

# Railway Car Technician (RCT) Level 3

## Railway Car Technician (RCT)

**Unit: A4 Orientation II: The Job of Journeywork  
Workplace Skills-Coaching and Mentoring of Apprentices**

**Level:** Three

**Duration:** 21 hours

Theory: 14 hours

Practical: 7 hours

**Overview:**

RCT technical training offers an entry-level orientation to the challenges of apprenticeship learning. The present unit introduces senior apprentices to the responsibilities of workplace *teaching* that they will assume as supervising journeypersons. Tradeworkers have a particularly rich tradition of refreshing and sharing their skills from one generation of practitioners to the next. This unit orients senior apprentices to some of the practical and conceptual tools that can enable them to contribute to this trade heritage when they themselves become certified journeypersons. The journeyperson's obligation to assist trade learners to develop skills and knowledge is complex and challenging. It involves safety considerations, employer expectations, provincial regulations, as well as the tradition of skills stewardship that links modern practice with the long history of workplace teaching and learning that defines the apprenticeable trades. The ability to offer timely, appropriate support to apprentices is itself an important area of RCT trade learning. This unit presents material intended to help refine this ability through reflection and discussion by senior apprentices, and dialogue with their instructor. The detailed descriptors under each unit-objective reflect Manitoba and Canadian standards prescribed for journey-level supervisory capabilities, as well as key topics in current research on the importance of workplace teaching and learning in trades-apprenticeship systems. Thus, descriptors represent suggested focal points or guidelines for potentially-worthy exploration. Delivery of this content will vary with the discretion of individual instructors, and with the experiences senior apprentices bring forward for group/individual reflection on the skills-stewardship dimension of their own future practice as journeypersons

<b>Objectives and Content:</b>	<b><u>Percent of Unit Mark (%)</u></b>
<b>1. Describe the scope, substance, and significance of journey-level status.</b>	<b>20%</b>
a. Historical background, including trainee experiences	
• Origin, definition, and examples of journey-level status	
• Obligations to employers, trade clients, and apprentices	
• Concept of skills stewardship, and its rationale	
• Customary responsibilities of journeyperson as workplace trainer/supervisor	
• Overview development of formal systems for regulating/recognizing journey-level competence in designated apprenticeable trades	
• Contributions of 'unticketed journeymen' and other informally-qualified RCTs to workplace trade-learning	
• Achievements/limitations of informal systems for workplace training	

- Trends (e.g., succession planning in the trades; recognition of credentials and prior learning; defined standards for on-the-job trades education and training)
- b. Regulatory/legal dimensions of journey-level status in designated trades
  - Rights and obligations re: Canada's Interprovincial 'Red Seal' program (Red Seal rationale, scope, and products, including the Provincial Occupational Analysis [POA], and examinations)
  - Manitoba provincial requirements [e.g., *Apprenticeship and Certifications Act; General Regulation*; the; relevant policies of the Apprenticeship and Certification Board, etc.]
  - Trade-specific requirements re: practical training supervision and documentation; importance of quality assurance and broad-scope coverage of prescribed task-content; ratios, etc.
- c. Other (as may be specified by instructor)

**2. Compare/contrast role-options and responsibilities of the supervising journeyperson.**

**20%**

- a. Recognizing the variability of supervision assignments, situations, and roles
- b. Source and specification of the supervision assignment
- c. Formal vs. informal roles (e.g., mandated by an employer's succession plan)
- d. Implicit vs. explicit standards and content: training goals are/are not codified; assessment measures are/are not used,
- e. Accountability for results: subject/not subject to third-party notification; completion of supervision assignment itself is/is not assessed by third party; journeyperson is/is not required to prepare performance evaluation that could affect apprentice's employability or wage-rate, etc.
- f. General vs. task- or job-specific supervision assignments: e.g., scope of expectations re: content of supervisory task(s)
- g. Long-term vs. short-run supervision assignments – e.g., considerable latitude/little latitude for apprentice to learn from mistakes
- h. Formally vs. informally structured – e.g., supervision assignment is part of a prescribed cycle of assignments involving coordination among multiple journeypersons; apprentice is trained according to an individual training plan negotiated with employer
- i. Typology of common supervisory role-options and what is implied by each:
  - Coach role: is often initiated by someone other than apprentice, and limited to a particular skill set, task, or production requirement
  - Mentor role : often initiated by apprentice, and relatively open-ended regarding content, duration, etc.
  - Peer role: typically involves individual upgrading or cross-training of one journeyperson by another; can include senior apprentice assisting less-experienced trade learner
  - Managerial role(s): can shade over into hire/fire issues as lead-hand or site-boss
  - Coordinator role: often a senior-level journeyperson appointed by an organization to assume responsibilities for monitoring progression of groups of apprentices
  - Other roles: may be improvised by journeyperson
- j. Possibilities, perils, and likelihood of role-overlap in 'real-life' trade practice
- k. Importance of clarifying all roles, expectations, and implications involved in accepting a supervision assignment
- l. Role of Apprenticeship Manitoba
- m. Resources for developing skills and knowledge re: providing journey-level supervision
  - Books and journals (not always trade-specific)
  - Websites

