

SKILLED**TRADES**^{BC}

PROGRAM OUTLINE

Mobile Crane Operator

Implementation date: September 1, 2024

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MOBILE CRANE OPERATOR PROGRAM OUTLINE

**APPROVED BY INDUSTRY
NOVEMBER 2023**

**IMPLEMENTATION DATE
SEPTEMBER 1, 2024**

THIS BC PROGRAM HAS BEEN HARMONIZED AND IS BASED ON RSOS 2021

**Developed by
SkilledTradesBC
Province of British Columbia**

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Section 1

INTRODUCTION

Mobile Crane Operator

Foreword

This revised Program Outline is intended as a guide for instructors, apprentices, and employers of apprentices as well as for the use of industry organizations, regulatory bodies, and provincial and federal governments. It reflects updated standards based on the 2021 Red Seal Occupational Standard (RSOS). It was developed by British Columbia industry and instructor subject matter experts.

Practical instruction by demonstration and student participation should be integrated with classroom sessions. Safe working practices, even though not always specified in each operation or topic, are an implied part of the program and should be stressed throughout the apprenticeship.

This Program Outline includes a list of recommended reference textbooks that are available to support the learning objectives and the minimum shop requirements needed to support instruction.

Competencies are to be evaluated through written exams and practical assessments. A passing grade is achieved by getting an overall mark of 70%. See the Assessment Guidelines in Section 4 for more details.

Achievement Criteria are included for those competencies that require a practical assessment. The intent of including Achievement Criteria in the Program Outline is to ensure consistency in training across the many training institutions in British Columbia. Their purpose is to reinforce the theory and to provide a mechanism for evaluation of the learner's ability to apply the theory to practice. It is important that these performances be observable and measurable and that they reflect the skills spelled out in the competency. The conditions under which these performances will be observed and measured must be clear to the learner as well as the criteria by which the learner will be evaluated. The learner must also be given the evaluation criteria.

The performance spelled out in the Achievement Criteria is a suggested performance and is not meant to stifle flexibility of delivery. Training providers are welcome to substitute other practical performances that measure similar skills and attainment of the competency. Multiple performances may also be used to replace individual performances where appropriate.

SAFETY ADVISORY

Be advised that references to the WorkSafe BC safety regulations contained within these materials do not/may not reflect the most recent Occupational Health and Safety Regulation (the current Standards and Regulation in BC can be obtained on the following website: <http://www.worksafebc.com>). Please note that it is always the responsibility of any person using these materials to inform themselves about the Occupational Health and Safety Regulation pertaining to their work.

Acknowledgements

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How to Use this Document

This Program Outline has been developed for the use of individuals from several different audiences. The table below describes how each section can be used by each intended audience.

Section	Training Providers	Employers/ Sponsors	Apprentices	Challengers
Program Credentialing Model	Communicates program length and structure, and all pathways to completion	Illustrates the length and structure of the program	Illustrates the length and structure of the program, and pathway to completion	Illustrates the challenger pathway to Certificate of Qualification
OAC	Communicates the competencies that industry has defined as representing the scope of the occupation	Displays the competencies that an apprentice is expected to demonstrate in order to achieve certification	Displays the competencies apprentices will achieve as a result of program completion	Displays the competencies challengers must demonstrate in order to challenge the program
Training Topics and Suggested Time Allocation	Shows proportionate representation of general areas of competency (GACs) at each program level, the suggested proportion of time spent on each GAC, and percentage of time spent on theory versus practical application	Shows the scope of competencies covered in the technical training, the suggested proportion of time spent on each GAC, and the percentage of that time spent on theory versus practical application	Shows the scope of competencies covered in the technical training, the suggested proportion of time spent on each GAC, and the percentage of that time spent on theory versus practical application	Shows the relative weightings of various competencies of the occupation on which assessment is based
Program Content	Defines the objectives, learning tasks, high level content that must be covered for each competency, as well as defining observable, measurable achievement criteria for objectives with a practical component	Identifies detailed program content and performance expectations for competencies with a practical component	Provides detailed information on program content and performance expectations for demonstrating competency	Allows individual to check program content areas against their own knowledge and performance expectations against their own skill levels
Assessment Guidelines	Shows the general areas of competency covered in each level of technical training, the theory and practical grading weight, and the calculation method for final percentage marks	Shows the general areas of competency covered in the technical training, the grading weight for each GAC, and the percentage of that time spent on theory versus practical application	Shows the general areas of competency covered in each level of technical training, the theory and practical grading weight, and the calculation method for final percentage marks	Shows the relative weightings of various general areas of competency within the occupation on which assessment is based

