



# Vital Transit Rail Applications with Axle Counters

June 2020



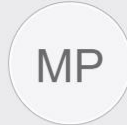
# Vital Transit Rail Applications with Axle Counters

June 2020

Audio Settings

Chat Box

Q&A Box



Michael Parzer

Participants

Search

Panelists (4)

AJ Ashish Jain  
Host

MP Michael Parzer

HG hal gordon

LF laura falcon

Attendee

Your name

# Today's Presenters



**Hal Gordon**  
Senior Sales Engineer



**Ashish Jain**  
Engineering Manager

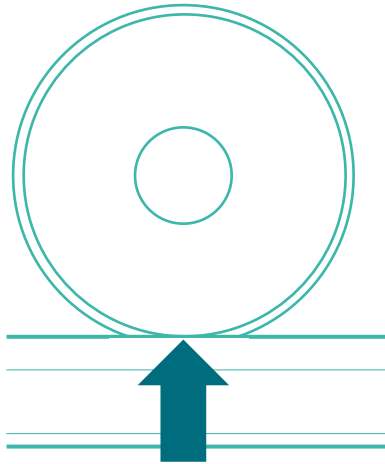
**Frauscher Sensor Technology USA**  
Princeton, NJ

# OVERVIEW

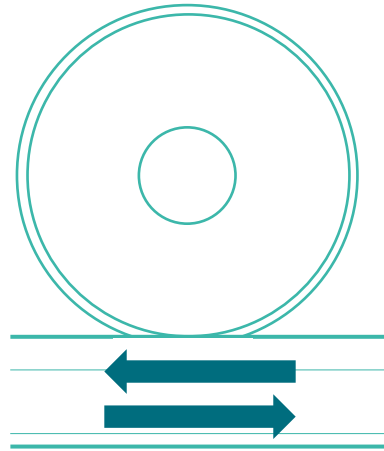
- What is Axle Counting?
- Why Axle Counters?
- Vital Applications with Axle Counters
  - Primary Signaling
  - Secondary Detection for CBTC
  - Grade Crossings
  - Traffic Light Preemption
  - Yard Automation
  - Switch and Crossover Protection
  - Red Signal Overrun Detection
  - Speed Enforcement
- Considerations for Use of Axle Counters