- Conversation with trade instructors, journeypersons, and peers
  - Workshops
- n. Other (as may be specified by instructor)

**3. Describe/demonstrate common requirements re: providing journey-level supervision. %**

- a. Review Unit A1 content re: challenges/opportunities opportunities of Apprenticeship learning adapted to journey-level supervision assignments and a journey-level standpoint
- Application of adult education concepts to trades teaching/learning (e.g., responsibilities and expectations of adult learners)
  - Practical significance of ‘styles’ of adult learning and teaching
  - Helping apprentices to integrate technical training (in school) and practical training (on-the-job) learning experiences
  - Providing help and guidance re: new tasks and skills
  - Providing help and guidance re: fixing mistakes
  - Learning/teaching ‘the ropes’ – socialization of learner within a community of trade practice (e.g., how to borrow a tool, interrupt a journeyperson, ‘recruit’ an advisor)
  - Coverage/documentation of prescribed tasks and subtasks (RCT POA), including responsibility re: logbook sign-off (where applicable)
  - Consultation with Apprenticeship Manitoba
  - Communicating with apprentices and employers about supervision assignments and assignment specifications, including the limits of the trainers’ own responsibilities and competence (e.g., substance-abuse intervention)
  - Benefits of maintaining a personal record of achievements, ideas, and needs as a workplace trainer
- b. Individual reflection and guided group discussion re: personal experiences of workplace learning as an apprentice
- Identification of best and worst practices of supervising journeypersons
  - Assessment of personal experiences (if any) to date in supervising, coaching, or guiding other people to learn or improve their skills (e.g., entry-level apprentices, members of athletic team, younger family members, etc.), and how this might compare/contrast with the journey-level support of apprenticeship learning
  - Identification of workplace and other factors that can contribute to good and bad trades teaching/learning experiences
  - Development of personal standards re: responsibility to share one’s knowledge and skill with others in the workplace (e.g., use/misuse of humour, rigour, discretion, craft-pride, etc.)
- c. Comparison/contrast of discussion results with current knowledge/resources re: workplace skills coaching methods as applicable to journey-level supervision assignments
- Qualities of a good workplace coach
  - Components of workplace skills coaching
  - Processes and recommended practices re: workplace coaching
  - Troubleshooting problems re: supervision assignments
- d. Other (as may be specified by instructor)

**4. Complete Modules 1 to 3, *Workplace Coaching Skills* (Burnaby, BC: 1995; ISBN 1-55139-030-2), or equivalent. 20%**

- a. Identifying purpose of the lesson
- Explaining the point of the lesson
  - Role of the coach in specific coaching situation

- Other (specified by instructor)
- b. Linking the lesson
  - Learner needs
  - Lesson sequence
  - Focus on learner
  - Selection/timing of coaching opportunities
- c. Demonstration of skill/task to be learned
  - Starting the coaching session
  - Demonstration
  - Hands-on trial
  - Recap for learner

5. **Complete Modules 4 to 6, *Workplace Coaching Skills* (Burnaby, BC: 1995; ISBN 1-55139-030-2), or equivalent.**

**20%**

- a. Practice of skill/task to be learned
  - Nature and importance of practice
  - Setting up for learner practice
  - Types of practice
  - Recycling and reinforcing skill/task learning
- a. Providing feedback to the learner
  - Value of feedback
  - Kinds of feedback
  - Guidelines and tips
- c. Assessment
  - Value of assessing learner progress
  - Assessing level of skill
  - Planning further steps toward skill/task mastery

