BC Crane Safety

Crane Operator Certification & Licensing Authority

CANDIDATE HANDBOOK

Mobile Crane Operator

- **Mobile Crane (Lattice Boom Friction, Lattice Boom Hydraulic, Mobile Hydraulic Unlimited)**
- **80 Tonnes and Under**
- **20 Tonnes and Under**

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This candidate handbook contains important information about obtaining a Crane Operator Certification and a British Columbia crane operator designation. Please read it carefully.

For more information, contact BC Crane Safety.

BC Crane Safety
PO Box 42066
RPO Guildford
Surrey, BC V3R 1S5
Phone: 604-336-4699

Email: info@bccranesafety.ca
Website: www.bccranesafety.ca

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In British Columbia, an operator of a mobile crane, tower crane, self-erect, or boom truck must hold a valid crane operator credential as outlined in WorkSafeBC Occupational Health and Safety Regulation 14.34.1.

The BC Association for Crane Safety (BC Crane Safety) is the organization responsible for the overall administration of crane operator certification in British Columbia. We provide leadership for health and safety development within the crane hoisting industry; serve as an advisory body on regulatory and safety matters; work closely with industry, labour and government to develop and implement new standards of assessment and certification; and provide leadership in the establishment, maintenance and support of industry-specific assessment tools (theory and practical) which result in a BC Crane Operator designation.

While every effort has been made to ensure the accuracy and completeness of this handbook, BC Crane Safety is not liable for any errors or omissions. This handbook is intended only as a guide to the BC crane operator certification and licensing process. It is the responsibility of the operator to follow all applicable Occupational Health and Safety regulations and safe operating procedures. BC Crane Safety assumes no responsibility for any injuries or damages resulting from the use of any information in this handbook.

BC Crane Safety reserves the right to change or modify, without notice, any content in this handbook at any time. Current information is available online at www.bccranesafety.ca.

This handbook has been developed to assist you with the certification process. If you have any questions or require further assistance, please call us at 604-336-4699 or email us at info@bccranesafety.ca.

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1.0 Goals and Objectives of the BC Crane Operator Certification Scheme

BC Crane Safety provides leadership for health and safety development within the crane hoisting industry. The BC Crane Operator Certification Scheme (the Scheme) provides the framework under which an individual can become certified for a specific crane classification and obtain a BC crane operator designation.

The Scheme has been designed to:

- Provide a consistent and updatable framework within which operators, employers and regulatory authorities can structure a safe and productive work environment
- Promote competence and skill levels across a range of crane types
- Provide an accessible means for those interested in the industry to obtain the certifications required to start or expand their career path
- Provide a standard that results in the recognition of the competency of BC certified operators in other jurisdictions in Canada and internationally

2.0 Program Development

BC Crane Safety works closely with industry, labour, and government to implement new standards of assessment and certification that make for a safer workplace. More information is available on the *About BC Crane Safety* page on our website.

Subject matter experts (SMEs) from the crane industry were involved in every stage of the theory exam development process, lending their expertise to writing, validating, and reviewing exams. All approved exam questions are stored in a bank from which exam forms are generated. Every applicable crane operator knowledge competency is tested on every exam.

Item analysis reports are reviewed on an ongoing basis to monitor exam performance, and candidates are encouraged to complete and submit exam feedback forms. This way, we can ensure that our exams are maintained to the highest standards.

3.0 Non-Discrimination Policy

BC Crane Safety does not discriminate against candidates based on colour, race, religion, gender, age, national origin, or sexual orientation.

4.0 BC Crane Operator Scheme – Paths to Certification

The paths to certification for the Mobile Crane Operator and all the relevant information for the different designations and steps involved can be found on the BC Crane Safety website.

The information included here is for those who are pursuing crane operator certification as a Mobile Crane Operator. Mobile Crane Operator designation includes: Lattice Boom Friction, Lattice Boom Hydraulic, and Hydraulic Boom Cranes with a lifting capacity over 80 tonnes. (The three aforementioned designations are available as apprenticeships.) Additional Mobile Crane Operator designations include: Hydraulic Boom Cranes with a lifting capacity of 80 tonnes and under, and Mobile Crane Operator 20 Tonnes and Under.

