PTS Pre-Work Pack
WHO NEEDS PERSONAL TRACK SAFETY?

Anyone who will be performing work that requires rail track protection.
Metrolinx Overview

A GUIDE TO PERSONAL TRACK SAFETY
METROLINX OVERVIEW

Ontario Government Agency that manages public transportation in the GTHA

Established in 2006

Works with Federal, Provincial, Municipal partners and private sector

Create an integrated transportation system that enhances our quality of life, creates a healthier environment, and builds a more prosperous economy.
GTHA experiencing extreme growth:

- Population 8.6 million by 2031
- Today two million automobiles daily; three million by 2031!
- Negative impact on economy (transportation costs, environmental impact)

Metrolinx’ Capital Projects Group will continue to build the infrastructure to support transit growth in the region.
METROLINX – NEXT 10 YEARS

• 40 GO and LRT Stations
• 50 new train sets
• 15 minute service to corridors
• 200 km of GO and LRT tracks
• 50 km of Bus Rapid Transit
• 45 bridge upgrades
• 10 grade separations

Increase service by 500%
Vision:
Getting you there better, faster, easier.

Mission:
We connect our communities.

Values:
Serve with passion. Think forward. Play as a team.
GO Transit

- 1967 to present, GHTA Regional Transit Service
- Extensive network of train and bus routes
- 70 million customer trips annually

WEST - Hamilton, Kitchener-Waterloo
EAST - Newcastle, Peterborough
NORTH - Orangeville, Barrie, Beaverton
SOUTH - Niagara Falls
2

UP Express

• Launched on June 6, 2015 to support the Pan Am games

• Connects two (2) major transportation hubs between Union Station and Toronto Pearson Airport

• Runs every 15 minutes, and only takes 25 minutes of travel time
PRESTO

• Rolled out (select locations 2009)
• Operating division (July, 2011)
• Electronic fare payment system that seamlessly connects 11 transit agencies across the GTHA and Ottawa
• Customers access vehicles and stations by tapping, avoiding lineups
• Funds and account managed online
Metrolinx Policies, Roles and Responsibilities
CONTRACTOR’S RESPONSIBILITIES

- Comply with the Occupational Health and Safety Act.
- Comply with Metrolinx policies and procedures.
- Site and equipment securement.
- Site cleanliness and organization.
- Follow direction and instructions of the Protecting Foreman at all times and participate in the job briefing prior to starting work.
- Address and report unsafe behaviours or damage.
FIT FOR DUTY

• Metrolinx Fit for Duty Policy applies to all workers on a Metrolinx owned project.
• All contractors are expected to support and enforce this policy.
WORKERS RESPONSIBILITIES UNDER FIT FOR DUTY

As a worker on Metrolinx projects you have the following responsibilities:

• If you are not Fit for Duty, speak up.
• If you believe a co-worker is not Fit for Duty, speak up.
• Cooperate with any potential investigations.
• Update your manager/supervisor of any changes to medication, or license suspension due to medical or any other related changes.
SUPERVISORS RESPONSIBILITIES UNDER FIT FOR DUTY

As a Supervisor on Metrolinx projects you have the following responsibilities:

• Same responsibilities as workers.
• Monitor employees for signs of fatigue or drugs/alcohol.
• Ensure workers have sufficient rest periods between shifts.
HARASSMENT, DISCRIMINATION AND VIOLENCE POLICY

• Metrolinx is committed to fostering and sustaining an inclusive, diverse, equitable, and accessible workplace that is free from harassment, discrimination, and violence.
• Receive infractions or result in temporary to permanent removal from work sites.
• Report immediately.
• Investigation measures.
• Corrective action.
• Unwelcome behaviours, comments, remarks, physical contact, psychological torment, persistent contact.
IDENTIFYING FATIGUE

The cost of fatigue is your safety and ability to be safe.

This is caused by loss of the following:

- Overall cognitive function.
- Problem solving.
- Decision making.
- Memory.
- Attention (vigilance).
- Reaction time.
IDENTIFYING FATIGUE

Proactive strategies to get better sleep:

• Give yourself time to sleep.
• Sleep in a quiet, dark, cool, humid location.
• Sleep strategically.
• Monitor your sleep debt.
• Add white noise to the environment.
• Get tested for sleep disorders.
• Avoid caffeine after a specific period of the day.
IDENTIFYING FATIGUE

Things to help eliminate or reduce the impact of fatigue:

- Caffeine.
- Bright lights.
- Exercise.
- Move key safety actions to earlier in the shift or outside of circadian trough.
PERSONAL PROTECTIVE EQUIPMENT (PPE)

Personal Protective Equipment (PPE) standards apply, along with the site requirements, when working in the rail corridor on Metrolinx work sites.

