Classroom Training
Course Catalogue
# Table of Contents

<table>
<thead>
<tr>
<th>Topic</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>26L Locomotive Air Brake</td>
<td>1</td>
</tr>
<tr>
<td>Apprenticeship Training Program (ATP)</td>
<td>2</td>
</tr>
<tr>
<td>Basic Operating Rules and Safe Railway Practices</td>
<td>3</td>
</tr>
<tr>
<td>Car Inspection Train/Yard - Initial</td>
<td>4</td>
</tr>
<tr>
<td>Canadian Rail Operating Rules (C.R.O.R.)</td>
<td>5</td>
</tr>
<tr>
<td>Derailment Investigation</td>
<td>6</td>
</tr>
<tr>
<td>Fast Track Conductor</td>
<td>7</td>
</tr>
<tr>
<td>An Insight into Communications &amp; Signals</td>
<td>8</td>
</tr>
<tr>
<td>Introduction to Continuous Welded Rail (CWR)</td>
<td>9</td>
</tr>
<tr>
<td>Protection of Track Unit and Track Works</td>
<td>10</td>
</tr>
<tr>
<td>Rail Car Mover Operator</td>
<td>11</td>
</tr>
<tr>
<td>Single Car Test</td>
<td>12</td>
</tr>
<tr>
<td>Student Locomotive Engineer</td>
<td>13</td>
</tr>
<tr>
<td>Track Inspection Guidelines</td>
<td>14</td>
</tr>
<tr>
<td>Track Welder</td>
<td>15</td>
</tr>
</tbody>
</table>
26L Locomotive Air Brake

Course Goal

The goal of this course is to:

- Improve the air brake skills of Mechanics with little or no knowledge of the 26L air brake system and its components
- Reduce out of service time and repair costs for the locomotive fleet
- Reduce the guesswork on air brake problems
- Outline the proper procedures for completing a shop track (functional/operational) air brake test.

Course Objectives

By the end of this course, trainees will be able to:

- Describe the principles of operation of the air brake system
- Describe the behavior of compressed air and determine pressure differentials accordingly
- Identify the main components of the air supply and air brake system and their functions
- Perform multiple unit hook-ups, with a job aid
- Describe the how and why of air brake tests
- Perform a shop track air brake test
- Perform compressor orifice tests
- Calibrate air flow meter operating pressure
- Interpret basic airflow circuits and troubleshoot air brake problems.

Course Content

- Introduction to Air Brake History
- Air Supply System
- Principles of the Automatic Brake System
- Principles of the Independent Brake System
- Penalty/Emergency Brake System
- Air Brake Tests
- Multiple Unit Hook-Ups

Hands-on practical demonstrations and exercises are intertwined with classroom presentations.

Target Audience

Machinists, Mechanics, Supervisors and Technical Officers from all types of rail operations

Pre-Requisites

Basic mechanical knowledge of a locomotive

Duration

24 Hours

Class Size

Minimum: 2
Maximum: 12

Course Code

00113V03
Apprenticeship Training Program (ATP)

Course Goal
The Apprenticeship Training Program (ATP) is a four part program (the level 1 includes a 3 month home study course as well) which S&C apprentices must undertake in order to be certified in their trade. Each level consists of a 10-day practical and theoretical course that must be successfully completed before moving on to the next.

Course Objectives
The objectives of the ATP is to provide S&C Helpers with the minimal competencies they require to assume S&C responsibilities required to install and modify signal systems as well as to troubleshoot problems in them.

At the end of this course, trainees will be able to do the following key functions:
- Properly troubleshoot 5 problems, in a Light Traffic CTC simulator which uses Genrakode and VPI equipment, within a 20 minute time limit for each problem.
- Perform all proper maintenance checks and procedures in order to properly maintain a Genrakode and VPI light traffic CTC system.
- Properly install Genrakode and VPI equipment.
- Properly adjust a track circuit using TrackAD in a Genrakode, VPI, and Light Traffic CTC environment.

Course Content
This program includes:
- **Level 1** consists of: Pre-course (Home study) called Electrical Fundamentals; Ohm’s Law; Overview of Signal Systems; Read Signal Prints; DC Relays; Track Appliances; Batteries; Energy Distribution; Track Circuits; Troubleshooting Track Circuits; Switch Circuit Controllers; Switch Machines.
- **Level 2** consists of: Light Signals; Highway Crossing Warning Devices; Gate Mechanisms; Automatic Signal Systems.
- **Level 3** consists of: Defect Detectors; Coding Systems; CTC; Switch Machines; Electric Switch Locks; Time Relays.
- **Level 4** consists of the following: Coded Track, Light traffic CTC, Microprocessor Based Coded Track, Vital Process Interlockers.

