Thomas&Betts

Power Solutions

FIELD TRIAL

SURGE PROTECTION SYSTEM FOR LIGHTING PROTECTION

Test conducted by:
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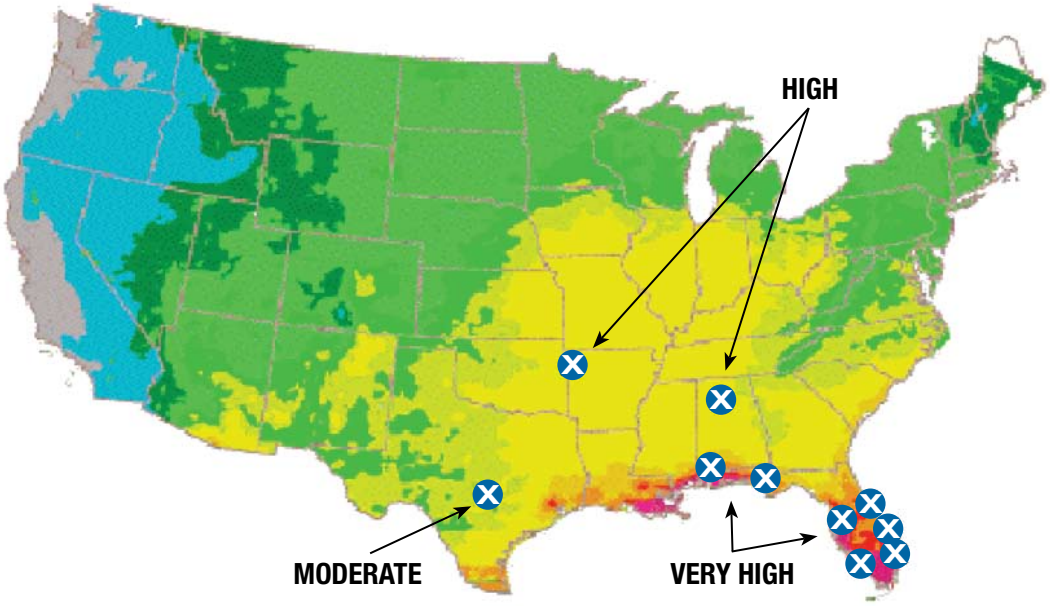
BACKGROUND INFORMATION

Lighting can account for up to 40% of a buildings energy bill. In efforts to reduce power consumption expenses many retail and commercial building managers replaced their existing lighting with energy efficient lighting ballasts to help reduce this expense. Energy efficient ballasts require less energy to start and keep the lights on. Some ballasts can be connected to sensors in the room to detect when someone has entered the room. There are ballasts designed now that can be dimmed remotely through a building management system. A technology that used to be as basic as a light bulb and a switch has now become extremely complex. Existing lighting ballasts require sophisticated printed circuit boards with microprocessors imbedded in the circuitry to control the logic that enables the ballasts to save energy, ultimately saving the end user money. However this new sophisticated technology is still being powered by the same power infrastructure. A technology that was once robust is now more susceptible to transient surge events.

Many companies have made the transition to energy efficient lighting and are benefitting from lower electric bills. However, many of these same companies have seen an increase in their lighting maintenance costs.

Thomas & Betts contacted one of these companies to see if we could help determine a root cause for the increased lighting maintenance costs and to investigate potential solutions. The company agreed to let us assistant them and provided ten stores for the evaluation. Several of the stores selected were stores that had seen the most increase in lighting maintenance budgets since switching to energy efficient lighting ballasts. The stores selected can be found as X's on the Isokeuranic Map shown below. The Isokeuranic map is a map that shows areas with high lightning activity.



