

Long Island Rail Road

Maintenance of Way Division Track & Rail Inspection Program

Long Island Rail Road

October 23, 2023



Long Island Rail Road

- Under Federal Railroad Administration (FRA) regulations, each railroad has primary responsibility to ensure its track meets or exceeds the minimum federal safety standards.
- A regular track inspection program is required by FRA in accordance with 49CFR213 (Track Safety Standards)
- A comprehensive inspection program is composed of several elements
 - Visual Track Inspection
 - Automated Track Geometry Measurement
 - Internal Rail Flaw Defect Detection
- The program is in place to ensure rail safety, track integrity and reliability of operations



Long Island Rail Road

▣ Visual Inspections

- ▣ Weekly Visual Inspection
 - Performed by 49CFR213 Qualified Track Inspectors
 - Physical walking of the system to inspect track
 - Hi-rail Inspection permitted option to walking
 - Observation includes:
 - Roadbed, including drainage and vegetation
 - Track Geometry, including gage, alignment, curves and surface
 - Track Structure, including ballast, cross-ties, rail, rail joints, fastening systems, switches, and frogs
 - Defects Identified are required to be corrected either immediately or within 30 days (depending on type)
- ▣ Monthly Switch Inspection – 692 Switches * Excl. Yards
 - Performed by 49CFR213 Qualified Track Inspectors
 - Joint Inspections with Signal Department
 - Observation includes:
 - Switches and turnouts, including Frogs, Stockrails, Switchpoints, guardrails, braces, rods, clips, plates, fasteners and closure rails
 - Track Geometry, including gage, alignment and surface
 - Defects Identified are required to be corrected immediately, within 30 days, or monitored depending on type of defect
- ▣ Monthly Track and Quarterly Switch Inspections for yards



Long Island Rail Road

- ❑ **Track Geometry Vehicle Testing**
 - ❑ Track Geometry Vehicle Testing performed over entire territory
 - 4 runs/year mainline; 2 runs/year yard
 - ❑ Onboard systems records various track geometry characteristics for review by LIRR Engineering Staff
 - Track Geometry: Gage, Profile and Alinement Characteristics
 - Platform and Tunnel Clearances
 - Rail Profile Measurement System
 - R.O.W. Video System
 - ❑ Non-destructive testing process
 - FRA Standards
 - LIRR Standards



Long Island Rail Road

- ❑ **Track Geometry Vehicle Testing**
- ❑ LIRR has recently awarded a contract for the replacement of our 2001 TC-82 Track Geometry Vehicle
- ❑ The new TC-83 will include enhanced technologies:
 - Track Geometry Measurement System
 - Rail Profile Measurement System
 - Rail Corrugation Measurement System
 - Ride Quality Measurement System
 - Clearance Measurement System
 - Third Rail Measurement System
 - Thermal Imaging System
 - Track Component Inspection System
 - Joint Bar Inspection System
 - Deployable Gage Restraint Measurement System



Long Island Rail Road

- Track Geometry Vehicle: TC-82 / TC-83 Conceptual



Long Island Rail Road

- ❑ **Rail Flaw Testing**
 - ❑ Ultrasonic Rail Testing
 - 3 runs/year mainline; 2 runs/year Class 2 and Class 1 Track w/in Yard Limits
 - ❑ Testing Program to identify internal rail defects
 - Rail defects develop in any type of rail, or rail welds, as a result of several conditions normally originating from the rail manufacturing process; cyclical loading; and impact from rolling stock, and rail wear.
 - ❑ Continuous Testing Process (Inspection Vehicle Runs without Stopping)
 - ❑ Staff at Sperry evaluate, identify and report anomalies within 24 hrs. of test run
 - ❑ Verification Testing performed as follow-up on each identified anomaly within 84 hrs.
 - ❑ Corrective Action depends on the type of defect (Repair, Restrict, Remove)
- ❑ Maintenance strategies used to reduce rail flaws:
 - ❑ State of Good Repair Investments
 - CWR Rail Replacement
 - Track renewal
 - ❑ Comprehensive rail grinding program
 - Removes rail surface conditions



Long Island Rail Road

- ▣ Ultrasonic Testing Cars



Metro-North Engineering Rail Integrity Compliance

Track and Rail integrity Program -
Supplements to Visual Inspections



October 23, 2023

Track Inspections on MNR Territory

- Metro North has over 750 track miles of territory and 1200+ switches (including mainline, sidings and GCT) requiring inspection. Visual Inspections are performed in accordance with the FRA track safety standards and our more stringent MW-4 standards
 - FRA 213.233: Track Inspections “main track to be inspected weekly with at least 1 calendar interval between inspections”
 - Metro-North performs twice weekly either walking or hi-rail inspections
- Track Geometry
 - Maintenance of Way Inspection Car (MOWIC/TCIC2020)
 - Track Geometry Inspection Services (TGIS)
 - Autonomous Track Geometry Inspection System (ATGIS) – on 3 Revenue Cars – M7, M8, & Shoreliner.
 - FRA Inspection Car/Amtrak TGC & TSAVe (Track Structure Assessment Vehicle) (GRMS)/NJT Inspection Car (Woh)
- Internal Rail Flaw Inspection (Ultrasonic Testing Services)