Target Audience
Signals and Communications Apprentices.

Pre-Requisites
Must have passed ATP - Electrical Fundamentals.

Duration
80 Hours

Class Size
Minimum: 4  
Maximum: 12

Course Code
00709CRS, 00710CRS, 00711CRS, 00712CRS
Basic Operating Rules And Safe Railway Practices

Course Goal
This course was developed by CANAC and the goal is to instruct and certify employees of industries, who perform rail car switching in their own plant and may also operate on non-main track, in basic safety operation. Upon successful completion of this course trainees will adhere to the operating rules and safe practices to safely and efficiently perform their duties.

Course Content
- Hand signals;
- Switching by use of radio;
- Blue Flags;
- Protection for track work;
- Entering roadway crossings;
- Operation of derails;
- Coupling to cars;
- Use of bell and whistle;
- Handling of switches;
- Semi-automatic switch
- Positive identification;
- Speed on non-main tracks;
- Crew member position when pushing cars;
- Safe procedures for switch operation;
- Engine bell
- Locomotive headlights
- Radio Communications
- Starting an engine
- Signaling emergency conditions
- Verification procedures
- Emergency communication procedures

Target Audience
Rail Operating employees working in an industrial environment

Pre-Requisites
None

Duration
8 Hours

Class Size
Minimum: 2
Maximum: 12

Course Code
00545 CRS
Car Inspection Train/Yard - Initial

Course Goal
The overall goal of this course is to enable employees assigned as car inspectors to: Inspect freight cars according to Company regulations, A.A.R. Interchange Rules, Federal Government Regulations; Ensure that cars can safely move to their destinations without mechanical failure or commodity damage.

Course Objectives
Upon completion of this course, trainees will be able to:
- State blue flag rules and work safely in a yard environment
- Reference an AAR Field Manual of Interchange Rules, for repair and billing purposes
- Identify car owner designations and component locations for defect repair and reporting purposes
- Recognize and, state the purpose of an appropriate action required for various defect cards/documents
- Inspect and service general freight car bodies, trucks, and brake components
- Install and test end of train (EOT) devices
- Perform train brake tests; Recognize "open top loads" and locate AAR guidelines specifying securement standards related to a specific load type.

Course Content
- Yard Safety & Blue Flag Rules
- AAR Interchange Rules
- Car Identification & Designation of Locations
- Documentation
- Inspection & Servicing
- End of Train Units (Cabooseless Train Operation)
- Train Air Brake Tests
- Open Top Loads

Target Audience
Personnel assigned to the inspection of freight cars: Car Inspector, Carman, Car Person, Car Mechanic, Car Maintainer, or Maintenance Technician. Also apprentices, craft people crossing over to the Car function, and supervisors of car inspection staff.

Pre-Requisites
Freight Car Repair (Level 1) plus minimum 9 months working in shop or repair track environment for car apprentice.

Duration
40 Hours (28 hours of classroom training with approx. 12 hours of “on-the-job” training on Car Inspection)
Recertification course is 24 hours (with 4-6 hours of “OJT”)

Class Size
Minimum: 4
Maximum: 8

Course Code
00546CRS
Canadian Rail Operating Rules (C.R.O.R.)

Course Goal

Course Objectives
Upon successful completion of this course, trainees will have the skills and knowledge to perform basic operating tasks under the supervision of a qualified conductor in a yard and mainline environment. They will be able to demonstrate the following:

- Non-main track and main track rules compliance.
- Coupling and uncoupling procedures.
- Handbrake application and yard switching techniques.
- Safe handling of Dangerous Goods.
- Proper procedures relating to copying authorities.

Course Content
The training consists of the following elements:

1. Operating Rules
   Non-main track rules; Main track rules; Rules applicable to switching; Radio Rules; Main track authority; Rules applied in emergencies; Systems of train control; Special Instructions; Dangerous Goods.

2. Field Training
   Demonstration and trainee practice of proper switching techniques; Demonstration and trainee practice of safe handbrake application; Demonstration and trainee practice of coupling locomotive to cars; Demonstration and trainee practice of coupling air brake hoses; Demonstration and trainee practice of cutting out air brake system on car; Demonstration and trainee practice of copying authorities and acting on such.