# What is Axle Counting?

Vital functions of an axle counting system



**Train axle location**



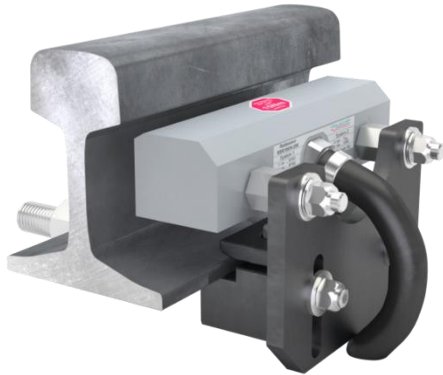
**Direction of travel**



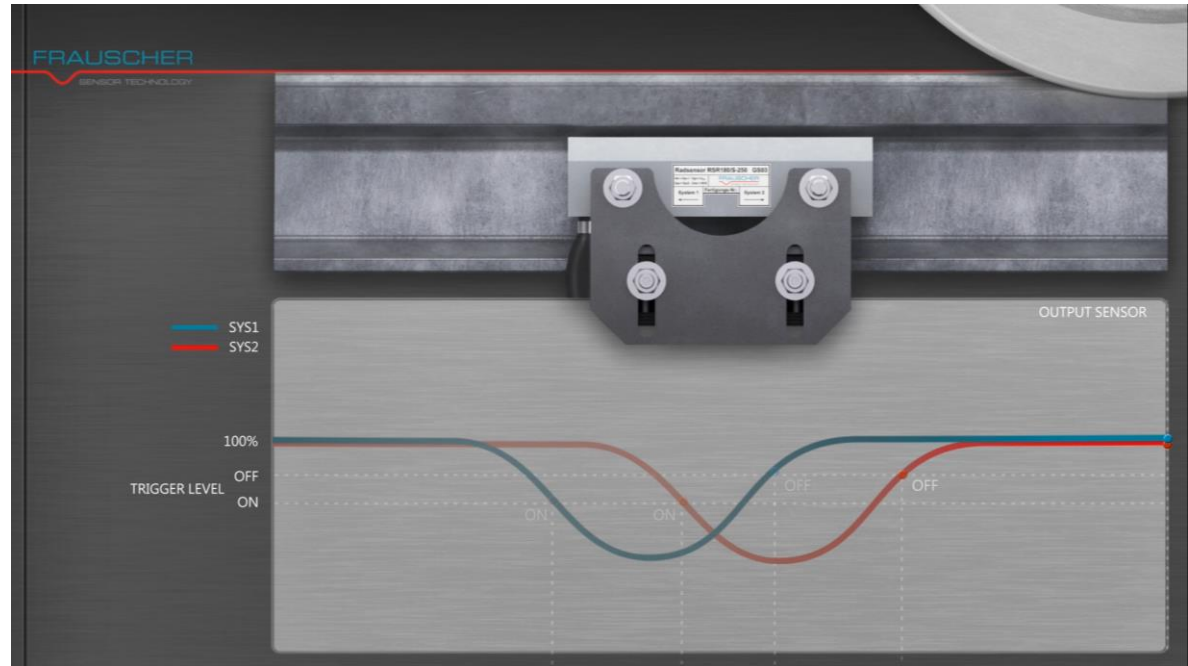
**Track vacancy detection**

# Principles of Axle Counting

Operation of the inductive wheel sensor



