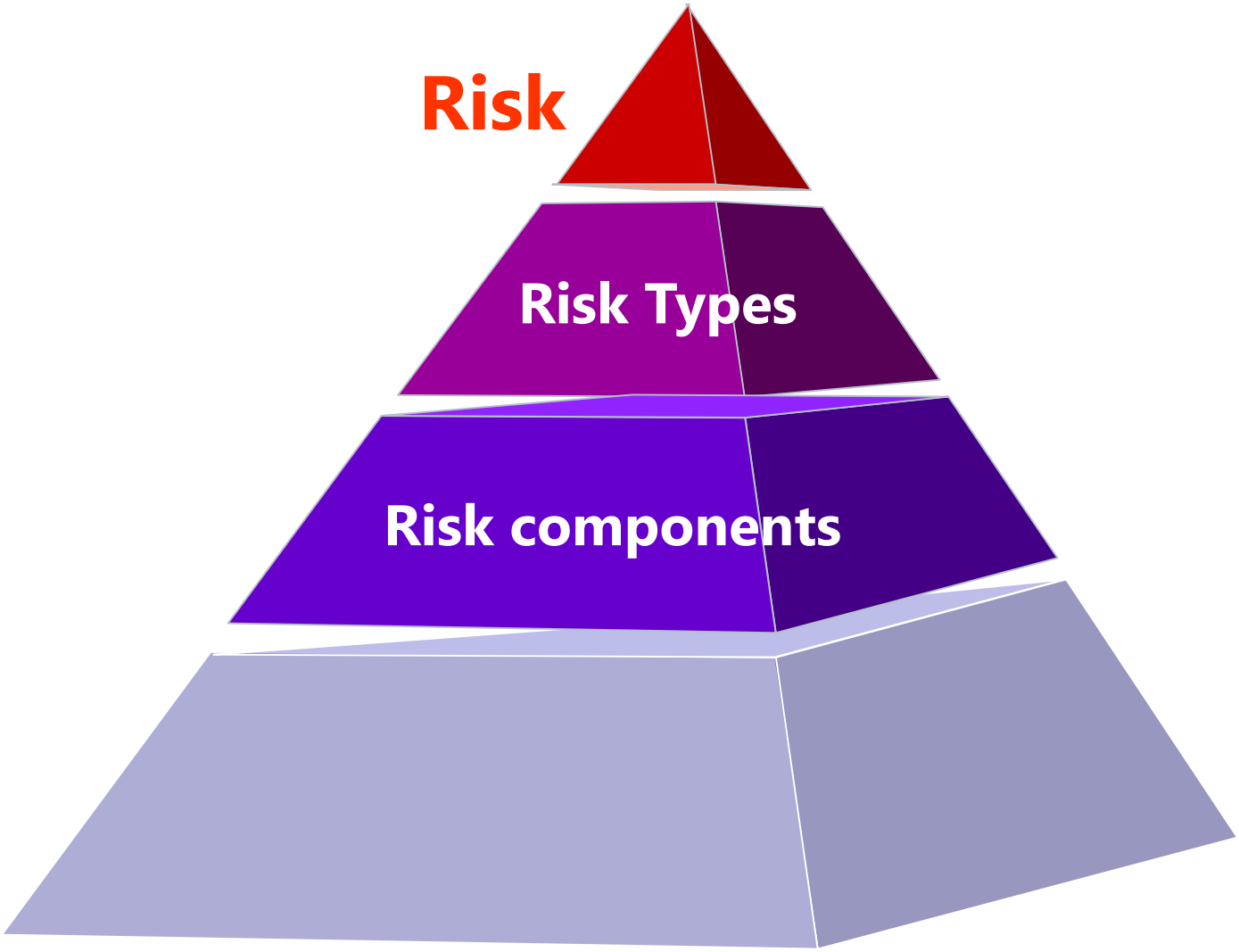
R_2: risk of loss of service to the public; **10^{-4}**



R_3: risk of loss of cultural heritage; **10^{-4}**

R_4: risk of loss of economic value.

