



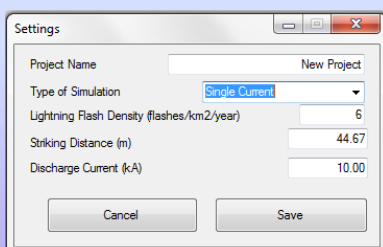
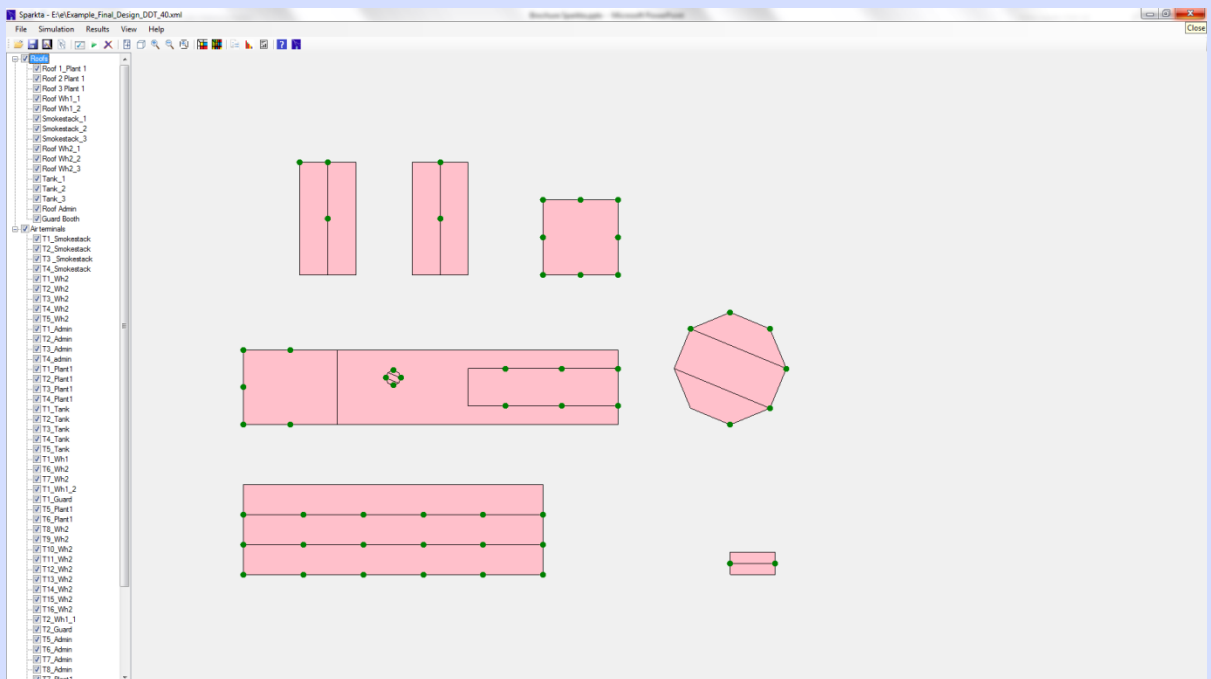
# Sparkta Lightning Protection Systems Design

Application for the optimal design of shielding against direct lightning. Sparkta makes it possible to reduce the final cost of the lightning protection system compared to the designs made using the rolling sphere method. It uses a statistical based simulation model to assess vulnerability of the installation and performance of the shielding system.

## Features

- ✓ 3D modeling
- ✓ Optimal design
- ✓ You can choose either: simulate for a single current or simulate for currents according to a probabilistic distribution
- ✓ Simulates different types of strike termination devices: air terminals, metal roofs and metal parts of structure having a thickness greater than 3/16"
- ✓ Simulates complex installations with multiple buildings
- ✓ Simulates the protection given by neighbor buildings
- ✓ Simulation of the entire installation instead of individual buildings
- ✓ Calculate the effectiveness of the lightning protection system
- ✓ NFPA 780 Risk Assessment