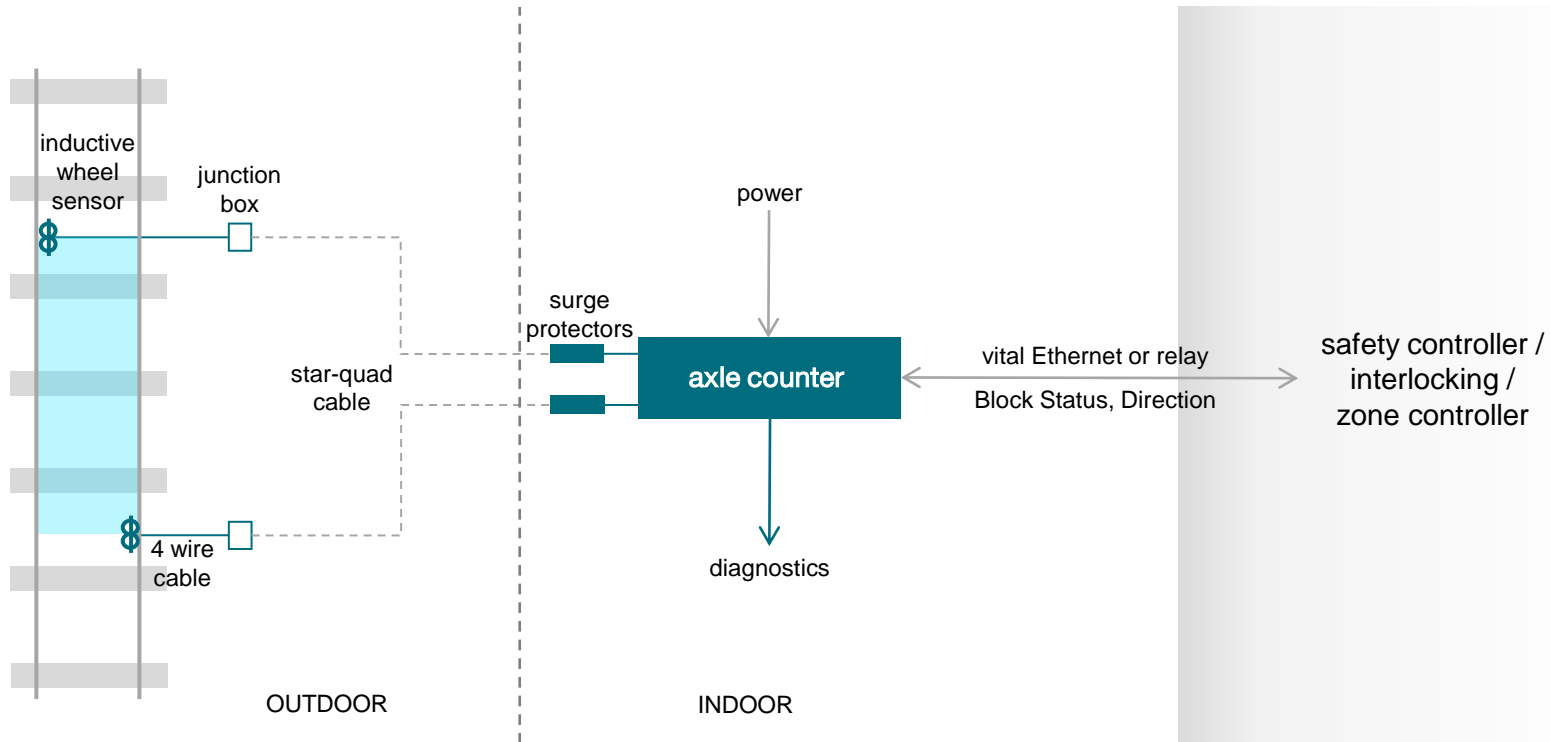
- No drilling of rail
- Detects axle location
- Detects travel direction
- Works for 0 - 280 mph



[Watch on YouTube](#)

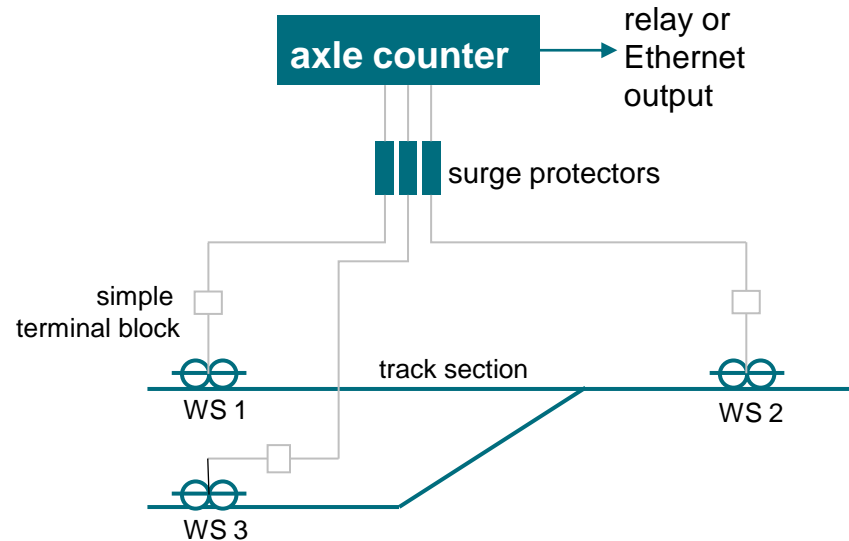
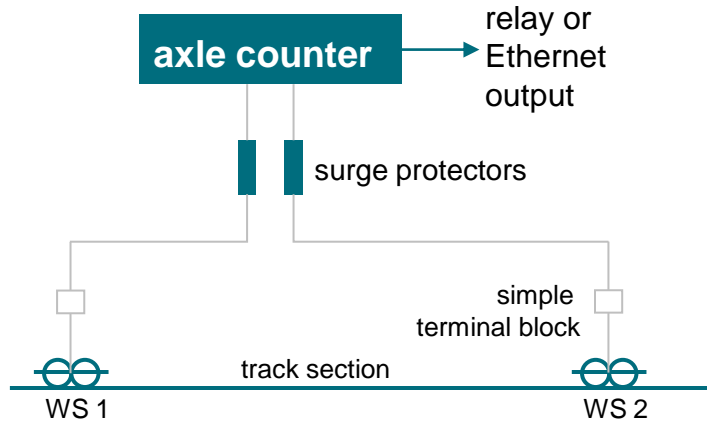
# Components of Axle Counters

