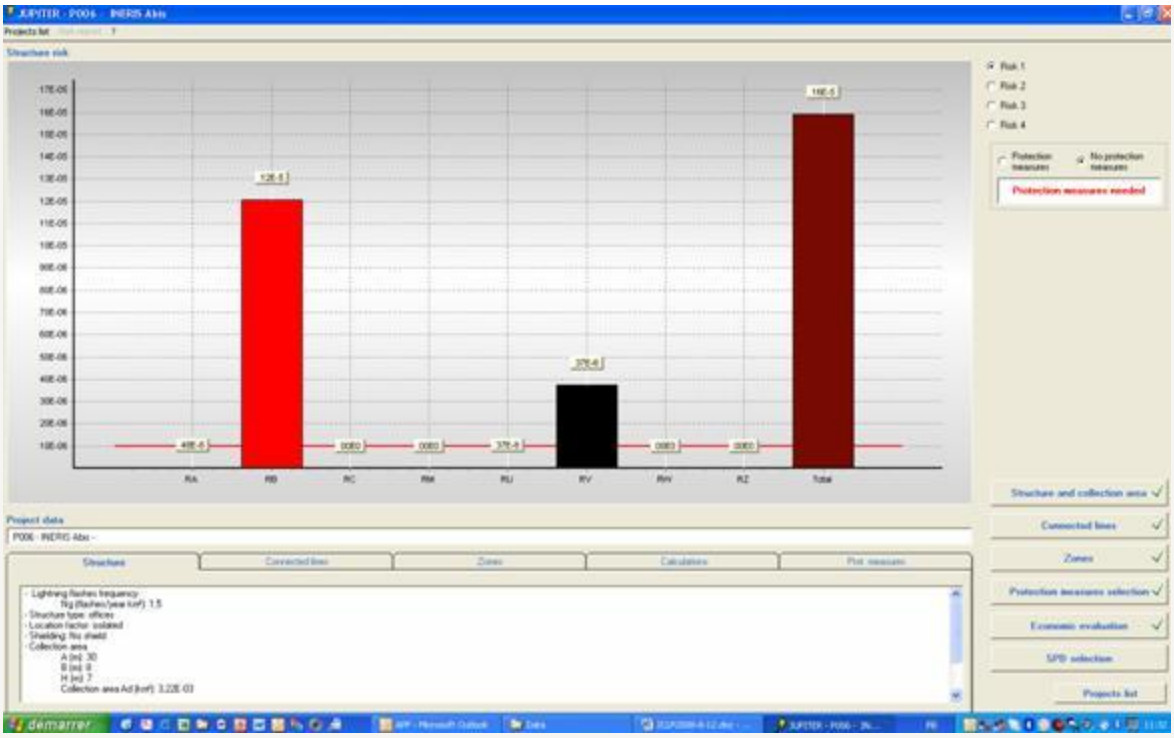
Lightning risk management

Lightning protection is nowadays clearly moving from Benjamin Franklin age to a more scientific approach. This is in particular the case for the lightning risk management

What is the reason for someone to decide to protect his property against lightning? There is not a single answer to this question. This may be because he has already experienced damages due to lightning (lightning here means direct lightning impact on the structure or surges due to lightning propagating along the connected lines). Another reason may be the law or the rules. In that case decision is quite clear: he has to be protected. Another simple case is when he believes that his property is worth protecting it (either cost of property or content). What to do in all the other cases?

The only possible answer is to perform a lightning risk assessment. Taking into account the structure and content (including inhabitants) characteristics the risk method will determine the level of protection needed to decrease the risk to an acceptable level. In fact this method is very useful in any case to determine what is the level of protection needed and what is the advantage of using such a protection solution. As a matter of fact without this guidance one has no idea of what is the type of lightning protection system you need even if one is decided to use a lightning protection system. In that case the risk management method allows to better decide what is optimum for the property. So this is a general method.

What are the available methods? For a long period the only existing methods were simple method relying on a few parameters to describe the property. This was of course adequate for simple structure but not for more complex one; case of chemical plants for which the method was generally too simple to suits the need. A new method appeared in 1995 at the International Electrotechnical Committee under number 61662. This method has been refined in 2006 after more than 10 years of experience and is now applicable worldwide at **IEC** level and at European level (**CENELEC**). This **new version published in 2006** under number **62305-2** is able to describe all situations from the simplest to the most complex. Purpose is to describe the structure as precisely as possible including connected lines and content (for simple structures a lot of approximations can be done to make the method easier to apply) and then to describe the environment. Then a probabilistic approach is used to determine what the level of risk is and compare it with tolerable levels given in the standard. If the risk level exceeds the tolerable risk protection means are added until the risk pass below the tolerable risk. Protection means may be surge protective devices, lightning protection system, shielding, equipotential bonding … or a combination of.



lightning risk management method

Example of “Risk components” for an office building:

Red bar means that a lightning protection system is needed and black bar means that SPDs are also needed. Brown bar is the total risk sum of all risk components. The red horizontal line is the tolerable risk which is exceeded.

What is interesting is that the risk method allows also performing an economic optimization and to decide which protection solution are the most cost effective. So this method is a general purpose tool.

Source: http://engineering.electrical-equipment.org/electrical-distribution/lightning-risk-management.html