

Tower Crane Operator Level 2

Tower Crane Operator

Unit: B1 Journeyperson Trainer

Level: Two

Duration: 7 hours

Theory: 7 hours

Practical: 0 hours

Overview:

Level 1 in-school technical training offers an entry-level orientation to the challenges of apprenticeship training as it relates to the development of core tasks and skill requirements, as well as social competencies. This unit introduces senior apprentices to the responsibilities of workplace training that they will assume as supervising journeypersons. Most trades have a rich tradition of refreshing and sharing their trade skills from one generation of trade practitioner 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 become certified journeypersons and, ultimately, journeyperson trainers.

The journeyperson's obligation to assist entry-level apprentices 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 and appropriate support to apprentices is itself an important area of trade learning. This unit presents material intended to help refine this ability through reflection and discussion by senior apprentices, and discussion with their in-school instructor and journeyperson trainer.

This content reflects Manitoba and Canadian standards prescribed for journeyperson-level supervisory capabilities, as well as key topics in current research on the importance of workplace training in apprenticeship systems. These detailed descriptors represent suggested focal points or guidelines for potentially worthwhile exploration, and are neither mandatory nor exhaustive.

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 (%)
<p>1. Compare/contrast role-options and responsibilities of the supervising journeyperson.</p> <ul style="list-style-type: none">a. Implicit vs. explicit standards and content: training goals are/are not codified; assessment measures are/are not usedb. Accountability for results: e.g. journeyperson is/is not required to prepare performance evaluation that could affect apprentice's employability or wage-rate, etc.c. Long-term vs. short-term supervision assignments – e.g., considerable latitude/little latitude for apprentice to learn from mistakesd. 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 employere. Types of supervisory role options and what is implied by each:	n/a

- Journeyperson Trainer (JT) role: 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
- 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, such as combination or multiple roles of the above

2. Describe and demonstrate common requirements about providing journeyperson level supervision. n/a

- a. Apprenticeship learning adapted to journeyperson supervision assignments and a journeyperson perspective
 - Application of adult education concepts to trades teaching and learning (e.g. responsibilities and expectations of senior-level apprentices)
 - Practical significance of 'styles' of adult learning and teaching
 - Helping senior-level apprentices integrate in-school technical training and on-the-job practical training experiences
 - Providing help and guidance about new tasks and skills
 - Providing help and guidance about fixing mistakes
 - Learning and teaching "the ropes" – socialization of apprentice within a community of trade practice (e.g. how to borrow a tool, interrupt a journeyperson, and seek advice of experienced co-workers)
 - Coverage and documentation of prescribed tasks and subtasks where applicable.
 - Discuss the limits of the journeyperson trainers' own responsibilities and competence (e.g. scope, willingness to train, etc.)
 - Benefits of maintaining a personal record of achievements, ideas, and needs as a journeyperson trainer (e.g. resume, portfolio, training credentials, logbook, etc.)
- b. Individual reflection and guided group discussion about personal experiences of workplace learning as an apprentice
 - Identification of best and worst practices of journeyperson trainer
 - Identification of workplace and other factors that can contribute to good and bad trades teaching/learning experiences
 - Development of professional standards and work ethics about responsibility to share one's knowledge and skill with others in the workplace (e.g., use/misuse of humour, rigour, discretion, craft-pride, etc.)
 - Qualities of a good journeyperson trainer
 - Components of workplace journeyperson training
 - Processes and recommended practices re: journeyperson training
 - Troubleshooting problems re: supervision assignments
- c. Role of assessment in supervising, coaching, or guiding other people to learn or improve their skills (e.g. formative and summative evaluation), and how this might contribute to how the journeyperson-level supervision task is approached in future
- d. Compare and contrast discussion results with current knowledge and resources about workplace training methods as they apply to journeyperson-level supervision assignments
- e. Other (as may be specified by instructor)

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Unit: B2 Maintenance and Regulations

Level: Two

Duration: 21 hours

Theory: 14 hours

Practical: 7 hours

Overview:

This unit, which builds on *A3 Trade Regulatory Environment*, is designed to provide the apprentice with additional knowledge about maintenance and regulations. The unit covers the types of tower cranes and related terminologies, tower crane components, maintenance and inspection procedures.

Objectives and Content:	<u>Percent of Unit Mark (%)</u>
1. Review types of tower cranes and related terminologies.	25%
a. Hammerhead	
b. Luffing-jib	
c. Self-erecting	
d. Configurations	
• Top climbing	
• Bottom climbing	
• Rail-mounted base	
• Ballast-based	
• Fixed-based	
• Bracing	
2. Describe tower crane components, maintenance and inspection procedures.	35%
a. Components and Systems	
b. Pre-operational inspection procedures	
c. Limit test procedures	
d. Maintenance and repair procedures	
3. Review unit <i>A3 Trade Regulatory Environment</i>.	40%
a. Tower crane specific regulations	
b. General crane and hoisting regulations	

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Unit: B3 Trade Math II

Level: Two

Duration: 21 hours

Theory: 21 hours

Practical: 0 hours

Overview:

This unit, which builds on *A5 Trade Math I*, is designed to provide the apprentice with additional knowledge about trade math. The unit covers load weight, sling tension and multiple crane lift calculations.

Objectives and Content:	<u>Percent of Unit Mark (%)</u>
1. Review unit A5 Trade Math I. a. Relevant mathematical operations b. Trade-related calculations	20%
2. Perform load weight calculations. a. Weight of load b. Center of gravity	30%
3. Perform sling tension calculations. a. Equal sling lengths b. Unequal sling lengths c. Offset center of gravity	25%
4. Perform multiple crane lift calculations. a. Load weight distribution b. Placement of connection points c. Load hoisting sequence (which crane picks first)	25%

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Unit: B4 Lift Planning II

Level: Two

Duration: 21 hours

Theory: 14 hours

Practical: 7 hours

Overview:

This unit, which builds on *A7 Lift Planning I*, is designed to provide the apprentice with additional knowledge about lift planning. The unit covers proper use of load charts, lift plan considerations for specialty operations and emergency procedures.