Applies to:
- Metrolinx workers,
- Contractors,
- Visitors,
- Railway Operating Crews, and
- No red clothing allowed in railway corridor.
PERSONAL PROTECTIVE EQUIPMENT (PPE)

Minimum pieces of PPE required in the rail corridor

- Class E, Type II Hard Hat
- Class 3 High Visibility wear — Fluorescent Orange “Blaze” OR Yellow “Chartreuse” CSA Safety Vest / Jacket and pants
- Safety Glasses with Fixed Side Shields – CSA Standard (Z94.3.1)
- Minimum 6” Green Patch / Electrical Shock Resistance Safety Boots with a defined heel
- Shirt with long sleeves

PPE IS EVERYONE’S RESPONSIBILITY
BEACON POLICY

Protects against physical hazards in the railway corridor, such as: other vehicles, moving equipment, and train movements.

- Improves visibility with advanced warning.
- Stop, yield right-of-way, or indicates existence of hazardous conditions.
- Non-revenue vehicles and equipment must be equipped when operating in Metrolinx rail corridor.
- Activated during movement.
- Not required when proceeding directly to designated parking/shipping/receiving areas.
- Delivery vehicles - hazard warning signals (4-way flashers) and one (1) vehicle escorted at a time.
Metrolinx Roles and Responsibilities
METROLINX OPERATIONS

• To successfully deliver the rail service at Metrolinx safely and efficiently various departments have to work together on a daily basis.
• Each department has specific set of responsibilities and working together help Metrolinx deliver rail services.
NETWORK OPERATIONS CENTRE (NOC)

Metrolinx’ information hub and provides a holistic view of the operations to ensure the highest standard of safety, customer service, reliability, and crisis management.

Reporting centre for all injuries, incidents, accidents, safety concerns, near-misses, etc.

Centralized operations centre comprised of:
• Rail Services,
• Operations control,
• Bus Services,
• Customer Services,
• Station Services, and
• Security and Transit Safety Dispatch
NOC DEPARTMENTS

• Independent departments in the NOC that work together throughout the day.
• Either address real-time information or redirect it to appropriate departments.
NOC CONTROLLER AND CUSTOMER SERVICE

Rail Traffic Controllers (RTC) and Train Movement Directors (TMD):

• Responsible for the smooth delivery of rail service.
• Dedicated to one or multiple corridors.
• Communicate with Train Crews, RTC, Contractors and other business units.
• Critical during crisis management.
Customer Service:
• Works closely with the Controllers to monitor train delays.
• Communicates accurate information to the public.
• Critical during crisis management.
NOC CRISIS MANAGEMENT

- Ensure the situation is safe,
- Dispatch appropriate personnel,
- Develop and execute a recovery plan,
- Communicate internally, and
- Coordinate communications to passengers and the public.
RAIL TRAFFIC CONTROL CENTRE (RTCC)

• The RTCC is the centre that coordinates train movements and grants authority for maintenance and construction personnel to occupy main track.

• Comprised of Rail Traffic Controllers (RTC) that are responsible for specific territories and are jointly responsible, with the operators, for the safe passage of a train or track unit over that territory.

• Metrolinx contracts dispatching services to Rail Term and recently took some territories in house.
RAIL CORRIDOR ACCESS AND CONTROL (RCAC)

- RCAC is the group at Metrolinx that approves and grants access within the corridor for all rail work and construction projects.
- The RCAC team collects access requests and before allowing access to the ROW they will identify and resolve:
  - Any major conflicts between projects, and
  - Any conflicts between regulatory or maintenance priorities.
CENTRALIZED TRAFFIC CONTROL SYSTEM (CTC)

- Provides RTC control of signals and switches from a central location.
- The RTC authorizes train movement and track occupancy by maintenance/construction personnel through a computer based system (RTCii or GTCS in the future).
- The photograph is of a typical RTC workstation and shows train locations, switch positions, signals cleared, and TOPs issued.
- If bond is broken, the signal will display “Stop”.
- Entire Subdivision details display, including protection.
- Track units do not display.
- Audible and visual warnings activation results in emergency call.
RAIL OPERATIONS: QCTO, CTO, CSA, GSR

All GO Trains and UP Express trains are operated by a 3-person crew.

GO Trains
• QCTO = Qualified Commuter Train Operator
• CTO = Commuter Train Operator
• CSA = Customer Service Ambassador

UP Express
• QCTO = Qualified Commuter Train Operator
• CTO = Commuter Train Operator
• GSR = Guest Service Representative
The Protecting Foreman is a CROR qualified person who is in charge of the protection of track work and track units, and is responsible for the safety of a specified piece of track they have authority on.

In charge of the safe passage of movements through their limits.
Types of work requiring protection:

- Maintenance work to repair track;
- Inspections to ensure the track is in safe working condition; or
- Construction work on a nearby passenger platform.
- Work or inspections requiring track to be fouled.
Metrolinx Rail & Construction Support
CONSTRUCTION SAFETY

To validate safety on railway sites, Metrolinx employs teams to monitor and audit various groups.

