



White Paper

Short Circuit Installation Problem

White Paper: Short Circuit Installation Problem



Introduction

An electrical contractor created a short circuit during a battery installation.

In 2016, we received a call for assistance from one of our customers when their “embedded” electrical contractor installed two battery systems in a new unit at their refinery. During one of the installations, the electrical contractor inadvertently connected cell #1 to cell #60 in one of the 120-vdc battery strings.

Fortunately for the installer, there was a loose connection between cell # 39 and cell #40 further down the string. This loose connection acted as a fuse for the short. Unfortunately, this did result in the disintegration of the connector nut and bolt hardware, turning the parts into shrapnel.

No one was injured during the event but five of the cells were damaged requiring replacement to get the string in service.

During the initial call, the customer asked us to assess the battery damage and to get their system back in service as soon as possible.

Actions We Performed

- Our technical service manager was on-site the day after we received the call to evaluate the damage and to develop a plan of action to get their system up and running as soon as possible
- Damaged cells were identified and removed from the damaged string
- Using identical cells from the second string on-site, we were able to build a fully functional 120-volt battery for the customer’s new unit allowing them to bring the new system on-line as scheduled
- A capacity test was performed on the battery to ensure that it would support the connected load
- Replacement cells were ordered
- When the cells were received, we returned to the site to reconfigure both battery strings
- A final acceptance test was performed on both
- Both battery strings passed and were placed in service



What the Contractors Did Wrong

- The battery was positioned on the rack with cell #1 setting adjacent to cell #60. The first and last cell of a string are normally separated by the length of the rack or placed on different rows of the rack
- The installer either was not paying attention to what they were doing or had no training on how to build a battery system when they completed the loop by connecting cell #1 and cell #60

Conclusion

The electrical contractors were reputable, highly qualified AC contractors with years of experience in installing AC circuits in industrial environments. The problems occurred because they had limited experience and no specialized training in working with battery systems.