Mill field storm detectors networking

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Abstract - The ability to install several mill field storm detectors network, offers a new prevention dimension, to anticipate, accurately, the storm approaching and developing.

Keywords – Storm detector, Field mill, Prevention, Electrostatic Field.

I- Introduction

The measuring electrostatic field storm detection prevents from the risk of lightning strikes. By consequence, it is used as a safety tool, essential for industrial and military sites prevention. Also for forest fires monitoring as well as other places where lightning risk must be taken into consideration.

Under some conditions, it is better or even necessary to multiply the number of storm detectors.

In this presentation, we will use several examples showing that the networking of this type of detection device, allows a significant improvement in prevention resulting a financial gain.

II-EXPERIMENTAL SITE

Two storm detectors, STORMDETECT™ brand, were installed on two different sites. The distance between both is 2.5 km with an average altitude of 60 m (Fig. 1).

In order to minimize environmental influence, they were installed in open areas in compliance with the manufacturer’s installation requirements.

The two sensors were previously calibrated in the same conditions, to ensure the best measurement as possible.

Each one of them were set with the same configurations (Fig. 2).
The use of WinSD, STORMDETEC™ software, allowed us to record storm activity on these two sites. In the hereunder picture (Fig.3), the chart records the storm activity on site Nbr. 2, whereas the text window below it, the monthly report, which records all level alarms.

We compared the records of the two sites (Fig. 4). During the day of 02/28/14, 2 storms appeared.

The records show very similar curves, but with an higher field amplitude on site Nbr.1 than site Nbr.2 (Fig.5)

This amplitude difference comes from the storm cell movement, nearer to the site nhr.1 than the site nbr.2.

If we compare now alarm activation, we can notice that level 3 alarm went off at 12:06 on site 1 and at 12:10 on site 2, with a lead of 4 minutes (Fig.6).

III- TELECOMMUNICATION SITE

To be advised in real time and in a reliable way, this is a telecommunications site aim, in Champagne region (East of France), in order to start a generator and thus isolate from the electricity network (fig.7).

To do so, the operator is equipped with 4 storm detectors, the first SD1 on the site to be protected, the second, SD2, in the NW, the third, SD3, in the south and finally the fourth, SD4, in the east (fig.8).

The 3 detectors were installed at a distance of 8 to 14 km from the first one; they are all connected to a computer, on which a software processing is performed, in order to measure field’s values, its duration, its distance and its orientation, making this software a virtual sensor.
Through this network, the user saves precious time for action in case of storm.

In addition, by setting the alerts, the company saves money.

IV - SITE NEAR THE SEA COAST

In this environment, it is difficult for the user to set alerts, in a reliable way, without disturbing the operation of installation.

For example, on a production site classified SEVESO in Gironde, near Bordeaux (South West of France), where lightning density is very high compared to other regions of France. This installation is about forty kms from the ocean (fig.8).

A storm detector, the same as used in the experimental site, was installed in July 2012. After several months of use, this storm detector recorded a very significant storm activity on this site, disrupting the production site (fig.9).

Despite of the environment consideration, alarm levels 2 and 3 were triggered too often. User was forced to increase the value of the alarm levels, in order to reduce production downtime.

For this type of site, the use of several network sensors, as for the above Telecommunication site, would integrate in a better way the lightning risk, respecting an optimum downtime and a quick activity restart.

V - MAINTENANCE OF DISTANCED SITES

This connectivity also allows us to anticipate detectors maintenance, diagnosing malfunctions in distance, modifying if necessary the sensor parameters, or even resetting the device.

Using the "Diagnostic" application, once the IP address of the computer server settled in the software, the user can at any time log in and checks the storm detector status (fig.9).
In addition, the operator can access to the device configuration, allowing him to modify the settings regarding to the use or to the environmental coefficient recommendations (fig.10).

The user can also do the maintenance at distance by testing the functions, by checking the different parameters values such as engine speed, voltage and charge current of the battery backup...(fig.11).

Finally, the person in charge of STORMDETETC™ maintenance has the ability to update softwares of the sensor and the control box and power, without dismounting them. This way of maintenance has a financial advantage, with a better anticipation of curative maintenances, a limited number of interventions and eventually a gain of time for the administrator in charge of several storm detectors.

VI- CONCLUSIONS

The storm detectors network is a device to monitor in real time the evolution of the storm, while increasing the coverage area. This increase aims not only to prevent from earlier lightning risk, but also to understand the storm cell movement and anticipate actions before or after the alerts, generating savings of production and maintenance of sites equipped.

This networking facilitates a lot the maintenance, reducing costs due to technician’s visits on site, but also by allowing the user, to monitor multiple sites at the same time.

The connection to a local or remote network of these storm detectors, has a financial advantage, a greater reliability of the information, reducing maintenance costs and production and allows a better organization in case of corrective maintenance.