



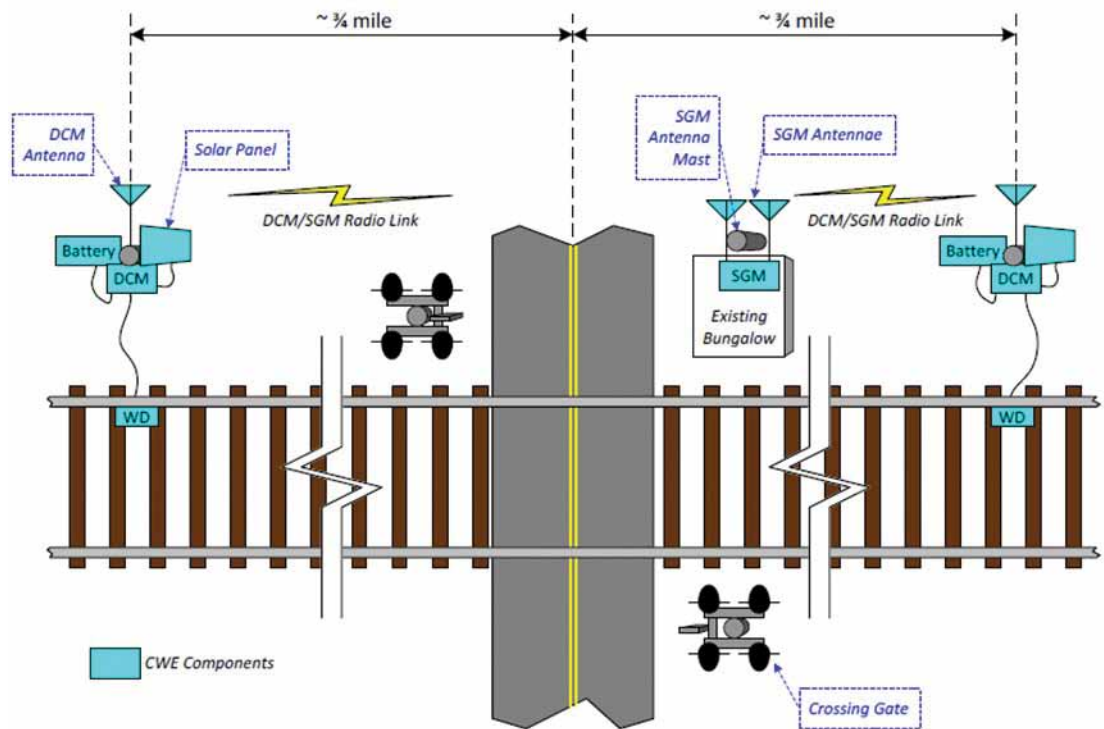
Cross Warning Enhancement System



A REVOLUTIONARY GRADE CROSSING PROTECTION UPGRADE

The Metrom Rail Crossing Warning Enhancement System (CWE) functions as an overlay or backup to existing legacy crossing systems. In the case of a failure to initiate or late-to-initiate crossing command, the CWE system will provide the existing crossing gate controller a timely command to lower the gates through an existing auxiliary input channel.

This system is independent of legacy systems and utilizes its own sensors, electronics, communication links, and power backup systems. The approach sensors and wireless communication links are solar powered with battery backup for simple, fast installation.





Cross Warning Enhancement System



SYSTEM OVERVIEW

A CWE configuration is comprised of three physically separate installations: a main control point located within the existing crossing gate control bungalow (SGM), and remote wheel detection (WD) modules located approximately 4,000 feet from the crossing (DCM).

SYSTEM OPERATION:

When trains approach from either direction, the wheel detection modules identify wheels and deliver raw data to the DCM, where speed and directional data is generated. The DCM then sends this data to the SGM via a radio link. The SGM monitors this information to determine whether a given train meets the criteria for notification. If so, the SGM signals the existing GCP system to activate the crossing.

The system can be set-up to only activate when certain criteria is met such as the speed of an approaching train. The system, for example, can be utilized to only activate or alarm when the approaching train is traveling over 65 MPH, and ignore all traffic below this speed.

The remote WD sensors used for activation of the system are located approximately 4,000 ft. (varies with max. track speed) from each approach. These sensors only require 1 wheel to activate, and as such will operate successfully with short or light train systems. The approach system is solar powered and utilizes a wireless link for self-contained operation and simple installation. The solar operation is possible because of the low current draw of our wheel detectors (WD). These detectors are also active in that they will constantly react and recalibrate to their surroundings. They require no calibration upon installation.