Track-mounted wheel sensors and indoor electronics



# Working Principle of Axle Counters

Track vacancy detection using 'check-in check-out' logic

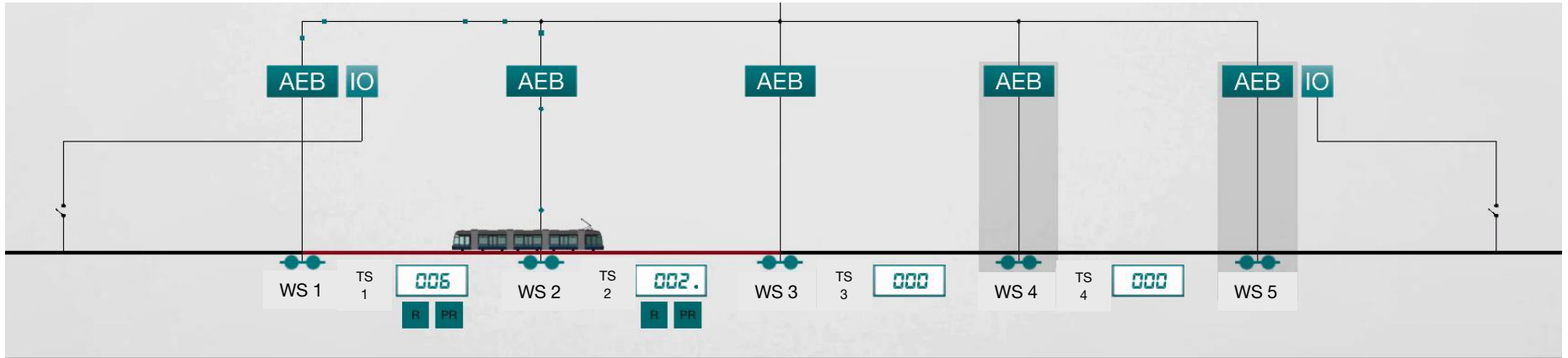


Works with any train direction and movement, including at a full stop



# Working Principle of Axle Counters

Simple detection example



[Watch on YouTube](#)

# Smart Self-Checks and Fault Mitigation

Advanced features to handle failure modes



Wheel sensor monitoring

Can detect sensor removal, damage, and wiring faults

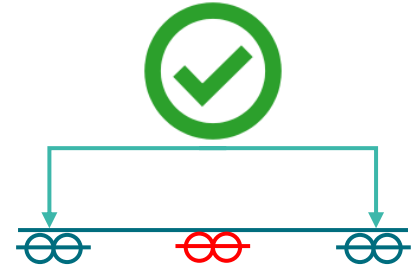
Fail-safe behavior



Suppression of false activations

Can suppress false activations due to foreign metal objects

Also suitable for embedded rail

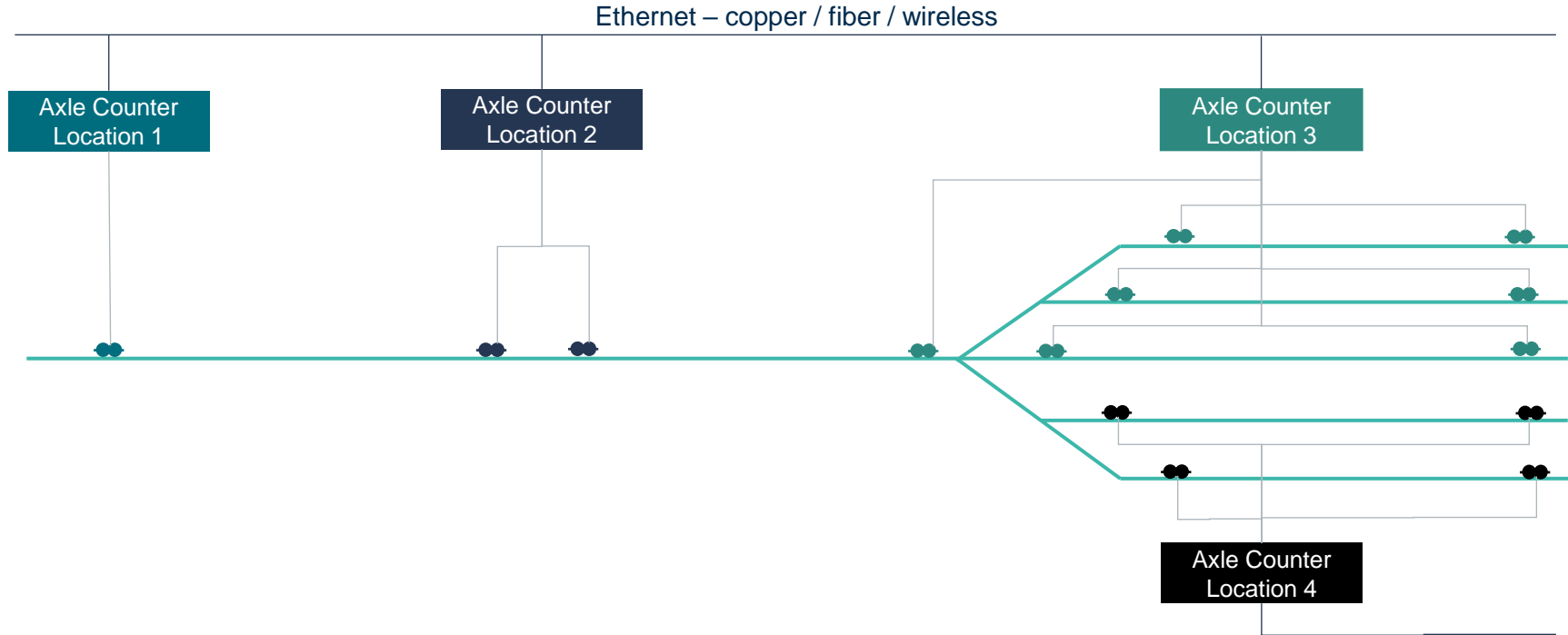


Axle miscount correction

Can self-correct in case of miscounted axles by comparing counts between alternating wheel sensors

