

Electrical Equipment in Hazardous Areas

One hundred years ago, on Oct. 14, 1913, the Senghenydd Colliery in Glamorgan, South Wales, exploded, resulting in 439 fatalities. This was the worst coal mine disaster in the history of the U.K. The incident is believed to have been started by methane gas (firedamp) ignited by electric sparks from equipment, possibly an electric bell signal. The gas explosion disturbed coal dust in the mine, creating a coal dust cloud that ignited. The dust explosion raised still more coal dust and the explosions continued to propagate.

The Senghenydd explosion was one of the events that led to a recognition of the potential hazard of sparks from electrical equipment igniting a flammable vapor, dust, or mist cloud. One protective approach is the use of intrinsically safe equipment. This is defined as “equipment and wiring which is incapable of releasing sufficient electrical or thermal energy under normal or abnormal conditions to cause ignition of a specific hazardous atmospheric mixture in its most easily ignited concentration.” This is accomplished by specific design of the electrical equipment – for example, by limiting the amount of power available to electrical equipment in a hazardous area to a level below that which would ignite the fuel mixture.

While a thorough discussion of electrical safety in a hazardous area is beyond the scope of the Beacon, there are some important things that you can do to maintain the integrity of electrical equipment in areas that are classified as hazardous.



▲ Monument to the victims of the Senghenydd disaster.

What Can You Do?

- Understand the hazardous areas and electrical classification in your plant. If you have not seen electrical classification drawings for your area, ask for these, and make sure that they are up to date.
- Invite your plant’s electrical classification experts to give a safety meeting describing the hazardous areas in your plant. Ask them how to recognize electrical safety issues and problems that you might observe as you work.
- Focus one of your routine plant-safety inspections on electrical safety. For example, look for damaged wiring or electrical connections, damaged electrical boxes, problems with gaskets and seals, inadequate air purge for an enclosure, and missing bolts on electrical enclosures.
- Be careful when taking any electric equipment into a hazardous area, or when authorizing permits to work. Some examples: anything with an electric motor or battery, such as portable pumps, portable instruments, flashlights, communications devices, and motor vehicles (including fork trucks, lift trucks, etc.). Ask about anything that must be plugged in or that needs a battery. Be certain that all equipment is acceptable for use in the specific hazardous area where you intend to use it. If you are not sure, get help from an expert who knows.
- Make sure that electrical safety in hazardous areas is addressed in management-of-change (MOC) reviews.

Understand electrical safety in your plant!

AIChE © 2013. All rights reserved. Reproduction for non-commercial, educational purposes is encouraged. However, reproduction for the purpose of resale by anyone other than CCPS is strictly prohibited. Contact us at ccps_beacon@aiche.org or 646-495-1371.

The Beacon is usually available in Afrikaans, Arabic, Chinese, Czech, Danish, Dutch, English, French, German, Greek, Gujarati, Hebrew, Hindi, Hungarian, Italian, Japanese, Korean, Malay, Marathi, Norwegian, Persian, Polish, Portuguese, Romanian, Russian, Spanish, Swedish, Telugu, Thai, Turkish, and Vietnamese.

Circle 103 on p. 95 for a free electronic subscription to the Beacon.