



DEHNconcept

Planning of lightning protection systems



A successful project starts
with professional planning



Our engineering know-how for your projects

In addition to our globally used protective devices, we also offer planning services. Our expertise is based on more than ten years of experience in planning lightning and surge protection solutions for different projects and industries. We have been planning industrial plants – e.g. petrochemical plants and power stations – as well as office buildings and production sites.

We offer planning services which are required for successfully implementing a project. We closely cooperate with our customers to meet industry and country-specific requirements. The basis for professional planning is good preparation. Project discussions and site surveys ensure high planning quality.

We create a lightning protection and earthing concept including drawings, mounting details, detailed descriptions, tender specifications and bills of material. We provide the planning documents to our customers so that they can create their own documentation. Upon request, a material quotation is available.

Our services include:

- As-built data collection, project discussions, site surveys
- Risk analysis*
- Assessment of material costs
- Planning of the lightning protection/earthing concept
- Lightning protection concept including detail engineering, detailed description and 3D/2D drawing
- Calculation of the separation distance
- Detailed mounting drawing of the air-termination system
- Calculation of the earth-termination system for the transformer
- Tender specifications for tender invitations
- Bill of material and material quotation (optional)

For more detailed information and enquiries, please contact our DEHNconcept team:

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Lightning protection system of the computer centre in Darmstadt, Germany

3D planning of lightning protection concepts

Planning complex objects and structures by means of a 3D program allows to efficiently design air-termination systems while taking into consideration all parts of the structure. This way, the air-termination systems can be installed more effectively than if the 2D method AutoCAD is used.

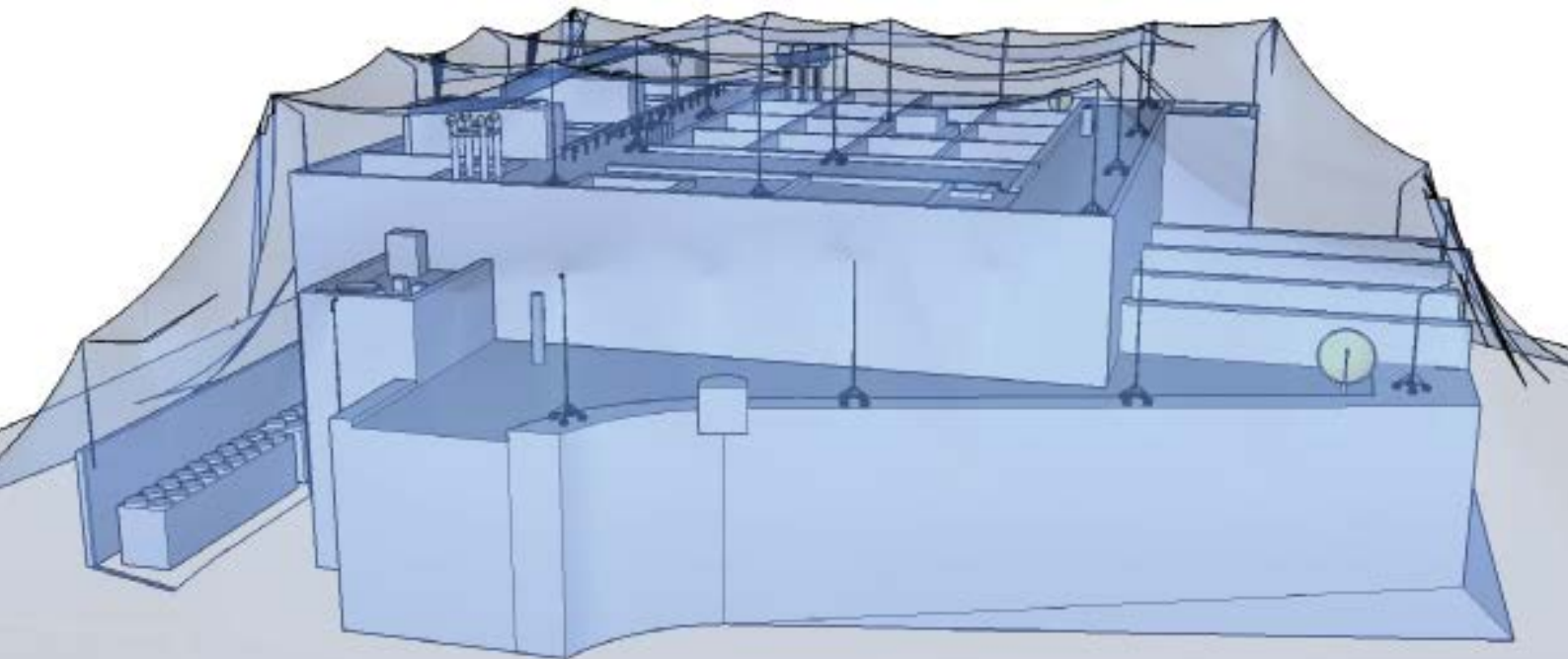
Due to the increasing requirements regarding the building architecture, 3D planning is a very good solution for visually representing lightning protection measures. Based on our 3D planning, customers get an idea of how to integrate the lightning protection measures into the building architecture. Another advantage is the clear visualisation of the protected volume of the air-termination systems.

