

Lightning Protection

Hotels and Resort

Lightning is a natural phenomenon that can of course enerate heavy consequences on hotels and resorts for people, structures and equipment.

However these consequences can be avoided with an adapted lightning protection. The steps to follow are described below:

- **Lightning Risk Analysis to determine accurately the risks taking into account of the various possible scenarios. People protection should be addressed with a determinist method even if the statistical risk remains quite low. Furthermore the economic risk should be taken into account.**
- **Technical Study of the needed protection means in order to reduce the risk below the determined risk level. Protection should of course address people (employees as well as tourists) but also the structure or the structures (in case of bungalows on a beach for example) and equipment (fire mitigation means, safety means, alarm system, computers and payment terminals ...). Outside of people protection, economic aspects should be integrated in the selection of protection means.**
- **Inspection after erection of the Lightning Protection System and periodic inspection to validate the efficiency of the protective measures as well as its longevity and associated user trainings.**



Hotels

1. Risk Analysis

Lightning risk depends on the various possible scenarios. We can potentially observe:

- Impact on people outside of structures (open areas) : swimming pool, beaches, gardens, terraces etc.
- Impact on people near structures (metallic structure or Lightning Protection System downconductors)
- Fire risk in the structure triggered by lightning. It is then important to take care of the fire protective means (smoke detectors, fire alarm system ...).
- Damage to electrical and electronic equipment (warning system, telephone, computers, payment system, booking system, air conditioning, lifts, lighting etc.

The Lightning Risk Analysis is a statistical method to evaluate the risk and to define as well as needed protective level to cover that risk. This statistical analysis is completed by a deterministic approach regarding people protection. Another deterministic method is used for the important safety devices (fire alarm system, safety system ...) or for equipment directly related to the hotel operation (computer system, payment terminals ...). As a matter of fact for people and these equipment, the risk, even if statistically low, is still too important and protection means are necessary whatever is the statistical risk level.

In general a single risk analysis is not enough and up to three analysis need to be performed.

First one (named R1 in IEC 62305-2 standard) has a single target : people protection. It consist mainly to ensure that in case of a fire triggered by lightning, the escape route will be safe and that fire brigade access will be guaranteed: it is then necessary that the fire alarm system, automatic extinguishers and telecom line to call fire brigade, for example, don't be degraded by lightning surges

The second calculated risk (named R2 in IEC 62305-2 standard) consists in validating the functionality of operational installations (computers, outdoor lightning, safety cameras ...). What are the important systems need to be defined in cooperation with the hotel manager.

The last and third analysis (named R4 in IEC 62305-2 standard) allows to validate the economic risk level. The cost of protection and maintenance cost are compared to the statistical damage cost on an annual basis. This method non only allows to know what will be the generated money savings thanks to the lightning protection but also to determine the more adapted protection means taking care of their economic efficiency for the hotel and resort.



Resort

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2. Technical Study of protection means

The Technical Study of protective means allows to identify the most effective protections capable of reducing the risk below the level defined by the LRA. It must consider the potential means of protection and implementation difficulties both aesthetic and technical. For example, for a Resort with bungalows on the sea shore or directly on the sea, it will not be economic to protect each bungalow and even if the economic factor is not considered, the setting-up of grounding on a beach creates technical difficulties and visual impairments also hardly compatible with the main objective of a Resort .



Indoor equipment

It is then generally sufficient to protect key buildings (restaurant, main building of the hotel complex, ...) and to associate a Lightning Warning System (storm detector) to inform users not to leave the bungalows or even to regroup in one of the protected buildings. The storm detector also prevents a danger for all outdoor activities (sailing, surfing, beach, swimming in the sea or pool if it is outside ...). The effectiveness of this storm detector (called FTWR in EN 50536 / IEC pr62793) must be compatible with efficiency determined during the Lightning Risk Analysis. On this basis procedures should be set up in order to notify the security team (early warning), and ultimately residents (imminent danger). For beach with very tall trees (coconut palms, pines ...) it is dangerous to stay close to them as they act as lightning rods but very soon either they will explode or will sparkover to near people and create an additional hazard.

Building lightning protection (Lightning Protection System) must consider the aesthetic aspects (in particular wooden roof or straw roof), the potential fire hazard of the frame and roof itself and have its down-conductors and lightning earthing system being located far away from pedestrian paths to avoid step voltages. It usually also takes account of strong winds (when near the seashore) and marine corrosion. For wooden structures or for structure with open parts, the risk of sparking over to internal lighting circuits or even on people must be considered. For concrete structures an isolated system is often the right solution when the lightning protection is not set up at the construction stage of the hotel.

Finally, Surge Protective Devices are required on incoming lines in a protected structure but also wherever the risk of sparking-over cannot be avoided (decorative light string on the roof, roof lights ...) and for all the facilities identified in the LRA as important for the safety or for the operation. It is unthinkable that the system of management and payment does not work in the morning when residents want to check-out if a lightning strike occurred on the complex or in the surrounding environment!



3. Inspection of protection means

The protection means, including the possible storm detector, must be subject to an initial check at the end of the work to validate their compliance and their settings.

After acceptance of installation, it is necessary to keep it in condition, by controlling at least every two years the value of the earthing system, the visual condition of the protective equipment and condition of the SPDs as well as the good operation of thunderstorm detection and related procedures. It is important to have chosen during installation or technical study protection means without maintenance or equipped with integrated fault indicators. The complexity of maintenance must be taken into account in the calculation of economic risk. Any significant change in the hotel complex should also lead to an analysis once it concerns the outside of structures (new air conditioning on the roof or facade ...) to ensure that it does not degrade the initial protection.