The system utilizes a 900 MHz, frequency-hopping spread-spectrum wireless communications link, which is always active for a reliable connection. The radio system is also designed to have multiple addresses which allow for several systems to be operated in a close geographic area.

A Metrom Rail integrated 32' folding communications tower has been specifically designed for this system. It arrives at the site pre-wired, and ready for mounting of the solar cell, antenna, and electronics/battery enclosure.

THE SYSTEM INCLUDES:

- (1) SGM module and all mounting brackets and surge protection which is located in the control bungalow.
- (2) DCM modules, WD modules, batteries, enclosures, surge protection, antennas, solar cells, all mounting brackets, 32' communication tower, precast foundation, grounding rods and all mounting hardware.



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SYSTEM COMPONENTS



SIGNALING MODULE: SGM

The SGM is made up of two elements: a transceiver to communicate with both DCMs, and a bungalow-based interface to communicate status and connect with external devices. The transceiver receives event and health messages from each DCM and passes them to the control board within the SGM interface for interpretation. All communication between the SGM and DCM are achieved through two directional antennas, mounted on a mast next to the bungalow. The interface sends outputs to the crossing warning system to initiate the crossing signal, and can connect to a laptop to transfer logs or receive firmware updates.



DCM WHEEL DETECTOR

The DCM Wheel Detector contains two magnetic sensor assemblies, one at either end, which are enclosed in a durable potting compound and sealed within coated aluminum housings. Each detector is waterproof and weather-resistant. The Wheel Detector is secured to the rail using a Metrom-Rail-designed clamping system, which can incorporate spacers to accommodate variations in rail geometry. When a vehicle moves over the sensor, direction and speed are determined from the order and timing of activations of the two magnetic sensors.



DETECTION CONTROL MODULE: DCM

A DCM is placed at both approaches, approximately 3/4 mile from the crossing. A DCM is made up of a self-sustaining power subsystem, in which a battery is charged by a solar cell located on the supplied 32' communications tower, a Wheel Detector (WD) for each monitored track, and a transceiver to communicate to the SGM located in the bungalow. All DCM modules are coordinated by a control board located in a tower enclosure. The DCM determines the speed and direction of a vehicle, and sends real-time data to the SGM for further evaluation.



32' FOLDING COMMUNICATIONS TOWER

The Metrom Rail Folding Communication Tower is easily accessible from the ground and can be operated by either a manual or electric winch which is also designed to be removable. The tower arrives at the site pre-wired with the antenna, grounding system and surge protectors installed. Metrom Rail's towers are designed to meet TIA and AREMA standards.



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SYSTEM SPECIFICATIONS

Metrom Rail Part Number: FA-1031

SGM MODULE – SIGNALING MODULE

Metrom Rail Part Number: FA-1032

Input Power: 13.8VDC

Temperature Range: -40°C to 70°C

Output Connections: Crossing signal initiation to legacy system
Alarm status
USB port for downloading of logs

Data Log Time: 90 days of data

Data Log Type: Start-up shut-down events, incoming train time and speed
Faults including power loss, wireless signal degradation

Surge Protection: Polyphaser 15-B50HN-C2

Radio Link: 900 MHz spread spectrum, frequency hopping

DCM MODULE – DETECTION CONTROL MODULE

Metrom Rail Part Number: FA-1069

Power Source: 30 - 40 watt Solar cell through an integral power supply/battery charger

Back-up Power: 90Ah deep cycle battery

Temperature Range: -40°C to 85°C

Surge Protection: Polyphaser 15-B50HN-C2

Enclosure: 25 x 18 x 16 Formed Aluminum case with heat isolation membrane

WD capability: Up to 3 tracks are supported

WD MODULE – WHEEL DETECTION

Metrom Rail Part Number: FA-1041

Input Power: 12.0 VDC

Temperature Range: -40°C to 85°C

Coils: 2

Power Consumption: <2mA

Mounting: Under rail mount, using 2 castle nuts and retaining pins
Sensor portion is vibration isolated using molded damper
Shim pack adapts to any rail size

Construction: Aluminum case, potted electronics with powder coat finish

Speed range: <5 MPH - >100 MPH