

A *Shotcrete* feature:

# SAFETY SHOOTER

## Third-Rail Safety

By Ray Schallom III

**T**here are a few things you should be aware of when working around the third rail of an electric-powered passenger train. Third rails are generally found in underground portions of the rail line, including subway tunnels and platform stations. When the trains are running above ground, they are commonly connected to electric lines supported by poles above the tracks.

This article only discusses electrified third-rail systems. Every year, we hear about someone getting badly injured or killed when they touch or come in contact with a third rail. The voltage running through the third rail is over 600 volts and is designed for powering the passenger rail cars as they come in contact with it. Cities that have the metro rail service as part of their major transportation system usually depend on electricity to run them. Electricity is a cleaner energy (no pollution) and is safer underground.

The energized third rail has a protective cover over it to keep anyone from directly coming in contact with it. Metro rail cars have two electrical power boxes mounted to the underside and at each end of the passenger car. A flat contact plate is folded down when the train car is in service so that as it comes in contact with the third rail, it will be energized. Power is conducted through these plates to complete the electrical circuit and power the rail car.

When the rail cars are energized, the electricity has a tendency to flow down through the metal wheels, which ride on the steel rails. It's never a problem when both tracks have live traffic running on them at the same time. When the power on one set of tracks is turned off, but the tracks are connected

to each other at crossovers, however, this creates a potential problem because electricity travels through connected metal.

Contractors performing work for the Transit Authority (TA) operating the train system in major metropolitan areas are required to send their employees to a safety orientation class conducted by TA field personnel. Depending on the nature of the work, the safety orientation can range from an all-day 8-hour session to an all-week 40-hour session. The safety orientation sessions stress the proper lockout procedures required when turning off sections of the electrical grid that energizes the third rail. This is usually done by a licensed electrician or TA electrician on a daily basis. TA instructors highlight the tools commonly used in rail construction that can conduct electricity when coming in contact with an energized third rail.

During these safety orientation sessions, workers are shown clothing and pictures of victims who contacted an energized third rail. Workers usually ground themselves by touching the third rail and the rail closest to it. It always seems to come down to the injured worker trying to finish up a project and thinking they can complete it without having to go through the steps in tagging out the electrical circuit (procedures for turning off the power and placing a lockout system on the switch to prevent someone from flipping the switch).

After the safety training has been completed, each attendee is given a hard-hat safety sticker by the TA, showing the rail staff that the worker has attended the safety orientation. These stickers are good for a year, which means that a refresher session is required for each additional year working on a particular



*The third rail is located about a foot up from the bottom in this picture*



*Note the horizontal wire at the bottom of this picture—this is the ground wire for one set of tracks. A similar wire was installed for the other set of tracks*

transit system. Any worker who does not have that hard-hat safety sticker will not be granted access into the rail work site by any TA personnel. Since 9/11, Homeland Security has been cracking down on security and safety plans by all contractors working on the metro rail systems across the country. No work is conducted until all safety and security plans have been submitted and approved by the TA.

When work begins, the TA representative will go with the contractor to lock out the third-rail power for the shift. Both the TA representative and the contractor will usually put their locks on the rail with the date. This lets other crews know that the power is off and that there is a crew working near or over the third rail. The TA representative verifies that the power is off.

Most of the work is performed on a work train to help prevent construction debris from landing in the ballast rock adjacent to the rails. What most contractors do not realize is that residual electricity can run through the crossover from live tracks outside the lockout area and back down to the work area. The residual electricity will then travel through the metal wheels sitting on the rails up into the cars of the work train. Speaking from experience, you must set up a ground wire system throughout the work area that connects to the cars on the work train. Grounding the cars will prevent the residual electricity from flowing through them. If you do not ground the metal rail cars, any conducting metal you come in contact with (such as wire

mesh, lattice girders, or existing reinforcing bar in the structure) will complete the circuit and create an arc.

## In Conclusion

Every worker is responsible for his or her own safety. You have to stay alert to all potential hazards from the beginning to the end of the shift. When working on live tracks to pick up debris or clean up overspray that landed on the rails, be sure to stay well clear of the third rail. If you have to dust off the cover of the third rail, make sure you are not touching one of the rails (if you do, you will ground yourself and the electrical surge can lead to injury or death). Make sure you look both ways when walking close to the live tracks. Also be aware that the suction wind created by a train passing the work area can pull someone into the path of the train. The safety training session will take you down in the subway so you can experience first-hand the wind generated by a live train passing.

Often in construction, we learn from our mistakes. In this case, when dealing with live trains, third rails, and electricity, even the first mistake can kill. Pay attention when you go through your mandatory TA safety training—what they teach you will help keep you safe and alive. Don't take for granted that it won't happen to you; make sure it doesn't by staying alert and practicing the safe procedures this hazardous work requires.



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