Section	Training Providers	Employers/ Sponsors	Apprentices	Challengers
Training Provider Standards	Defines the facility requirements, tools and equipment, reference materials (if any) and instructor requirements for the program	Identifies the tools and equipment an apprentice is expected to have access to; which are supplied by the training provider and which the student is expected to own	Provides information on the training facility, tools and equipment provided by the school and the student, reference materials they may be expected to acquire, and minimum qualification levels of program instructors	Identifies the tools and equipment a tradesperson is expected to be competent in using or operating; which may be used or provided in a practical assessment
Appendix A - Acronyms			Defines program specific acronyms	
Appendix B - Summary of Achievement Criteria	Summarizes and organizes expected practical assessments by level		Summarizes and organizes expected practical assessments by level	

Section 2

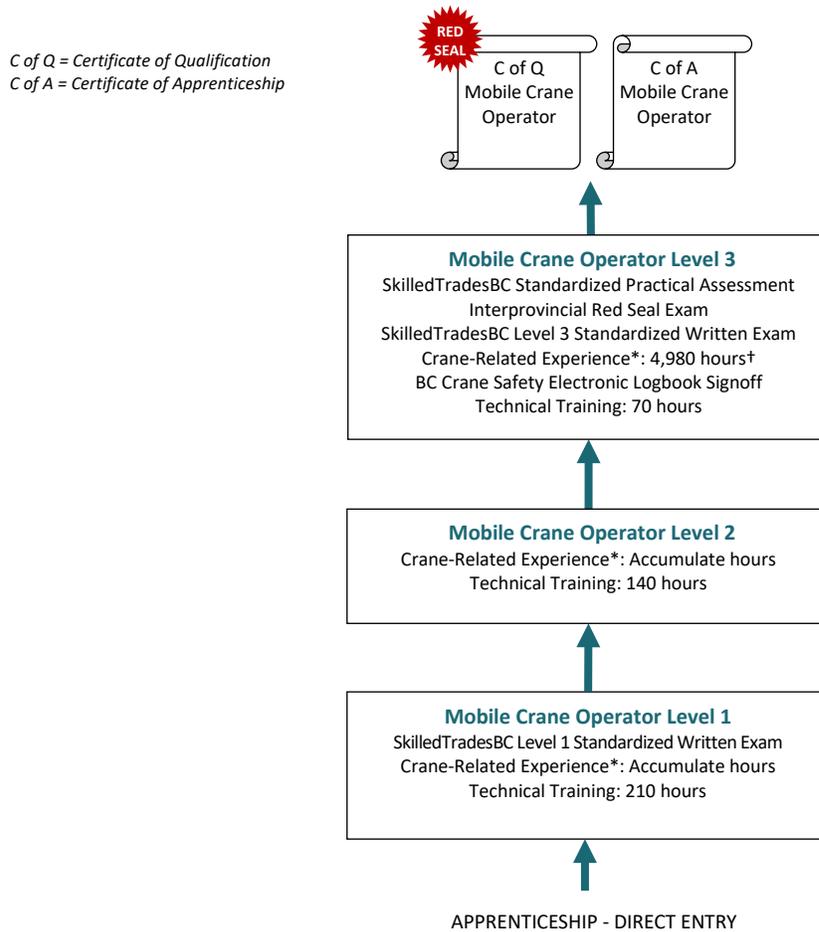
PROGRAM OVERVIEW

Mobile Crane Operator

Program Credentialing Model

Apprenticeship Pathway

This graphic provides an overview of the Mobile Crane Operator apprenticeship pathway.



* Crane-related experience as entered in the operator's BC Crane Safety electronic logbook

† Must include a minimum of 1,600 hours of mobile crane operating time. Of the 1,600 operating hours, a minimum of 400 hours must be accumulated on one or more of:

- Mobile lattice friction equipment
- Mobile lattice hydraulic equipment
- Mobile hydraulic equipment with capacity greater than 80 tonnes

CROSS-PROGRAM CREDITS

Individuals who hold partial credit in a crane program and plan to move to an alternate crane program

Mobile Crane
Operator and Tower
Crane Operator
Level 1

Technical Training: Level 1, including
SkilledTradesBC Level 1 Standardized Written Exam

Occupational Analysis Chart

MOBILE CRANE OPERATOR

Occupation Description: “Mobile Crane Operator” means a person who operates a mobile crane to perform lifts and hoists, sets up cranes, takes down cranes and plans lifts and crane procedures.