Risk components

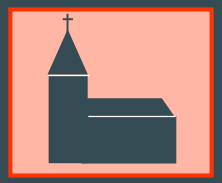


Risk components

Risk

Human life

Service to the public



Cultural heritage

Economic loss

R_1 R_2 R_3 R_4

Each risk consists of several risk components

=

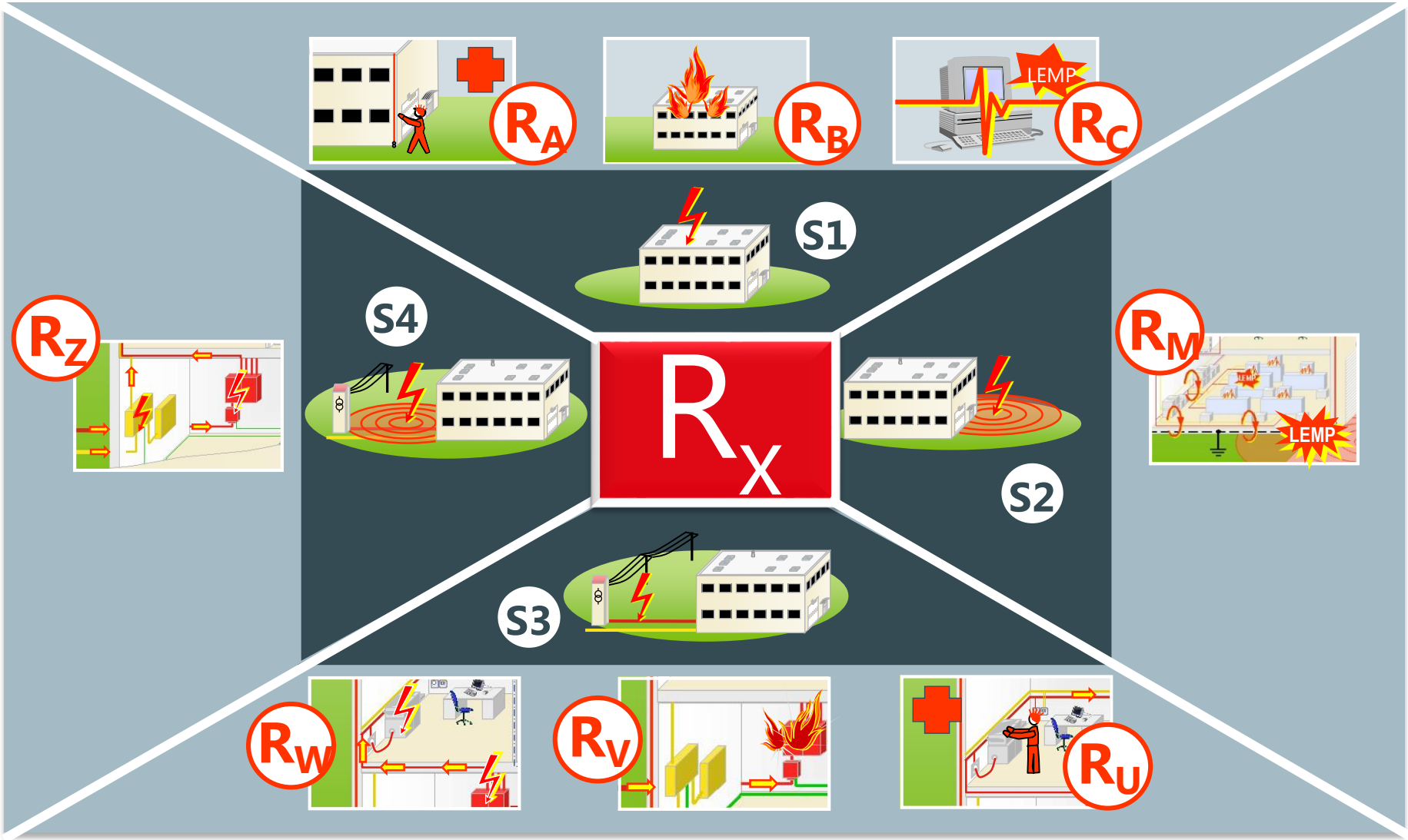
$R_1 = R_A + R_B + R_C + R_M + R_U + R_V + R_W + R_Z$

