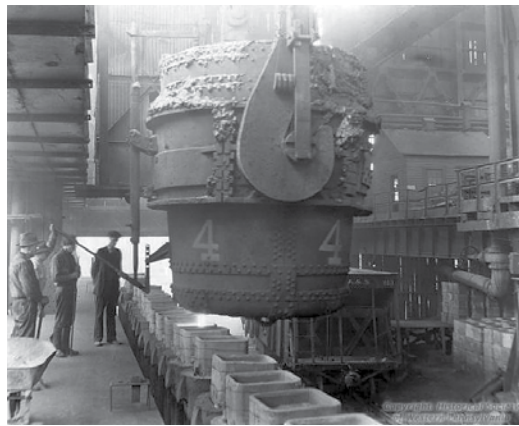


Static Electricity

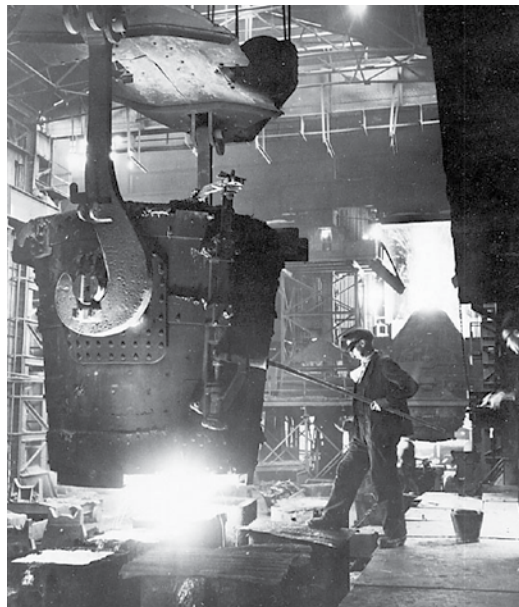
By Ted W. Sofis

Those of us who have been involved in the installation of dry-process shotcrete have at some point experienced problems with static electricity. My first experience with static electricity came while gunning teeming ladles at J&L Steel in Aliquippa, PA.

The brick lining of the ladles would be glowing red as they were put into position to be hot gunned. Hot gunning is a term used in the steel industry for gunning refractory onto glowing hot surfaces



A steel industry teeming ladle pouring steel in ingot molds. The teeming ladles were lined with refractory brick and often hot gunned in between heats, with thin layers of gunned refractory



Another teeming ladle pouring molten steel into ingot molds

in vessels, soaking pits, and ladles. With hot gunning, thin layers of refractory are shot onto the hot surface where it dries on contact. Because of the intense heat of the glowing ladle brick, we would often add a metal or plastic pipe to lengthen and extend the nozzle. Unfortunately, the extending nozzle pipe was not grounded to the gun and the gunning hose. Here is where it gets ugly. While we were gunning a ladle, there was a crackle and a 3 ft (0.9 m) long blue lightning bolt of electricity instantaneously appeared. It electrically (and probably mentally) shocked the nozzleman, who dropped the nozzle like a hot potato. Yes, we had inadvertently discovered the Taser! I immediately shut off the gun and, fortunately, no one was hurt—at least not seriously. I had heard about static electricity with gunning; but until you experience it, you have no idea how powerful it can be.

So when gunning, always make sure you are using static-grounded hose. Everything from the gun to the nozzle should be grounded. Whenever possible, with kiln-dried materials such as refractory gunning mixtures or prepackaged shotcrete materials, consider predampening. Whenever you need to add a pipe or extension to the end of your nozzle to get closer to the gunning surface, make absolutely sure that it is grounded. If possible, it's always safer to stay with conventional manufactured nozzles. The equipment, hoses, and nozzles that are manufactured and marketed for shotcrete have a proven track record; it's better to be safe than sorry.

Over the years, our shotcrete crews have always preferred using the black tube sandblast hose for gunning. It's a stiffer static-grounded gunite hose that does not kink as easily as softer hoses. Whatever hose your crews like to use, whether it is the soft gum rubber refractory hose or the stiffer black tube, it's important to make sure that it is a static-conducting hose. No one on the nozzle needs the surprise shock of a 3 ft (0.9 m) long lightning bolt of static electricity. Let's leave the Taser gun to law enforcement and keep it as far away from construction as possible.

Like all other elements of construction safety, common sense is an important ingredient. So in addition to making sure that gunning hoses are grounded, take an extra 5 minutes to look over everything before you start working. Make sure that everyone on the job wears the proper personal

Safety Shooter

protective equipment, the air lines have safety pins, whip checks are in place, and all other safety procedures are followed.



The use of a static-dissipating gunning hose is recommended in gunning operations and should alleviate many of the problems with static electricity. Pictured is black tube, white stripe refractory hose with dual copper static wire

Photo courtesy Tom Norman, Airplaco Equipment Co.



Ted W. Sofis and his brother, William J. Sofis Jr., are the Principal Owners of Sofis Company, Inc. After graduating from Muskingum College, New Concord, OH, with a BA in 1975, Ted began working full time as a shotcrete nozzleman and operator servicing the steel industry. He began managing Sofis Company, Inc., in 1984 and has over 34 years of experience in the shotcrete industry. He is the Treasurer for ASA, Chair of the ASA Publications Committee, and a member of multiple ASA committees. Over the years, Sofis Company, Inc., has been involved in bridge, dam, and slope projects using shotcrete and refractory installations in power plants and steel mills. Sofis Company, Inc., is a member of the Pittsburgh Section of the American Society of Highway Engineers (ASHE) and ASA.