Mobile Crane Operator
Course Outline

2024

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

Saskatchewan Apprenticeship and Trade Certification Commission

TRAINING PROFILE CHART

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

Mobile 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, while level 3 is a 2 week in-class session.

Level One	Hours
Safety/Tools and Equipment	
Rigging	
Mobile Crane Operations	
Load Charts I	
Load Weight Calculations	
	240

Level Two	Hours
Rigging	
Load Weight Calculations II	
Load Charts II	
Mobile Crane Setup	
Mobile Crane Operations	
Pre-operational Checks, Inspections and Maintenance	
	240

Level Three	Hours
Mobile Crane Operations	
Safety/Tools and Equipment	
Rigging	
Load Charts	
Load Weight Calculations	
Preoperational Checks, Inspections and Maintenance	
Mobile Crane Setup	
	80

TECHNICAL TRAINING COURSE OUTLINE

This chart outlines the model for Saskatchewan Apprenticeship and Trade Certification Commission (SATCC) technical training sequencing. For the harmonized level of training, a cross reference to the Red Seal Occupational Standard (RSOS) apprenticeship technical training sequencing, at the learning outcome level, is provided.

Level One 8 weeks 240 hours

Safety/Tools and Equipment

- types of personal protective equipment (PPE) and clothing and describe their applications, limitations and procedures to maintain
- hazards and describe workplace safety and health regulations
- techniques for effective verbal and non-verbal communication
- applicable hand signals used during craning operations
- 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

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

Load Weight Calculations

- knowledge of the weight of basic shaped loads
- knowledge of center of gravity

Load Charts

- basic load charts, their characteristics and applications
- crane capacity, crane component capacity and working radius for basic lifting operations

Mobile Crane Operations

- lifting theory and forces
- units of measure and symbols regarding lifting plans and load charts
- basic crane operations, applications and procedures
- procedures used to perform pre/post-operational inspections
- 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

Level Two	8 weeks	240 hours

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

Load Weight Calculations

- procedure to determine weight of irregular shaped loads.
- procedure to determine center of gravity.

Load Charts

- Demonstrate knowledge of load charts, their characteristics and applications.
- Demonstrate knowledge of crane capacity, crane component capacity and working radius for lift operations.

Pre-operational Checks, Inspections and Maintenance

- engines and drive systems, components, their purpose and operation
- procedures used to inspect, maintain and troubleshoot engines and drive systems
- mechanical systems, components, their purpose and operation
- procedures used to inspect, maintain and troubleshoot mechanical 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

Mobile Crane Set-up

- positioning, blocking and leveling operations and their applications
- lattice boom cranes and their associated components
- procedures used for the assembly and disassembly of lattice boom cranes and their components
- telescopic boom cranes and their associated components
- procedures used for the assembly and disassembly of telescopic boom 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

Mobile Crane Operations

- hydraulic telescopic boom cranes, their applications and operation
- procedures used to operate telescopic boom cranes and their attachments
- hydraulic drive lattice boom cranes, their applications and operation
- procedures used to operate hydraulic drive lattice boom cranes, hydraulic drive systems and their attachments
- friction drive lattice boom cranes, their applications and operation
- procedures used to operate friction drive lattice boom cranes, friction drive systems and their attachments
- knowledge of specialty crane operations, their characteristics, applications and procedures

Level Three	2 weeks	80 hours

Safety/Tools and Equipment

- safety equipment, their applications, maintenance and procedures for use
- safe work practices and regulatory requirements pertaining to safety
- effective communication practices
- communication devices, their operation and the procedures used to communicate during hoisting operations
- procedures used to operate cranes near high voltage electrical equipment
- procedures used to complete documentation
- tools and equipment, their applications, maintenance and procedures for use
- fasteners and retaining devices, their applications and procedures for use

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Load Weight Calculations

- weight of basic shaped loads
- center of gravity
- procedures to determine weight of irregular shaped loads
- procedures to determine center of gravity

Rigging

- wire ropes, their applications, limitations and procedures for use
- procedures used to install, monitor, inspect, maintain, store and dispose of wire ropes and rigging hardware
- rigging hardware, their applications, limitations and procedures for use
- rigging and hoisting applications and techniques
- sling configurations, their characteristics and applications
- working load limits (WLL)
- non-routine rigging and lifts, their applications, limitations and procedures
- non-routine rigging and lift techniques
- methods and equipment used for reeving operations
- procedures used for multi-crane lifts