Target Audience
Operations supervisors that have had limited or no exposure to train operations.

Pre-Requisites

Duration
24 Hours

Class Size
Minimum: 04
Maximum: 12

Course Code
01043V01
Derailment Investigation

Course Goal
This course has been designed to provide the essential skills required to conduct a thorough derailment investigation by describing basic methodology and step-by-step logic. By using methods such as root-cause analysis, the investigation should identify the specific causes of the derailment.

Through use of lectures and case studies, guidelines for the most prevalent types of accidents and cause/effect factors are explored.

Course Objectives
At the end of this course, trainees will be able to:
- Identify the required participants, the chain of command and the procedures following First Notification of a derailment
- Prepare On-the-Scene action tasks to accurately determine derailment cause(s)
- Assist in the development of proper accident cause analysis techniques
- Recognize general conditions and/or failures of track and train components that are possible contributing factors
- Propose implementation procedures for corrective action
- Use standard procedures for gathering and preserving evidence.

Course Content
- First Notification Action
- On-The-Scene Action and Initial Investigation
- Transportation - In-Field Operating Investigation
- Engineering - Maintenance of Way Investigation
- Equipment - Mechanical Investigation
- Track/Train Dynamics (TTD)
- Derailment Scenarios: Video and Paper-Based Case Studies

Target Audience
First Line Supervisors in all areas of rail operations

Pre-Requisites
None

Duration
24 Hours

Class Size
Minimum:
Maximum:

Course Code
00917V01
OAGNAI 00917 E V01
Fast Track Conductor

Course Goal

Upon successful completion of this course trainees will have the skills and knowledge to safely and efficiently perform the duties of conductor trainee under the supervision of a qualified conductor in a yard and mainline environment. They will be able to demonstrate the following:

- Non-main track and main track rules compliance.
- Coupling and uncoupling procedures.
- Handbrake application and yard switching techniques.
- Proper procedures relating to copying authorities.
- Procedures dealing with train documentation.
- Safe handling of Dangerous Goods.
- Proper procedures for freight car air brake testing.
- Enroute train troubleshooting.

Course Objectives

The training consists of the following elements:

1. **Operating Rules**
   - Non-main track; Main track; Radio Rules; Main track authority; Rules applied in emergencies.

2. **Technical Subjects**
   - Freight car air brake systems; Air brake tests; Freight car and train inspection; Train marshalling regulations; Radio regulations; Dangerous Goods regulations; Passenger Evacuation procedures (where required).

3. **Train Documentation**
   - Train journals; Switch lists; Vehicle/Crossing accident reports; Authority forms.

4. **Field Training**
   - Demonstration and trainee practice of proper switching techniques, safe handbrake application, coupling locomotive to cars, coupling air brake hoses, cutting out air brake system on car, copying authorities and acting on such, train emergency procedures, train operations by day, train operations by night.

**NOTE:** There is also a 24-hour re-certification version of this course. It is intended for employees who have had the initial course. The emphasis of this course is to review the rules and safe practices and re-certify employees according to government regulations.

Target Audience

New employees of railroads hired to perform the duties of conductor.

Pre-Requisites

Trainee must have completed "Basic Operating Rules and Safe Railway Practices".

Duration

120 Hours

Class Size

Minimum: 04
Maximum: 12

Course Code

01050CRS
An Insight Into Communications & Signals

Course Goal
The goal of this course is to familiarize trainees with Signals and Communications related terminology and for these trainees to gain an insight into signal control systems.

Course Objectives
By the end of the course, trainees should be able to:
- Recognize different signal appliances.
- Identify signals and communications components.
- Relate signal circuits to other work related tasks (e.g., changing rail).
- Identify different crossing protection systems.
- Differentiate between various wayside inspection systems.
- Apply radio fundamentals and relate to radio sub-sections.
- Identify the various components of a communications system, including fiber optics.

Course Content
- Light signals
- Automatic block signals
- Track appliances
- Energy distribution
- Interlocking
- Switch circuit controllers
- Power switch machines
- Control machines
- CAMBS
- Highway crossing warning system
- Motion sensors
- Wayside inspection system
- Snow meltors
- Hump yard
- Radio fundamentals
- Transportation radio system
- Engineering radio system
- Second generation radio
- Fiber optic transmission systems

Target Audience
Entry level Signals and Communications personnel, Individuals who are unfamiliar with signal control systems, but for whom an introduction would be helpful in their respective positions.