# Flexible Architecture

Many choices for equipment placement and configuration



# Why Axle Counters?

Increase safety, reliability, and savings

## Increase safety

- Immune to 'shunting issues'
- Immune to snow, salt, water, leaves, etc.
- Works with rusty rails and wet ballast

## Reduce cost

- Quick 'one-nut' installation
- No on-track joints, bonds, transformers, or filters
- Two-year preventative maintenance cycle

## Improve performance

- No 'loss of shunt' timer required
- Remote diagnostics and troubleshooting
- Vital relay and Ethernet interfaces

## Highly adaptable

- Overlay existing systems
- Works with steel structures and ties
- AC / DC traction compatible

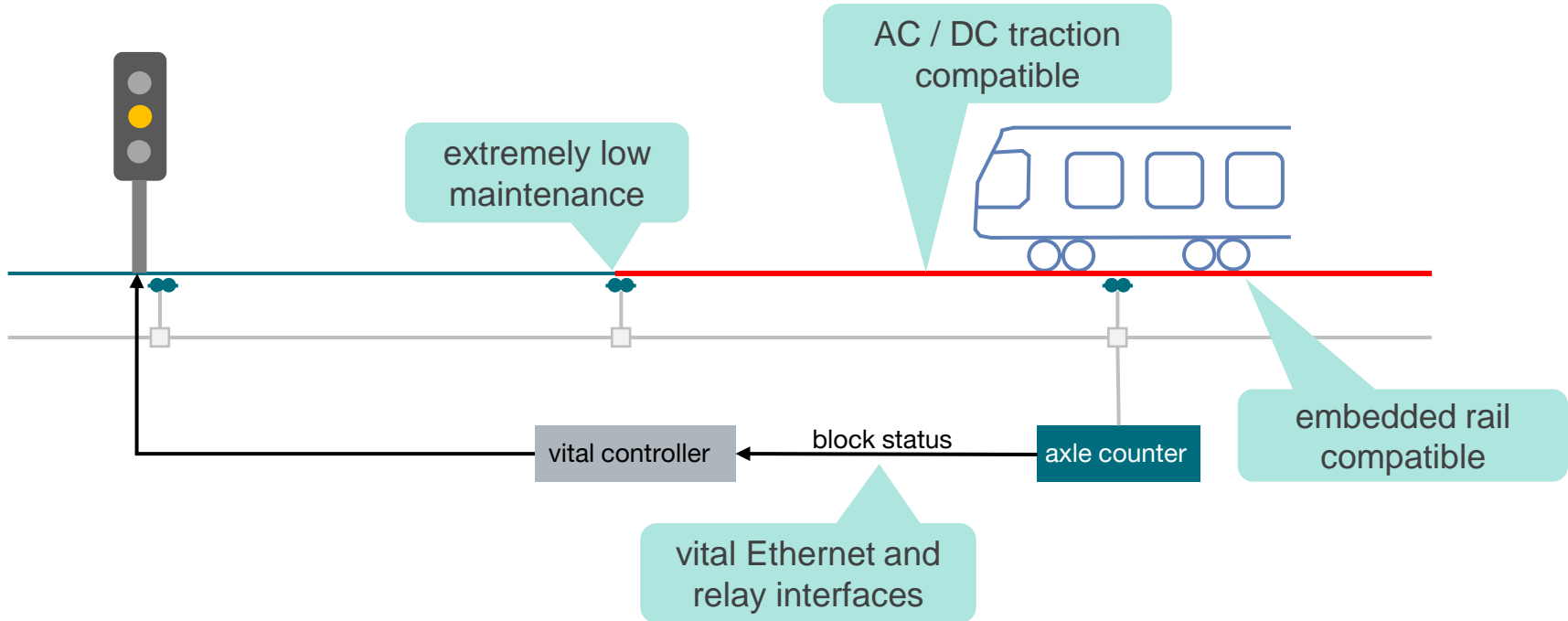
# Axle Counters Work in Adverse Conditions



# Examples of Vital Applications

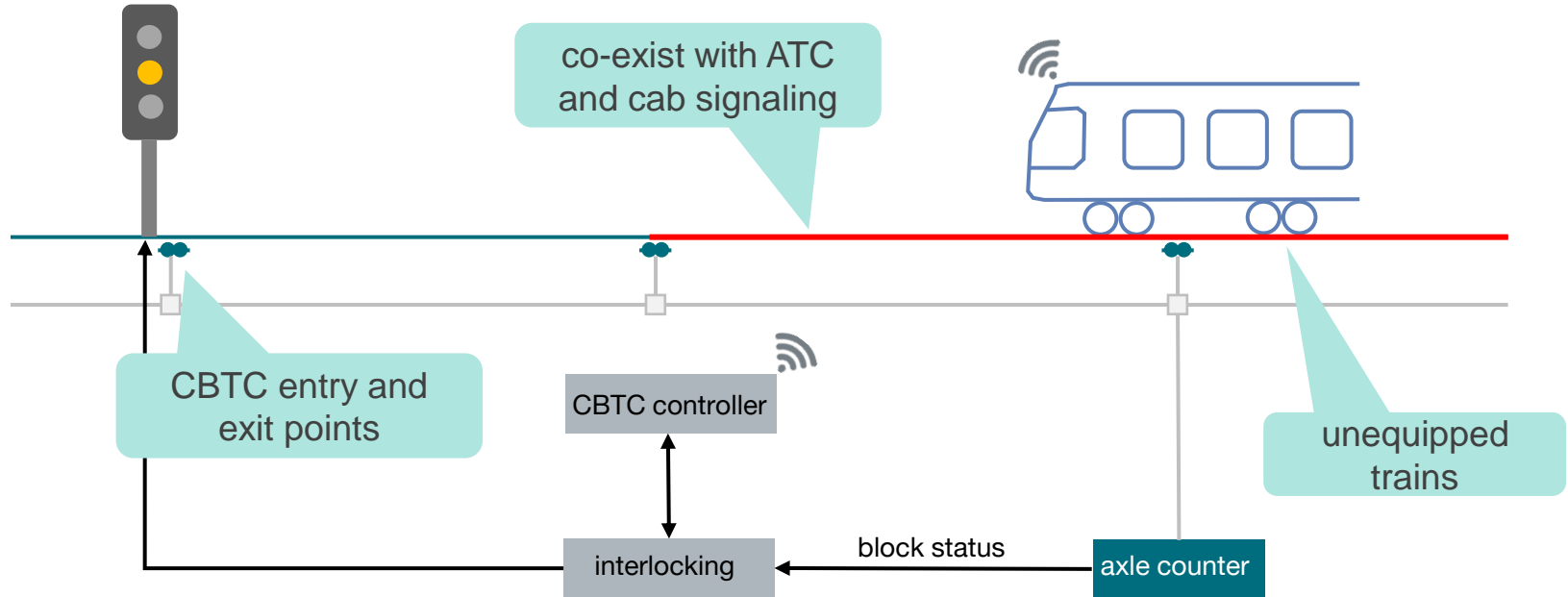
# Primary Track Vacancy Detection for Signaling

