Lightning Touch and Step Voltage Protection

How to protect workers and especially electrical workers during a storm?

Associate for Lightning Consultancy

- In case of lightning activity, step and touch voltage risk can occur in an area of 3 m around the place where the lightning current enters the soil.
- This channel can be well known for example when there are only down-conductors on a wooden structure.

However, in many cases the lightning current will split between various paths (structure metallic frame, metallic façade covering, electrical installation and equipment, pipes …) existing in a structure and the location of dangerous zones, especially inside the structure, is not easy to determine.

- This risk can be reduced by insulating people feet from the ground, for example a thickness of 5 cm of asphalt or 15 cm of gravel.

However this thickness is difficult to check in practice and the effect of a top layer of rain water above this insulating material is not clear. In addition, there are many cases where the top surface is made of soil or concrete that are not insulating surfaces.

Associate for Lightning Consultancy

- A way to solve the problem is to avoid people to be around down-conductors or any part where a significant partial lighting current can flow by using a fence located at 3 m from dangerous places or storm detection to avoid people to be outside in stormy periods.

In some cases, for safety reasons, people need to work in places that can be dangerous even in presence of storms.

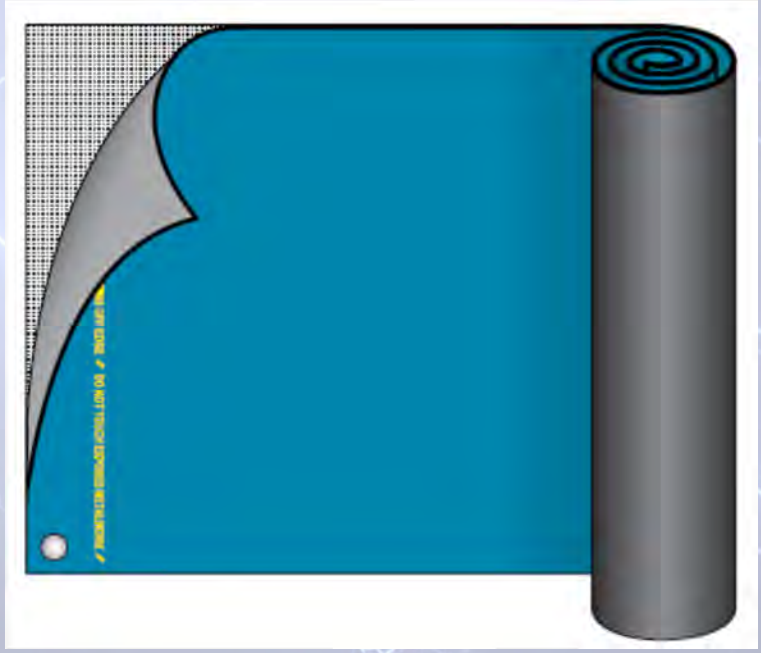
This is especially the case for a few electrical emergency devices that need to be operated all the time and for which soil insulation around the Lightning Protection System is irrelevant.

Associate for Lightning Consultancy

- A good solution would be providing insulation where the worker will be in stormy periods, to take care of touch voltage "*IEC 62305-5 clause 8.1 : the contact resistance of the surface layer of the soil, within 3 m of the down-conductor, is not less than 100 kΩ*"
- Another good solution, for step voltage is to reduce the voltage between feet by using a metallic mesh "*IEC 62305-5 clause 8.2 : equipotentialization by means of a meshed earth-termination system*"

Associate for Lightning Consultancy

- A new solution exists that includes both solutions : a mat named “EPR” that is provided like a portable carpet 3.2 mm thick, size 1.0 m x 1.5 m based on 3 layers :
  - Top : non conductive rubber
  - Medium : Stainless steel
  - Bottom : conductive rubber



Associate for Lightning Consultancy

- This includes a hole and a connector to interconnect the mesh to the structure when it is metallic.

Associate for Lightning Consultancy

Example of a worker in operation during a storm to operate an urgent safety equipment.

Associate for Lightning Consultancy

For technical details or enquiries:

Your contact:

sales@alightningconsultant.com

+33 975889664