Duration
24 Hours

Class Size
Minimum: 2
Maximum: 10
Introduction to Continuous Welded Rail (CWR)

Course Goal
This course is designed to provide employees with the skills and knowledge they require to supervise the maintenance of CWR, according to Standard Practice specifications and to accurately identify and correct stressed rail conditions.

Course Objectives
Upon completion of this course, trainees will be able to:
- Describe the theory of thermal expansion as it applies to rail and identify track components that resist thermal expansion
- Calculate the length of an unrestrained rail at different temperatures
- Calculate rail forces and resistance
- Identify the thermal stress limits of properly maintained track structure and describe the consequences of exceeding those limits
- Identify when destressing can be performed
- Review the steps to destressing rail and precautions to be taken
- Calculate the adjustment required to return rail to its ideal stress-free temperature
- Identify track defects related to CWR and the probable causes
- Describe the signs of overstressed rail
- Identify track locations and conditions where rail is most likely to become overstressed
- Describe the probable outcome if defects are left unattended
- Identify the effect that specific maintenance activities have on the track structure
- Identify the appropriate action to take to protect/correct the track structure
- Define the Preferred Rail Laying Temperature (PRLTR), Working Zone, and Joint Change Zone
- Describe the actions required to repair buckles, pull apart and track failures in CWR
- Accurately complete forms for specific maintenance operations

Course Content
- CWR Theory Review
- Destressing CWR Review
- Seasonal Inspection of CWR
- Maintenance of CWR

Target Audience
Track Maintainers

Duration
16 Hours

Class Size
Minimum: 8
Maximum: 15

Course Code
00082V02
Protection of Track Unit and Track Works

Course Goal
The goal of this course is to certify engineering employees in the operation of track units and track units in compliance with the Canadian Rail Operating Rules and special instructions.

Course Content
Course Topics include:
- Canadian Rail Operating Rules (CROR)
- Regulations governing Protection of Track Units and Track Work
- Introduction to various main track authorities
- Introduction to required protection for workers involved in track work

Target Audience
Engineering employees requiring initial rules qualification

Pre-Requisites
Must have passed medical and entrance exams

Duration
24 Hours

Class Size
minimum: 6
maximum: 16

Course Code
00277 CRS
Rail Car Mover Operator

Course Goal

Upon successful completion of this course trainees will have the skills and knowledge to safely and efficiently perform the duties of rail car mover operator in an industrial environment. They will be able to demonstrate the following:

- Start up and shut down procedures.
- Daily safety inspections and checklist.
- Brake tests.
- Operation on “rubber”.
- Operation on “rails”.
- Operation coupling and uncoupling rail cars.
- Proper use of independent and automatic brakes valves.
- Train handling techniques.
- Troubleshooting.

Course Objectives

The training consists of the following elements:

1. Classroom Training
   Safety; Hand Signals; Components of rail car mover; Rail car mover braking systems; Freight car air brake systems; Conducting safety checks.

2. Field Training
   Walk around safety inspection; Starting and shutting down rail car mover; Basic operation; Operating on “rubber”; Operating on “rails”; Coupling and moving rail cars; Charging, applying and releasing air brakes; Proper use of automatic air brake to control cars; Brake testing; Use of power and braking in relation to grade of land; Setting equalizing reservoir to standard brake pipe pressure; Monitoring of gauges; Troubleshooting.

Target Audience

Operators working in an industrial environment.

Pre-Requisites

Trainees must have completed “Basic Operating Rules and Safe Railway Practices”.

Duration

16 Hours

Class Size

Minimum: 1
Maximum: 4

Course Code

01047CRS
Single Car Test

Description
This course instructs trainees on the proper procedures for performing a brake test using the single car air brake test device, testing the single car test device, and performing repair track and single car tests.

Course topics include:
- daily test for the test device
- repair track test
- single car test on a standard freight car, a long freight car, a car equipped with an SC-1 empty/load brake system, and a car equipped with a J-type relay valve.

Target Audience
Car Mechanics, Apprentices and Equipment Supervisors

Pre-Requisites
Freight Car Repairs

Duration
8 Hours

Class Size
Minimum: 2
Maximum: 6

Course Code
00072 E CRS
Student Locomotive Engineer

Course Goal
With the help of a CANAC Locomotive Simulator, this course will reduce on-the-job training
trips. Trainees acquire mastery of good train handling and fuel conservation practices, which
can lead to significant future operating economies. Real-time in-train force display enables
trainees to see the draft and buff forces as they would be generated on a real train; reduction
of in-train forces reduces damage to lading.