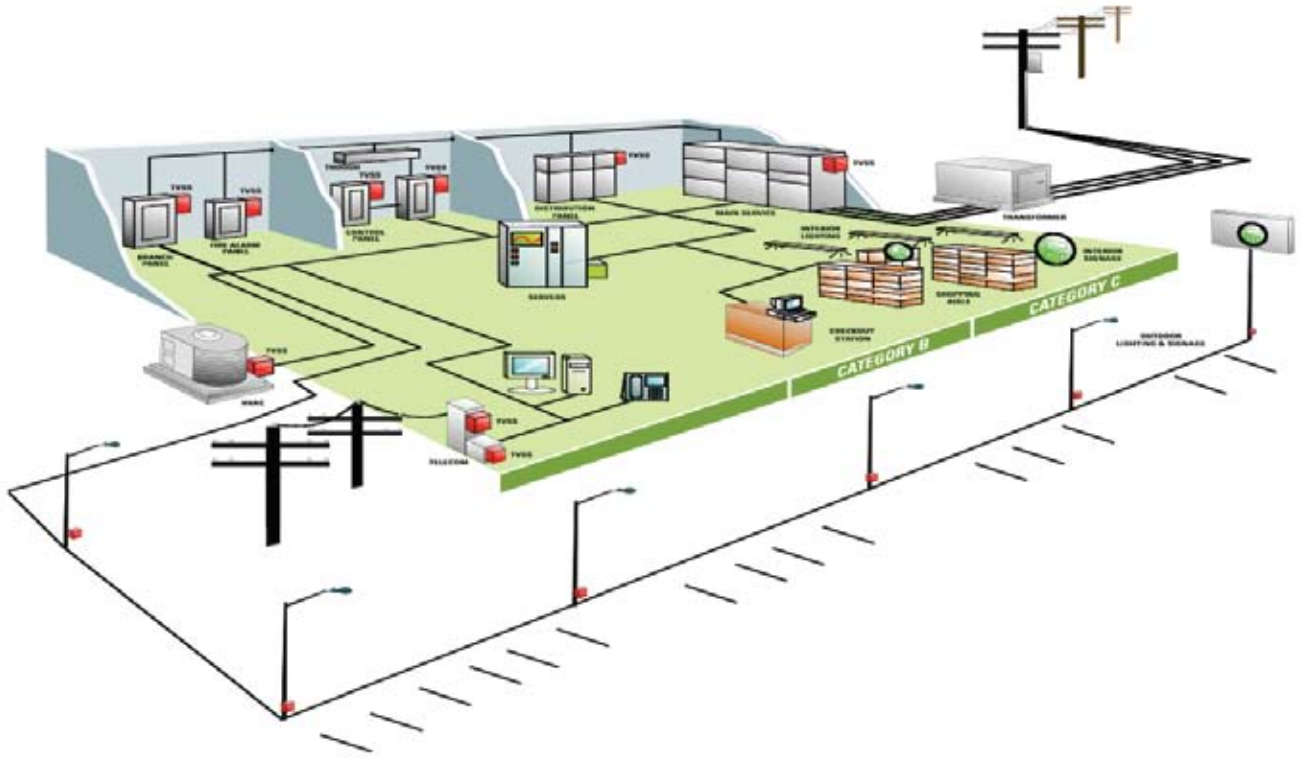
Site survey and ground audits were conducted at each location with no major findings to report. A review of the company's maintenance expenditure report suggested that two factors contributed to the increase in the lighting maintenance budget.

1. Stores that were using the new energy efficient lighting ballasts
2. Significant lighting failures inside and outside the store, with a higher concentration of failures in the Central and Southern states. Particularly stores with parking lot lighting controls and environmental controls in the store.

The data suggested that the lighting ballasts may have been susceptible to transient surges. To validate this information several common and popular style energy efficient ballasts were purchased and brought into the test lab. Each ballast was subjected to several different surge wave shapes as defined by IEEE C62.34. The test results revealed that all of the ballasts tested failed when subjected to a single Category C3 surge event. The same tests were repeated using the same make and model of ballast, but this time a surge protection device was installed in front of the lighting ballasts. The results showed 100% functionality of the lighting ballasts after repeat C3 surges.

The tests performed in the lab demonstrated that properly installed surge protection could help limit the failure of lighting ballasts to transient surge activity. The next test would be to perform the same test in a real world environment.

It appeared the problem had been identified and a suitable solution had been identified as well. The next step was to apply the proposed solution in the field. All ten stores had small surge protection devices installed at each parking lot light pole and more robust surge protectors installed on the panels inside. The diagram below shows a typical store layout and where surge protectors were installed.



END RESULTS

Each store realized a significant decrease in lighting maintenance costs due to the surge protection installed. The chart below shows the lighting maintenance figures provided by the company for five store locations. The figures show lighting maintenance costs before and after surge protection was installed.

Store	Monthly Expense Before Surge was Installed	Monthly Expense After Surge was Installed	% Decrease in Lighting Maintenance Dollars
Store #1	$1,800.00	$100.00	1700.0%
Store #2	$1,100.00	$100.00	1000.0%
Store #3	$1,950.00	$100.00	1850.0%
Store #4	$2,800.00	$100.00	2700.0%
Store #5	$2,166.00	$100.00	2066.0%

These pre and post monthly expenses did not contain normal replacement costs, but were specific to break/fix issues as a result of failures caused by power quality events. The data provided after the surge protection was installed was actually below $100 a month.

An average the stores required was approximately $6500 worth of surge protection. The longest return on investment in the stores evaluated during this test was 6 months.

Recent follow up calls with the individual stores involved in the test has shown a continued decline in lighting maintenance costs due to a decrease in ballast replacements.