They are responsible for:

• Auditing Metrolinx’ and the Ministry’s rules around construction on Railways. Construction Safety Management Program (CSMP) and Ontario Health and Safety Act (OHSA).
• Educating and coaching workers about safe work.
• Site audits and inspections.
• Administering infractions for unsafe work or actions.
OPERATIONAL SECURITY

• Transit Safety Officers are dispatched accordingly to provide assistance.

• If you come across any:
  o Unsafe or questionable conditions.
  o Suspicious packages, persons, or activities.

• Report directly to NOC, your Supervisor, and Protecting Foreman.
OPERATIONAL SECURITY

Report the following:

• Uncooperative person.
• Suspicious behaviours.
• Unattended items (HOT)
  o H - Is the item hidden.
  o O - Is the item obviously suspicious/curious.
  o T - Is the item typical to what is seen in the area.
Railway Infrastructure and Environment
What is a Railway?
WHAT IS A RAILWAY AND METROLINX CHARACTERISTICS

Railway:

- Network of tracks, made up of steel rail that run through and connect cities, provinces and countries with train service.
- Operates both freight or passenger trains.
- Governed by The Railway Safety Act; enforced by Transport Canada with Rules and Regulations.
- Divided into:
  - Regions
  - Districts
  - Zones
  - Subdivisions
WHAT IS A RAILWAY AND METROLINX CHARACTERISTICS

• Metrolinx operates solely within Southern Ontario.
• No need to separate into Regions, Divisions and Zones like CN/CP
• Continue to use Subdivisions identified by CN and CP.
• Created Corridors that are specific to the MX Network.
WHAT IS A RAILWAY AND METROLINX CHARACTERISTICS

Metrolinx owns approximately 75% of the infrastructure GO Train operate over.

Increased ownership and dispatch of movements provide greater control over the network, maintenance and expansion work.
SUBDIVISIONS

Subdivision’s are large portions of main line track that make up the rail network.

- Any railways operating over the same portion of track will all refer to the same Subdivision.
- Characteristics are identified in the Time Table
Corridor’s are Metrolinx defined portions of track based on where GO Train service originates and terminates.

- Creates a more user-friendly service for the public.
- A corridor can be made up of one Subdivision, multiple subdivisions or portions or multiple subdivisions.
<table>
<thead>
<tr>
<th>Corridor Name</th>
<th>Subdivisions</th>
<th>Operation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lakeshore East</td>
<td>• Kingston Sub • GO Sub</td>
<td>Union Station to Oshawa</td>
</tr>
<tr>
<td>Lakeshore West</td>
<td>• Oakville Sub • CP Hamilton Sub</td>
<td>Union Station to Hamilton (West Harbour and Hamilton GO)</td>
</tr>
<tr>
<td>Niagara Falls</td>
<td>• Oakville Sub • Grimsby Sub</td>
<td>Union Station to Niagara Falls</td>
</tr>
<tr>
<td>Milton Corridor</td>
<td>• Galt Sub</td>
<td>Union Station to Milton</td>
</tr>
<tr>
<td>Kitchener Corridor</td>
<td>• Weston Sub • Halton Sub • Guelph Sub</td>
<td>Union Station to Kitchener</td>
</tr>
<tr>
<td>Barrie Corridor</td>
<td>• Newmarket Sub</td>
<td>Union Station to Barrie</td>
</tr>
<tr>
<td>Richmond Hill Corridor</td>
<td>• Bala Sub</td>
<td>Union Station to Gormley</td>
</tr>
<tr>
<td>Stouffville Corridor</td>
<td>• Uxbridge Subdivision</td>
<td>Union Station to north end of Stouffville</td>
</tr>
<tr>
<td>UP Express</td>
<td>• Weston Sub • Pearson Sub</td>
<td>Union Station to Pearson Airport</td>
</tr>
</tbody>
</table>
DESIGNATION OF MAIN TRACK

<table>
<thead>
<tr>
<th>No of TRKs</th>
<th>Designation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Track</td>
<td>“Main Track”</td>
</tr>
<tr>
<td>2 Tracks</td>
<td>“North Track” or “South Track”</td>
</tr>
<tr>
<td></td>
<td>“East Track” or “West Track”</td>
</tr>
</tbody>
</table>

More than 2 tracks

- Numbered from the north as No 1 Track, No 2 Track, No 3 Track…
- Numbered from the east as No 1 Track, No 2 Track, No 3 Track…

Where time table direction indicates Eastward and Westward

<table>
<thead>
<tr>
<th>North Track</th>
<th>South Track</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Where time table direction indicates Southward and Northward

<table>
<thead>
<tr>
<th>West Track</th>
<th>East Track</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Where time table direction indicates Eastward and Westward

<table>
<thead>
<tr>
<th>No. 1 Track</th>
<th>No. 2 Track</th>
<th>No. 3 Track</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Where time table direction indicates Southward and Northward

<table>
<thead>
<tr>
<th>3</th>
<th>2</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
The maximum allowable train speed on a portion of track determines the class of track for that Subdivision.