$R_2 = R_B + R_C + R_M + R_V + R_W + R_Z$

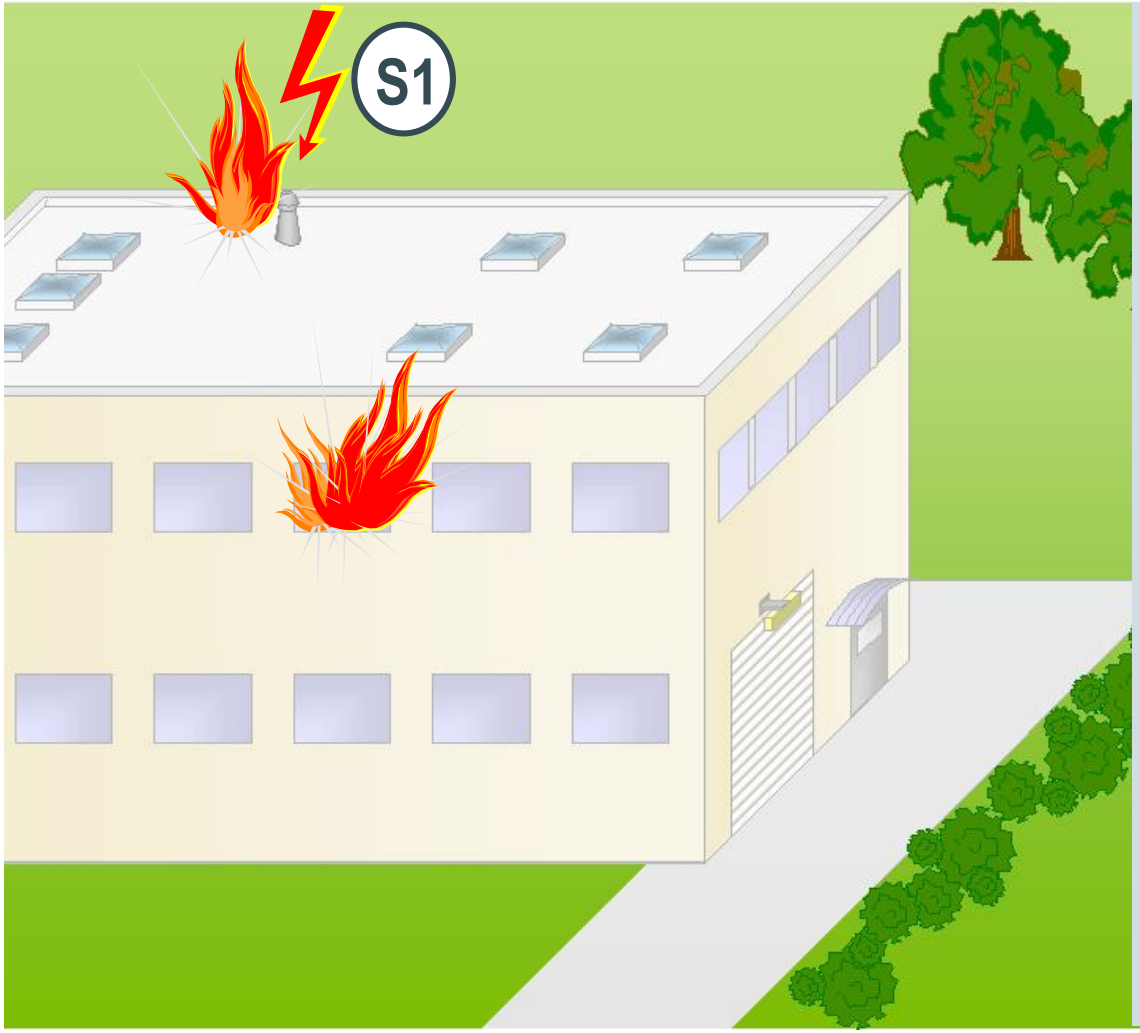
$R_3 = R_B + R_V$

$R_4 = R_A + R_B + R_C + R_M + R_U + R_V + R_W + R_Z$

Overview of risk component R_X



Risk component R_B - Fire
Source of damage S1



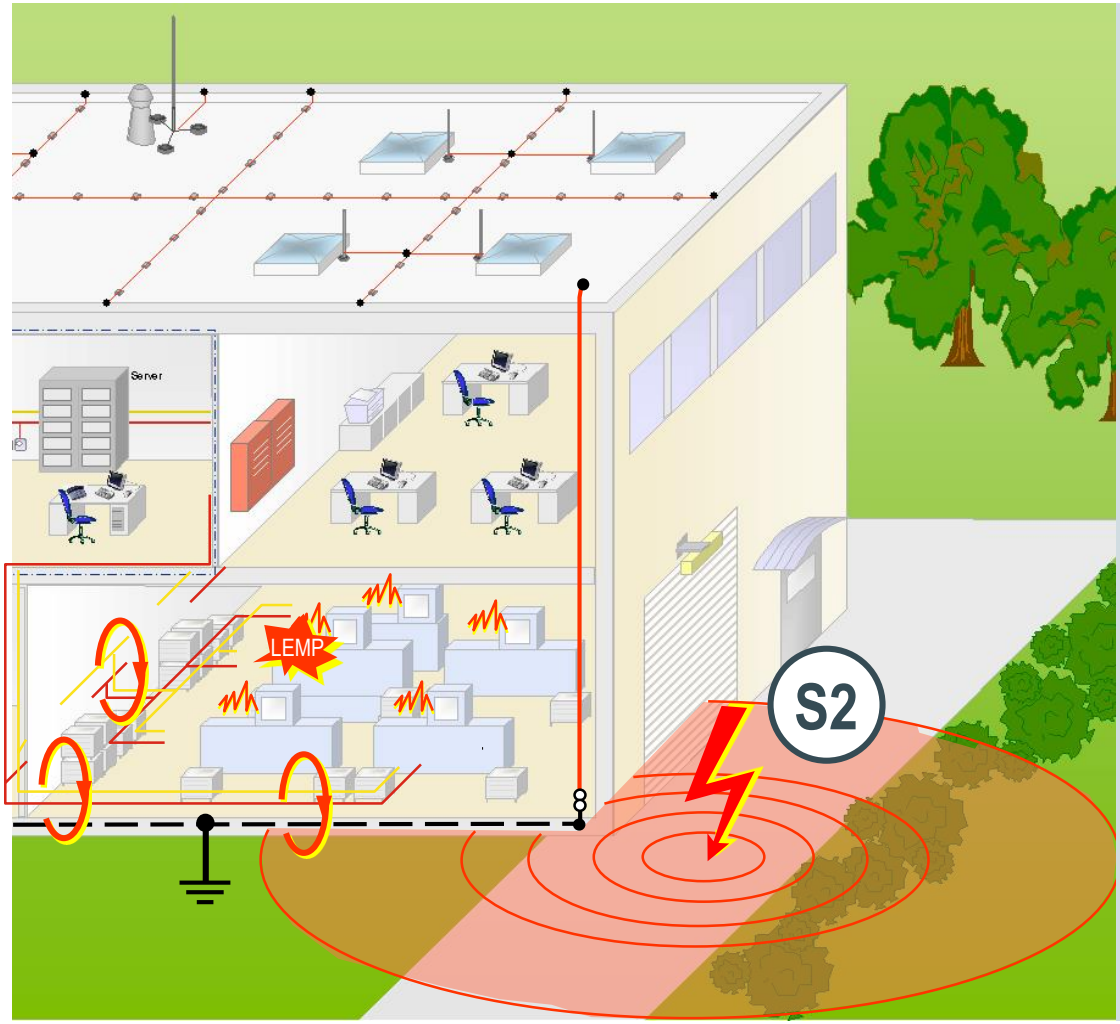
R_B = fire

Physical damage due to dangerous sparking inside the structure causing fire and explosion.

Possible types of loss:

- ➔ **L1: Loss of human life**
- ➔ **L2: Service to the public**
- ➔ **L3: Cultural heritage**
- ➔ **L4: Economic loss**