USE COMMON OCCUPATIONAL SKILLS A	Comply with regulations, policies, and manufacturers’ manuals A1	Maintain a safe working environment A2	Awareness of energized systems A3	Practice effective worksite communications A4		
	1	1	1	1 3		
DEFINE CRANE TYPES AND COMPONENT TERMINOLOGY B	Define crane types and classifications B1	Use crane terminology B2	Describe hydraulic crane systems B3	Describe friction crane systems B4		
	1	1	1	1		
USE RIGGING C	Identify types of slings and rigging hardware C1	Inspect slings and rigging hardware C2	Maintain and store slings and rigging hardware C3	Perform rigging C4		
	1	1	1	1 2		
PERFORM HOISTING CALCULATIONS D	Determine load weights D1	Use a crane capacity chart for a telescoping boom crane D2	Use a crane capacity chart for a lattice boom crane D3			
	1 2	1 2	1 2			
PERFORM CRANE INSPECTION AND MAINTENANCE E	Use tools for basic crane maintenance E1	Perform basic crane maintenance E2	Identify pre-operational inspection components E3	Perform a pre-operational inspection for a lattice boom crane E4	Perform a pre-operational inspection for a telescoping boom crane E5	Inspect, maintain, and use crane wire rope E6
	1	1	1	1 2	1	1

**Section 2
Program Overview**

PLAN A LIFT F	Perform ordinary lift planning F1	Perform engineered and critical lift plan F2														
	1					1		3								
PERFORM COMMON CRANE OPERATIONS G	Interpret operator manuals G1	Perform a pre-operational set-up for a telescopic boom crane G2	Perform a lattice boom crane set-up G3	Perform telescoping boom crane operations and hoisting techniques G4	Perform lattice boom crane operations and hoisting techniques G5	Secure crane G6										
	1					1	2				1		3			
ASSEMBLE, DISASSEMBLE, AND TRANSPORT A CRANE H	Perform crane transportation H1	Assemble and disassemble a crane H2	Assemble and disassemble specialty equipment and attachments H3													
	1					1		3								
USE SPECIALIZED OPERATIONS I	Operate with a suspended work platform I1	Perform heavy lifts I2	Operate a crane with piling equipment and duty cycle operations I3	Perform multiple crane lifts I4	Operate a crane on a floating platform I5											
	1		3				2					2	3			

Training Topics and Suggested Time Allocation

MOBILE CRANE OPERATOR – LEVEL 1

		% of Time Allocated to:			
		% of Time	Theory	Practical	Total
Line A	USE COMMON OCCUPATIONAL SKILLS	6%	80%	20%	100%
A1	Comply with regulations, policies, and manufacturer’s manuals		✓		
A2	Maintain a safe work environment		✓		
A3	Awareness of energized systems		✓	✓	
A4	Practice effective worksite communications		✓	✓	
Line B	DEFINE CRANE TYPES AND COMPONENT TERMINOLOGY	3%	90%	10%	100%
B1	Define crane types and classifications		✓		
B2	Use crane terminology		✓	✓	
B3	Describe hydraulic crane systems		✓		
B4	Describe friction crane systems		✓		
Line C	USE RIGGING	16%	60%	40%	100%
C1	Identify types of slings and rigging hardware		✓	✓	
C2	Inspect slings and rigging hardware		✓	✓	
C3	Maintain and store slings and rigging hardware		✓	✓	
C4	Perform rigging		✓	✓	
Line D	PERFORM HOISTING CALCULATIONS	16%	80%	20%	100%
D1	Determine load weights		✓		
D2	Use a crane capacity chart for a telescoping boom crane		✓	✓	
D3	Use a crane capacity chart for a lattice boom crane		✓	✓	
Line E	PERFORM CRANE INSPECTION AND MAINTENANCE	10%	60%	40%	100%
E1	Use tools for basic crane maintenance		✓	✓	
E2	Perform basic crane maintenance		✓	✓	
E3	Identify pre-operational inspection components		✓		
E4	Perform a pre-operational inspection for a lattice boom crane		✓	✓	
E5	Perform a pre-operational inspection for a telescoping boom crane		✓	✓	
E6	Inspect, maintain, and use crane wire rope		✓	✓	
Line F	PLAN A LIFT	15%	85%	15%	100%
F1	Perform ordinary lift planning		✓	✓	
F2	Perform engineered and critical lift plan		✓		
Line G	PERFORM COMMON CRANE OPERATIONS	23%	60%	40%	100%
G1	Interpret operator manuals		✓		
G2	Perform a pre-operative set-up for a telescopic boom crane set		✓	✓	
G3	Perform a lattice boom crane set-up		✓		
G4	Perform telescoping boom crane operations and hoisting techniques		✓	✓	
G5	Perform lattice boom crane operations and hoisting techniques		✓		
G6	Secure crane		✓	✓	