<table>
<thead>
<tr>
<th>Class of Track</th>
<th>Maximum Allowable Speed (mph)</th>
<th>Maximum Allowable Speed (km/h)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Passenger</td>
<td>Freight</td>
</tr>
<tr>
<td>1</td>
<td>15</td>
<td>10</td>
</tr>
<tr>
<td>2</td>
<td>30</td>
<td>25</td>
</tr>
<tr>
<td>3</td>
<td>60</td>
<td>40</td>
</tr>
<tr>
<td>4</td>
<td>80</td>
<td>60</td>
</tr>
<tr>
<td>5</td>
<td>95</td>
<td>80</td>
</tr>
<tr>
<td>6</td>
<td>110</td>
<td>N/A</td>
</tr>
<tr>
<td>7</td>
<td>125</td>
<td>N/A</td>
</tr>
</tbody>
</table>

*LRC Trains -100mph

*LRC Trains -160km/h
RAILWAY INFRASTRUCTURE

Infrastructure is the term used to describe the track, equipment, and components of the railway used to control the train’s direction.
Railway Infrastructure: Components Of Track
• Track is two parallel running steel rails separated, and maintained at proper gauge allowing trains and high rail equipment to run.
• Tracks can be used in either direction.
• Comprised of sub-ballast, ballast, ties, plates, anchors, spikes and rail.
• Metrolinx runs on bonded track and CTC territory, where method of control is CTC (Centralized Traffic Control).
  o USRC is an exception which uses interlocking.
• Track terminology: main track, non-main track, multi-track, single track, siding, switch, crossover, etc.
• Running rail is a term used to refer to the rail the train travels on.
• Steel rail has a profile of an asymmetrical round I-beam and is graded based by weight over standard length (3ft).
• Heavier rail can endure very high stresses of heat and support greater loads, higher train speeds.
• Each rail consists of a head, web, and base and has a flat-bottom.
• Rail is made and shipped as long as possible, as the joints between rails are a source of weakness.
TIES

• Ties are rectangular supports perpendicular to the rails used as a base for tracks.
• Transfer loads from the train to the ballast and subgrade.
• Stabilizes the rail.
• Helps keep rails spaced to the correct gauge.
• Metrolinx has wood, steel, concrete and composite ties throughout the system.
TIE PLATES

- Tie plates combined with anchors and spikes complete the fastening system.
- The plate anchors the running rails to the ties at the correct gauge.
- The larger the plate the more surface area to transfer the load of the train.
- Fastened to wood ties by spikes.
- Concrete ties do not have plates. They are made to allow rail to sit in the rail seat and a clip is used to prevent the vertical and horizontal movement of the rail.
FASTENING SYSTEM: ANCHORS AND SPIKES

- Anchors are hook-like fasteners located on each side of the tie.
- Typically every other tie is anchored unless on the approach to vulnerable areas like switches and crossings.
- Anchors prevent the rail from lateral movement.
- Spikes are large nails with an off-set head used to fasten the rail to the tie plate.
- Concrete ties use Pandrol Clips with a rail pad and a gauge plate rather than tie plates, anchors and spikes.
Track bolts and bars is one method used to fasten rail joints.

The bolts vary in size according to the size of the rail.
BALLAST

• Ballast is the term for the crushed rock that forms the track bed to which the ties are laid.
• It is packed between, below and around the ties and on the ends of each tie (known as a shoulder).
• Two types of ballast; walking and mainline.

Four Main Functions:
1. Hold and support track structure,
2. Improve water drainage,
3. Controls vegetation,
4. Bears loads from railroad ties, cars and locomotives.
SWITCHES AND SWITCH MACHINES

- A switch is a device used to route a train or movement from one track to another.
- Movements either enter a switch from a trailing point or facing point direction.
SWITCHES

Switches have a normal and diverging route:

- The normal route is identified by a green target (typically the straight track).
- The diverging route is identified by either a yellow or red target (typically the turn route).
SPEED SIGNALS – CONTROLLED SIGNAL INDICATIONS

• Speed signals, like the ones below will give you a signal indication; is associated with a speed that operators must follow the signals.
SWITCHES AND SWITCH MACHINES

There are five (5) types of Switch Machines on Metrolinx Property

<table>
<thead>
<tr>
<th>Switch Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dual Control Switch</td>
<td>A switch equipped for powered and hand operation.</td>
</tr>
<tr>
<td>Main Track Hand Operated Switch</td>
<td>A switch connected to the main track used to route equipment or a track unit to or from the main track.</td>
</tr>
<tr>
<td>Non-Main Track Hand Operated Switch</td>
<td>A switch used to route equipment or a track unit within non-main track territory.</td>
</tr>
<tr>
<td>Power-Operated Switch</td>
<td>A switch equipped for powered operation, but not equipped for hand operation.</td>
</tr>
<tr>
<td>Semi-Automatic Switch</td>
<td>A non-main track switch equipped with an internal securing mechanism that permits equipment to trail through the switch points thus setting the switch for the route being used.</td>
</tr>
</tbody>
</table>
SWITCHES PINCH POINTS