Load Charts

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

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Pre-operational Checks, Inspections and Maintenance

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

Mobile Crane Setup

- positioning, blocking and leveling operations and their applications
- procedures used for the assembly and disassembly of lattice boom cranes and their components
- procedures used for the assembly and disassembly of telescopic boom cranes and their components
- 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

Mobile Crane Operations

- lifting theory and forces
- units of measure and symbols relating to lifting plans and load charts
- procedures used to perform pre- and post-operational inspections
- procedures to perform crane operations
- crane computers, integrated computerized components, their applications and procedures for use
- procedures used to operate telescopic boom cranes and their attachments
- procedures used to operate hydraulic drive lattice boom cranes, hydraulic drive systems and their attachments
- procedures used to operate friction drive lattice boom cranes, friction drive systems and their attachments
- procedures used to perform specialty crane operations

MOBILE CRANE OPERATOR TASK MATRIX CHART

This chart outlines the major work activities, tasks and sub-tasks from the 2013 Mobile Crane Operator National Occupational Analysis. 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. Harmonization for the mobile Crane Operator trade has been fully implemented for each level of technical training.

A – Performs common occupational skills — 6%

Task A-1 Performs safety-related functions	**1.01 Maintains a safe work environment** 1, 2, 3	**1.02 Uses personal protective equipment (PPE) and safety equipment** 1, 2, 3	**1.03 Uses documentation** 1, 2, 3
Task A-2 Uses communication and mentoring techniques	**2.01 Use communication techniques** 1, 2, 3	**2.02 Uses mentoring techniques** 1, 2, 3	

B – Performs hoisting calculations — 18%

Task B-3 Determines load weights	**3.01 Identifies weight** 1, 2, 3	**3.02 Calculates weight** 1, 2, 3
Task B-4 Calculates crane capacity	**4.01 Determines radius and crane configuration** 1, 2, 3	**4.02 Interprets load charts** 1, 2, 3
Task B-5 Performs rigging calculations	**5.01 Performs sling angle calculations** 1, 2, 3	**5.02 Performs working load limit (WLL) calculations** 1, 2, 3

C – inspects and maintains crane

13%

Task C-6 Performs pre-operational checks and regular inspections	6.01 Inspects engine systems 1, 2, 3	6.02 Inspects air systems 1, 2, 3	6.03 Inspects electrical systems 1, 2, 3	6.04 Inspects hydraulic systems 1, 2, 3	6.05 Inspects chassis/car body and running gear components 1, 2, 3
	6.06 Inspects outriggers and counterweights 1, 2, 3	6.07 Inspects boom components and attachments 1, 2, 3	6.08 Inspects hoisting systems 1, 2, 3		
Task C-7 Performs operational and continual checks	7.01 Checks operating controls 1, 2, 3	7.02 Inspects monitoring and warning systems 1, 2, 3	7.03 Monitors running lines, hoist lines and standing ropes 1, 2, 3	7.04 Monitors gauges and warning systems 1, 2, 3	7.05 Monitors support base 1, 2, 3
Task C-8 Performs minor crane maintenance	8.01 Changes oil and filters 1	8.02 Greases crane 1, 2, 3	8.03 Lubricates wire ropes 1, 2, 3	8.04 Makes adjustments and replacements 1, 2, 3	

D – Performs rigging

12%

Task D-9 Inspects, maintains and stores slings and hardware	9.01 Lubricates slings and hardware 1, 2, 3	9.02 Identifies deficiencies in slings and hardware 1, 2, 3	9.03 Disposes of damaged slings and hardware 1, 2, 3	9.04 Stores slings and hardware 1, 2, 3
Task D-10 Follows rigging procedures	10.01 Selects required rigging 1, 2, 3	10.02 Rigs load 1, 2, 3	10.03 Monitors rigging 1, 2, 3	

E – Plans lift, prepares site and sets up crane — 15%

Task E-11 Performs pre-lift planning	11.01 Participates in routine, engineered and specialty lift planning 1, 2, 3	11.02 Evaluates risks and hazards 1, 2, 3	
Task E-12 Sets up crane	12.01 Performs final site inspection 2, 3	12.02 Positions crane 2, 3	12.03 Completes setup 2, 3