Risk component R_M - Overvoltage (LEMP)
Source of damage S2



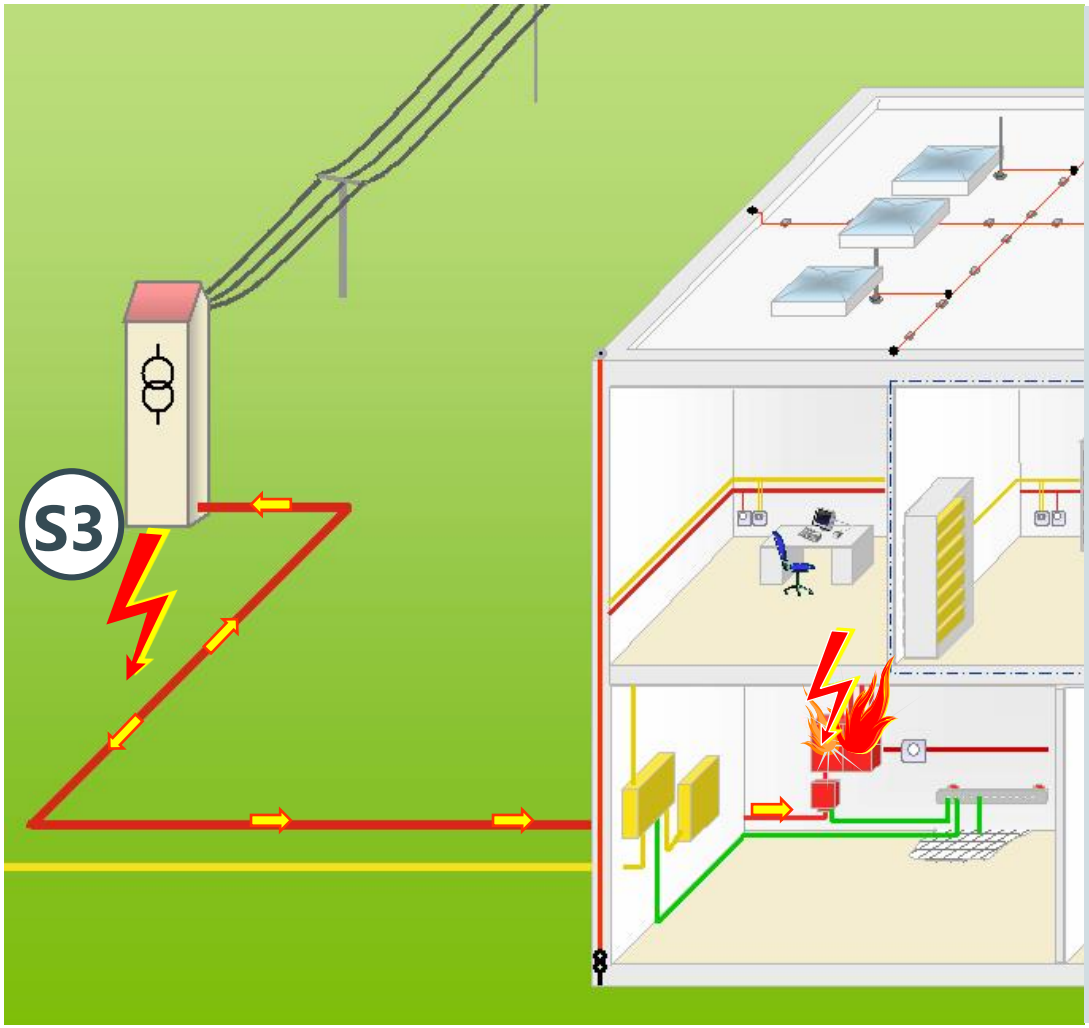
R_M = overvoltage (LEMP)

Failure of internal systems caused by LEMP. Electromagnetic effects of the lightning current.

Possible types of loss:

- ➔ **L1: Loss of human life (structures with risk of explosion, hospitals)**
- ➔ **L2: Service to the public**
- ➔ **L4: Economic loss**