4.1 Register with BC Crane Safety

The first step is to register on the website at www.bccranesafety.ca. All crane operators working in British Columbia must be registered with BC Crane Safety.

4.2 Register as an Apprentice with ITA (Optional)

If your intended designation is available as an apprenticeship and you select the apprenticeship route, then you must register as an apprentice with the Industry Training Authority (ITA). The ITA outlines the rights and responsibilities of both the apprentice and the sponsor/employer. Find out more about the benefits of apprenticeship on the ITA website.

Whether an operator chooses the trainee/challenge path or the registered apprenticeship path, they need to have a BC Crane Operator – Provisional designation to operate a crane.

4.3 Apply for a BC Crane Operator – Provisional Designation (Formerly Level B)

A BC Crane Operator – Provisional designation (formerly Level B) is required during your entire training period. The application form must be completed in collaboration with your employer. A Provisional designation is issued for one year, with up to three one-year renewals, upon application. The trainee must have a valid crane employer to be eligible to apply for and work under as a Provisional operator.

4.4 Work Under Supervision Until Competent

As soon as you are registered with BC Crane Safety, you will have access to an online logbook where you record your work experience. Your sponsor/employer approves your logbook entries as you progress and, at the end of your training period, signs off on your logbook. This confirms that you have the required number of operating hours and have the relevant experience. Operators who are challenging for the credential need to follow the ITA process and fill in and submit an ITA challenge package. This applies to the Mobile Crane credential and the Mobile Crane 80 Tonnes and Under credential.

The trainee/registered apprentice must be under a minimum of indirect supervision for non-critical lifts and direct supervision for critical lifts, as defined by WorkSafeBC. The employer must ensure a plan is in place for supervision and assign a supervisor who is qualified to supervise crane operations.

4.5 Experience

Certification exams, Certificate of Qualification, and Inter-Provincial Red Seal are designed for operators who are trained and who currently work in crane operations.

4.6 Complete the BC Crane Operator Assessment

The BC Crane Operator Assessment consists of a theory exam (or multiple exams) and a practical test designed to evaluate an operator's crane-handling skills. The operator must successfully pass the theory exam(s) before being permitted to take the practical test.

Registered apprentices typically write the theory exam(s) as they progress through their apprenticeship. Trainees that are not registered apprentices must register for and write the theory exam(s) through the challenge process.

After successfully completing both the theory and practical portions of the assessment, you will be designated a BC Crane Operator – Full Scope for the relevant crane classification.

5.0 Documenting Hours

Both trainees and certified operators must document their hours in their BC Crane Safety online logbook and have entries approved by the sponsor/employer as they progress. These entries confirm operating hours and relevant experience.

6.0 Challenging the Exams

Experienced operators who intend to challenge the exams must also hold a Provisional designation if they want to operate a crane until a Full Scope designation is obtained.

7.0 Privacy Policy – Candidate Records

BC Crane Safety has in place a Personal Information Protection policy that is designed to safeguard the personal information entrusted to us. A copy of that policy is available by request via info@bccranesafety.ca or by calling our office via the number provided in the front matter of this document.

8.0 Assessment Methods

8.1 Assessment Criteria – Theoretical

Each designated crane classification has a corresponding BC Crane Operator standard. Each standard specifies in detail the competency areas and related tasks that are required in order to obtain the Crane Operator designation for that classification. The designations are laddered. This means that if an operator has obtained a Mobile Crane designation, they can operate any Mobile Crane that is in a smaller category. For example, a Mobile Crane operator can operate a Mobile Crane 80 Tonnes and Under and a Mobile Crane 20 Tonnes and Under without any

further qualification required. Similarly, a Mobile Crane 80 Tonnes and Under operator can operate a Mobile Crane 20 Tonnes and Under without any further qualification.

