

Lightning protection – a cost-saving investment

While energy efficiency and cost-saving are fully par for the course when planning new buildings, lightning and over-voltage protection are frequently neglected. These precautionary measures are, however, of fundamental importance for protecting refrigeration and air-conditioning equipment set up outdoors.



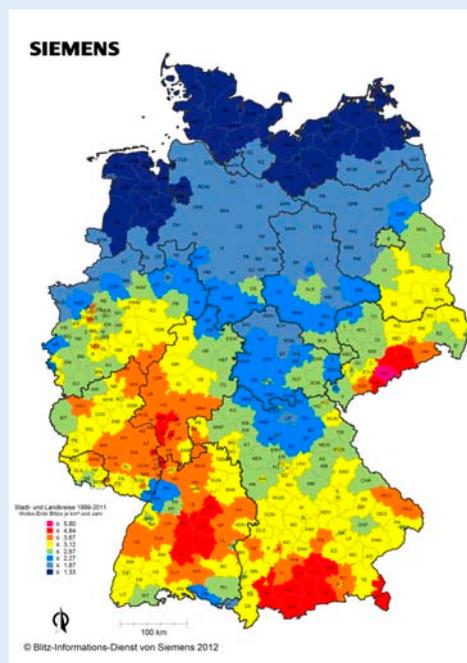
Foto: DEHN + SÖHNE, Neumarkt

Everyone is talking about the more evident cost factors, such as energy efficiency with the components for refrigeration and air-conditioning systems, etc., but lightning and over-voltage protection appears to be a happily neglected topic. The considerations here for the possible long-term risks and the costs connected with them are very important from a financial point of view alone. Everyone, no doubt, becomes somewhat uneasy when they think about the costs that might be incurred, if, for example, the complete control of a refrigeration or air-conditioning system fails, or because leaks occur after a direct lightning strike – let alone possible personal injury.

Different regional dangers

The danger of lightning strikes is by no means the same everywhere – it is actually extremely different from region to region. Siemens maintains a lightning information service called BLIDS, which records lightning strikes across Germany and other European countries, and provides the data collected to various institutions. In March 2012 BLIDS published a new atlas, which shows how high the lightning danger is in individual regions.

The frequency of lightning strikes shows a clear north-south incline: While in Mecklenburg Western-Pomerania or Schleswig-Holstein there was sometimes no lightning for years, in the Central Erz Mountains, for example, there can be over 6 strikes per square kilometre.



Safety with competent advice

In addition to the special geographical features, the professionals also know all about legal situations, e.g. the relevant standards, such as the four parts of the DIN EN 62305 (VDE 0185-305) lightning protection standard or DIN VDE 0100-534 or 540, which must be taken into consideration when selecting and using materials for lightning and over-voltage protection. They have specialized software to make the required risk assessments, which then form the basis for classification in the necessary protection classes and for implementing the resulting protective measures.

Assessing damage risks

Lightning protection planning is primarily about assessing damage risks. Standardized risk analyses are performed to assess a building's hazard potential, and to be able to implement specific measures for risk reduction. The result provides a selection of economically beneficial protective measures, which are harmonized with the respective building.

The property to be assessed is first considered without any protective measures for the risk analysis of direct and indirect lightning strikes. Dangers, which could emerge as the result of direct and indirect lightning strikes on the building complex or on supply lines, are identified as "R" damage risk, which represents a dimension for a possible annual loss. The main focus of attention here, of course, is possible personal injury. Classification is then made, according to the risk situation, in the corresponding protective classes.

Protective classes and protective measures

These protective classes for lightning protection systems are defined in Part 3 of the VDE 0185-305 Lightning Protection Standard. They provide a set of construction rules, whereby, for example, mesh apertures, shielding angle and rolling sphere radii for lightning current arresters, distances from outgoing feeders and ring conductors or minimum lengths for earth

conductors are defined in acc. with the respective danger levels. The effectiveness of the measures diminishes from protective class I to protective class IV.

The measures include earth termination systems, arrestors, discharge devices, lightning protection potential equalisation with over-voltage protection devices, a lightning protection zone concept with subdivision into different zones and further measures, which are each classified in a sub-categorization of the individual protection concepts.

When you realise the complexity of these specifications, if not long before, you then realise that it is always safer to rely on a specialist to deal with the important topic of lightning protection.

Sources:

- Siemens lightning information service (www.blids.de)
- Graduate Engineer (UAS) Michael Hess, Thomas Seitz (Dehn + Söhne GmbH & Co. KG, 92306 Neumarkt); "Lightning and Over-voltage Protection"; tab 10/2011