Railroad Signal Systems Fundamentals

An Online Continuing Education Course for Engineers

Course Number: T-5011

Credit: 5 Hours / 5 PDH / 5 CPD

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Contents

1 LEARNING OBJECTIVES

This course teaches the following specific knowledge and skills:

- Safety rules and work traditions required for visiting a railroad
- Railroad associations and regulating agencies that affect their interaction with other industries
- Basic railroad jargon necessary for communication with signal engineers
- Working knowledge of railroad track and equipment components
- Introduction to the general operation of railroads and the role of signals in it
- Basics of several methods of using electric circuits on the rails for train detection
- Fundamentals of railroad wayside signal design and operation
- Rudiments of railroad highway crossing train detection devices
- Introduction to the effect of electromagnetic interference on train detection equipment

2 PURPOSE OF THIS COURSE

This course is designed to provide the basics of railroad signaling such as train detection and track circuit operation for those who don't always work in this area but could use the knowledge to do their jobs better and avoid expensive signal problems or conflicts during planning and construction.

Engineers at utilities that construct power lines or substations near railroad facilities should have a basic knowledge of railroad signal systems, their importance to the transportation industry, and their vulnerability to powerline interference. This course was written with the power engineer in mind. However, anyone working in the railroad industry, from track maintenance to operating department executives should also have at least a basic knowledge of how such a vital component of their business operates.

Even though Railroads are an essential backbone to our economy, very few outside the signal industry understand the intricate signal systems that protect and facilitate movement of trains and warn the public of approaching trains at highway crossings. Few university or trade school courses cover railroad signal design or even basics. The railroads, themselves, have some schools that provide training in maintenance and basic equipment and system testing for their own workers, but even they do not provide a good overview of railroad signal systems.

Although railroad signal engineers are exempt from Professional Licensing Requirements, there arise many instances involving government authorities or private industry where a PE seal is required on signal plans. Since PE's with railroad signal knowledge are rare, engineers with questionable qualifications end up sealing plans. As in any professional discipline, it is a requirement that the Engineer be knowledgeable in all areas on which he places his seal. Sealing plans without knowledge of their purpose or operation can result in loss of license and other penalties. This course will provide a foundation for building that knowledge.

Knowledgeable people in the signal industry are rapidly disappearing. Most of the consultants in this field are at or above retirement age. Many are trying to pass on their knowledge to a new generation, but it seems the railroads are being very short- sighted. Dozens of contracting companies throughout the U.S. now do most of the signal work. It is they, rather than the railroads, who are desperately seeking knowledgeable engineers. They are willing to pay a high price for a little training. However, to assure meeting their best interests, railroads need at least a few engineers with some signal knowledge who can oversee contractors and spot areas that might cause signal difficulties.