		% of Time Allocated to:			
		% of Time	Theory	Practical	Total
Line H	ASSEMBLE, DISASSEMBLE, AND TRANSPORT A CRANE	10%	100%	0%	100%
H1	Perform crane transportation		✓		
H2	Assemble and disassemble a crane		✓		
H3	Assemble and disassemble specialty equipment and attachments		✓		
Line I	USE SPECIALIZED OPERATIONS	1%	100%	0%	100%
I1	Operate with a suspended work platform		✓		
Total Percentage for Mobile Crane Operator Level 1		100%			

Training Topics and Suggested Time Allocation

MOBILE CRANE OPERATOR – LEVEL 2

		% of Time Allocated to:			
		% of Time	Theory	Practical	Total
Line C	USE RIGGING	15%	60%	40%	100%
C4	Perform rigging		✓	✓	
Line D	PERFORM HOISTING CALCULATION	20%	70%	30%	100%
D1	Determine load weights		✓	✓	
D2	Use a crane capacity chart for a telescoping boom crane		✓	✓	
D3	Use a crane capacity chart for a lattice boom crane		✓	✓	
Line E	PERFORM CRANE INSPECTION AND MAINTENANCE	10%	50%	50%	100%
E4	Perform a pre-occupational inspection for a lattice boom crane		✓	✓	
Line G	PERFORM COMMON CRANE OPERATIONS	30%	20%	80%	100%
G3	Perform a lattice boom crane set-up		✓	✓	
Line I	USE SPECIALIZED OPERATIONS	25%	100%	0%	100%
I2	Perform heavy lifts		✓		
I3	Operate a crane with piledriving equipment and duty cycle operations		✓		
I4	Perform multiple crane lifts		✓		
Total Percentage for Mobile Crane Operator Level 2		100%			

Training Topics and Suggested Time Allocation

MOBILE CRANE OPERATOR – LEVEL 3

		% of Time Allocated to:			
		% of Time	Theory	Practical	Total
Line A	USE COMMON OCCUPATIONAL SKILLS	5%	100%	0%	100%
A4	Practice effective worksite communications		✓		
Line F	PLAN A LIFT	25%	50%	50%	100%
F2	Perform engineered and critical lift plan		✓	✓	
Line G	PERFORM COMMON CRANE OPERATIONS	25%	20%	80%	100%
G5	Perform lattice boom crane operations and hoisting techniques		✓	✓	
Line H	ASSEMBLE, DISASSEMBLE, AND TRANSPORT A CRANE	25%	20%	80%	100%
H2	Assemble and disassemble a crane		✓	✓	
H3	Assemble and disassemble specialty equipment and attachments		✓	✓	
Line I	USE SPECIALIZED OPERATIONS	20%	10%	90%	100%
I1	Operate with a suspended work platform		✓	✓	
I3	Operate a crane with piledriving equipment and duty cycle operations		✓	✓	
I4	Perform multiple crane lifts		✓	✓	
I5	Operate a crane on a floating platform		✓		
Total Percentage for Mobile Crane Operator Level 3		100%			

Section 3
PROGRAM CONTENT
Mobile Crane Operator

Level 1

Mobile Crane Operator

Line (GAC):	A	USE COMMON OCCUPATIONAL SKILLS
Competency:	A1	Comply with regulations, policies, and manufacturers’ manuals

Objectives

To be competent in this area, the individual must be able to:

- Locate, identify, interpret and use information related to crane operations from government regulations, manufacturers’ manuals, and training provider references and policies.