There are four written exams related to the respective Mobile Crane Operator designations available:

1. Common Core (required for all classifications)
2. Mobile Crane (includes Lattice Friction, Lattice Hydraulic, and Unlimited Hydraulic)
3. Mobile Crane 80 Tonnes and Under
4. Mobile Crane 20 Tonnes and Under (currently forms part of the practical test)

Item #2, Mobile Crane, contains a subset of exam questions relating to each of Lattice Friction, Lattice Hydraulic, and Unlimited Hydraulic, along with an additional Specialized Operations section.

The Common Core topics are included as Appendix A and the Mobile Crane topics are included as Appendix B of this document. Mobile Crane 80 Tonnes and Under topics and Mobile Crane 20 Tonnes and Under topics are included as Appendices C and D respectively. Both of these designations, and hence their exams, are subsets of the main Mobile Crane standard.

8.2 Theory Exams

Theory exams for Common Core, Mobile Crane, and Mobile Crane 80 Tonnes and Under are currently administered by the Industry Training Authority (ITA). The Mobile Crane 20 Tonnes and Under theory exam currently forms part of the practical test for this classification. There are different paths to certification for trainees, apprentices, and challengers. Information and links to the required applications can be found through the BC Crane Safety website.

8.3 Practical Test

After passing all the required theory exams, the final step is a practical test on the appropriate crane classification. The practical test must be administered by a certified Practical Examiner. The application for a mobile crane practical test must be approved by BC Crane Safety and the results of the test must be submitted to BC Crane Safety before credentials will be issued. Links to the relevant application forms are found through the BC Crane Safety website.

For the Mobile Crane Operator certification, the candidate can take their practical test on any one of the following crane classifications:

1. Lattice Friction
2. Lattice Hydraulic
3. Mobile Hydraulic Unlimited

The practical test for Mobile Hydraulic 80 Tonnes and Under and Mobile Hydraulic 20 Tonnes and Under are similarly performed on cranes that meet that classification definition.

Regardless of which type of crane the test is taken on, the practical test consists of two parts:

1. Hand signals
2. On-crane practical assessment
    a. Hazard assessment
    b. Pre-operational inspection
    c. Crane setup
    d. Crane operation – with and without load

The practical test takes approximately 2.5 hours for a Mobile Crane and 3.5 hours for a Lattice Friction Crane. The practical test examiner will come to your job site but the operator is responsible for providing the crane.

9.0 Scoring

Theory exams are scored by computer. Practical test results are scored by an independent third-party assessor.

10.0 Retest Policy

Should you require a retest on a practical test, please refer to the retest form available from Fulford Certification. Information on rewriting the theory exam is available on the ITA website.

11.0 Suspension of Right to Operate

The suspension of right to operate is under the jurisdiction of WorkSafeBC and enforced in accordance with regulations on the job site.

12.0 Renewal

A BC Crane Operator's status must be renewed.
Please note: A new renewal policy is scheduled to take effect in 2025. Further details will be provided as the implementation date approaches.

13.0 Appeal

The appeal process is managed by the Quality Management Committee subgroup, The Assessment Review Panel. For more information on the appeal process, please contact BC Crane Safety via email or phone.

14.0 Forms

Please refer to the BC Crane Safety website for the most current forms.

15.0 Crane Operator Designation

When all the requirements for a specified Crane Operator designation have been met, the operator's status will be upgraded to BC Crane Operator – Full Scope in the BC Crane Safety compliance verification system.

Appendix A Common Core TOS

Competency
A SAFETY (approximately 13%)
A1 Comply with regulations, policies, and manufacturers' manuals
A2 Maintain a safe working environment
A3 Follow emergency procedures
A4 Be aware of power line hazards
A5 Practice effective worksite communications
B TYPES AND TERMINOLOGY (approximately 5%)
B1 Define types of cranes and classifications
B2 Use crane terminology
C SYSTEMS AND COMPONENTS (approximately 10%)
C1 Describe the components and functions of carrier systems, outrigger systems, and turntable assemblies
C2 Describe the components and functions of power plants and drive systems
C3 Describe the components and functions of pneumatic systems, hydraulic systems, and electrical systems
C4 Describe the components and functions of steering systems and braking systems
C5 Describe the components and functions of hoisting systems and attachments
C6 Describe the functions of safety components, devices, and aids
D WIRE ROPE AND RIGGING (approximately 22%)
D1 Specify types of wire rope and their uses
D2 Follow wire rope installation procedures
D3 Inspect wire rope, slings, and rigging hardware
D4 Specify types of slings, rigging hardware, and their uses
D5 Use rigging techniques
D6 Maintain and store wire rope, slings, and rigging hardware