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## Railway Car Technician (RCT)

**Unit: A5 Provincial Certification Exam Preparation (CEP):  
Program Review**

**Level:** Three

**Duration:** 63 hours

Theory: 63 hours

Practical: 0 hours

### Overview:

This unit offers senior apprentices a systematic review of skills and knowledge required to pass their journey-level certification exam. Unit content promotes a purposeful, personal synthesis between on-the-job learning and the content of in-school technical training. The unit includes information about the significance of occupational qualifications, and the main features of the certification exam, as well as practical strategies/resources for mastering study materials. This material on mastering study-materials accompanies a comprehensive and systematic review of prescribed, trade-specific program content. It is intended that apprentices who seriously tackle the objectives of this unit should be able to approach the certification exam with well-founded confidence. The unit also supports consolidation of study practices, trade knowledge, and self-awareness to help meet longer-term requirements of further learning throughout one's career as a skilled worker. **Note: No percentage-weightings for test purposes are prescribed for this unit's objectives. Instead, a 'Pass/Fail' grade will be recorded for the unit in its entirety.**

### Objectives and Content:

**Percent of  
Unit Mark (%)**

1. **Describe the significance, format, and content of the RCT certification exam.** n/a
  - a. Scope and aims of occupational qualification systems; value of certification
  - b. Obligations/entitlements of candidates for certification
    - Relevance of certification exam on to current industry standards, practices, and expectations
    - Supplementals policy (retesting)
    - Confidentiality of examination content; the candidate's own stake in examination security (value of credential)
    - Limitations on use of calculators (e.g., dedicated, pre-programmed builders' calculator not allowed)
  - c. Multiple-choice (four-option) item format; common standards for acceptable test items (e.g., no "trick"-type questions; specifications for use of metric/Imperial units)
  - d. Important government materials relevant to the certification examination
    - Provincial Occupational Analysis (POA); prescribed scope of the skills and knowledge which comprise the trade
    - Special significance of subtask-level POA descriptors re: exam content
  - e. Other (specified by instructor)

- 2. Identify resources, strategies, and other key considerations for maximizing successful completion of tradesperson-certification exams.** **n/a**
- a. Personal preparedness
    - Proper rest/nutrition; eye-testing
    - Making room for a personal study regimen: appropriate prior communication with family members, friends, and employers about exam-related commitments/needs; identifying – and concluding – all necessary arrangements for minimizing distractions/disruptions
    - Focused reflection on prior experience – good and bad – in test situations (e.g., Unit Tests), especially with respect to what the trainee already has learned re: personal characteristics, learning styles, exam anxiety, and strategies (e.g., time management) for effective performance in test situations.
  - b. Self-assessment, consultation, and a personal study plan
    - Preliminary self-assessment of individual strengths/weaknesses in trade-related skills and knowledge; usefulness of old tests and training program materials; personal reflection re: in-school and on-the-job components of the program, as well as the relationship between these two components; usefulness of consultation with trainer(s), instructor(s), appropriate peers, the Apprenticeship Training Coordinator), and/or personal mentors and skills-coaches
    - Use(s) of approved textbooks, chapter tests, study guides, and note-taking in preparing for an examination
    - Study groups: perils and possibilities
    - Formulation, and submission for instructor’s comments, of a personal study plan, including an approximate timetable, which describes/schedules a course of action for reviewing all relevant material(s) and for strengthening areas of deficient skills/knowledge in anticipation of the certification exam
  - c. Other (specified by instructor)
- 3. Review program content re: RCT trade-foundations.** **n/a**
- a. Structure and scope of RCT trade-learning
  - b. Trade safety awareness
  - c. RCT trade-standards and the regulatory environment
  - d. Workplace skills-coaching of apprentices, skills-stewardship, and the journey person role in regulation as well as in practice
- 4. Review program content re: trade math, technical drawing, and document use.** **n/a**
- a. Applied math for RCT work-assignments
  - b. Using railway-car schematics, blueprints, and other technical drawings
  - c. RCT-trade computer applications
  - d. Techniques for building RCT trade-skills re: measurement, layout, inspection, and troubleshooting
- 5. Review program content re: RCT-trade tools, equipment, and ways of work.** **n/a**
- a. Overview use of RCT tools, equipment, and materials
  - b. RCT metalwork and woodwork practices
  - c. RCT welding and cutting practices
  - d. RCT metal-fabrication practices
  - e. RCT painting practices
  - f. RCT rigging and materials-handling practices