Risk component R_V - Fire
Source of damage S3



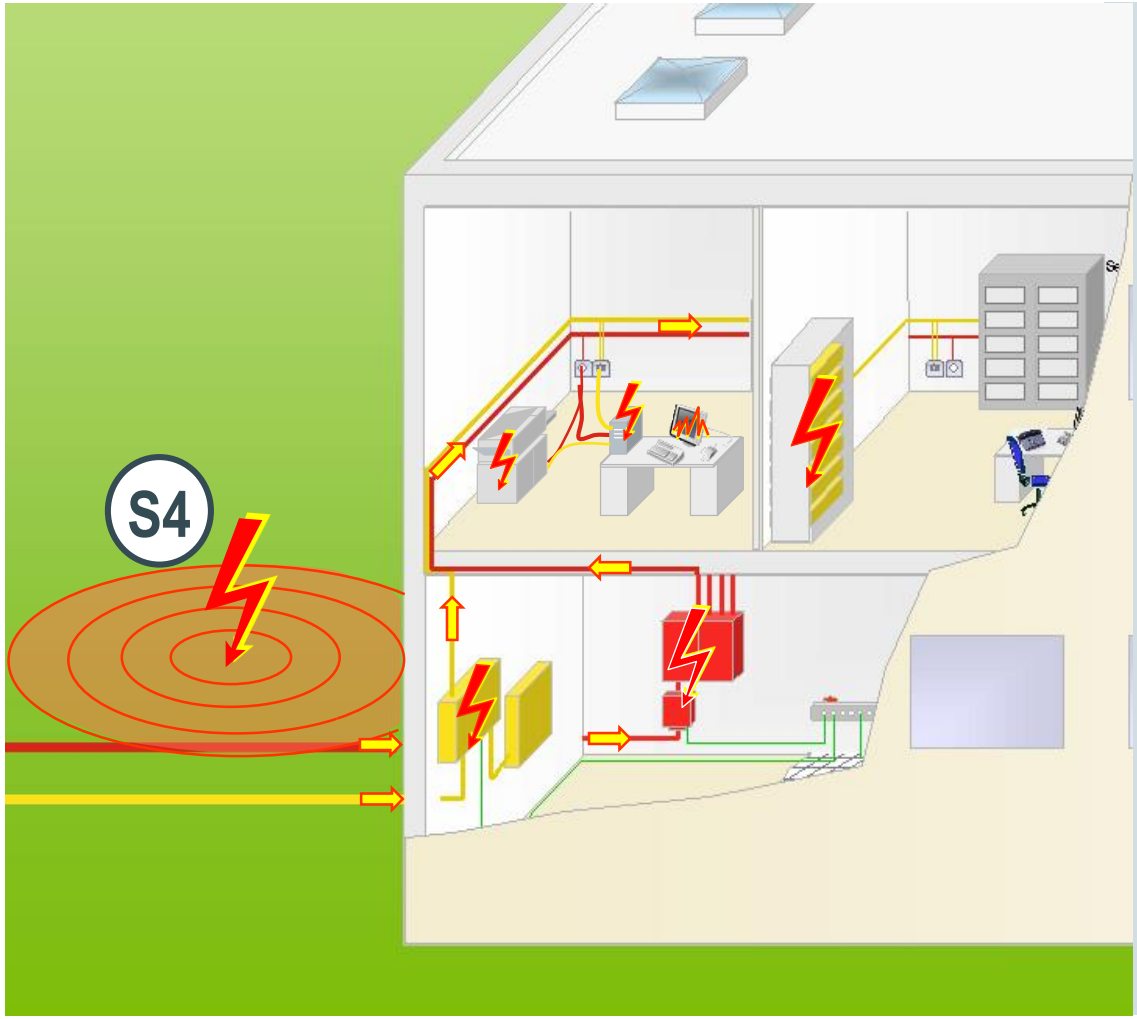
R_V = fire

Physical damage due to lightning current injected in supply lines entering the structure.

Possible types of loss:

- ➔ **L1: Loss of human life**
- ➔ **L2: Service to the public**
- ➔ **L3: Cultural heritage**
- ➔ **L4: Economic loss**