F – Assembles, disassembles and transports crane — 13%

Task F-13 Loads and unloads components for transport	13.01 Loads crane and components 2, 3	13.02 Unloads and crane and components 2, 3			
Task F-14 Drives cranes on public roadways	14.01 Performs pre-trip planning 1, 2, 3	14.02 Prepares crane for transport 2, 3	14.03 Drives cranes 2, 3		
Task F-15 Assembles and disassembles lattice boom cranes	15.01 Installs tracks on car body (lattice boom) 1, 2, 3	15.02 Installs superstructure/ upperworks (lattice boom) 1, 2, 3	15.03 Installs outrigger boxes (lattice boom) 1, 2, 3	15.04 Installs boom base (lattice boom) 1, 2, 3	15.05 Assembles couterweights (lattice boom) 1, 2, 3
	15.06 Assembles main boom, tip and boom attachments (lattice boom) 1, 2, 3	15.07 Installs hook blocks and overhaul ball (lattice boom) 1, 2, 3	15.08 Removes hook blocks and overhaul ball (lattice boom) 1, 2, 3	15.09 Disassembles main boom, tip and boom attachments (lattice boom) 1, 2, 3	15.10 Removes counterweights (lattice boom) 1, 2, 3
	15.11 Removes boom base (lattice boom) 1, 2, 3	15.12 Removes superstructure/ upperworks (lattice boom) 1, 2, 3	15.13 Removes tracks from car body (lattice boom) 1, 2, 3	15.14 Removes outrigger boxes (lattice boom) 1, 2, 3	

Task F-16 Assembles and disassembles telescopic boom cranes	16.01 Installs tracks on car body (telescopic boom) 1, 2, 3	16.02 Installs outrigger boxes (telescopic boom) 1, 2, 3	16.03 Installs superstructure/ upperworks (telescopic boom) 1, 2, 3	16.04 Installs main boom (telescopic boom) 1, 2, 3	16.05 Installs hook blocks and overhaul ball (telescopic boom) 1, 2, 3
	16.06 Installs counterweights (telescopic boom) 1, 2, 3	16.07 Installs jibs and inserts (telescopic boom) 1, 2, 3	16.08 Removes jibs and inserts (telescopic boom) 1, 2, 3	16.09 Removes counterweights (telescopic boom) 1, 2, 3	16.10 Removes hook blocks and overhaul ball (telescopic boom) 1, 2, 3
	16.11 Removes main boom (telescopic boom) 1, 2, 3	16.12 Removes outrigger boxes (telescopic boom) 1, 2, 3	16.13 Removes tracks from car body (telescopic boom) 1, 2, 3	16.14 Removes superstructure/up perworks (telescopic boom) 1, 2, 3	
Task F-17 Assembles and disassembles specialty equipment and attachments	17.01 Assembles specialty equipment and attachments 3	17.02 Disassembles specialty equipment and attachments 3			

G – Operates crane

23%

Task G-18 Performs common craning operations	18.01 Configures load moment indicator (LMI) 1, 2, 3	18.02 Mobilizes crane on jobsite 1, 2, 3
Task G-19 Operates friction drive lattice boom cranes	19.01 Operates friction drive crawler-mounted lattice boom cranes 1, 2, 3	19.02 Operates friction drive truck-mounted lattice boom cranes 1, 2, 3
Task G-20 Operates hydraulic drive lattice boom cranes	20.01 Operates hydraulic drive crawler-mounted lattice boom cranes 1, 2, 3	20.02 Operates hydraulic drive truck-mounted lattice boom cranes 1, 2, 3

Task G-21 Operates telescopic boom cranes	**21.01 Operates crawler-mounted telescopic cranes** **1, 2, 3**	**21.02 Operates rubber-mounted telescopic cranes** **1, 2, 3**			
Task G-22 Performs specialty craning operations	**22.01 Operates crane with piledriving equipment** **2, 3**	**22.02 Performs duty cycle operations** **2, 3**	**22.03 Operates cranes on floating platforms** **3**	**22.04 Performs multi-crane lifts** **2, 3**	**22.05 Uses personnel hoisting equipment** **2, 3**
Task G-23 Secures crane	**23.01 Secures crane for short-term** **1, 2, 3**	**23.02 Secures crane for long-term** **1, 2, 3**			

***The Mobile Crane Operator Red Seal Occupational Standard (RSOS) describing the "full scope" of the trade, can be found at** www.red-seal.ca

***For more detailed information on course content, please refer to the Mobile Crane Operator Guide to Course Content at** www.saskapprenticeship.ca