Tower Crane Operator

Guide to Course Content

2025

1-877-363-0536
apprenticeship@gov.sk.ca
saskapprenticeship.ca

Saskatchewan Apprenticeship and Trade Certification Commission

Online: www.saskapprenticeship.ca

Recognition:
To promote transparency and consistency, this document has been adapted from the 2023 Tower Crane Operator Red Seal Occupational Standard (Employment and Social Development Canada).

A complete version of the Occupational Standard can be found at www.red-seal.ca

STRUCTURE OF THE GUIDE TO COURSE CONTENT

To facilitate understanding of the occupation, this guide to course content contains the following sections:

Task Matrix: a chart which outlines graphically the major work activities, tasks and sub-tasks of this standard detailing the essential skills and the level of training where the content is covered. The Task Matrix is broken down into the following:

Major Work Activity: the largest division within the standard that is comprised of a distinct set of trade activities.

Task: distinct actions that describe the activities within a major work activity.

Sub-task: distinct actions that describe the activities within a task.

Training Profile Chart: a chart which outlines the model for Saskatchewan Apprenticeship and Trade Certification Commission (SATCC) technical training.

Technical Training Course Content for the Tower Crane Operator trade: a chart which outlines the model for SATCC technical training sequencing.

TRAINING REQUIREMENTS FOR THE TOWER CRANE OPERATOR TRADE

To graduate from each level of the apprenticeship program, an apprentice must successfully complete the required technical training and compile enough on-the-job experience to total at least 1500 hours each year. Total trade time required is 3000 hours and at least 2 years in the trade.

There are two levels of technical training delivered by the Western Trade Training Institute in Regina:

Level One: 8 weeks equivalent (3, 3, 3, 4-day sessions)
Level Two: 8 weeks equivalent (3, 3, 3, 4-day sessions)

The information contained in this guide to course content details the technical training delivered for each level of apprenticeship. An apprentice spends approximately 15% of their apprenticeship term in a technical training institute learning the technical and theoretical aspects of the trade. The hours and percentages of technical and practical training may vary according to class needs and progress.

The content of the technical training components is subject to change without notice.

Entrance Requirements for Apprenticeship Training

Your grade twelve transcripts (with no modified classes) or GED 12 is your guarantee that you meet the educational entrance requirements for apprenticeship in Saskatchewan. In fact, employers prefer and recommend apprentices who have completed high school. This ensures the individual has all of the necessary skills required to successfully complete the apprenticeship program and receive journeyperson certification.

Individuals with “modified” or “general” classes in math or science do not meet our entry requirements. These individuals are required to take an entrance assessment prescribed by the SATCC.

English is the language of instruction in all apprenticeship programs and is the common language for business in Saskatchewan. Before admission, all apprentices and/or “upgraders” must be able to understand and communicate in the English language. Applicants whose first language is not English must have a minimum Canadian Language Benchmark Assessment of six (CLB6).

Note: A CLB assessment is valid for a one-year period from date of issue.

Designated Trade Name	**Math Credit** at the Indicated Grade Level	**Science Credit** at Grade Level
Tower Crane Operator	Grade 10	Grade 10

 - (One of the following) WA – Workplace and Apprenticeship; or F – Foundations; or P – Pre-calculus, or a Math at the indicated grade level (Modified and General Math credits are not acceptable.).

*Applicants who have graduated in advance of 2015-2016, or who do not have access to the revised Science curricula will require a Science at the minimum grade level indicated by trade.

For information about high school curriculum, including Math and Science course names, please see: http://www.curriculum.gov.sk.ca/

Individuals not meeting the entrance requirements will be subject to an assessment and any required training

TOWER CRANE OPERATOR TASK MATRIX CHART

This chart outlines the major work activities, tasks and sub-tasks from the 2023 Red Seal Occupational Standard (RSOS). Each sub-task details the corresponding essential skill and level of training where the content is covered. *

* Sub-tasks with numbers in the boxes is where the content will be delivered in training.