Objectives and Content:	Percent of Unit Mark (%)
1. Review unit <i>A7 Lift Planning I</i>.	20%
2. Describe and demonstrate proper use of load charts.	45%
a. Capacities based on crane configurations	
b. Multiple part lines	
3. Describe lift plan considerations for specialty operations.	25%
a. Operating near high voltage	
b. Multiple crane lifts	
c. Hoisting of personnel	
d. Other cranes operating within swing area	
e. Blind hoisting	
f. Precision lift	
4. Describe emergency procedures.	10%
a. Evacuation procedures	
b. Aerial EMT equipment	
c. Emergency rescue plan	

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Unit: B5 Rigging II

Level: Two

Duration: 21 hours

Theory: 7 hours

Practical: 14 hours

Overview:

This unit, which builds on *A9 Rigging I*, is designed to provide the apprentice with additional knowledge about rigging. The unit covers specialty rigging procedures.

Objectives and Content:

Percent of Unit Mark (%)

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| 1. Review unit <i>A9 Rigging I</i>. | 70% |
| a. Rigging hardware and tools | |
| b. Wire rope types and applications | |
| c. Rigging procedures for handling materials | |
| 2. Describe and demonstrate specialty rigging procedures. | 30% |
| a. Rigging for multiple crane lifts | |
| b. Rolling loads | |
| c. Transferring loads | |
| d. Rigging complex loads | |

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Unit: B6 Tower Crane Operation

Level: Two

Duration: 49 hours

Theory: 7 hours

Practical: 42 hours

Overview:

This unit is designed to provide the apprentice with the knowledge about tower crane operation. The unit begins with coverage of the procedures for crane reconfigurations, and crane assembly and disassembly. Part of the unit covers the procedures for tower crane operations. Finally, the unit covers communication procedures.

Objectives and Content:	<u>Percent of Unit Mark (%)</u>
1. Describe the procedures for crane reconfigurations.	20%
a. Top climbing	
b. Bottom/internal climbing	
c. Telescoping sections	
d. Parts of line	
e. Bracing	
f. Rail leveling and adjustment	
2. Describe the procedures for crane assembly and disassembly.	20%
a. Regulations, drawings and specifications	
• Location considerations	
• Jurisdictional regulations	
• Engineered drawings (i.e. soil reports, base design)	
• Manufacturer's specifications	
b. Inspection intervals and procedures	
c. Manufacturer's assembly and disassembly manuals	
3. Describe and perform the procedures for tower crane operations.	40%
a. Pre-lift inspection, warm-up and function tests	
b. Limit test procedures	
c. Operation of all tower crane functions	
• Individual function operations	
• Simultaneous function operations	
• Configuration changes (i.e. parts of line)	
• Auxiliary equipment (i.e. service hoist)	
d. Shutdown procedures	
• Short term	

- Long term
- Emergency
- e. Specialty operations
 - Multiple crane lifts
 - Personnel hoisting
 - Working on multiple crane sites
 - Critical lifts
 - Precision hoisting
 - Emergency procedures

4. Describe and perform communication procedures.

20%

- a. Radio communications
 - Blind lifts
 - Portable and stationary radio equipment
- b. Hand signals
- c. Multiple crane site coordination
 - Contact avoidance systems
 - Inter-crane communications
- d. Other communication devices (i.e. horn, whistle, mobile phone)

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Unit: B7 Pre-Interprovincial Exam Review

Level: Two

Duration: 35 hours

Theory: 35 hours

Practical: 0 hours

Overview:

This unit offers senior apprentices a systematic review of skills and knowledge required to pass the Inter-Provincial Examination. It 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 Provincial certification and the features of the Inter-provincial Examination.

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:	<u>Percent of Unit Mark (%)</u>
<p>1. Describe the significance, format and general content of Inter-Provincial (IP) Examinations for the trade of Tower Crane Operator.</p> <ul style="list-style-type: none"> a. Scope and aims of Inter-Provincial certification; value of certifications b. Obligations of candidates for Inter-Provincial certification <ul style="list-style-type: none"> • Relevance of Inter-Provincial Examinations to current, accepted trade practices; industry-based provincial and national validation of test items • Supplemental Policy (retesting) • Confidentiality of examination content c. Multiple-choice format (four-option) item format, Red Seal standards for acceptable test items d. Government materials relevant to the Inter-Provincial Examinations for Tower Crane Operator apprentices <ul style="list-style-type: none"> • National Occupational Analysis (NOA); prescribed scope of the skills and knowledge which comprise the trade • NOA "Pie-chart" and its relationship to content distribution of Inter-provincial Examination items • Apprenticeship Manitoba Technical Training package. 	n/a
<p>2. Identify resources, strategies and other considerations for maximizing successful completion of written examinations.</p> <ul style="list-style-type: none"> a. Personal preparedness <ul style="list-style-type: none"> • Rest • Nutrition • Personal study regimen • Prior experience in test situations (e.g., Unit Tests) b. Self-assessment, consultation and personal study plan 	n/a

- Self-assessment of individual strengths/weaknesses in trade related skills and knowledge
- Approved textbooks
- Study groups

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| 3. Review program content regarding common occupational skills. | n/a |
| 4. Review program content regarding crane inspection and maintenance. | n/a |
| 5. Review program content regarding crane set-up, hoisting calculations and lift planning. | n/a |
| 6. Review program content regarding rigging. | n/a |
| 7. Review program content regarding crane operations. | n/a |