## User Interface



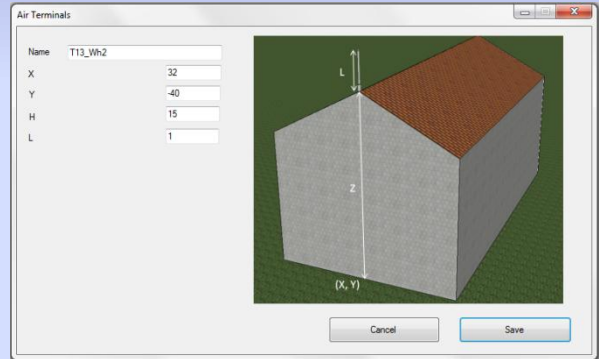
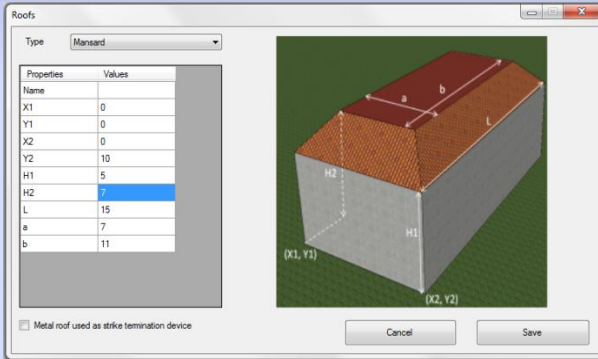
## Settings

- ✓ Single discharge current simulation
- ✓ Probabilistic simulation



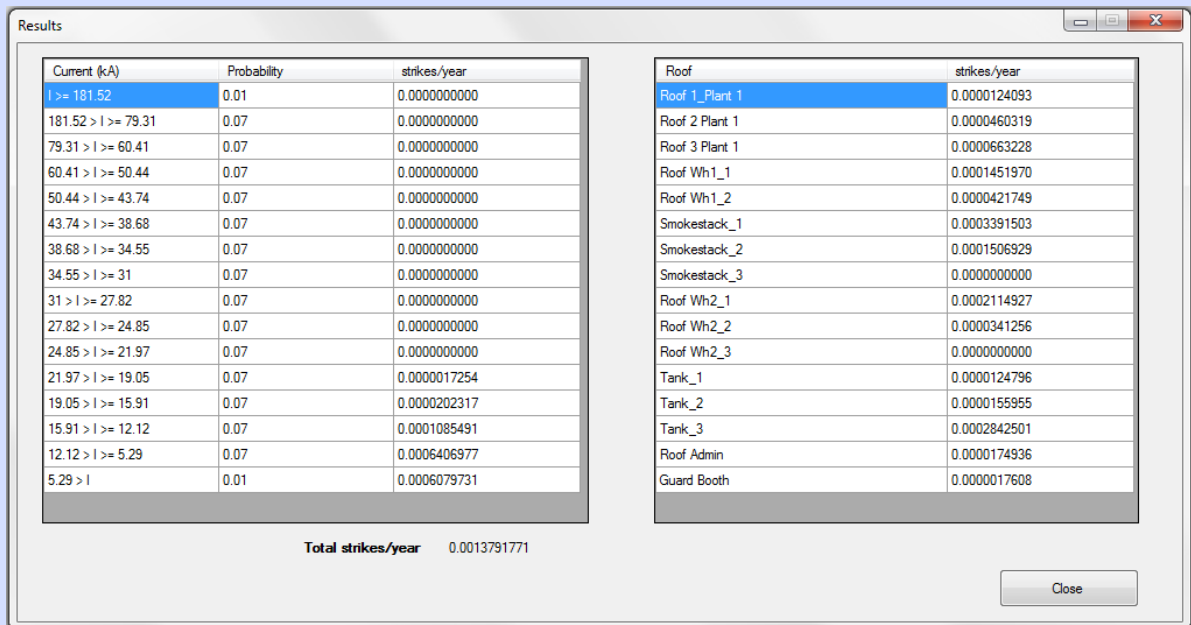
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## Roofs and Air Terminals Data Input