Competency
E LIFT PLANNING (approximately 28%)
E1 Follow site assessment procedures
E2 Determine load weights
E3 Determine crane lifting capacity
E4 Determine rigging requirements
F CRANE APPLICATIONS (approximately 12%)
F1 Interpret operator manuals
F2 Perform a pre-operational inspection
F3 Perform a pre-operational setup
F4 Demonstrate hoisting techniques
F5 Operate a 20-80 tonne telescoping boom crane
F6 Operate a tower crane
F7 Leave a crane unattended
G TRANSPORTING A CRANE (approximately 7%)
G1 Define Commercial Transport Regulations
G2 Prepare a crane for travel
G3 Prepare a crane for transport
G4 Assemble and disassemble a crane
H CRANE MAINTENANCE (approximately 3%)
H1 Use tools for basic crane maintenance
H2 Perform basic crane maintenance

Appendix B Mobile Crane TOS

Competency
I LIFT PLANNING - TELESCOPING BOOM CRANE (approximately 25%)
I1 Conduct a site assessment for a telescoping boom crane
I2 Use a crane capacity chart for a telescoping boom crane
J TELESCOPING BOOM CRANE OPERATIONS (approximately 13%)
J1 Interpret operating manuals for a telescoping boom crane
J2 Perform a pre-operational inspection for a telescoping boom crane
J3 Perform a pre-operational setup for a telescoping boom crane
J4 Perform hoisting techniques for a telescoping boom crane
J5 Operate a 20-80 tonne telescoping boom crane with a slewing upper structure
J6 Leave a telescoping boom crane unattended
K LIFT PLANNING - LATTICE BOOM HYDRAULIC CRANE (approximately 9%)
K1 Conduct a site assessment for a lattice boom hydraulic crane
K2 Use a crane capacity chart for a lattice boom hydraulic crane
L LATTICE BOOM HYDRAULIC CRANE OPERATIONS (approximately 12%)
L1 Interpret operating manuals for a lattice boom hydraulic crane
L2 Perform a pre-operational inspection for a lattice boom hydraulic crane
L3 Perform a pre-operational setup for a lattice boom hydraulic crane
L4 Perform hoisting techniques for a lattice boom hydraulic crane
L5 Operate a lattice boom hydraulic crane
L6 Leave a lattice boom hydraulic crane unattended
M LIFT PLANNING - LATTICE BOOM FRICTION CRANE (approximately 9%)
M1 Conduct a site assessment for a lattice boom friction crane
M2 Use a crane capacity chart for a lattice boom friction crane

Competency
N LATTICE BOOM FRICTION CRANE OPERATIONS (approximately 12%)
N1 Interpret operating manuals for a lattice boom friction crane
N2 Perform a pre-operational inspection for a lattice boom friction crane
N3 Perform a pre-operational setup for a lattice boom friction crane
N4 Perform hoisting techniques for a lattice boom friction crane
N5 Operate a lattice boom friction crane
N6 Leave a lattice boom friction crane unattended
O SPECIALIZED OPERATIONS (approximately 20%)
O1 Operate a crane with a suspended work platform
O2 Perform engineered lifts
O3 Perform heavy lifts
O4 Perform dragline and clamshell operations
O5 Perform foundation and shoring operations
O6 Perform multiple crane lifts
O7 Describe lifting an object into or out of water

