American Railway Engineering and Maintenance of Way Association
Letter Ballot 38 20-03

1. Committee and Subcommittee:
   AREMA C&S Committee 38

2. Letter Ballot Number: 38 20-03

3. Assignment:
   MP's revised at Spring ‘20 meeting.

4. Ballot Item:
   Ballot 38 20-03: This ballot contains the MP approved at the Spring ‘20 meeting:
   - 05.03.03 Recommended Instructions for Hot/Cold-Wheel Detector Site Selection

5. Rationale:
   Revised Manual Parts
Recommended Instructions for Hot/Cold-Wheel Detector Site Selection

A. Purpose

This Manual Part recommends instructions for the survey and/or selection of hot wheel and/or cold wheel detector sites. The instructions set forth general requirements representing recommended practice.

B. Instructions

1. Detector Location – Hot Wheel Detector
   a. Site (outbound) should be placed an appropriate distance from the nearest terminal areas to permit the wheels to stabilize at their normal operating temperature. Site (outbound) should be no closer than 5 miles (8 km) (10 minutes running time) from the nearest terminal areas to permit the wheels, with stuck brakes, to reach alarm levels. It is recommended that hot wheel detector systems be installed on each side of terminals, crew change locations, or interchanges with other railroads.
   b. Sites (inbound) to a terminal should not be located where prolonged stops may occur.
   c. Sites should be readily accessible from nearby roads to facilitate maintenance.
   d. Sites should provide sufficient space to install wayside equipment conforming to railroad practices.
   e. Avoid low areas where flooding may occur.
   f. Avoid areas of high vandalism.
   g. Consideration should be given to the consolidation with other types of defect detectors.
   h. Consideration should be given to the availability of communication facilities required for hot wheel detector systems operation, maintenance, and remote interrogation/diagnostics. These may be company owned/leased or commercially available voice and data communications means.
2. Detector Location – Cold Wheel Detector

a. Cold wheel detection is considerably different from hot wheel detection in the way the information should be used. Whereas hot wheel detection is looking for wheels running at dangerously elevated temperatures and the system should flag those wheels in a timely manner as individual events. Cold wheels are better evaluated as a measure (trend) of brake performance over the entire train. It may not be appropriate to stop a train for a few cold wheels. Based on this logic, cold wheel sites need to be more strategically located than hot wheel sites, and their functionality needs to be defined for their specific applications. These type of defects may indicate poor brake performance over the train consist or possible train mishandling by the crew.

b. Due to the field equipment’s limited processing capability, it is recommended that cold wheel detectors have their data off loaded to a server with enough processing power to trend the trains overall braking performance over the complete consist. Typically, cold wheels if trended over the consist, would not cause real-time alarms, they would normally be post train only. In addition, to trending the consist, individual cars with truly cold wheels should be individually flagged for repair, but normally these defects do not rise to the level of a real-time train stop.

c. Site (outbound) should be placed an appropriate distance from the nearest terminal areas to permit the wheels, with applied brakes, to reach normal operating temperatures. Site (outbound) should be no closer than 5 miles (8 km) (10 minutes running time) from the nearest terminal areas to permit the wheels, with applied brakes, to reach normal operating temperatures.

d. Sites (inbound) to a terminal should not be located where prolonged stops may occur.

e. Where possible considerations should be given to locate cold wheel sites where natural braking and non-braking events occur.

f. Sites should be readily accessible from nearby roads to facilitate maintenance.

f. Sites should provide sufficient space to install wayside equipment conforming to railroad practices.
g.f. Avoid low areas where flooding may occur.

h.g. Avoid areas of high vandalism.

h. Consideration should be given to the consolidation with other types of defect detectors.

i. Consideration should be given to the availability of communication facilities required for cold wheel detector systems operation, maintenance, and remote interrogation/diagnostics. These may be company owned/leased or commercially available voice and data communications means.

3. Track Conditions

a. Track should be tangent for a minimum of 1500 feet (457 m) from curves, turnouts, and a minimum of 150 feet (46 m) from grade crossing (highway or rail), and/or other structures that could cause excessive lateral displacement or truck skew.

b. Track gauge at hot or cold wheel detectors shall not exceed:

(1) 56-3/4 inches (144.15 cm) when measured under moving load. This is the maximum dynamic gauge allowable. Gauge transition requires a minimum of 100 feet (30 m) of rail for each 1/4 inch (6.35 mm) of gauge correction.

(2) 56-5/8 inches (143.83 cm) when measured on the unloaded track. This dimension should be reduced by the extent to which physical evidence indicates that both rails can move toward the field under load. Track gauge tighter than 56-1/2 inches (143.50 cm) does not adversely affect wheel temperature/hot bearing detection. Therefore, the gauge through the detector should be as tight as permitted by the railroad.

c. Track should be clipped and anchored through and on both sides of every tie for of the detector site per Railroad standards a minimum distance of 100 feet (30 m) on each side of the installation.

d. Track bed should be tamped, stable, and well maintained.

e. Jointed/sectioned track requires the installation be placed midway between the adjacent rail joints.
4. Train Operation – Hot Wheel Detector Locations

   a. Sites should be selected where trains generally travel more than 10 mi/h (16 km/h) and seldom stop except where manufacturers recommendations allow for lower speeds.

   b. Site should be chosen where train braking is minimal.

   c. Site should be chosen to permit normal braking to stop the train for inspection before passing a setout location.

   d. Consideration should be given to the availability of suitable setout locations nearby that are accessible by road for car inspectors.

   e. Sites should be avoided where the terrain, bridges, and/or structures present hazards to crews inspecting the trains. The area for several miles in either direction of the detector site should conform to this need.

   f. Sites should not be within 300 feet of highway-rail grade crossings.

   fg. Sites should be avoided where trains may block highway-grade-rail crossings when stopped for inspection.

   g. Sites should comply with all government guidelines including those governing sightline requirements for grade crossings.

5. Train Operation – Cold Wheel Detector Locations

   a. Sites should be selected where trains generally travel more than 10 mi/h (16 km/h) and seldom stop except where manufacturers recommendations allow for lower speeds.

   b. Site should be chosen where there has been the need for sustained braking, prior to the location, for at least five minutes to allow wheels to reach normal operating temperatures.

      (1) This would normally be on a long grade.

      (2) The purpose of the Cold Wheel Detector, at these locations, is to find wheels with non-operating brakes.
(2) (3) Other applications for Cold Wheel Detectors could include, but are not limited to, the following:

- Inoperative brake detection.
- Slid wheel detection.
- For these locations the site should be chosen to meet the parameters of the detection requirements and train operating performance.

6. Hot/Cold Wheel Detector Site Requirements.

a. Sites for hot/cold wheel detectors should be located near commercial power source.

b. Detector sites should be equipped with radios to alert crews of detector’s inspection results, as required. Consideration should be given to terrain, structures and other restrictions to radio transmissions.

c. Data transmission capability, if used, should be available to send wheel detector inspection results and other pertinent data to a central office for analysis and/or storage.

d. Hot/cold wheel detector systems equipped with a self check capability that require advance start circuits should be located to take into consideration advantage of existing signal circuitry.

e. When selecting sites for Hot/Cold Wheel Detectors, consideration should be given for acquiring accurate AEI data for cold wheel identification.