- All switches create pinch points.
- Cross tracks away from switches
- Under no circumstances should anyone step on or sit on rail.
TURNOUT

• A turnout is made up of the switch points, switch rods, and the frog and is the distance from the switch points through the entire curve.
• Size of the turnout is linked to the speed a train operates on the turnout.
• Turnouts are the junction in track where rail diverge or converge enabling the train to transition from one track to another.
FROG

• The frog is the rail transition point of the turnout.
• Supports the train wheels while train movement diverges from one track to another over the switch area.
• Switch and frog work together for movement direction and is the point at which left and right rails cross in a switch or turnout.
GUARD RAILS AND JORDAN RAILS

Guard rails are placed parallel to the running rails to ensure that train wheels follow the appropriate alignment through the frog area.

- Helps ensure the flange of the wheel is channeling properly over the frog.
- Jordan rail (similar to guard rail) is between running rail in high risk areas: bridges, waterways, and roadways to help keep the train within the track structure in the event of a derailment.
CROSSOVER

A “Crossover” is a pair of switches that connects two parallel main tracks, or a main track with another track; allowing a train on one track to cross over to the other.
A derail is a tool used to intentionally derail a train or track unit where it’s not supposed to travel or; protect track work on track under Rule 841 protection.

- Form of last resort protection.
- Is portable (only used in non-main track).
- Highly visible with painted signage.
- Only works at slow train speeds.
- If you encounter a derail do not touch it unless you are authorised to do so.
Railway Infrastructure: Signals and Inspection Systems
METHOD OF CONTROL

Method of control is the term used to identify how train movements are controlled throughout the system.

• Metrolinx operates on Centralized Traffic Control (CTC).
• CTC is bonded track that is governed by signal indication and controlled by the RTC. RTC controls train movements by commanding field signal appliances (such as signals and switches). Status of field signal appliances is reported to the RTC through a dedicated communications system.
• CTC has a specific set of rules identified in the CROR.
A railway signal is a visual display device that displays information to the train crew about the section of track in front of the train, on the other side of the signal.
TWO (2) SIGNAL TYPES

• Block/Control signal – Can display stop. RTC provides permission to proceed by clearing the controlled signal.

• Intermediate signal – Provides information regarding the block ahead and advance information regarding the next signal to facilitate appropriate train handling.

Majority of Metrolinx operates on the RTC II control system.
SIGNS

- Signals can be a high mast or low mast signal.
- Each signal has either 1, 2 or 3 “aspects” which, when read together, create an “indication”.
- Aspects can display either 3 colours:
  - Red
  - Yellow
  - Green
- Some signals can have a plate(s) fastened to it which will change the indication depending what signal is displayed.
- Aspects can be displayed as solid colours or flashing lights which will also change the indication.
- Permission to proceed and permissible speed are identified with colours and signal indications.
Railway Infrastructure: Equipment
SNOW CLEARING DEVICES

- Snow clearing devices (Track switch heaters) keep the switch points and rods free of snow and ice.
- An air blower system (gas fueled high pressure heat unit) forces hot air throughout switch area via ducts and nozzles.
- Sensor activated on moisture conditions or manually by the RTC/TMD.
SIGNAL BUNGALOWS

- The “smarts” of the signal system that power railway infrastructure: switches, signals, and snow clearing devices.
- Metal or fibreglass structures that house signal equipment used to safely control train movements.
- Have a light on the side of each bungalow that when flashing indicates a “power off” indication. This should be reported immediately to the NOC.
WAYSIDE POWER

Wayside Power Cabinets are cabinets that engines are plugged into when they are shut down.

• Sizes vary based on the amount of power needed to operate the train.
• GO Trains (575V) and UP Trains (480V) do not share Wayside Cabinets.
• Eliminates idling.
• Keeps the engine and operating cab warm.
• Regulates the temperature of the coaches.
DAMAGE TO INFRASTRUCTURE

• If, at any point, damage to any of the infrastructure occurs, the situation must immediately be protected and made safe.
• The incident must then be reported to the NOC.
Railway Infrastructure: Crossings, Tunnels & Bridges
RAILWAY CROSSINGS

Railway crossings are intersections where railway track(s) cross a roadway or pedestrian path.

- Each crossing is unique based on the roadway characteristics and track geography.
- Crossings are governed by the Railway Grade Crossing Regulation.
- Crossing warning systems can be a combination of or all of: crossbucks, flashing lights, bells, gates, and signage on the road.
There are two types of railway crossings:

- Private Crossings.
- Public Crossings.