Risk component R_Z - Overvoltage
Source of damage S4



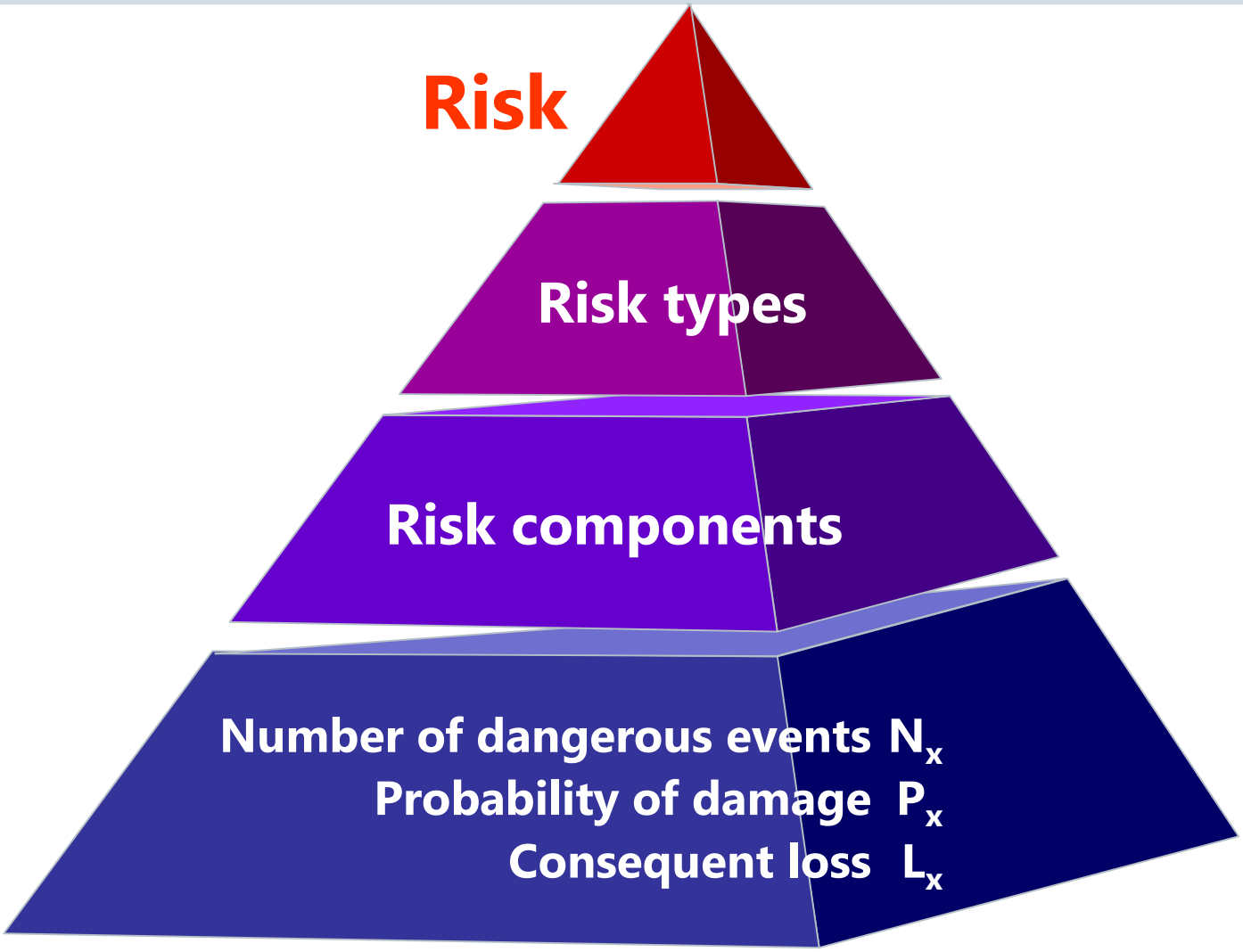
R_Z = overvoltage

Failure of internal systems caused by overvoltages induced on incoming lines and transmitted to the structure.

Possible types of loss:

- ➔ **L1: Loss of human life (structures with risk of explosion, hospitals)**
- ➔ **L2: Service to the public**
- ➔ **L4: Economic loss**