- ✓ Metal roofs can be configured as strike termination devices

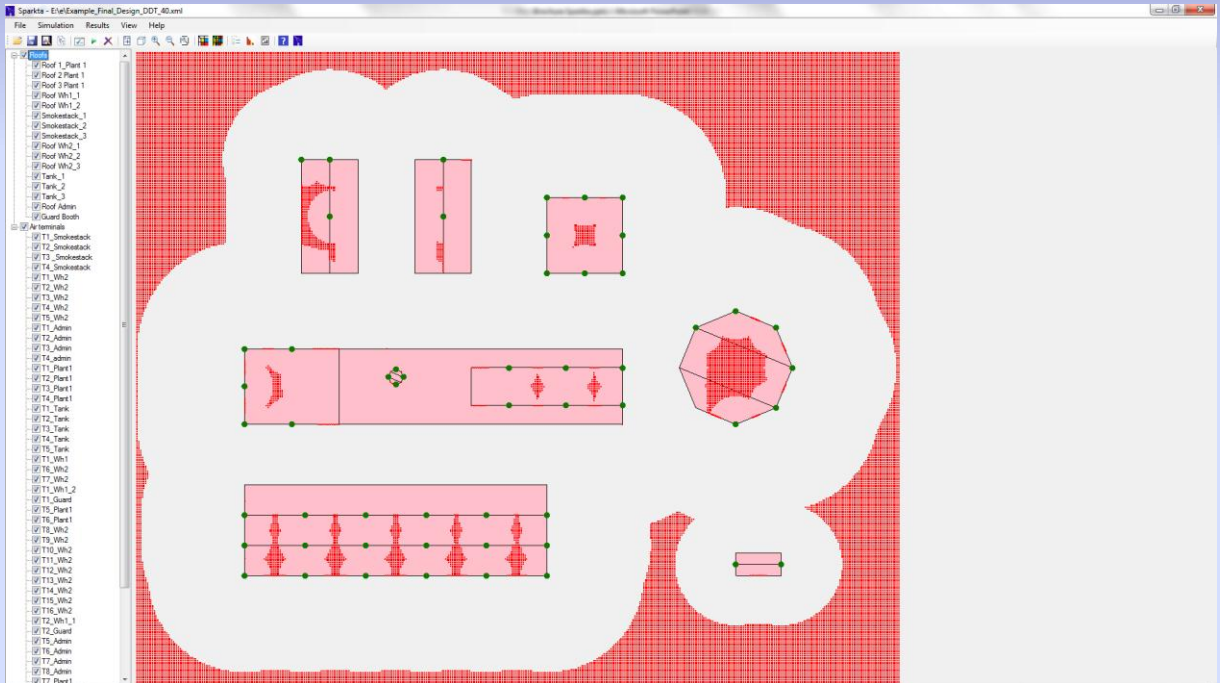
## Results



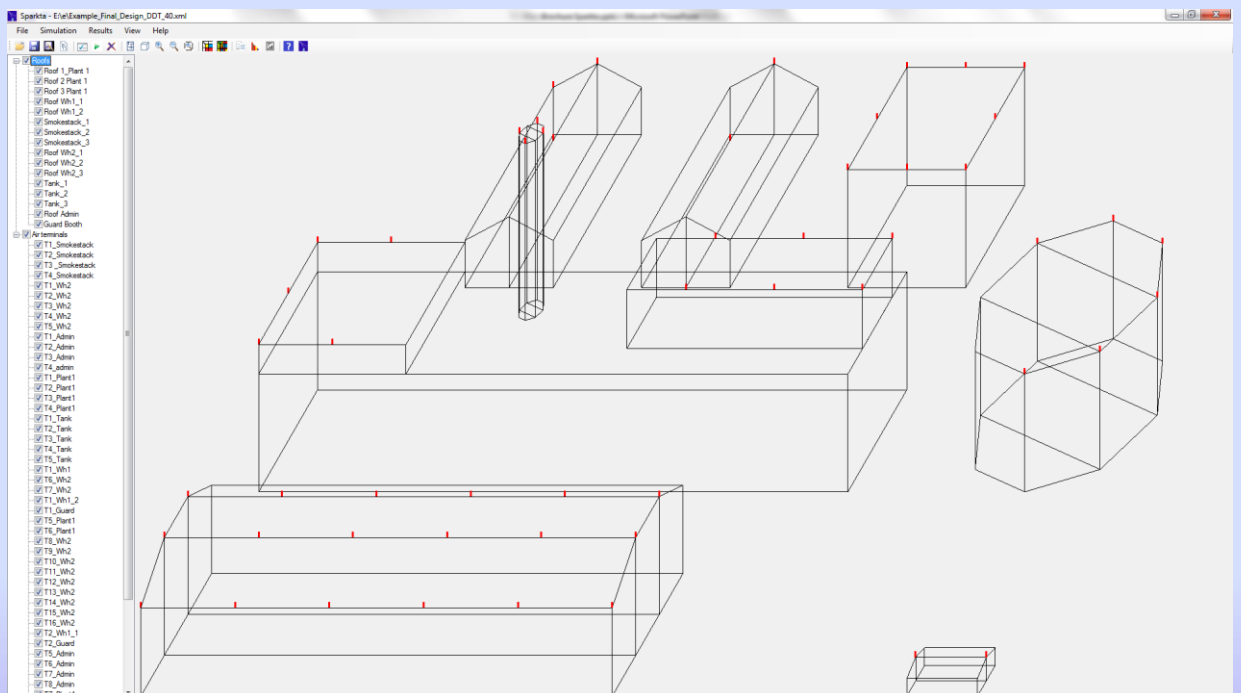
- ✓ Strikes per year for each roof
- ✓ Strikes per year for each range of current

