

CASE STUDY 02

Torres de la Masella Communications Tower

Study Period: January 6, 2014 – December 31, 2015

Introduction

The Torre de la MASELLA is located in an area with a high incidence of lightning (area with Ceraúnico level (Nc) of 6). Prior to the installation of the device (on June 1, 2014), ABERTIS TELECOM (CELLNEX) informs us that there have been direct impacts on the tower with significant electrical damages.



Conclusion

- In the year and 7 months of study (1/06/2014 - 12/31/2015) there have been 299 lightning impacts in 3 km around the tower
- The closest impact has been more than 100 meters (recorded on 22/08/2015 at 16:33:19 h of 10.9 KA (Negative).) All impacts have occurred more than 100 meters from the tower
- By distance segments the results tell us that 3.60% of impacts occur at distances between 100 m and less than 300 m from the tower, 2.91% of impacts occur at distances between 300 m and less than 500 m, 18.24% of impacts occur at distances between 500 m and 900 m and 81.55% of impacts occur at distances greater than 900 m (table 1)
- It can be seen that although the average intensity of negative rays is about 13 KA and that of positive rays is over 30 KA, there are several impacts of significant intensities, such as that recorded on June 11, 2014 from 79,900 A (Negative) to 2 Km from the tower and from 95,000 A (Positive) to 1.5 km from the tower. This makes us think that an electrical installation should be protected with potential lightning impacts of these intensities
- It is demonstrated that the technology compensates the variable electric field in its environment, preventing the formation of the upward streamers and, therefore, a direct lightning strike. The real data prove that the risk of lightning impact increases as the storm moves away 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

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- Therefore the effectiveness of the device in this study (Tower LA MASELLA) of 2 years and 7 months, in a high incidence area of rays ($N_g = 6$), is 100% on direct lightning impacts on 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	374	
Days with lightning impacts	56	
Ground to cloud lightning	25	
Cloud to ground lightning	224	
Cloud to cloud lightning	125	
Direct strikes to tower	0	0%
Impacts < 100 m from tower	0	0%
Impacts within 100 m and < 500 m	11	3.6%
Impacts within 300 m < 500 m	8	2.91%
Impacts within 500 m and < 900 m	50	18.24%
Impacts > 900 m from tower	305 (up to the limit of 2 km)	81.55%
Maximum intensity negative beam	79.9 KA 2 km from tower	
Maximum intensity positive beam	95 KA 1.5 km from tower	

Table 1