FRAUSCHER

Track more with less.

Application Solution

Track Circuits vs. Axle Counters

Reliable, fail-safe train detection serves as the foundation for railroad signaling. In 1872, Dr. William Robinson developed the first track circuit to detect train occupancy. For over 140 years, track circuits have been providing train detection, utilizing a technology that is virtually unchanged from what Dr. Robinson developed. Axle counters have been used for decades in Europe and other parts of the world, offering an alternative technology for a variety of applications and conditions where track circuits could become unreliable, impractical, or too expensive to maintain.

Drawbacks of AC / DC track circuits

- Sensitive to deteriorated ballast conditions and rusty rails
- Can be impacted by power fluctuations
- Reliability can decrease due to many unavoidable factors such as road salting, flooding, snow, debris, rusty rails, and other track and environmental conditions
- Trains or vehicles with different shunting characteristics can be missed, and track vacancy incorrectly indicated
- Require a high level of electrical power and advanced power supply equipment that requires frequent maintenance
- Installation is often complicated, time consuming and requires insulated rail joints that can be expensive to maintain
- Track circuits have limited block size

Improvements needed

- Train detection that will perform reliably in all environmental and deteriorated track/ballast conditions
- The ability to be used in areas not conducive to track circuits, such as steel structures (bridges, elevated tracks) and embedded rail
- Low power requirement, infrequent required maintenance, and low life cycle costs
- Quick, simple installation without drilling of rail
- Long block lengths
- High uptime, reliability and improved safety
- A system that can be seamlessly integrated with existing infrastructure, as a stand alone or in tandem

	Axle Counters	Track Circuits
Functional Scope	Track vacancy detection, direction, speed, number of axles	Track vacancy detection, rail breaks, cab signaling
Compatible with electric traction	Yes	Special measures required depending on traction and rail type
Track section length	Theoretically unlimited, depending on network structure	2 miles maximum
Rail break detection	No	Some breaks, if clean
Reset required after error	Yes – remote & local reset options available	Not required
Can monitor complex switches & crossovers	Yes, without restriction	Yes, with complex designs required
Maximum speed	280 mph	155 mph
Sensitive to environmental conditions (heat, snow, water, road salt, rust, debris, etc.)	Virtually immune to these conditions, (potentially affected by metallic debris)	Can be significantly impacted by any of these conditions
Installation requirements	After installation training, 5 minutes for each sensor using Frauscher rail claw	Drilling of rail required as well as installation of insulated rail joints
Maintenance requirements	Low – remote calibration and diagnostics reduce need for regular maintenance	Frequent and regular maintenance schedule required
Track maintenance precautions	Sensors can be easily removed, repositioned and placed back on track	Wiring prevents easy removal from rail; can be damaged during track maintenance
Train passage frequency required	Once in 2 years	Every few days to prevent rusty rails which would decrease electric conductivity between the wheel and the rail
Installation costs	Low	High
Life cycle maintenance costs	Low	High

Solution

Frauscher Advanced Counter FAdC is a vital, SIL 4 fail-safe axle counter with flexible design capabilities that can detect trains up to 280 mph, configured with hardware (relay) or software (Ethernet) based interfaces. The FAdC is easily integrated with existing infrastructure. It can replace or act as an overlay system to existing track circuits. The Frauscher Advanced Counter FAdCi is also available, a vital SIL 3 axle counter that detects trains from zero speed to 50 mph. The advantages of axle counters over track circuits are significant, including quick and easy installation, low maintenance (both time and cost), low life cycle costs, high uptime, low power requirements, and overall reliability in extreme weather and environmental conditions. In addition, axle counters are indicated in locations where track circuits cannot be used, such as steel structures or embedded track. The long track section lengths that are possible with axle counters make them an ideal choice for dark territory applications. Axle counters can also be used as an overlay for track vacancy detection in mass transit systems, and CBTC Fallback. Trackside equipment can be triggered using wheel sensors to provide direction of travel and accurate position. Frauscher has implemented the FAdC in Class 1 yards, where track occupation and capacity can be easily determined. It is also effective for grade crossings, switch point protection and yard automation, offering high availability and increased uptime from track circuit only systems.

Equipment

- Frauscher Advanced Counter FAdC SIL 4
- Frauscher Advanced Counter FAdCi SIL 3
- Wheel Sensor RSR180 (for vital applications)
- Wheel Sensor RSR110 (for non-vital applications)

Further Information

Find more detailed information on Application Solutions such as Switch Point Protection & Yard Automation, Grade Crossing Control Systems, HBD, Crossover Protection and CBTC Fallback at: www.frauscher.us

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