Risk composition



Parameters affecting risk components

Risk of damage

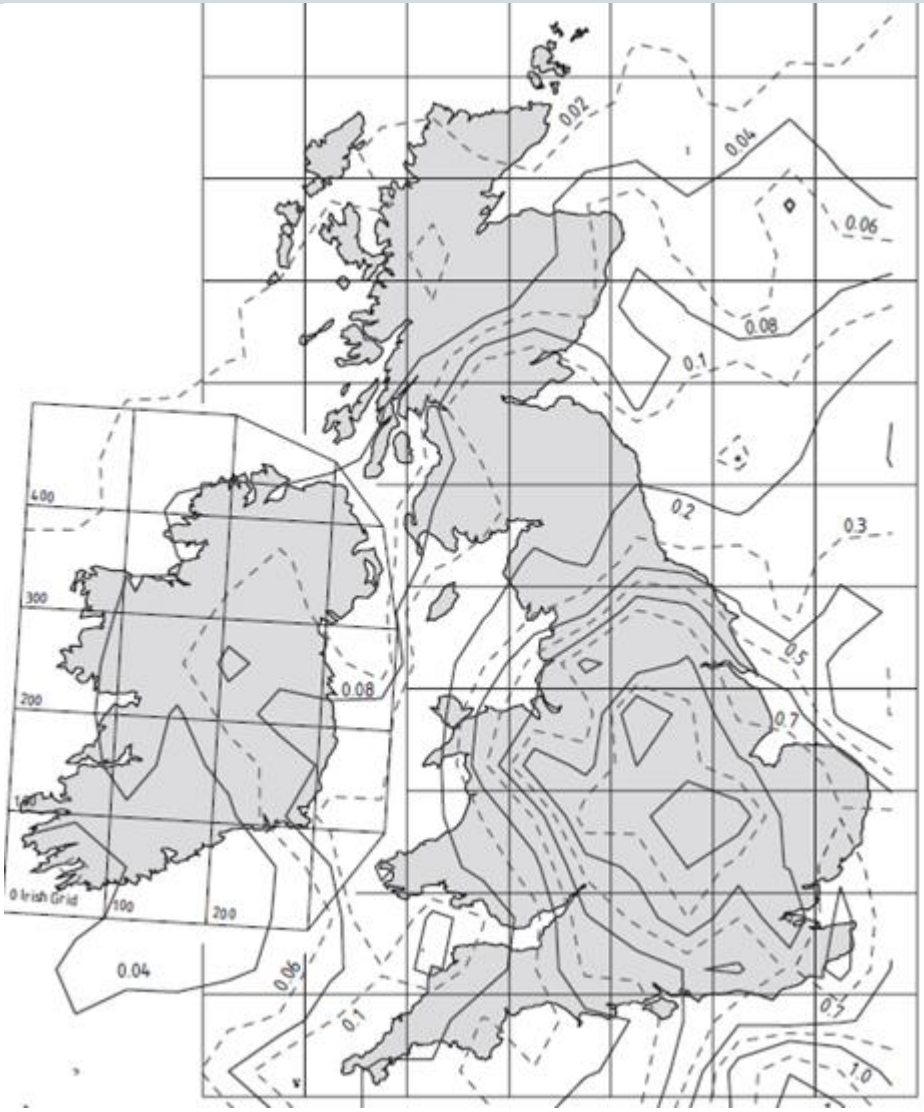
$$R_X = N_X \cdot P_X \cdot L_X$$

N_X
Number of dangerous events

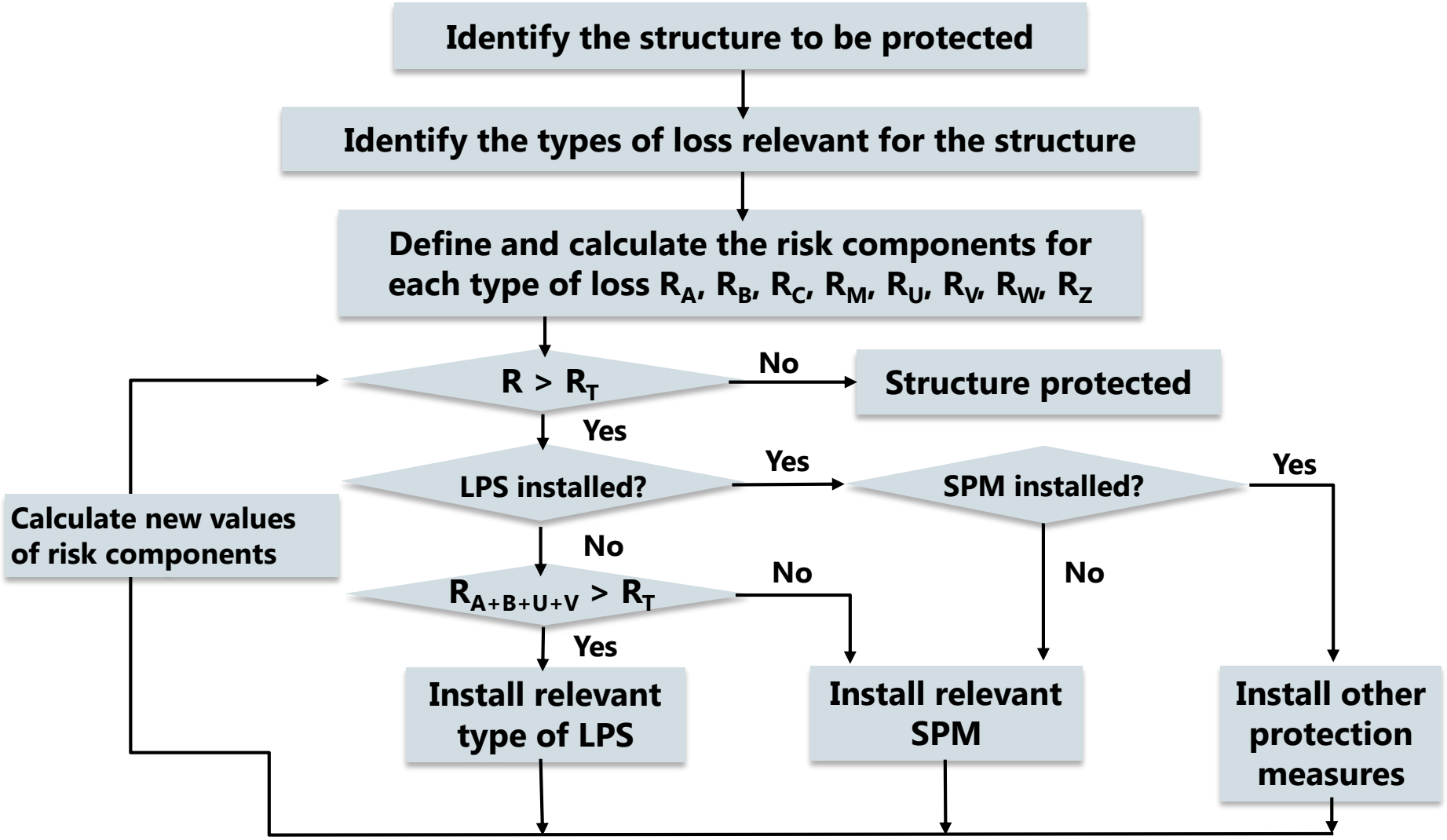
P_X
Probability of damage

L_X
Consequent loss

Lightning Ground Flash Density (N_G) per square kilometre per year



Selection of protection measures for buildings



DEHNsupport Demonstration

Risk assessment calculation using DEHNsupport Toolbox