6. **Review program content re: railway-car underframe systems.** n/a
  - a. Railway-car wheel/axle assemblies
  - b. Railway-car coupling units
  - c. Railway-car chassis components
  - d. Railway-car cushion units
  
7. **Review program content re: railway-car brake-systems.** n/a
  - a. RC hand-brakes
  - b. RC air-brakes
  
8. **Review program content re: railway-car bodies and units.** n/a
  - a. Open-top freightcars
  - b. Enclosed freightcars
  - c. Rail-passenger rolling stock of the baggage-, coach, and sleeper-car varieties
  - d. Rail-passenger rolling stock of the diner- and domed-car varieties
  
9. **Review program content re: railway-car plumbing and climate-control systems.** n/a
  - a. Pipefitting for RCT work-assignments
  - b. RC plumbing systems and components
  - c. RC climate-control systems and components
  
10. **Review program content re: yard (lie-point) and other RCT jobsite specialties.** n/a
  - a. Rerailment protocols and procedures
  - b. RC switching protocols and procedures
  - c. RC hoisting practices
  - d. Certified Car Inspector (CCI) Qualification

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## Railway Car Technician (RCT)

**Unit:** C5 RCT Metal Fabrication Practices

**Level:** Three

**Duration:** 70 hours

Theory: 56 hours

Practical: 14 hours

### Overview:

This unit of instruction offers senior apprentices the opportunity to broaden the knowledge and refine the skills required to perform proficiently RCT metal-fabrication procedures including as heat-treating, forging, non-destructive testing, etc.

<b>Objectives and Content:</b>	<b>Percent of Unit Mark (%)</b>
1. Describe standards, procedures, main contexts, and special hazards/precautions (e.g., high temperatures, toxins, harmful dusts, etc) associated with RCT work-assignments requiring fabrication proficiency.	30%
2. Describe/demonstrate the tools, equipment, materials, and techniques required to perform the metal fabrication practices of the RCT trade in general, including heating, forging, heat-treating, metal identification, metallurgy, nondestructive testing, etc.	40%
3. Describe/demonstrate fabrication procedures required to complete particular railway-car projects as specified by the instructor, with particular reference to including measurement, heating-techniques, surface preparation, post-heating/pre-heating, monitoring/control of metal distortion including camber, etc.	30%

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## Railway Car Technician (RCT)

**Unit:** C6 RCT Painting Practices

**Level:** Three

**Duration:** 28 hours

Theory: 14 hours

Practical: 14 hours

### Overview:

This unit offers provides classroom and shop-floor instruction concerning RCT trade-practice that require the use of industrial- painting tools, equipment, and materials per current standards.

<b>Objectives and Content:</b>	<b><u>Percent of Unit Mark (%)</u></b>
1. Describe standards, procedures, main contexts, and special hazards/precautions (including WHMIS) associated with RCT work-assignments requiring industrial-painting proficiency (e.g., spray, etc.).	35%
2. Describe/demonstrate the tools, equipment, materials, and techniques required to perform the painting practices of the RCT trade in general.	35%
3. Describe/demonstrate painting procedures, including decaling and stenciling, required to complete particular railway-car projects as specified by the instructor.	30%

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## Railway Car Technician (RCT)

**Unit:** G2 Pipefitting for Railway-Car Projects

**Level:** Three

**Duration:** 35 hours

Theory: 14 hours

Practical: 21 hours

### Overview:

This unit offers senior-level instruction in pipefitting practices as these pertain to the work of Railway Car Technicians.