Easy integration, installation, and maintenance



# Secondary Detection for CBTC Systems

Easy integration, installation, and maintenance

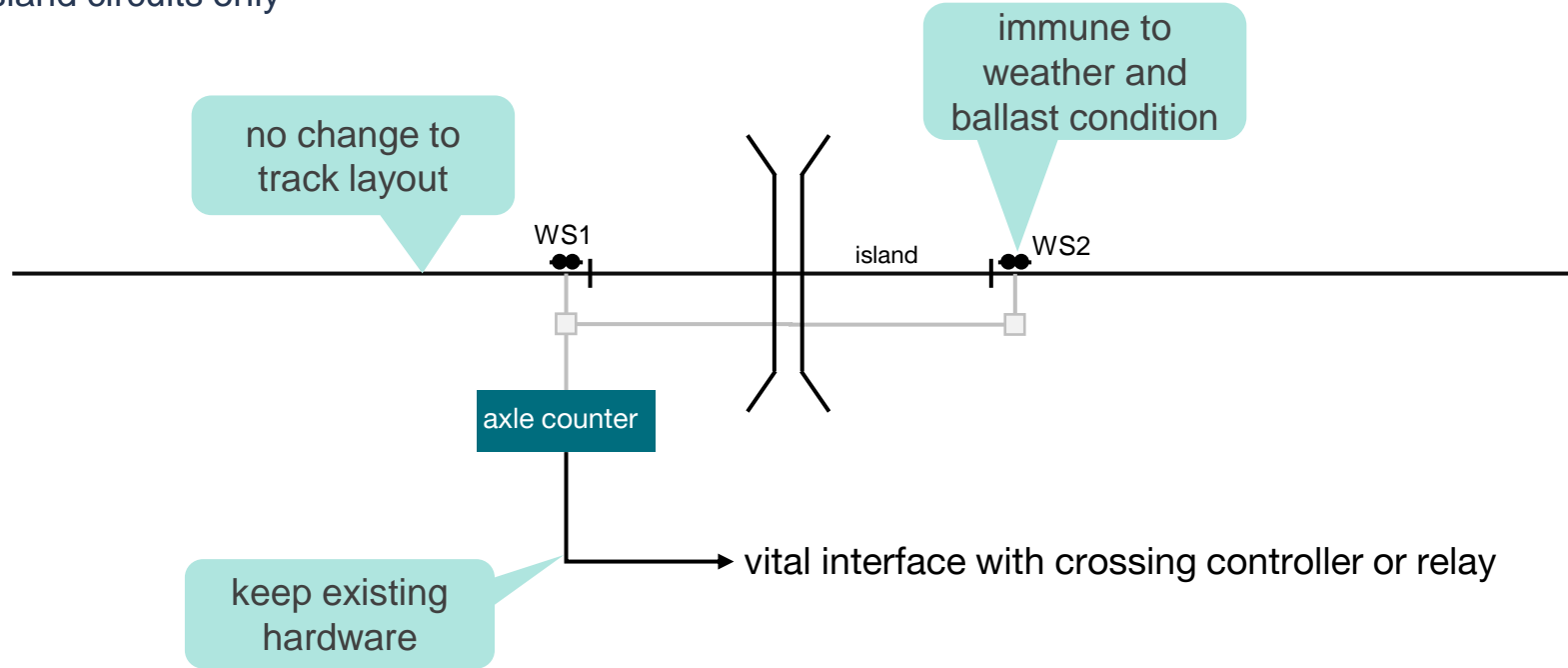




# Axle Counter Based Grade Crossings

Can overlay existing island circuit

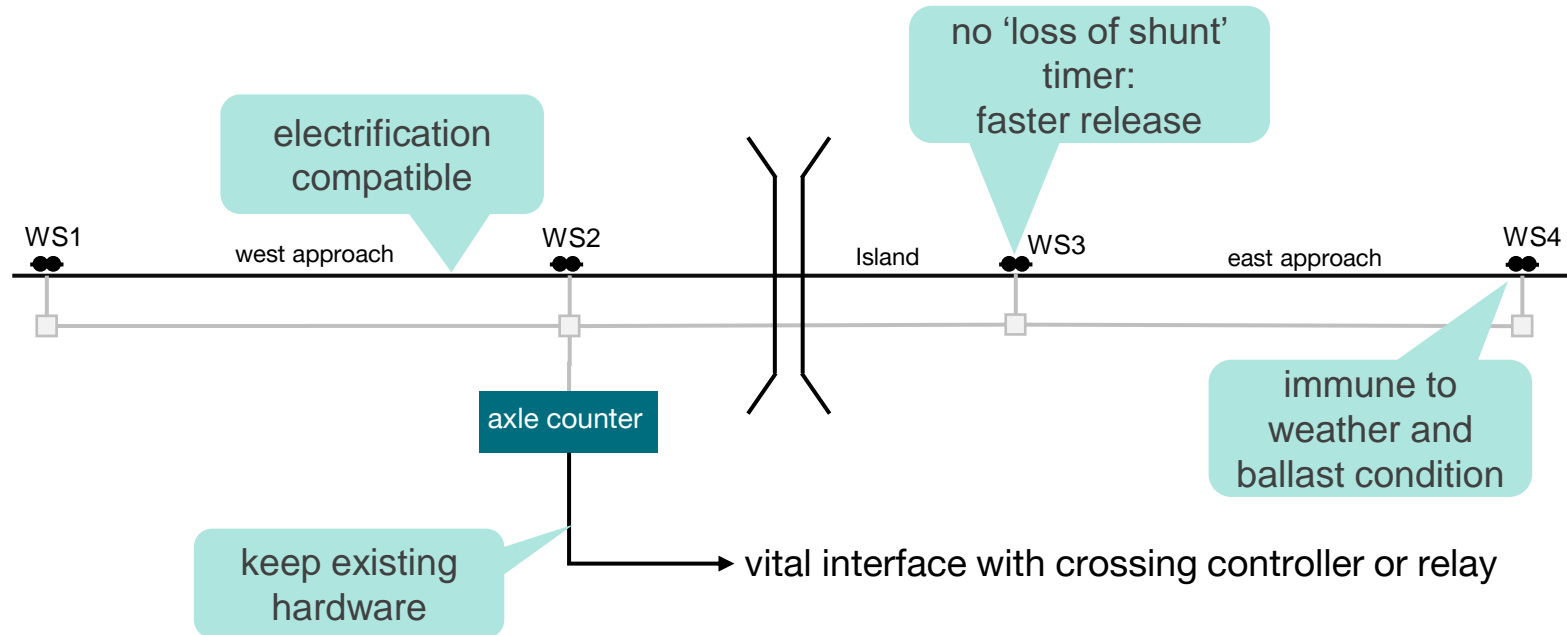
- Island circuits only



# Axle Counter Based Grade Crossings

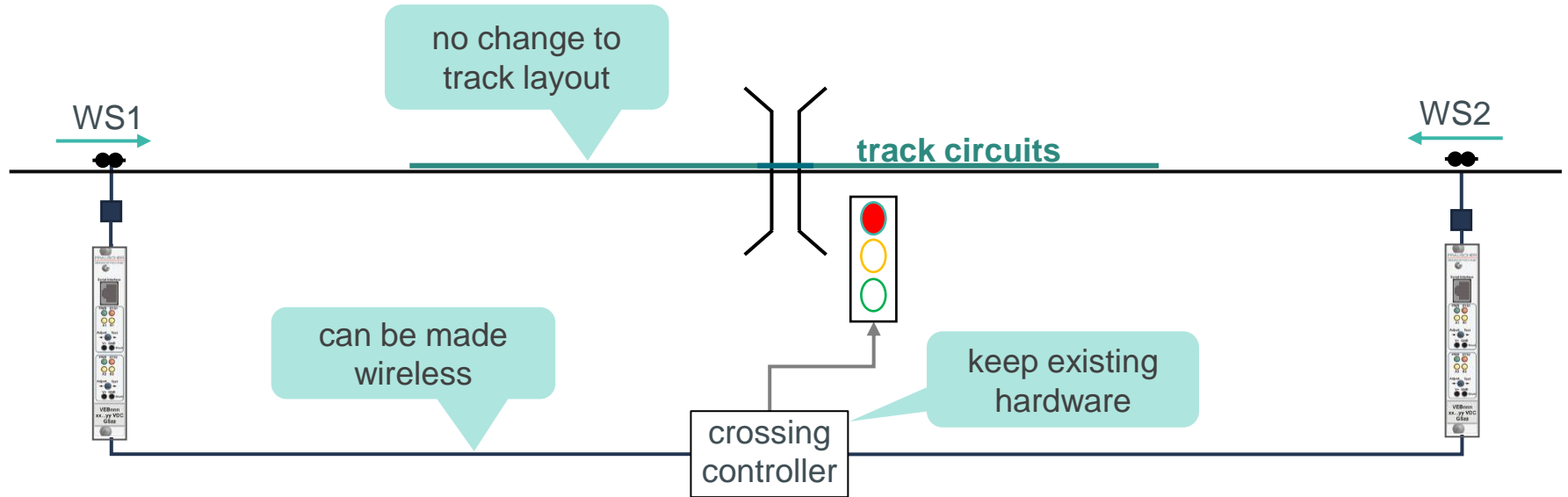