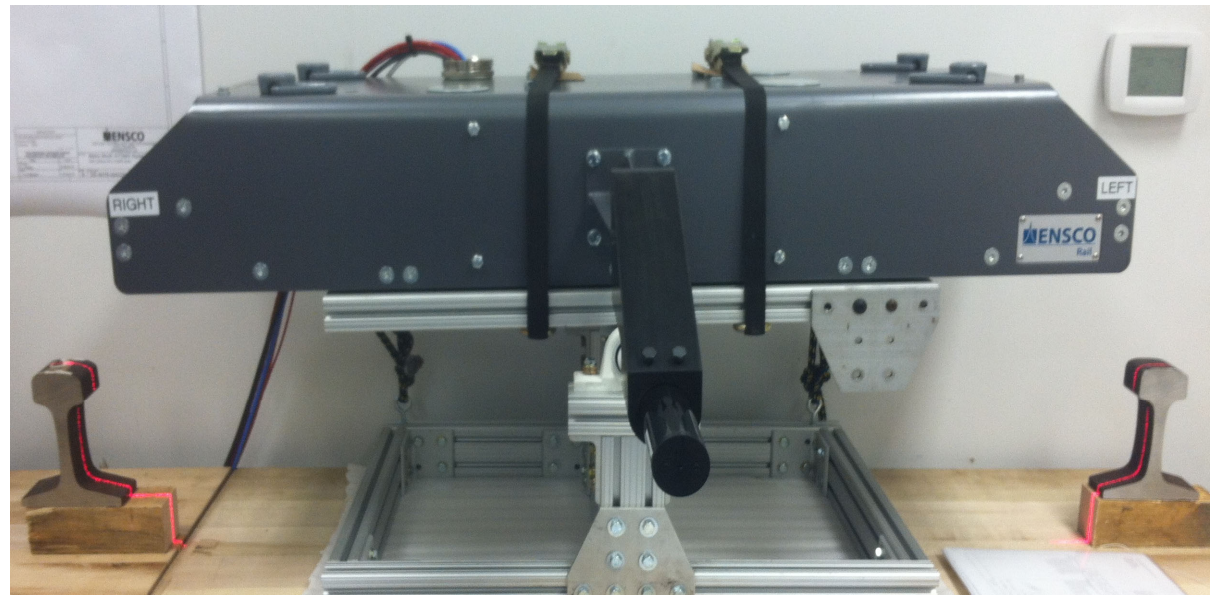
Maintenance of Way Inspection Car (MOWIC/TCIC2020)

- ❑ Self-propelled inspection car commissioned in 2020. Capable to operate certain systems at 50 MPH (25MPH for GRMS).
- ❑ Includes inspections system in addition to track geometry including:
 - ❑ RPMS (Rail Profile Measurement System)
 - ❑ **GRMS (Gage Restraint Measurement System)**
 - ❑ TCIS (Track Component Imaging System)
 - ❑ JBIS (Joint Bar Inspection Systems)
 - ❑ RQMS (Ride Quality Measuring System)
 - ❑ RCMS (Rail Corrugation Measurement system)
 - ❑ CMS (Clearance Measurement System)
 - ❑ DVIS (Driver View Imaging System)
 - ❑ TRMS (Third Rail Measurement System)
 - ❑ OWMS (Overhead Wire Measurement System)
 - ❑ OWIS (Overhead Wire Imaging System)



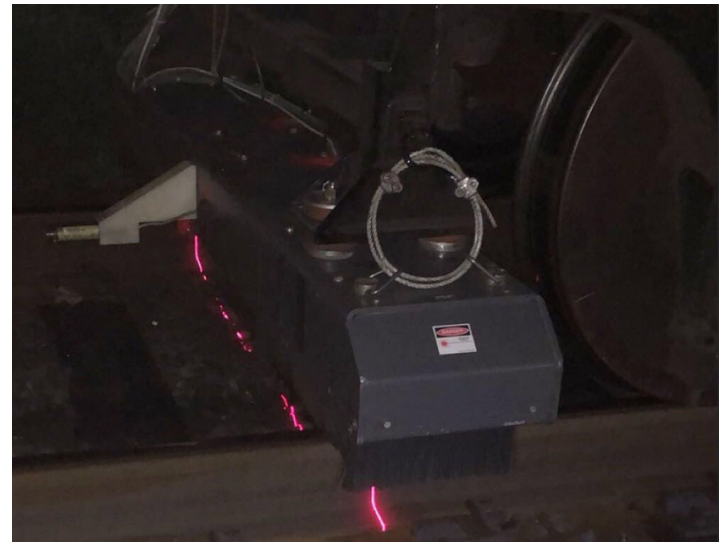
Autonomous Track Geometry Inspection System (ATGIS)

- Autonomous systems are mounted on three MNR Revenue cars, M7, M8 and Shoreliner coach car. They do not require personnel aboard to run the equipment. They run over 80 percent of the territory on a regular basis
- Each unit continuously monitors the track for compliance with the safety and maintenance limits set forth in the MW-4 for the following conditions:
 - i. Gage
 - ii. Warp in 62'
 - iii. Crosslevel
 - iv. Profile in 62'
 - v. Runoff in 31'
 - vi. Alignment 31'/62'



Track Geometry Inspection Services (TGIS) / GEO Train

- Scheduled annually. Uses MNR Coach Inspection cars (MN2) to host geometry beam. Towed by two locomotives through a pre-established route.
- Entire system inspected in 4 nights, beam installed before and removed after inspection is complete.
- Allows year over year analysis of condition of track assets.



Internal Rail Flaw Inspection

- ❑ Rail Flaw testing(Ultrasonic Testing Services) required by CFR Track Safety Standards §213.237 is required annually for Class 3 track and above.
 - ❑ MNR performs 2+ runs yearly using the continuous testing program adopted in 2021.
 - ❑ Defects detected and remediated through this process include those presented during rail manufacturing such as Transverse and compound fissures, detail fractures and split head conditions.
 - ❑ Other defects that upon usage include engine burn fractures, rolling contact fatigue, and SSC's (Surface Shelling and corrugations).
 - ❑ The system also inspects for Bolt Hole Cracks/ Broken Base, Ordinary Breaks and Damaged

