U.S. Manufacturers Driving Public Transportation—Trolley to Light Rail

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In the late 1970s, electrified urban trains—a nearly exclusive method of transportation in the early twentieth century—had nearly disappeared with widespread adoption of private transportation and automobiles. While most saw the trolley industry declining, Service Wire saw an opportunity.

Adoption of automobiles and public buses brought traffic congestion and suburban migration, resulting in pollution and decline of city centers. Yet, expanding urban-suburban metropolitan areas led cities across North America to look for transportation alternatives. As cities looked for solutions, advances in electric rail technology, cost, and comfort were made, and new "light rail" proved attractive. Light rail was an ideal solution to sprawling cities, reducing bus traffic on crowded roads and connecting into existing urban bus systems.

Meanwhile, the use of trolley wire in the mining industry prompted Service Wire to purchase the Perth Amboy, New Jersey, division of General Cable in 1979. While initially acquired to serve Appalachia's growing coalmining sector, Service Wire's manufacturing efforts expanded to accommodate the emerging return of light rail.

Marshall Yokelson, a recognized member of the wire and cable industry and recipient of the 1985 ASTM Award of Merit, refined the unique shapes of contact wire (Figure 1). Through this effort of detailed shape definition, he helped bridge the gap from old "trolley" wire to new "light rail" contact wire.

Over the years, Service Wire has become a premier manufacturer of contact and messenger wire in the U.S.,

supplying wire for nearly every light rail system in North America today. As the world looks to the future of light rail and the evolution of high-speed rail, manufacturing advances have ensured Service Wire is ready to meet the demand.

Contact wire is primarily made up of copper because of its excellent conductivity and proven resistance in standard environmental conditions and speeds. Applications subjected to stressful environments have traditionally used bronze (copper-cadmium) alloys for their increased breaking strength. The current worldwide interest in high-speed rail also places demands on contact wire. As a result of alloy availability and higher performance requirements, there is a growing need for alternative materials such as copper-tin, copper-magnesium, and copper-silver.

Most U.S. light rail systems run at speeds of less than 70 mph. High-speed rail systems have attained speeds in excess of 200 mph. At these speeds, higher tensions are required to avoid wave propagation from the conducting pantograph. Efforts to share right of ways with roadways are limited by the wider turning radii of trains at these speeds.

The Obama administration has placed substantial focus on building a high-speed rail network. Transportation Secretary Ray LaHood has asserted that this initiative is as transformational as the interstate highway system and the transcontinental railroad in earlier eras. While the development of the U.S. transportation sector is still hotly discussed, U.S. manufacturers like Service Wire are developing wire and cable technology to meet these needs.

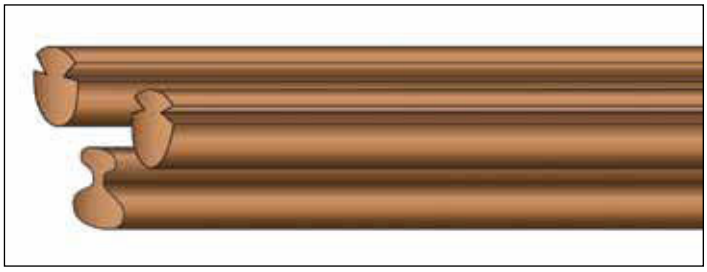

Figure 1. Three types of contact wire (from top left) are described "Grooved," "Figure 9," and "Figure 8." Illustration courtesy of Service Wire Co.

Mr. Weisberg chairs the NEMA Power and Control Cable Section and is in charge of production, information technology, and process improvements at Service Wire. Mr. Perry is a member of NEMA 7WC-1 Building Wire & Cable Technical Committee, IEEE Overhead Catenary Systems Committee, and ASTM B01 Electrical Conductors. Ms. Brown has a BFA in Graphic Design.

› ITS Transportation Trivia

- LED traffic signal heads only use 10 percent as much energy as incandescent signal heads.
- You can find, reserve, and pay for parking with your smart phone.
- There are GPS systems available that monitor traffic and provide alternate routes.
- Traffic signals can be activated by your vehicle by use of in-pavement loop detectors, video cameras, or radar detection devices.
- Google autonomous cars successfully completed a "1,000-miles challenge," in which they drove through a complex route including city streets and fast highways without human intervention.
- Sitting in traffic affects your life—the average American commuter wastes nearly $750 each year sitting in traffic, based on wasted time and fuel.
- The first traffic-actuated signal, developed and installed in 1928, was activated by the honk of a car horn.
- Word-oriented pavement signage, such as "STOP," were introduced during World War I as a result of blackout conditions that made street signs nearly invisible.
- Traffic congestion measures have been in use as early as the first century BCE. Julius Caesar banned wheeled traffic, carts, and wagons from Rome during the day to minimize traffic congestion and increase safety.
- Pike Research estimates that global investment in smart transportation systems will total $13.1 billion between 2011 and 2017.