It is the joint responsibility of the Road Authority and Railway (Metrolinx) to maintain the safety of the crossing.

Private crossings have specific agreements in place between Metrolinx and the land owner.
CROSSING PROTECTION

- Railway crossings can be protected by automatic warning devices or just signage.
- The type of protection is determined through various factors including:
  - Train speed
  - Road speed
  - Sightlines
  - Design vehicle
RAILWAY CROSSINGS CROSSING PROTECTION

Crossing protection can be all of, or a combination of:
- Flashing lights
- Gates
- Bells
- Crossbucks

Private crossings
- Crossing protection varies based on the risk level of the crossing and the agreement between the railway and the land owner

Whistle sounds at crossings
- 2 long, 1 short, 1 long pattern.
- Anti-whistling in the GTA.
Constant Warning Device systems predict the speed of the train and activate the crossing protection at a constant warning time, regardless of train speed.

As the train approaches the crossing, the electrical current drops.

The electrical current continues to drop which determines direction and speed of the train.
RAILWAY CROSSINGS CROSSING ACTIVATION

- Once the train reaches the island circuit the information received about speed and direction is used to activate the warning system. The warning system will activate with a constant warning time for vehicle traffic regardless of the train speed.
TUNNELS

- Tunnels are underground passageways, dug through the surrounding soil / earth / rock and are enclosed except for an entrance and exit at each end.
- Restrictions and instructions for tunnels are located in the Time Table.
  - Example: Freight Trains – T2 Weston Sub.
GRADE SEPARATIONS

Rail grade separations allow an uninterrupted flow of train movement, at higher speeds, and increased safety while eliminating the safety threat posed by trains, pedestrians, or other vehicles.

There are two (2) forms of grade separations:
• Train-to-Train
• Train-to-Traffic
BRIDGES

Railway bridges are structures constructed for the exclusive purpose of carrying railroad traffic across an obstruction.
TUNNELS, GRADE SEPARATIONS, BRIDGES

• If you are in the right of way, do not cross the tracks unless with a qualified person and with the appropriate track protection in place.

• Tunnels, Grade Separations and Bridges are a very vulnerable spots to be in the ROW.
Union Station Rail Corridor (USRC)

A GUIDE TO PERSONAL TRACK SAFETY
INTERLOCKING

• Arrangement of signal indications that govern movements over intersecting tracks.

• Four (4) types of interlocking:
  o Manual
  o Locally controlled
  o Remotely controlled
  o Automatic

• USRC Interlocking
  o Operated by Train Movement Director (TMD)
  o USRC Operating Manual.
INFRASTRUCTURE

- Same as other corridors.
- Power operated switches.
- Railway Signal Maintainer (RSM) are the only qualified signal personnel that can manually operate power switches in the USRC.
TRACK PROTECTION

• Positive protection – Track Occupancy Permit (TOP).
• Long-term work requires track removal from service – Switches are re-wired and permanently lined away from work zone.
• Projects are always preplanned in advance.
USRC: Parking Policies
VEHICLE PARKING

- Subject to change due to construction staging and/or property allocation issues.

- USRC parking permits:
  - Valid for one (1) year.
  - Returned upon completion.
  - Not applicable to motorcycles.
  - 5 million dollar liability.
  - Clearly identified.
  - Vehicle beacon policy.
  - Idling policy.
  - TTR and GO Transit requirements
TYPES OF PARKING PERMITS

Blue – USRC Contractors

- Issued to contractors requiring access to work vehicle in ROW.
- Amber light (beacon).
- Company name and/or logo on vehicle.
- Assigned parking area.

Yellow – Critical operations (TMD/RSM)

- Issued to critical operations personnel.
- TMD and RSM.
- Bottom of Cherry Street Tower or along the ramp at Bathurst North Yard.
- Renewed annually.
TYPES OF PARKING PERMITS

Green – Management parking

- Issued to TTR Management staff and GO Transit officials.
- Emergency access/parking.
- Renewed annually.
- Authorizes to park close to emergency scene as approved by Incident Commander.

Red – Training Compound

- TTR staff.
- At the Ordnance and Bathurst North Yard Training Compounds.
- Renewed annually.
TYPES OF PARKING PERMITS

Pink – Contractors with equipment in ROW

- Issued to contractors requiring equipment within the ROW.
- Beacon required.
- Company name and/or logo on vehicle.
- Park and store in designated approved areas.
- Protecting Foreman and Railway Signal Maintainer will provide additional guidance on permitted areas to store equipment.
Hazards and Risk Evaluations
DEFINITION OF HAZARD AND RISK

Hazard
Any source with the potential to damage, harm, or in any way adversely affect something or someone.

Risk
The chance or probability that harm will be caused or experienced if a person or situation is exposed to a hazard.
EVALUATING RISKS

- Risk assessments.
- Likelihood (probability) and impact (severity).
- Financial, environmental, site specific, and safety risks
- Rules and regulations.
- Impact of work on operations.
LIKELIHOOD (PROBABILITY)

Likelihood is the probability / chance of an event occurring.