Course Objectives
On completion, trainees will have a solid overall knowledge of locomotive systems and safe
train handling practices, as well as an understanding of locomotive and car air brake
operation.

By the end of the course, trainees will be able to:
- Operate a train safely and efficiently under the guidance of a qualified Locomotive
  Engineer
- Reduce in-train forces through good train handling practices
- Perform shop track brake tests (26L)
- Change operating ends of a locomotive

Course Content
- Description of major locomotive components
- Diesel engine, lube oil, fuel oil and water systems
- Main reservoir system
- 26L braking system, independent and automatic operation
- Multiple-unit hook-up
- Car air brake system
- Car control valves (AB, ABD, ABDW, ABDX)
- Quick service
- Accelerated release
- Bottling the air
- Penalty applications
- Tractive effort
- Wheel slip systems
- Locomotive starting/stopping procedures
- Basic high-voltage and low-voltage systems
- Dynamic brake
- Traction motor faults
- Troubleshooting power plant problems
- Shop track tests
- Leaving units unattended
- Fuel conservation
- Basic train handling guidelines, practice during Locomotive Simulator runs.

Target Audience
New or potential Locomotive Engineers on class 1, Regional and Shortline railroads, as well
as qualified Conductors. Also ideal for managers wanting to gain practical knowledge of
locomotive operation.

Pre-Requisites
Trainee must be a qualified conductor or trainman with a minimum of 6 months field
experience.

Duration
120 Hours

Class Size
Minimum: 2
Maximum: 8
Track Inspection Guidelines

Course Goal
The goal of this course is to teach how to inspect track effectively and how to authorize train movement over repaired track in accordance with the specific requirements of your company. Emphasis is on classroom exercises based on field situations, with straight lecturing minimized. This course is also available for customized on-site training.

Course Objectives
Upon completion of this course, trainees will be able to:

- Interpret and apply “Rules Respecting Track Safety” to a track inspection
- Record any defects and take needed remedial action; Identify track geometry defects
- Determine priority levels as per your company standards (trainees should bring a copy of their company’s Standards or Regulations Manual for the exercises)
- Recall their standard practices and apply them to track inspection
- Define various track/train dynamics concepts.

Course Content
- Current Track Safety Rules
- Basic Elements of Track Geometry
- The Concept of Track/Train Dynamics
- Measuring and Calculating Track Geometry Deviations
- Actions required for Excessive Deviations
- Checking Track and Drainage Systems, Including Bridge Structures
- Inspection of Turnouts and Railway Crossings

Target Audience
Engineering Supervisors and Track Inspectors, Work Gang Supervisors and Foremen, Bridge & Structure Supervisors and Foremen, Tamper Operators and Work Equipment Supervisors

Pre-Requisites
Basic Track knowledge

Duration
16 Hours

Class Size
Minimum: 2
Maximum: 12

Course Code
00022V06
Track Welder

Course Goal
The course goal is to cover the requirements necessary to perform the specialized reclamation welding needed to maintain rails, manganese frogs, carbon steel frogs, diamonds, switches, and switch point protection. Also included is the inspection, safety, use of tools, knowledge of materials, and the ability to recognize rail defects and initiate appropriate actions.

Course Objectives
Upon completion of this course, trainees will be able to:

- Perform track inspection and pre-welding inspection
- Demonstrate the use and care of tools and grinding equipment
- Weld rail ends using the electric arc method; Describe precautions and pre-weld maintenance operations
- Repair switch points by welding
- Weld manganese steel used in a variety of track castings
- Weld stock rails with proper preparation and procedures.

Course Content
- Track Inspection Pre-Welding Procedures and Rail Defects
- Fundamentals of Metallurgy and Electrocodes
- Rail joint Welding using the Electric Arc Method
- Switch Point and Switch Point Protector Welding
- Carbon Steel Rigid Rail Frog Welding
- Reclamation of Manganese Steel Trackwork
- Engine Burn Welding
- Spring Frog Welding

Target Audience
Certified Welders who need to expand their expertise in track welding

Pre-Requisites
Certified Professional Welder

Duration
40 Hours

Class Size
Minimum: 2
Maximum: 8

Course Code
00906CRS
ENWLAR 00906 E CRS