Appendix C Mobile 80 Tonnes and Under TOS

Competency
C CRANES **(approximately 16%)**
C5 Demonstrate knowledge of crane components and attachments for boom trucks
C6 Demonstrate knowledge of engines and ancillary systems
C7 Demonstrate knowledge of power transfer for boom trucks
C8 Demonstrate knowledge of crane components and attachments for mobile cranes
C9 Demonstrate knowledge of power transfer for mobile cranes
F TRANSPORTATION AND DELIVERY **(approximately 14%)**
F1 Demonstrate knowledge of BC Ministry of Transportation – Commercial Transport rules and regulations
F2 Demonstrate knowledge to prepare a boom truck and associated loads for highway/road travel
F3 Demonstrate knowledge to assemble, set up to operate and disassemble a mobile crane at a worksite
F9 Demonstrate knowledge to prepare a mobile crane for transport and/or travel
G SITE PLANNING AND CRANE POSITIONING **(approximately 10%)**
G1 Demonstrate knowledge of accurate site assessment tools
G2 Demonstrate knowledge to locate and safely position a crane
H CRANE OPERATIONS **(approximately 51%)**
H2 Demonstrate knowledge of crane operations
H3 Demonstrate knowledge of lifting plans and rigging for cranes
H4 Demonstrate knowledge of folding boom (unlimited tonnage) load charts and load calculations
H5 Demonstrate knowledge of stiff boom (unlimited tonnage) load charts and load calculations
H6 Demonstrate knowledge to leave a mobile crane unattended
H7 Demonstrate knowledge of mobile hydraulic crane 80 tonnes and under load charts and load calculations
I MAINTENANCE AND SERVICE **(approximately 9%)**
I2 Demonstrate knowledge of inspecting engines, monitoring devices and hydraulic systems
I3 Demonstrate knowledge of servicing and maintenance procedures

Appendix D Mobile Crane 20 Tonnes and Under TOS

Competency
A SAFETY (approximately 12%)
A1u Demonstrate knowledge of safe working practices for crane operators
A2u Demonstrate knowledge of power line hazards and high voltage equipment
B COMMUNICATIONS (approximately 10%)
B1u Demonstrate knowledge of hand signals
B2u Demonstrate knowledge of radio communications
C CRANES (approximately 24%)
C3u Demonstrate knowledge of terminology related to craning and hoisting functions and systems for mobile hydraulic cranes 20 tonnes (22.05 US tons) and under
C6u Demonstrate knowledge of crane operations for mobile hydraulic cranes 20 tonnes (22.05 US tons) and under
C7u Demonstrate knowledge of regulatory requirements pertaining to cranes
C10u Demonstrate knowledge of crane components and attachments for mobile hydraulic cranes 20 tonnes (22.05 US tons) and under
C13u Demonstrate knowledge of pre-operational requirements on mobile hydraulic cranes 20 tonnes (22.05 US tons) and under operations
C14u Demonstrate knowledge of power transfer for mobile cranes
C17u Demonstrate knowledge to leave a mobile hydraulic crane 20 tonnes (22.05 US tons) and under unattended
D RIGGING AND LIFTING THEORY (approximately 16%)
D1u Demonstrate knowledge of lifting theory and forces
D2u Demonstrate knowledge of slings (all types), rigging hardware, materials, inspection and capacity cards
D3u Demonstrate knowledge of wire rope hoist line construction and inspection

Competency
E HOISTING FUNDAMENTALS (approximately 24%)
E1u Demonstrate knowledge of determining load weights using fundamental math functions and calculations
E4u Demonstrate knowledge of load charts and load calculations for mobile hydraulic cranes 20 tonnes (22.05 US tons) and under
F TRANSPORTATION AND/OR TRAVEL (approximately 4%)
F1u Demonstrate knowledge of BC Ministry of Transportation – Commercial Transport rules and regulations
F4u Demonstrate knowledge to prepare a mobile hydraulic crane 20 tonnes (22.05 US tons) and under for transport and/or travel
G SITE PLANNING AND CRANE POSITIONING (approximately 6%)
G1u Demonstrate knowledge of site assessment tools
G2u Demonstrate knowledge of safely locating and positioning a crane
I MAINTENANCE AND SERVICE (approximately 4%)
I3u Demonstrate knowledge of inspecting engines, monitoring devices and hydraulic systems on mobile hydraulic cranes 20 tonnes (22.05 US tons) and under
I6u Demonstrate knowledge of servicing and maintenance procedures for mobile hydraulic cranes 20 tonnes (22.05 US tons) and under

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PO Box 42066
RPO Guildford
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