Can overlay existing track circuit

- Approach + island circuits only



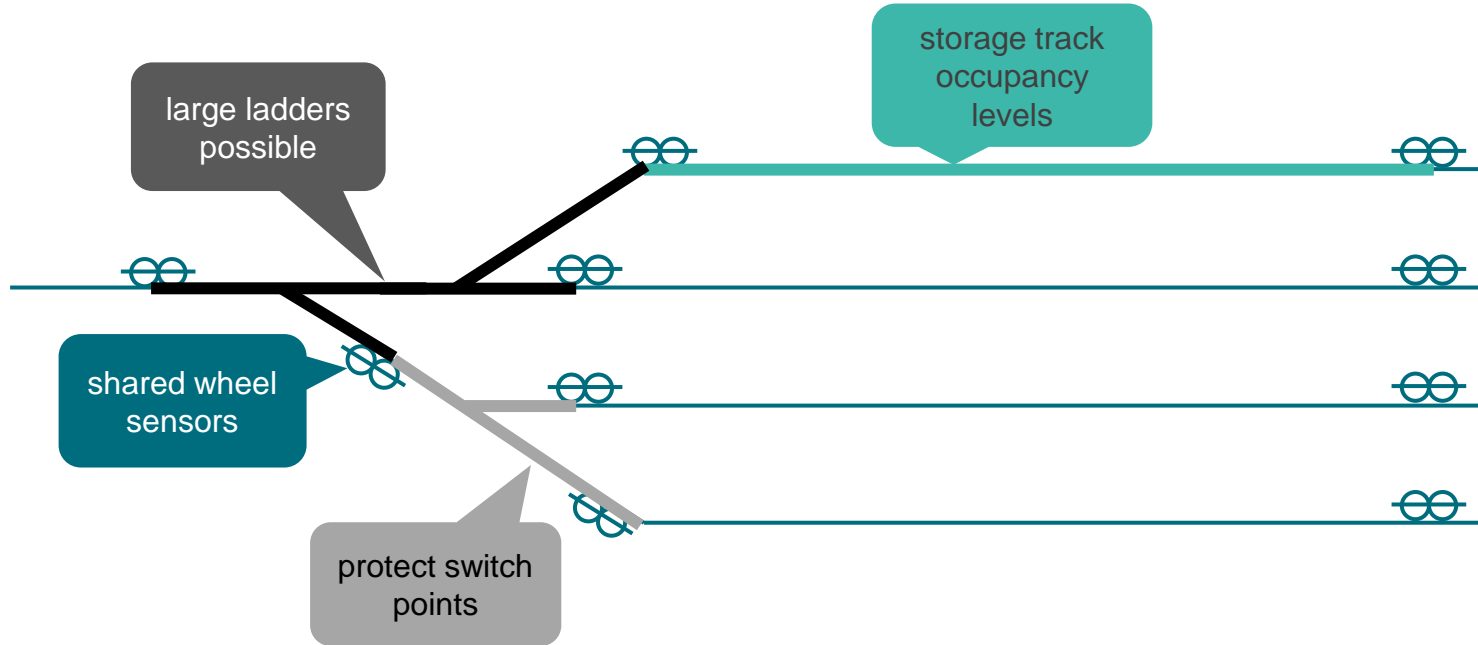
# Traffic Light Advance Preemption

Advance warning without modification of track structure



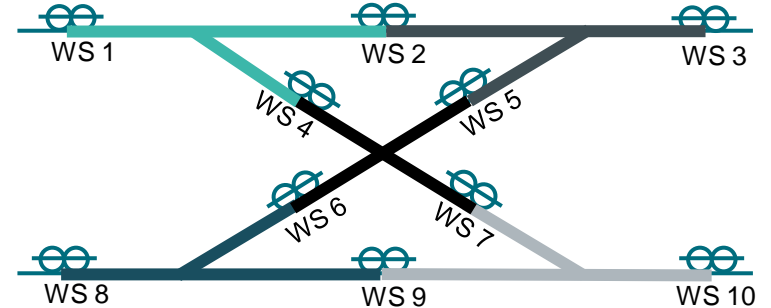
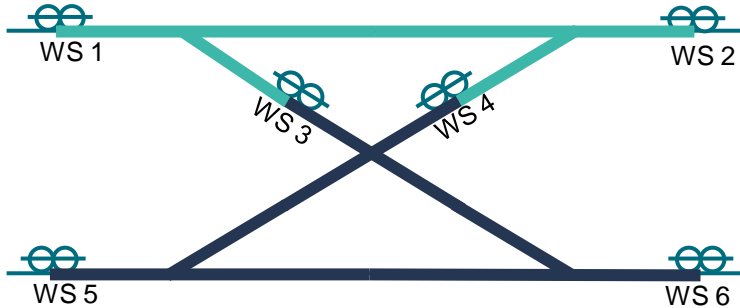
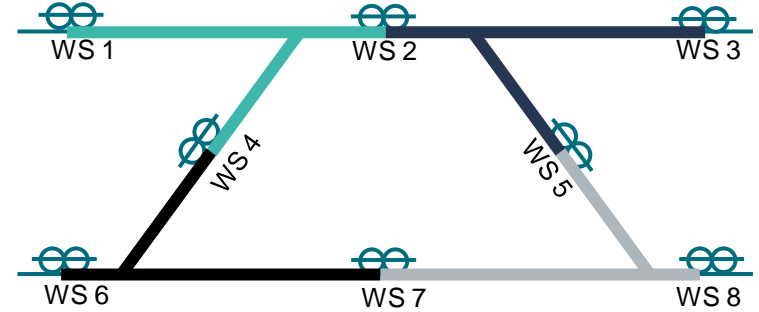
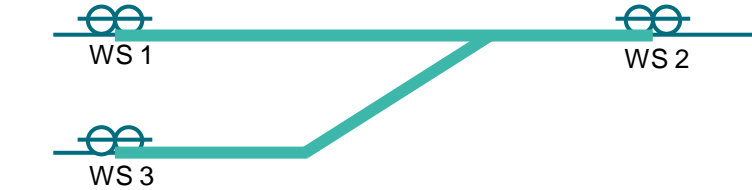
# Yard Automation