<table>
<thead>
<tr>
<th>Likelihood</th>
<th>Very Low (1)</th>
<th>Low (2)</th>
<th>Moderate (3)</th>
<th>High (4)</th>
<th>Very High (5)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very unlikely</td>
<td></td>
<td>Less likely to occur</td>
<td></td>
<td></td>
<td>Highly likely</td>
</tr>
<tr>
<td>&lt;10% but not 0%</td>
<td></td>
<td>10% to &lt;40%</td>
<td>May or may not occur</td>
<td>More likely than not</td>
<td>&gt;90%, but not 100%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>40% to 60%</td>
<td>60% to 90%</td>
<td></td>
</tr>
</tbody>
</table>

A GUIDE TO PERSONAL TRACK SAFETY
Impact is the severity of consequences should the risk occur.

### Potential Outcomes

<table>
<thead>
<tr>
<th></th>
<th>Potential Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Isolated minor injuries</td>
</tr>
<tr>
<td>2</td>
<td>Multiple minor injuries, or disabling injury</td>
</tr>
<tr>
<td>3</td>
<td>Fatalities due to misadventure, mental trauma, severe injuries, fatality due to</td>
</tr>
<tr>
<td></td>
<td>misadventure or voluntary action</td>
</tr>
<tr>
<td>4</td>
<td>Isolated severe injuries/fatality</td>
</tr>
<tr>
<td>5</td>
<td>Multiple severe injuries/fatality</td>
</tr>
</tbody>
</table>
**Risk Score**

- Multiply likelihood and impact.
- Actions must be taken to reduce score to the lowest practical level.
CONTROL MEASURES

- Tools and procedures used to reduce or eliminate the level of risk.
- Strive to reduce risk levels.
- Hierarchy of controls.
RESIDUAL RISK

- Level of risk that still exists after control measures have been established.
- Re-evaluate likelihood and impact.
- Multiply scores to achieve residual risk.
Planning Safe Work in a Railway Environment
RAIL CORRIDOR ACCESS AND CONTROL – RCAC

• Department in Metrolinx that takes in all work requests, approves, and grants access to perform work.
• Schedule projects.
• Review forms of protection.
• Work with Communications.
• Access requests applications.
• Work plans.
NON-DISRUPTIVE TRACK ACCESS FOR INVESTIGATIVE WORKS

• Contractor to submit application for access and Work Complexity Assessment.
• No later than 15 business days (3 weeks) prior to request date.
• Submit work plan when you applied.
NON-DISRUPTIVE TRACK ACCESS OR MINOR CLOSURES

• Contractor to submit application for access and Work Complexity Assessment.
• No later than 100 business days (20 weeks/6 months) prior to request date.
• Work plan submitted 80 business days prior.
MAJOR TRACK CLOSURES

• Contractor to submit application for access and Work Complexity Assessment.
• No later than 175 business days (35 weeks / approx. 9 months) prior to request date.
• Work plan submitted 80 business days prior.
Site Specific Safety and Work Plans
HOUSEKEEPING

• Cannot block or obstruct access routes.
• Check area for hazards, remove, and report.
• Keep area free of hazards.
• Waste in appropriate containers and removed daily.
• Do not use Metrolinx containers to dispose of garbage.
• Do not throw garbage on the ground, out windows, or onto tracks.
• Rebar capping and covers required.
• Oily rags disposed of in metal containers.
• No tools or materials left unattended by track.
• No fouling ballast.
WORK SITE AWARENESS AND PERSONAL CONDUCT

- No use of communication devices within 6m (20ft) of track OR where the Protecting Foreman has designated the safety zone.
- No entertainment devices.
- Maintain good housekeeping.
- Smoke and vape in designated areas.
- No burning or burying.
- No littering.
- Proper vehicle and equipment washing.
- Control filtration, noise, and dust.
WORK SITE AWARENESS AND PERSONAL CONDUCT

• Cooperate with government inspectors, site health and safety personnel, worker health and safety representatives, and Supervisors.
• Participate in Toolbox Talks.
• Read and follow notices and warnings.
• Proper training on equipment, machinery, and tools.
• Do not create distractions for equipment and machinery operators.
Work site storage requirements:

- Pre-authorization to store in ROW and Metrolinx property.
- Away from electrical conductors.
- Properly locked up.
- Does not endanger workers, public, access points.
- Cleaned and returned to proper location.
- Properly stored and separated.
STORAGE

• Legible signed identifying the following:
  o Project number.
  o Metrolinx PM and contact number.
  o Contractor’s Site Supervisor and contact number.
  o Date anticipated to be removed.

• Not stored 2m (6.5ft) from edge of roof, floor, excavation, or openings.