2D drawings and 3D planning?

3D planning ensures component-optimised design. No individual views and details of building outlines are drawn, but the building is virtually designed on the computer. In this process, a detailed 3D model is created. 2D drawings can also be generated from this 3D model.

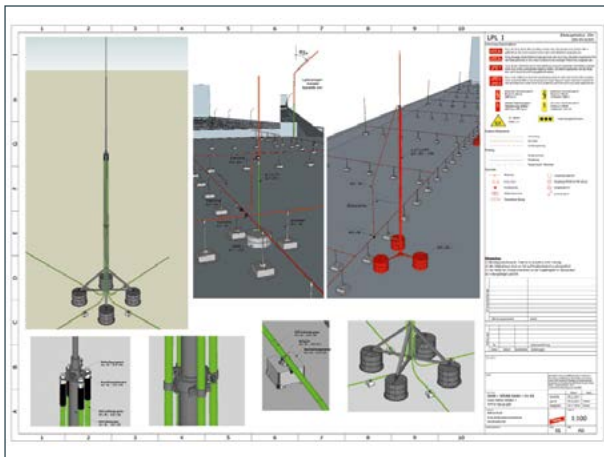
This procedure has numerous benefits:

- All drawings always correspond to the latest version of the 3D model
- Faults are minimised due to a 360 degree view of the protected volumes around the building
- The installation company can improve coordination of the mounting process
- Any number of 2D and 3D view drawings can be generated from the 3D model
- In addition to the view drawings, any number of mounting details can be generated

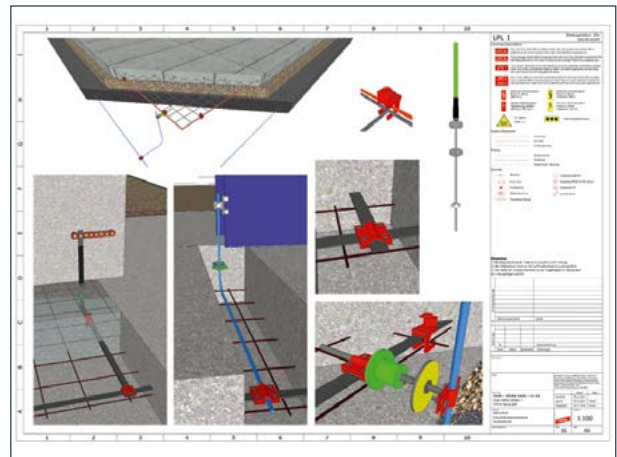


3D concept for the lightning protection system of the computer centre in Darmstadt, Germany

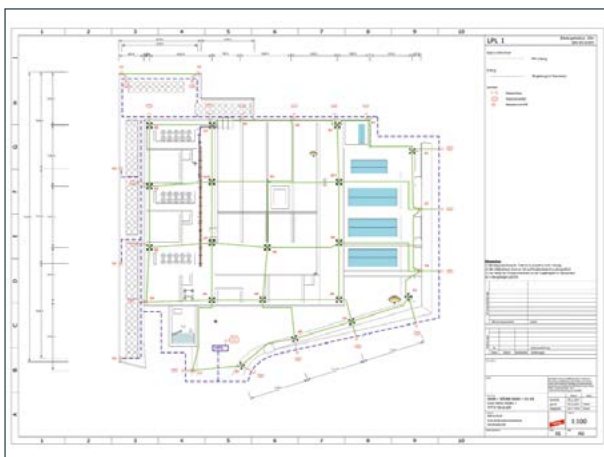
3D planning of lightning protection concepts



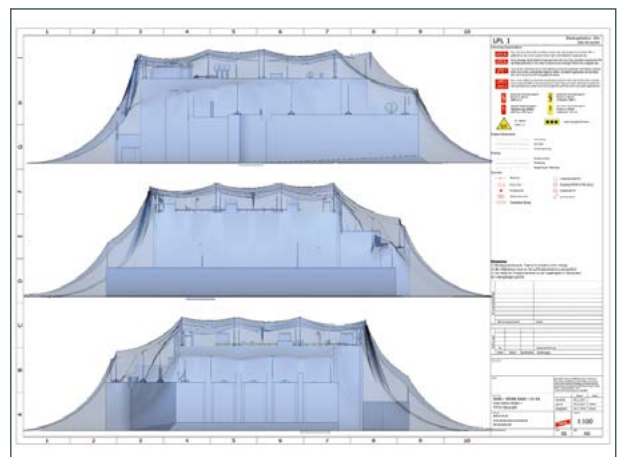
Detailed view of the lightning protection system