LEARNING TASKS

CONTENT

1. Describe and identify the structure and general content of books, manuals and sources of information related to crane operations	<ul style="list-style-type: none"> • Current regulations and standards • WorkSafeBC regulations • Canadian Standards Association (CSA) Z150 and Z248 • Commercial Transport Regulations • IHSA Hoisting and Rigging Safety Manual • Manufacturers’ manuals including user and maintenance manuals • Training provider training references and policies • ASME standards • Fire safety
2. Locate, identify, and interpret and use specific items of information in documents related to crane operations	<ul style="list-style-type: none"> • Safe operating practices • Safety devices • Crane load charts • Crane set-up instructions • Documentation

Line (GAC): A USE COMMON OCCUPATIONAL SKILLS

Competency: A2 Maintain a safe working environment

Objectives

To be competent in this area, the individual must be able to:

- Work safely at the work site in accordance with Occupational Health and Safety (OHS) Regulations and the training provider policy.

LEARNING TASKS

CONTENT

- | | |
|---|--|
| <p>1. Identify the operator’s responsibilities in maintaining a safe work environment</p> | <ul style="list-style-type: none"> • Qualified operator • Full control of equipment controls • Hoist within limits • Safe handling of loads • Secure loads • Safe use and operation of equipment |
| <p>2. Understand how to maintain and when to remove PPE from service</p> | <ul style="list-style-type: none"> • Hard hat • Boots • Eyewear • Hearing protection • Fall protection • High-visibility clothing |
| <p>3. Describe safe crane set-up</p> | <ul style="list-style-type: none"> • Blocking • Limits of approach • Sheer/swing hazard • Crane as per manufacturers’ specifications <ul style="list-style-type: none"> ○ Level ○ Configuration |
| <p>4. Use documentation</p> | <ul style="list-style-type: none"> • Safety <ul style="list-style-type: none"> ○ FLRA ○ Incident report ○ Notification to supervision ○ 30M33 – limits of approach ○ MSDS • Crane <ul style="list-style-type: none"> ○ Logbook ○ Maintenance request ○ Lift plan |

LEARNING TASKS

5. Identify potential hazards

CONTENT

- Critical lifts
- Engineered lifts
- Crane, rigging and attachments certification

- Unsafe workplace conditions
 - Energy source hazards
 - Overhead hazards
 - Obstructions
 - Mobile machinery hazards
 - Rotating equipment hazards
 - Hydraulic fluid
- Regulations
- Manufacturers' manuals
- Company policy

Line (GAC): A USE COMMON OCCUPATIONAL SKILLS

Competency: A3 Awareness of energized equipment

Objectives

To be competent in this area, the individual must be able to:

- Define the limits of approach on how to operate a crane in proximity to energized equipment.
- Assess and determine safest operating procedures.
- Identify safeguards and regulations when operating near energized equipment.
- Complete applicable limits of approach document.

LEARNING TASKS

CONTENT

1. Describe the procedures for operating in proximity of energized equipment	<ul style="list-style-type: none"> • Limits of approach • Required documentation • Assurance in writing • Tag lines • Nature of electricity
2. Define safe limits of approach to energized equipment	<ul style="list-style-type: none"> • Power Authority • WorkSafeBC regulations
3. Describe the procedures recommended in the event of contact with energized equipment	<ul style="list-style-type: none"> • Safe exit (if possible) • Remain at a safe distance • Contact proper authorities
4. State the procedure for reporting contact with energized equipment	<ul style="list-style-type: none"> • WorkSafeBC regulations • Call the Power Authority
5. Interpret signage related to energized equipment	<ul style="list-style-type: none"> • WorkSafeBC regulations • Limits of approach signage • Line voltage
6. Complete applicable limits of approach document	<ul style="list-style-type: none"> • WorkSafeBC regulations • Associated Power Authority

Achievement Criteria

Performance	The learner will be able to complete a limits of approach document.
Conditions	The learner will be given <ul style="list-style-type: none"> • Unable to maintain limits of approach scenario.
Criteria	The learner will be evaluated on <ul style="list-style-type: none"> • Follow procedures for working around energized equipment in accordance with WorkSafeBC regulations and/or associated Power Authority.