A – Performs Common Occupational Skills — 11%

A-1 Performs safety-related functions	1.01 Maintains safe work environment 1 (2 in context)	1.02 Uses personal protective equipment (PPE) and safety equipment 1 (2 in context)	1.03 Uses documentation 1 (2 in context)
A-2 Uses communication and mentoring techniques	2.01 Uses communication techniques 1	2.02 Uses mentoring techniques 2	

B –Inspects and Maintains Crane — 21%

B-3 Performs pre-operational checks and regular inspections	3.01 Inspects structural components 1, 2	3.02 Inspects mechanical components 1, 2	3.03 Inspects lines, wire ropes and hoisting system components 1, 2	3.04 Inspects hydraulic system components 1, 2	3.05 Inspects electrical system components 1, 2
	3.06 Inspects support components 1, 2	3.07 Inspects track (rail) travel components 1, 2	3.08 Inspects cab components 1, 2	3.09 Inspects safety and access components 1, 2	3.10 Completes inspection documentation 1, 2

B-4 Performs continual checks	4.01 Monitors weather conditions 1, 2	4.02 Monitors site conditions 1, 2	4.03 Monitors lines, wire ropes and hoisting system components 1, 2	4.04 Monitors equipment performance and conditions 1, 2	4.05 Monitors structural and support components 1, 2
B-5 Performs minor crane maintenance	5.01 Maintains mechanical components 1, 2	5.02 Lubricates wire ropes and crane components 1, 2			

C – Performs Crane Set-up, Hoisting Calculations and Lift Planning 23%

C-6 Participates in tower crane assembly, disassembly and transportation	6.01 Participates in crane assembly 1, 2	6.02 Participates in crane disassembly 1, 2	6.03 Transports self-erecting tower crane 1, 2	6.04 Participates in assembly and disassembly of self-erecting tower cranes 1, 2
C-7 Participates in tower crane climbing and reconfigurations	7.01 Participates in bottom-climbing procedures 1, 2	7.02 Participates in top-climbing procedures 1, 2	7.03 Participates in crane reconfiguration 1, 2	
C-8 Plans lifts	8.01 Determines load weights 1, 2	8.02 Interprets load charts 1, 2	8.03 Plans work procedures 1, 2	8.04 Prepares for specialty lifts 1, 2

D – Performs Rigging 17%

D-9 Inspects, maintains and stores rigging equipment	9.01 Identifies deficiencies in slings and hardware 1, 2	9.02 Lubricates slings and hardware 1, 2	9.03 Stores rigging equipment 1, 2
D-10 Follows rigging procedures	10.01 Selects required rigging equipment and configuration 1, 2	10.02 Rigs load 1, 2	10.03 Monitors rigging 1, 2

E – Operates Crane 28%

E-11 Performs pre-lift (warm-up) activities	11.01 Performs function test 1, 2	11.02 Confirms limits 1, 2			
E-12 Operates tower cranes	12.01 Moves trolley in and out 1, 2	12.02 Booms (luffs) up and down 1, 2	12.03 Swing (slews) jib 1, 2	12.04 Hoists load 1, 2	12.05 Travels crane 1, 2
	12.06 Performs functions simultaneously 1, 2				
E-13 Performs specialty tower crane operations	13.01 Participates in multi-crane lifts 2	13.02 Operates in multi-crane site 2	13.03 Hoists personnel 1		

E-14 Shuts down and secures tower cranes	**14.01 Secures crane while leaving controls (short-term)** **1, 2**	**14.02 Secures crane while out of service** **1, 2**

TRAINING PROFILE CHART

This Training Profile Chart represents Saskatchewan Apprenticeship and Trade Certification Commission (SATCC) technical training at the topic level.

Tower Crane Operator technical training for levels 1 and 2 are provided in alternative delivery. This method uses a combination of in-class training and at-home course work between training sessions. As a result, hours are listed below for a specific training level, but not for individual courses.

Technical training for levels 1 and 2 are both equivalent to 8 weeks in length.

Level One	**Hours**
Safety/Tools and Equipment	
Introduction to Rigging	
Introduction to Tower Crane Operations	
Introduction to Load Charts	
Introduction to Load Weight Calculations	
	240 hours

Level Two	**Hours**
Advanced Rigging	
Advanced Load Weight Calculations	
Advanced Load Charts	
Advanced Tower Crane Setup	
Advanced Tower Crane Operations	
Non-Routine Pre-Operational Checks, Inspections and Maintenance	
	240 hours

TECHNICAL TRAINING COURSE CONTENT

This chart outlines the model for Saskatchewan Apprenticeship and Trade Certification Commission (SATCC) technical training sequencing.

