



# Lehigh Hanson partners with Eaton to improve electrical workplace safety

**Location:**

Irving, Texas

**Segment:**

Cement processing

**Challenge:**

Develop and implement a comprehensive, multi-site arc flash compliance program

**Solution:**

Partner with Eaton because it is a global engineering services provider with extensive experience conducting multi-site power systems and arc flash studies

**Results:**

An enterprise-wide arc flash compliance program in line with emerging standards, reducing risk through improved electrical workplace safety

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**Background**

For Lehigh Hanson, Inc., the reliability, cost and safety of electricity and industrial power systems are critical ingredients for achieving its business goals. As one of the largest cement producers in North America, a core value of the business is a commitment to industry-leading safety standards designed to protect employees.

While electric shock hazards, including electrocution, have long been understood, arc flash has recently gained increased attention. Standards and regulatory organizations including the National Fire Protection Association (NFPA®), the Occupational Safety and Health Administration (OSHA®) and the Mine Safety and Health Administration (MSHA®), which regulates the cement industry, have developed electrical workplace safety processes and procedures to protect personnel

and equipment from this rapid energy release. The threat is real, as arc flash events can result in a violent explosion as solid copper vaporizes and expands to 67,000 times its original volume with heat energy exceeding 19,000 degrees C.

**Challenge**

Considering the importance of standards and regulations to its business, and focused on improving workplace safety across the enterprise, Lehigh Hanson wanted to ensure that its facilities incorporated the latest electrical workplace safety standards at its 14 cement plants across the United States and Canada. Cement plants utilize a continuous pyro-processing method to produce the product, and in this process environment, safety is paramount when performing energized work while the process is running. As a result, the company was committed to developing and implementing a comprehensive arc flash compliance program.

Although some facilities had completed preliminary studies and started their own site-specific arc flash implementation, others had not yet started. To ensure that all plants would employ a common

process that assured consistent results, Lehigh Hanson established a project team led by its technology center to manage the arc flash compliance program.

**Solution**

The company recognized that partnering with a global engineering services provider with extensive experience conducting multi-site power systems and arc flash studies would enable it to expedite the development and implementation of its arc flash compliance program. Additionally, Lehigh Hanson wanted to work with a service provider that was also a major electrical equipment manufacturer that offered various power systems upgrade solutions to reduce arc flash hazards.

The company chose to work with Eaton because the engineering services operation offers the global capabilities that were needed, the power systems and field engineers are MSHA certified, and the company already had extensive experience in the cement industry. Since Eaton maintains a large and experienced team of over 100 power systems engineers, located both at the



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company headquarters and also in field offices across the United States, including several that were in close proximity to the 14 cement plants where the work was to be performed, Lehigh Hanson was confident that it would have the resources needed to help achieve its goals.

Eaton's power systems engineers have skills primarily focused on system modeling and completion of engineering studies, while its field service engineers have skills focused on site commissioning and troubleshooting of electrical equipment. However, for this project, the Lehigh Hanson project team decided to utilize Eaton power systems engineers for both the site work in collecting data and also to complete the systems studies. The company's field-based power systems engineers were used for site data collection. Their experience in performing power systems studies assured the cement producer that the information needed to complete the studies was efficiently collected on the first site visit, eliminating the need for multiple return trips. A centralized power systems engineering group led by a project engineer was deployed to support the systems studies effort following the data collection phase. This group was intentionally selected to be only a few people at the same location, which assured that the study methodology used and the resulting reports would be consistent across all 14 plant sites.

After the engineering services field engineers collected circuit and equipment data at most facilities, updated electrical system diagrams were developed. As a part of the site surveys, field-based power systems engineers reviewed equipment installations to ensure compliance with code requirements and recommended improvements for increasing operational reliability. Following completion of the field work, power system studies were performed by the central group to identify the arc flash hazard at each "openable" electrical panel. The power system study also identified equipment that could be upgraded or replaced to stay current with power system changes and improvements of overcurrent protective devices. Each site study also included engineering recommendations that could be implemented to reduce the hazard. In several cases, Eaton was able to identify areas where the plants could upgrade fuses, circuit breakers and other electrical components to reduce the potential arc flash energy to a lower level.

### Results

The completed studies resulted in a specific "arc flash" label, affixed to each "openable" electrical panel, which clearly defined the required personal protective equipment to assure the worker was protected while performing energized work. Recommendations to reduce the arc flash hazard also included a host of new product technologies available

from Eaton. Protective device technologies such as the Arcflash Reduction Maintenance System™ were presented as solutions that could significantly reduce arc flash hazards.

The successful implementation of the arc flash compliance program was driven by the project team's ability to gain enterprise-wide support for the effort, followed up with the expertise and coordinated effort between Lehigh Hanson and Eaton. Additional key factors contributing to the project's success were deploying Eaton's power systems engineers who were de-centralized in data collection but centralized in systems studies, and standardizing the process across the enterprise including data collection methods, system analysis software, study results/recommendations and site safety training.

Lehigh Hanson was committed to early action in order to assure compliance with emerging

standards and this effort is only the beginning of a continuous effort to improve electrical workplace safety. Engaging with Eaton to complete this enterprise-wide project resulted in a number of unexpected benefits beyond the primary objective of improving personnel safety. One of these areas was improved knowledge of existing electrical systems by facility operations. With each plant's electrical system accurately modeled plus improved awareness and understanding, a clear path forward to identify system improvements in reducing electrical hazards and also improve operational efficiency was realized. All plant sites benefitted from the value that electrical system documentation provided, enabling effective management of plant power systems, which ultimately delivered improvements to the business' bottom line.

For detailed information about the program's development and implementation, visit *The Journey of an Enterprise in a Process Industry Toward Improved Electrical Workplace Safety*.

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