

Protection of Critical Equipment from Power Surges in Surface Coal Mines

Rayvoss TVSS systems are designed to protect your equipment from power surges and to help you drastically reduce maintenance and operations costs.

One of the largest surface coal mines of Greece is located in Megalopolis in the southern part of the country. It is owned by the Public Power Corporation of Greece (PPC) and it supplies lignite to the adjacent thermoelectric power plant that accounts for roughly 15% of the country's energy production.

In this coal mine, 10 bucket wheel excavators are used for the continuous, selective mining of lignite. Conveyor belts with a total length of 43 km are used for transporting the excavated lignite to the stockyards and the waste to the dumping sites. Hundreds of kilometers of power cables of different lengths and types are used throughout the mine.

The challenge

The Megalopolis coal mine had been experiencing continuous failures of the PLCs that control the conveyor belts' motion. These failures were due to a combination of lightning strikes and switching-related overvoltages.

Since conveyor belts are an integral part of the coal mine, their immobilization was causing the production to stop. Tons of lignite had to be unloaded from the conveyor belts before they could be inspected and repaired. During this repair process the lignite had to be transported to the power plant via a fleet of rental trucks. This procedure could take from several hours up to a full week. The total cost of the restoration process was overwhelming. It is worth noting that the expenditure for renting the trucks alone, amounted to \$450,000 US annually!

The engineering department of the mine had made countless efforts to solve the problem. The surge sup-

pression devices that had been used in the past, from practically every available supplier in the market, had all failed leaving the coal mine unprotected for a period of years.



Bucket wheel excavator with conveyor belt

Solution

Raycap has a long-standing relationship with PPC and has provided them with a broad range of products. During a regular customer visit to the mine, Raycap's representatives were informed about the failures the site had been facing.

This was around the time that Raycap had acquired the Rayvoss product line from Tyco Electronics / Raychem, and the promotion of this product in the Greek market had just started. The engineering management of the coal mine agreed to purchase and install 4 Rayvoss systems in selected locations, as a field trial.

The results of this field trial were immediate and shocking! Those four initial installations proved the efficiency of Rayvoss in containing power surges as shown from the measurements depicted in the representative diagrams of figures 1 & 2, from one typical installation in the mine.



The field trial lasted for a whole year. During this period no damage of the Rayvoss TVSS units or equipment failure was reported. The situation in the rest of the mine installations (using conventional protection systems or no protection at all) remained the same.

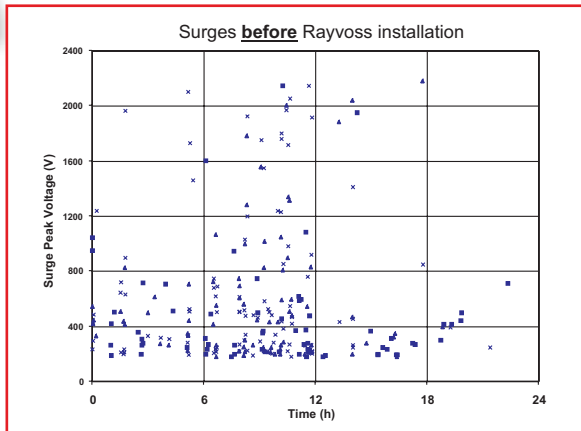


Fig 1: Power line transient overvoltages up to 2300 V, in a conveyor belt PLC controller, measured in a 24h period before installing Rayvoss.

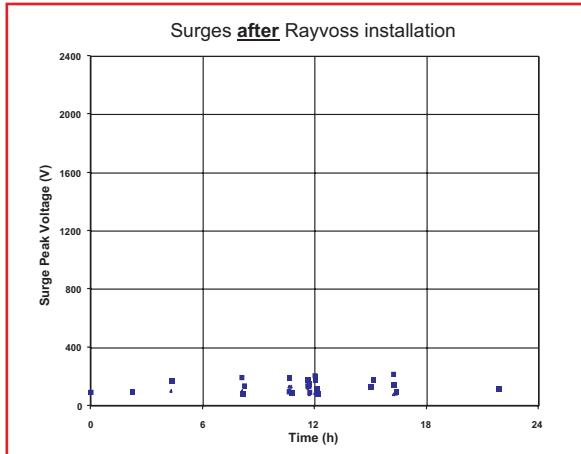


Fig 2: Power line transient overvoltages in a conveyor belt PLC controller, measured in a 24h period after installing Rayvoss. None of them exceeds 300 V.

The management team of the mine as well as the General Manager of the Mines Division of PPC and his staff were so pleased by the unexpected solution to their long lasting problem that they decided unanimously, to proceed with a purchase of 110 additional Rayvoss systems, in order to protect every possible point of failure in the coal mine of Megalopolis.

Benefits

The use of Rayvoss in Megalopolis resulted in the continuous and maintenance-free operation of the mine. The net present value (NPV) of the savings realized for a period of ten years will exceed **US \$4,800,000!** The internal rate of return (IRR) for this investment will reach **133%**, while after one year from the installation of Rayvoss throughout the mine, the payback period for Rayvoss has proven to be as short as **nine months!**



Rayvoss installed on a conveyor belt

About Rayvoss

Rayvoss Transient Voltage Surge Suppression (TVSS) systems have been designed to provide the ultimate protection to telecommunication, IT, industrial, medical and military infrastructure. Strikesorb, the surge suppression module found in the heart of Rayvoss systems, is a high surge capacity protection element able to efficiently manage surge currents up to 200,000 A.

For more information on Rayvoss and Strikesorb TVSS please visit <http://www.rayvoss.com>

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