<b>Objectives and Content:</b>	<b><u>Percent of Unit Mark (%)</u></b>
1. Describe standards, procedures, main contexts, and special hazards/precautions associated with air-, water-, and pneumatic-pipefitting assignments in the RCT trade.	10%
2. Describe/demonstrate the tools, equipment, materials, and general techniques required to complete air-, water-, and pneumatic-pipefitting for railway-car projects in general.	25%
3. Describe/demonstrate pipefitting procedures required to complete particular railway-car projects as specified by the instructor.	25%
4. Complete the RCT pipefitting-skills demonstration project per instructor specifications and grading-criteria.	35%

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## Railway Car Technician (RCT)

**Unit:** G3 Railway-Car Climate-Control Systems and Components

**Level:** Three

**Duration:** 28 hours

Theory: 14 hours

Practical: 14 hours

### Overview:

This unit of instruction offers senior-level training in the procedures required to measure, diagnose and service railway-car climate-control systems and components.

### Objectives and Content:

**Percent of  
Unit Mark (%)**

- |   |     |
|---|-----|
| 1. Identify/describe RCT work-requirements, including close coordination with other personnel, concerning railway-car climate-control systems as these pertain to the structure/function of railway-car technology more generally.                        | 15% |
| 2. Describe special hazards/precautions, including mandated testing/inspection protocols, such as MOPIA, re: RCT work-assignments to diagnose and service railway-car climate-control systems/components such as ductwork, fans, filtration systems, etc. | 15% |
| 3. Describe/demonstrate RCT-trade standards and procedures, including special tests and measurements, for diagnosing and servicing railway-car heating/air-conditioning systems and components.   | 40% |
| 4. Describe/demonstrate RCT-trade standards and procedures, including special tests (e.g., asbestos) and measurements, for diagnosing/servicing heaters, cabooses, spreaders, plows, etc.   | 15% |
| 5. Complete the RCT climate-control competencies demonstration project as specified by instructor, including procedure for monitoring/verifying temperature(s) of delivery.   | 15% |

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## Railway Car Technician (RCT)

**Unit:** H3 Railway-Car Rerailment Protocols and Procedures

**Level:** Three

**Duration:** 35 hours

Theory: 14 hours

Practical: 21 hours

### Overview:

This unit of instruction offers senior -level training in the practices prescribed for the rerailing of railway cars in accordance with current industry standards and operational protocols.

<b>Objectives and Content:</b>	<b><u>Percent of Unit Mark (%)</u></b>
1. Identify and describe RCT work-requirements regarding rerailment of cars as these relate to the trade's responsibilities to complete yard (line-point) assignments in general.	15%
2. Describe special hazards/precautions re: RCT work-assignments to rerail cars (e.g., pinch-points, crushing injuries, dangerous commodities, placement/orientation of jacking equipment, positioning of personnel, etc.).	15%
3. Describe/demonstrate RCT-trade standards and procedures for setting up and using rerailers (replacers) per instructor specifications.	15%
4. Describe/demonstrate RCT-trade standards and procedures for operating jacking equipment to rerail cars per instructor specifications.	15%
5. Describe/demonstrate RCT-trade standards and procedures, including use of engineered lift plans, for operating hoisting equipment to rerail cars.	15%
6. Complete the rerailment competencies demonstration project per instructor specifications.	25%

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## Railway Car Technician (RCT)

**Unit:** H4 Railway-Car Switching Protocols and Procedures

**Level:** Three

**Duration:** 35 hours

Theory: 14 hours

Practical: 21 hours

### Overview:

This unit of instruction offers senior level training in the practices prescribed for the switching of railway cars in accordance with current industry standards and operational protocols.

<b>Objectives and Content:</b>	<b><u>Percent of Unit Mark (%)</u></b>
1. Identify and describe RCT work-requirements regarding switching cars as these relate to the trade's responsibilities to complete yard (line-point) assignments in general.	10%
2. Describe special hazards/precautions re: RCT switching-assignments (e.g., major collisions and environmental crises; classification/use of derails; close reference to Yard Rules, etc.).	15%
3. Describe/demonstrate RCT-trade standards and procedures for operating railcar-mover with particular reference to proceeding in accordance with switching-assignment specifications (e.g., engineered lift-plan provisions) and with Yard Operating Rules.	15%
4. Describe/demonstrate RCT-trade standards and procedures for operating switches and rerails, including variations re: loaded vs. empty cars, weigh-transfers, etc.	10%
5. Complete the RCT switching competencies demonstration project per instructor specifications, with particular reference to use of brake systems, trackmobile operation, signals, monitoring of weight transfers, and practical interpretation of yard operating rules.	50%

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