

CASE STUDY 03

AEMET Meteorological Radar

Study Period: 2015 – 2016

Introduction

The PIC DE GOMÀ Tower is located in an area with a high incidence of lightning (area with Ceraúnico level (Nc) of 7.5). It is owned by Andorra Telecom and is located in the Ordino area (Principality of Andorra, Western Pyrenees).

Prior to the installation of the technology (on May 1, 2015), ANDORRA TELECOM informs us that there have been direct impacts on the tower with significant electrical damage.



Conclusion

In the 2-year study period (2015 - 2016), there was NO direct lightning impact on the tower, nor within 100 m of coverage radius

In this period 96 impacts have been recorded within the 2 km radius around the tower with the following results:

- The closest impact has been more than 100 meters (recorded last day 01/07/2015 at 18:09:29 of 6 KA (Negative) .All impacts have occurred more than 100 meters from the tower
- By distance segments the results tell us that 6.25% of impacts occur at distances between 100 m and less than 300 m from the tower, 4.16% of impacts occur at distances between 300 m and less than 500 m, 17.70% of impacts occur at distances between 500 m and 900 m and 71.87% of impacts occur at distances greater than 900 m
- It can be seen that although the average intensity of negative rays is about 14.5 KA, there are several impacts of significant intensities, such as the one recorded on August 22, 2015 from 33,300 A (Negative) to 1.3 km from the tower. This makes us think that an electrical installation should be protected with potential lightning impacts of these intensities and above.
- It is demonstrated that the device compensates the variable electric field in its environment, preventing the formation of the ascending tracer and, therefore, a direct lightning strike. The real data prove that the risk of lightning impact increases as the storm moves away

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from the point where the device is placed, which is logical, since the device will compensate the electric field in its environment and it will increase again as that moves away from the device

- Therefore the effectiveness of the device in this study (Torre JATA) of 2 years, in a zone of high incidence of lightning ($N_g = 5$), is 100% on impacts of direct rays in the structure that protects and 100% on impacts within the area of its coverage radius of 100 meters
- The device only has influence on the electric field that appears in its surroundings. It has NO influence on what happens in the cloud, nor on the number of storms that appear in the area nor the time in it, as is logical

Concept	Test Period Data	Impact Probability
Impacts 2 km around the tower	96	
Days with lightning impacts	11	
Ground to cloud lightning	1	
Cloud to ground lightning	28	
Cloud to cloud lightning	67	
Direct strikes to tower	0	0%
Impacts < 100 m from tower	0	0%
Impacts within 100 m and < 500 m	6	3.6%
Impacts within 300 m < 500 m	4	2.91%
Impacts within 500 m and < 900 m	17	18.24%
Impacts > 900 m from tower	69 (up to the limit of 2 km)	81.55%
Maximum intensity negative beam	33.3 KA 1.3 km from tower	
Maximum intensity positive beam	6.2 KA 1.5 km from tower	

Table 1