Hassle-free low maintenance solution for yard operation



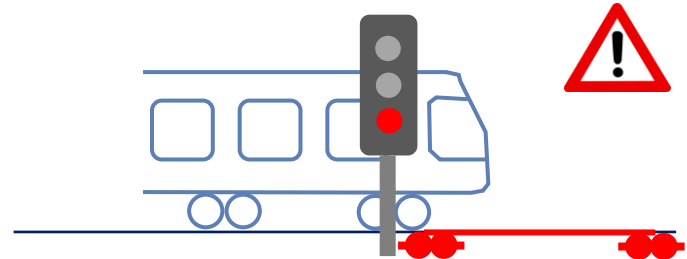
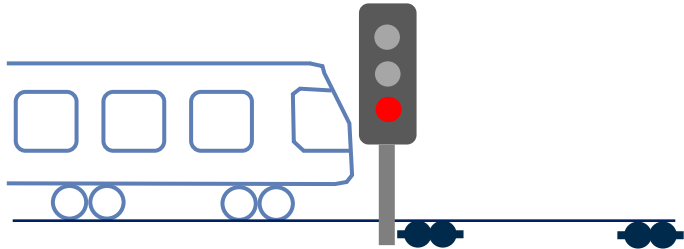
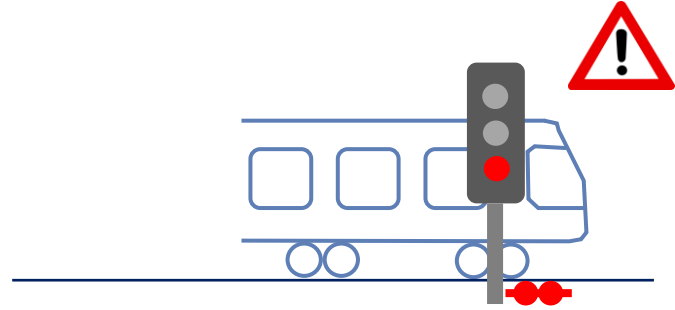
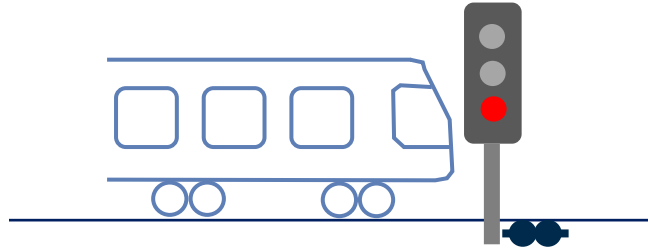
# Switch and Crossover Protection

No dead sections or electrical isolation required



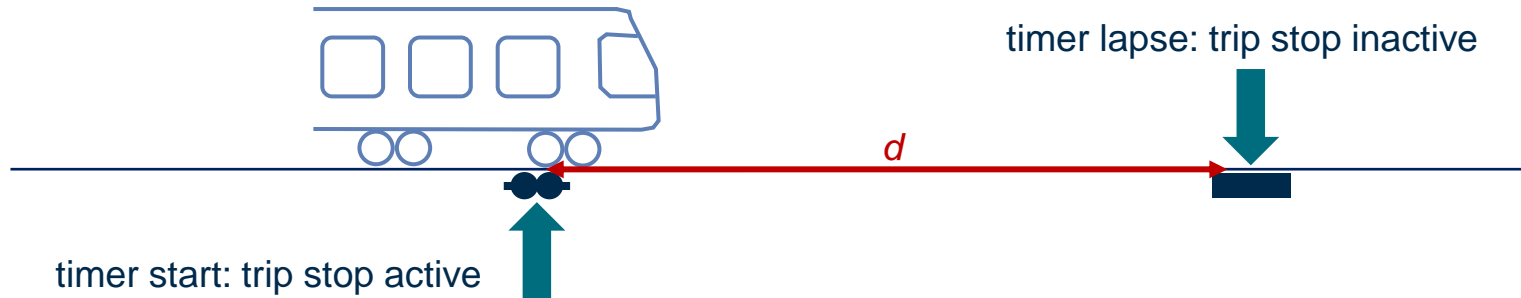
# Red Signal Overrun Detection

Can be direction based or track occupancy based

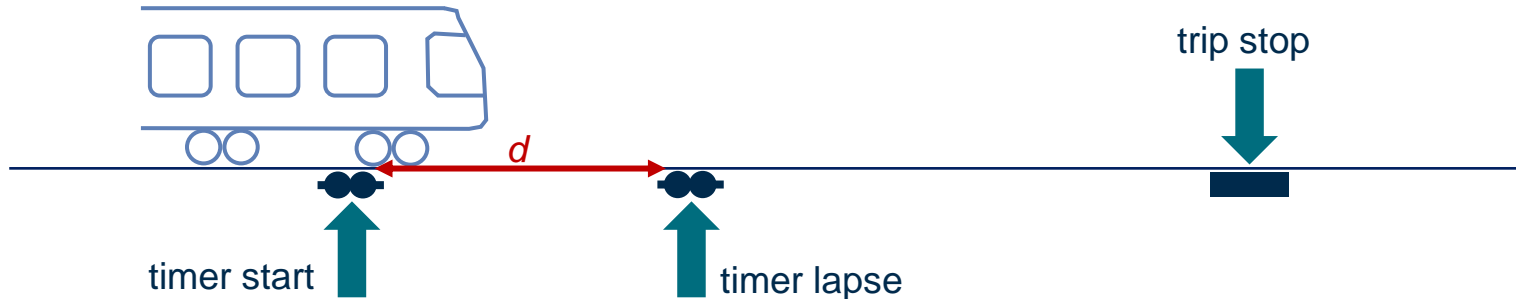


# Speed Enforcement

Wheel sensor output coupled with vital timers



$$speed = \frac{d}{\Delta t}$$



# Considerations for Use of Axle Counters



## RESET PROCEDURES

Unlike traditional systems, axle counters require 'reset procedures'

Resets can be executed remotely over Ethernet or locally using relay interfaces



## BROKEN RAIL PROTECTION

Axle counter can overlay existing track circuits

Preventive rail inspection techniques, like ultrasonic, can be used with axle counters



## TRACK WORK

Track work requires consideration to track mounted wheel sensors

E.g. skipping ties during tamping





# Key Takeaways

Axle counters leave you more time for what matters!

- Vital and fail-safe technology for wheel location and track vacancy detection
- Increased operational safety under all weather conditions
- Accelerated project delivery timelines
- Drastically reduced maintenance
- Compatible with virtually all track layouts and traction systems



**Hal Gordon**  
Senior Sales Engineer

[hal.gordon@us.frauscher.com](mailto:hal.gordon@us.frauscher.com)



**Ashish Jain**  
Engineering Manager

[ashish.jain@us.frauscher.com](mailto:ashish.jain@us.frauscher.com)

## **Frauscher Sensor Technology USA**

300 Carnegie Center, Suite 320

Princeton, New Jersey 08540

USA

[www.frauscher.us](http://www.frauscher.us)



FRAUSCHER

[www.frauscher.com](http://www.frauscher.com)