Sub-tasks listed are the minimum to be covered in a topic. Related sub-tasks not listed may be used as a reference and taught “in context” in other topics.

Level One — 8 weeks equivalent (3, 3, 3, and 4 days of training over 4 months) — 240 hours

Safety/Tools and Equipment

- types of Personal Protective Equipment (PPE) and safety equipment, their applications, limitations, maintenance and inspection requirements, storage and procedures for use
- identify workplace hazards, safe work practices and regulatory requirements regarding pre-lift planning and mobile crane operation
- identify electrical hazards and the effect on the job planning
- techniques for effective verbal and non-verbal communication
- applicable hand signals used during craning operations
- identify trade related documents and describe their applications
- hand, power and measuring tools and describe their applications, procedures for use
- retaining devices and describe their applications and procedures to install and remove

RSOS topics covered in this section of training:

A-1 Performs safety related functions
A-1.01 Maintains safe work environment
A-1.02 Uses personal protective equipment (PPE) and safety equipment
A-1.03 Uses documentation

A-2 Uses communication and mentoring techniques
A-2.01 Uses communication techniques

B-4 Performs continual checks
B-4.01 Monitors weather conditions
B-4.02 Monitors site conditions

C-6 Participates in tower crane assembly, disassembly and transportation
C-6.01 Participates in crane assembly
C-6.02 Participates in crane disassembly

C-8 Plans lifts
C-8.03 Plans work procedures

Introduction to Rigging

- codes, standards and regulations pertaining to wire ropes, rigging hardware and slings
- wire ropes, rigging hardware and slings and describe their applications, limitations and procedures for use and storage
- procedures used to select, install and connect wire ropes, rigging hardware and slings
- procedures used to troubleshoot issues with wire rope, slings and rigging components
- procedures used to dispose of damaged rigging components
- information pertaining to rigging and hoisting found on drawings and specifications
- procedures used to calculate sling angles and their effect on sling capacities
- procedures used to determine the appropriate sling size for a given load
- considerations and calculations used to determine WLLs

RSOS topics covered in this section of training:

A-1 Performs safety -related functions
A-1.03 Uses documentation

A-2 Uses communication and mentoring techniques
A-2.01 Uses communication techniques

B-3 Performs pre-operational checks and regular inspections
B-3.03 Inspects lines, wire ropes and hoisting system components
B-3.10 Completes inspection documentation

C-8 Plans lifts
C-8.01 Determine load weights
C-8.02 Interprets load charts
C-8.03 Plans work procedures
C-8.04 Prepares for specialty lifts

D-9 Inspects, maintains and stores rigging equipment
D-9.01 Identifies deficiencies in slings and hardware
D-9.02 Lubricates slings and hardware
D-9.03 Stores rigging equipment

D-10 Follows rigging procedures
D-10.01 Selects required rigging equipment and configuration
D-10.02 Rigs load
D-10.03 Monitors rigging

Introduction to Load Weight Calculations

- identify the weight of basic shaped loads
- procedures used to calculate the weight of basic shaped loads
- procedures to determine the center of gravity

RSOS topics covered in this section of training:

C-8 Plans lifts
C-8.01 Determine load weights
C-8.03 Plans work procedures
C-8.04 Prepares for specialty lifts

Introduction to Load Charts

- basic load charts, their characteristics and applications
- crane capacity, crane component capacity and working radius for basic lifting operations
- regulatory requirements pertaining to the application of load charts

RSOS topics covered in this section of training:

C-8 Plans lifts
C-8.02 Interprets load charts
C-8.03 Plans work procedures
C-8.04 Prepares for specialty lifts

Introduction to Tower Crane Operations

- lifting theory and forces
- units of measure and symbols regarding lifting plans and load charts
- basic crane operations, configurations, applications and procedures
- procedures used to perform pre/post-operational inspections and basic maintenance
- crane computers and integrated computerized components, their applications and procedures for use
- procedures used to plan and organize job tasks
- mobile cranes, their characteristics and applications
- procedures to load/unload cranes and components for transport
- regulations pertaining to transporting cranes on public and private roadways
- procedures to prepare a crane for transport and perform pre-trip planning
- operational controls, their purpose, and their application intro to operation
- monitoring of gauges, warning systems, hoist lines and running lines
- procedures and regulatory requirements for storing a crane short and long term