• Secured to prevent movement.
Safety Critical Communications
RADIO FREQUENCIES AND CHANNELS

- Metrolinx systems (train operations) uses multiple radio frequencies within two (2) bands.
- **UHF frequency band** is used by Transit Safety and NOC.
- **VHF frequency band** is used by RTC, Train Crews, Protecting Foreman, Supervisors, etc.
- Radios on specific channels.
- Sub-division channels defined in Time Table.
- Only authorized personnel are allowed to use Metrolinx radio frequencies.
RADIO FREQUENCIES AND CHANNELS

• Standby Channel (CN1 or CN42)
  o Channel that is monitored by all trains and Protecting Foreman operating on the main line.
  o The first broadcast will be made to stop train movements in the case of an emergency.

• RTC Channel
  o Changes based on location.
  o Monitored by the RTC Dispatcher designated to that territory.
  o Is initiated through a tone rather than a verbal call.
  o Designated emergency tone and broadcast (*0#) is the second step after the emergency broadcast.
The Military Clock is used to avoid confusion about the hour in the day. We do not use 0000 but rather 2359 or 0001 depending on the day in which is being referred to.

<table>
<thead>
<tr>
<th>Midnight</th>
<th>0001</th>
<th>6 AM</th>
<th>0600</th>
<th>12 PM</th>
<th>1200</th>
<th>6 PM</th>
<th>1800</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 AM</td>
<td>0100</td>
<td>7 AM</td>
<td>0700</td>
<td>1 PM</td>
<td>1300</td>
<td>7 PM</td>
<td>1900</td>
</tr>
<tr>
<td>2 AM</td>
<td>0200</td>
<td>8 AM</td>
<td>0800</td>
<td>2 PM</td>
<td>1400</td>
<td>8 PM</td>
<td>2000</td>
</tr>
<tr>
<td>3 AM</td>
<td>0300</td>
<td>9 AM</td>
<td>0900</td>
<td>3 PM</td>
<td>1500</td>
<td>9 PM</td>
<td>2100</td>
</tr>
<tr>
<td>4 AM</td>
<td>0400</td>
<td>10 AM</td>
<td>1000</td>
<td>4 PM</td>
<td>1600</td>
<td>10 PM</td>
<td>2200</td>
</tr>
<tr>
<td>5 AM</td>
<td>0500</td>
<td>11 AM</td>
<td>1100</td>
<td>5 PM</td>
<td>1700</td>
<td>11 PM</td>
<td>2300</td>
</tr>
</tbody>
</table>
**The phonetic alphabet**

<table>
<thead>
<tr>
<th>A</th>
<th>alpha</th>
<th>J</th>
<th>juliet</th>
<th>S</th>
<th>sierra</th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
<td>bravo</td>
<td>K</td>
<td>kilo</td>
<td>T</td>
<td>tango</td>
</tr>
<tr>
<td>C</td>
<td>charlie</td>
<td>L</td>
<td>lima</td>
<td>U</td>
<td>uniform</td>
</tr>
<tr>
<td>D</td>
<td>delta</td>
<td>M</td>
<td>mike</td>
<td>V</td>
<td>victor</td>
</tr>
<tr>
<td>E</td>
<td>echo</td>
<td>N</td>
<td>november</td>
<td>W</td>
<td>whisky</td>
</tr>
<tr>
<td>F</td>
<td>foxtrot</td>
<td>O</td>
<td>oscar</td>
<td>X</td>
<td>x-ray</td>
</tr>
<tr>
<td>G</td>
<td>golf</td>
<td>P</td>
<td>papa</td>
<td>Y</td>
<td>yankee</td>
</tr>
<tr>
<td>H</td>
<td>hotel</td>
<td>Q</td>
<td>quebec</td>
<td>Z</td>
<td>zulu</td>
</tr>
<tr>
<td>I</td>
<td>india</td>
<td>R</td>
<td>romeo</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Tips for Effective Delivery

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Not engaging in unnecessary radio chatter.</td>
<td></td>
</tr>
<tr>
<td>Removing oneself from the noisy environment.</td>
<td></td>
</tr>
<tr>
<td>Move to an area with clear transmission.</td>
<td></td>
</tr>
<tr>
<td>Be confident in your communications.</td>
<td></td>
</tr>
<tr>
<td>Think before speaking.</td>
<td></td>
</tr>
<tr>
<td>Ask for information to be repeated when unclear.</td>
<td></td>
</tr>
<tr>
<td>When saying numbers, Zero (0) may be spoken as “Nought”.</td>
<td></td>
</tr>
<tr>
<td>Avoid filler words like ums and errs.</td>
<td></td>
</tr>
<tr>
<td>Correct any errors verbally and repeat it back for confirmation.</td>
<td></td>
</tr>
</tbody>
</table>
Tips and Tricks to Keep you Safe
TRAIN MOVEMENT SAFETY

• If you can, stand 6 meters (20 feet). Further is preferred.
• Trains are quiet!
• Be aware of surroundings.
• See something, say something, do something!