# Sparkta Lightning Protection Systems Design

## Graphic Results



## 3D View





# Sparkta Lightning Protection Systems Design

## Risk Assessment

**Simplified Risk Assessment**

Use flashes./year from electrogeometric model simulation

Width (m) 10.00 Length (m) 10.00 Height (m) 4.00

Lightning Rash Density (flashes./km2/year) 2.00

**Relative Structure Location**

Structure surrounded by taller structures or trees within a distance of 3H

Structure surrounded by structures of equal or lesser height within a distance of 3H

Isolated structure, with no other structures located within a distance of 3H

Isolated structure on hilltop

**Structure**

Metallic

Non Metallic

Cumbustible

**Roof**

Metallic

Non Metallic

Cumbustible

**Structure Occupancy**

Unoccupied

Normally occupied

Difficult to evacuate or risk of panic

**Structure Content**

Low value and noncombustible

Standard value and noncombustible

High value, moderate combustibility

Exceptional value, flammable, liquids, computer or electronics

Exceptional value, irreplaceable cultural items

**Lightning Consequences**

Continuity of facility services not required, no environmental impact

Continuity of facility services required, no environmental impact

Consequences to the environment

**Results**

Collection Area (m2) 1032.39

Nc 0.0015000

Nd 0.0020648

Calculate

**Detailed Risk Assessment**

Use flashes./year from simulation Lightning Flash Density (flashes./km2/year) 10.00

**Incoming Service**

Buried  Transformer Length (m) 700.0

Soil Resistivity (Ohm m) 250.0 Height of conductors (m) 10.00

Height of structure at end "a" (m) 10.00 Height of structure at end "b" (m) 10.00

Service Environmental Coefficient Suburban-residential on outskirts of cities

**Structure**

Width (m) 10.00 Length (m) 10.00 Height (m) 5.00

Relative Location Isolated structure, with no other structures located within a distance of 3H

**Adjacent Structure**

Width (m) 10.00 Length (m) 10.00 Height (m) 5.00

Relative Location Isolated structure on hilltop

**Protection Measures**

For Touch and Step Voltages Electrical insulation/isolation of exposed down conductor

For Surge (SPD) No SPD Protection

For Direct Flashes (LPD) No protection provided

**Internal Wiring**

Type Shielded cable with shield resistance between 1 and 5 Ohm/km

Mesh Width (m) 5.00 Shield Thickness (mm) 0.50

Shield and Equipment Bonded to Same System

Withstand Voltage Uw (kV) 4

**Losses**

Loss of Human Life Persons inside the building

Type of Structure Industrial, commercial, school

Risk of Explosion  Animals Could be Lost

**Factors**

Type of Surface Soil, concrete

Risk of Fire Ordinary

Provisions to Reduce Consequences of Fire No provisions or structure contains risk of explosion

Kind of Hazard Average level of panic (e.g., structures designed for cultural or sporting events with a number of people between 100 and 1000)

**Collection Areas**

Structure (m2)	1406.86	Near the Structure (m2)	206449.54
Service (m2)	10119.29	Near the Service (m2)	276699.30
Adjacent Structure (m2)	1406.86		

**Number of Discharges (flashes./year)**

Structure	0.0140685835	Near the Structure	2.0504268250
Service	0.0101192885	Near the Service	0.2766992953
Adjacent Structure	0.0056274334		

**Risk Components**

RA	0.0000000000
RB	0.0000351715
RC	0.0000000000
RM	0.0000000000
RU	0.0000000005
RV	0.0000118100
RW	0.0000000000
RZ	0.0000000000

**Risk Components**

	Tolerable	Calculated
Risk of Injury or Loss of Life - R1	0.00001	0.0000469820
Risk of Loss of Service - R2	0.001230	0.0000469815
Risk of Loss of Historical Significance - R3	0.001340	0.0000469815
Risk of an Economic Loss - R4	0.001450	0.0000469815

Calculate

- ✓ NFPA 780 simplified risk assessment
- ✓ NFPA 780 detailed risk assessment