RSOS topics covered in this section of training:

A-1 Performs safety related functions
A-1.01 Maintains safe work environment
A-1.02 Uses personal protective equipment (PPE) and safety equipment
A-1.03 Uses documentation

B-3 Performs pre-operational checks and regular inspections
B-3.01 Inspects structural components
B-3.02 Inspects mechanical components
B-3.03 Inspects lines, wire ropes and hoisting system components
B-3.04 Inspects hydraulic system components
B-3.05 Inspects electrical system components
B-3.06 Inspects support components
B-3.07 Inspects track (rail) travel components
B-3.08 Inspects cab components
B-3.09 Inspects safety and access components
B-3.10 Completes inspection documentation

B-4 Performs continual checks
B-4.01 Monitors weather conditions
B-4.02 Monitors site conditions
B-4.03 Monitors lines, wire ropes and hoisting system components
B-4.04 Monitors equipment performance and conditions
B-4.05 Monitor structural and support components

B-5 Performs minor crane maintenance
B-5.01 Maintains mechanical components
B-5.02 Lubricates wire ropes and crane components

C-6 Participates in tower crane assembly, disassembly and transportation
C-6.03 Transports self-erecting tower crane

C-8 Plans lifts
C-8.01 Determine load weights
C-8.02 Interprets load charts
C-8.03 Plans work procedures
C-8.04 Prepares for specialty lifts

D-9 Inspects, maintains and stores rigging equipment
D-9.01 Identifies deficiencies in slings and hardware
D-9.02 Lubricates slings and hardware
D-9.03 Stores rigging equipment

E-11 Performs pre-lift (warm-up) activities
E-11.01 Performs function test
E-11.02 Confirms limits

E-12 Operates tower cranes
E-12.01 Moves trolley in and out
E-12.02 Booms (luffs) up and down
E-12.03 Swings (slews) jib
E-12.04 Hoists load
E-12.05 Travels crane
E-12.06 Performs functions simultaneously

E-14 Shuts down and secures tower cranes
E-14.01 Secures crane while leaving controls (short-term)
E-14.02 Secures crane while out of service

Level Two | 8 weeks equivalent (3, 3, 3, 4 days of training) | 240 hours

Advanced Rigging

- non-routine rigging and lifts, their applications, limitations and procedures
- non-routine rigging and lift techniques
- reeving operations
- methods and equipment used for reeving operations
- multi-crane lifts and their applications
- procedures used for multi-crane lifts

RSOS topics covered in this section of training:

A-2 Uses communication and mentoring techniques
A-2.01 Uses communication techniques
A-2.02 Uses mentoring techniques

B-3 Performs pre-operational checks and regular inspections
B-3.03 Inspects lines, wire ropes and hoisting system components
B-3.10 Completes inspection documentation

C-8 Plans lifts
C-8.01 Determine load weights
C-8.02 Interprets load charts
C-8.03 Plans work procedures
C-8.04 Prepares for specialty lifts

D-9 Inspects, maintains and stores rigging equipment
D-9.01 Identifies deficiencies in slings and hardware
D-9.02 Lubricates slings and hardware
D-9.03 Stores rigging equipment

D-10 Follows rigging procedures
D-10.01 Selects required rigging equipment and configuration
D-10.02 Rigs load
D-10.03 Monitors rigging

E-13 Performs specialty tower crane operations
E-13.01 Participates in multi-crane lifts
E-13.02 Operates in multi-crane site

Advanced Load Weight Calculations

- identify the weight of irregularly shaped loads
- procedures used to calculate the weight of irregular shaped loads
- procedure to calculate center of gravity and its effect on the load

RSOS topics covered in this section of training:

C-8 Plans lifts
C-8.01 Determine load weights
C-8.03 Plans work procedures
C-8.04 Prepares for specialty lifts

Advanced Load Charts

- advanced load charts, their characteristics and applications
- crane capacity, crane component capacity and working radius for non-routine lift operations

RSOS topics covered in this section of training:

C-8 Plans lifts
C-8.02 Interprets load charts
C-8.03 Plans work procedures
C-8.04 Prepares for specialty lifts