Detailed view of the earth-termination system



Overview of the lightning protection system



Design of the protected volume



3D concept for the lightning protection system of an industrial plant

3D planning of lightning protection concepts



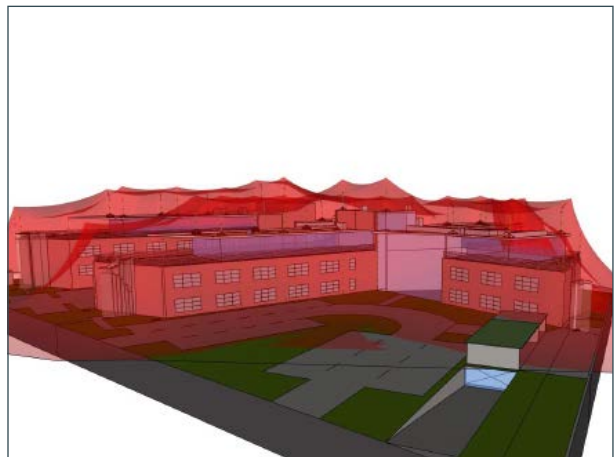
Positioning of the air-termination systems



Positioning of the air-termination systems



Positioning of the air-termination systems



Design of the protected volume



Risk management according to the international standard

Risk management for structures and buildings according to IEC/EN 62305-2*

The risk potential of structures is assessed in a risk analysis. The result of this analysis allows to take measures which reduce the risk. The aim is to select economically reasonable protection measures which are adapted to the properties and utilisation of the building. A risk analysis allows to define the class of LPS** and a complete protection concept including the necessary shielding measures against lightning electromagnetic impulses (LEMP***). It is supposed to reduce the existing risk to a tolerable risk. Therefore, the tolerable risk is defined when selecting the risks. These tolerable risks are specified in the standard. However, competent bodies may define them differently.

Risks to be considered

At the start of the risk analysis process, the focus is on the utilisation of the structure which allows to calculate the risks which have to be considered for the object to be protected.

Four different categories are distinguished in a risk analysis:

- **Risk R₁**: Loss of human life
- **Risk R₂**: Loss of service to the public
- **Risk R₃**: Loss of cultural heritage
- **Risk R₄**: Loss of economic value

One or more risk can be relevant for the structure. The planner decides which risks are to be considered.

We create an efficient state-of-the-art lightning protection concept based on this risk analysis.

* IEC 62305-2: Protection against lightning – Part 2: Risk management

** LPS: Lightning Protection System

*** LEMP: Lightning Electromagnetic Impulse



Dimensioning of earth-termination systems for transformer stations

These calculations allow to determine the cross-sectional area of the earthing conductors which are required depending on the technical data of the transformer and the power supply system.

This is important since the earth-termination system must meet the requirements of the lightning protection system and the short-circuit current of the transformer. This procedure is often used in industrial plants and production buildings.



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DEHNconcept Planning services

At the early project stage, only a rough budget for the different trades is required for a quotation since there is often not enough time for more detailed planning. Therefore we offer a material cost assessment which gives a quick overview of the rough costs of a lightning protection system.

Assessment of material costs

A calculation which is based on a variety of implemented projects is used to assess the material costs. In this context, the following factors of the object are considered:

- Building footprint (length x width)
- Class of Lightning Protection System (LPS)
- Additional costs, e.g. for hazardous areas or roof-mounted structures

The material cost assessment for the earth-termination system mainly depends on the type of earth-termination system (earth rod, foundation earth electrode, ring earth electrode). The implementation of the lightning protection system is roughly outlined in the material cost assessment.

Concept including detail engineering

We create a complete lightning protection/earthing concept according to IEC/EN 62305 for your structures. This includes 3D/2D drawings, mounting details, calculation of the separation distance, detailed descriptions, tender specifications, bills of materials and, if required, a material quotation.

These services are liable to costs which are listed in the material cost assessment.

The DEHNconcept team will be pleased to answer your questions and enquiries.

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More information:

<http://www.dehn-international.com/en/dehnconcept>



DEHNconcept Reference projects

Compressor station of Open Grid Europe in Werne, Germany

In industrial plants with potentially explosive atmospheres, it is important to plan a non-sparking lightning protection concept. This can be achieved by an isolated external lightning protection system.

We implemented such an isolated external lightning protection system for Open Grid Europe's compressor station in Werne.

Computer centre in Darmstadt, Germany

Availability has top priority in computer centres. An isolated external lightning protection system is an efficient solution since it has the advantage that no lightning currents enter the structure. This considerably reduces the risk of damage to technical equipment.

A meshed lightning protection system with HVI®Conductors was installed in the computer centre in Darmstadt.



More information on
HVI®Conductors



Pumping station in Geyen, Germany

It is also advisable to plan and install an isolated lightning protection system for individual parts of installations and systems such as pipelines which are located in the open field.

In the pumping station in Geyen, HVI®power Conductors were used to lead the lightning current out of the potentially explosive areas. This measure allowed us to make the system considerably safer.



More information on
HVI®power Conductors



Free field photovoltaic system in Greece

Free field photovoltaic systems are cost-intensive systems. Permanent availability is required to achieve a good return on investment. An efficient lightning protection system prevents failure resulting from lightning strikes. Therefore an isolated external lightning protection system is also often used in this case.

The free field photovoltaic system in Greece was equipped with an isolated lightning protection system with air-termination rods and insulated spacers.

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**Surge Protection
Lightning Protection
Safety Equipment
DEHN protects.**

DEHN + SÖHNE
GmbH + Co.KG.

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