Non-Routine Pre-Operational Checks, Inspections and Maintenance

- engines and drive systems, components, their purpose and operation
- procedures used to inspect, maintain and troubleshoot drive systems
- mechanical systems, components, their purpose and operation
- procedures used to inspect, maintain and troubleshoot mechanical systems and their components
- procedures used to inspect, maintain and troubleshoot electrical systems and their components
- hydraulic systems, components, their purpose and operation
- procedures used to inspect, maintain and troubleshoot hydraulic systems and their components
- procedures used to perform continual checks

RSOS topics covered in this section of training:

B-3 Performs pre-operational checks and regular inspections
B-3.01 Inspects structural components
B-3.02 Inspects mechanical components
B-3.03 Inspects lines, wire ropes and hoisting system components
B-3.04 Inspects hydraulic system components
B-3.05 Inspects electrical system components
B-3.06 Inspects support components
B-3.07 Inspects track (rail) travel components
B-3.08 Inspects cab components
B-3.09 Inspects safety and access components
B-3.10 Completes inspection documentation

B-4 Performs continual checks
B-4.01 Monitors weather conditions
B-4.02 Monitors site conditions
B-4.03 Monitors lines, wire ropes and hoisting system components
B-4.04 Monitors equipment performance and conditions
B-4.05 Monitor structural and support components

B-5 Performs minor crane maintenance
B-5.01 Maintains mechanical components
B-5.02 Lubricates wire ropes and crane components

E-11 Performs pre-lift (warm-up) activities
E-11.01 Performs function test
E-11.02 Confirms limits

Advanced Tower Crane Set-up

- tower cranes and their associated components
- procedures used for the assembly and disassembly of tower cranes and their components
- procedures used to prepare cranes for transport
- procedures used to transport cranes, their components and accessories
- steps required for pre-lift planning
- procedures used to determine crane positioning and setup
- procedures used to prepare worksite for crane operations

RSOS topics covered in this section of training:

A-2 Uses communication and mentoring techniques
A-2.01 Uses communication techniques
A-2.02 Uses mentoring techniques

C-6 Participates in tower crane assembly, disassembly and transportation
C-6.01 Participates in crane assembly
C-6.02 Participates in crane disassembly
C-6.03 Transports self-erecting tower crane
C-6.04 Participates in assembly and disassembly of self-erecting tower cranes

C-8 Plans lifts
C-8.01 Determine load weights
C-8.02 Interprets load charts
C-8.03 Plans work procedures
C-8.04 Prepares for specialty lifts

E-13 Performs specialty tower crane operations
E-13.01 Participates in multi-crane lifts
E-13.02 Operates in multi-crane site
E-13.03 Hoists personnel

Advanced Tower Crane Operations

- tower cranes, their applications and operation
- procedures used to operate tower cranes and their attachments
- multi-crane lift operations, their characteristics, applications and procedures
- operation on a multi-crane jobsite
- specialty hoisting applications with a tower crane

RSOS topics covered in this section of training:

C-7 Participates in tower crane climbing and reconfigurations
C-7.01 Participates in bottom-climbing procedures
C-7.02 Participates in top-climbing procedures
C-7.03 Participates in crane reconfiguration

E-12 Operates tower cranes
E-12.01 Moves trolley in and out
E-12.02 Booms (luffs) up and down
E-12.03 Swings (slews) jib
E-12.04 Hoists load
E-12.05 Travels crane
E-12.06 Performs functions simultaneously

E-13 Performs specialty tower crane operations
E-13.01 Participates in multi-crane lifts
E-13.02 Operates in multi-crane site
E-13.03 Hoists personnel

E-14 Shuts down and secures tower cranes
E-14.01 Secures crane while leaving controls temporarily (short term)
E-14.02 Secures crane while out of service

Level Two topics from the RSOS that are taught in context:

A-1 Performs safety related functions

For details regarding the In Context Topic, see page 19

In Context Topics

In context means learning that has already taken place and is being applied to the applicable task. Learning outcomes for in context topics are accomplished in other topics in that level.

A-1 Performs safety related functions
A-1.01 Maintains safe work environment
A-1.02 Uses personal protective equipment (PPE) and safety equipment
A-1.03 Uses documentation