Line (GAC): A USE COMMON OCCUPATIONAL SKILLS

Competency: A4 Practice effective worksite communications

Objectives

To be competent in this area, the individual must be able to:

- Demonstrate hand signals.
- Demonstrate use of radio crane communication.

LEARNING TASKS

CONTENT

<p>1. Explain the requirements for a signaller</p>	<ul style="list-style-type: none"> • Accurate descriptions • Identification and interpretation • Signal relaying for a blind lift • Regulations
<p>2. Describe personnel involved in crane operations</p>	<ul style="list-style-type: none"> • Crane operator • Signal person • Site supervisor • Rigger • Construction Safety Officer (CSO)
<p>3. Interpret worksite audio signals</p>	<ul style="list-style-type: none"> • Horn signals
<p>4. Demonstrate and interpret standard hand signals used during crane operations</p>	<ul style="list-style-type: none"> • Regulations
<p>5. Demonstrate the use of two-way electronic voice communication devices</p>	<ul style="list-style-type: none"> • Regulations • Basic functions of the radio communication devices • Language and terminology • Requirement to stop operation due to lost contact or interference
<p>6. Demonstrate effective oral communications</p>	<ul style="list-style-type: none"> • Listening skills • Tact • Diplomacy • Assertiveness
<p>7. Demonstrate effective written communications</p>	<ul style="list-style-type: none"> • Report writing • Recording <ul style="list-style-type: none"> ○ Logbook • Communication plan <ul style="list-style-type: none"> ○ FLRA ○ Critical lift

Achievement Criteria

Performance The learner will be able to direct a crane with hand signals and radio communications.

Conditions The learner will be given

- Regulations
- A crane to direct (operated by qualified operator)
- Radio.

Criteria The learner will be evaluated on

- Correct use of hand signals and radio communication etiquette.

Line (GAC): B DEFINE CRANE TYPES AND COMPONENT TERMINOLOGY
Competency: B1 Define crane types and classifications

Objectives

To be competent in this area, the individual must be able to:

- Identify common crane types.
- Categorize cranes using a variety of classifications.

LEARNING TASKS

1. Identify types of cranes

2. Identify crane classification categories

3. Select best crane type for scope of work

CONTENT

- Rubber tire cranes
- Crawler cranes

- Carrier types
- Hoist mechanisms
- Boom types
- Heavy lift cranes

- Pros & cons
 - Boom type
 - Carrier type
 - Site conditions
 - Length of job

Line (GAC): **B** **DEFINE CRANE TYPES AND COMPONENT TERMINOLOGY**
Competency: **B2** **Use crane terminology**

Objectives

To be competent in this area, the individual must be able to:

- Interpret common crane terminology.

LEARNING TASKS

CONTENT

1. Define terms related to crane components

- Carrier
- Upperworks
- Wire rope assemblies
- Hoists
- Attachments
- Boom type

2. Interpret terms related to load charts

- Load
 - Net
 - Gross
- Capacity
 - Net
 - Gross
- Boom angle
- Boom length
- Radius
- Quadrants of operation
- Range diagram

3. Describe lever classes

- Class 1 lever
- Class 2 lever
- Class 3 lever
- Centre of gravity

Line (GAC): **B DEFINE CRANE TYPES AND COMPONENT TERMINOLOGY**
Competency: **B3 Describe hydraulic crane systems**

Objectives

To be competent in this area, the individual must be able to:

- Describe hydraulic crane systems.

LEARNING TASKS

CONTENT

1. Identify components of a hydraulic system

- Pumps
- Tanks
- Hoses
- Valves
- Cylinders
- Motors
- Oil
 - Viscosity
 - Temperature
 - Filters

2. Describe terminology associated with hydraulic crane hydraulic systems

- Open/closed centre systems
- Flow rate
- Controls
- System pressure
- System failures

Line (GAC): C USE RIGGING
Competency: C2 Inspect slings and rigging hardware

Objectives

To be competent in this area, the individual must be able to:

- Inspect slings and rigging hardware and identify rejection criteria.

LEARNING TASKS

CONTENT

1. Describe the inspection for slings and rigging hardware	<ul style="list-style-type: none"> • Regulations • Manufacturers' manuals • Company policy • Rejection criteria
2. Inspect slings and rigging hardware for defects	<ul style="list-style-type: none"> • Regulations • Manufacturers' manuals • Company policy • Criteria <ul style="list-style-type: none"> ○ Inspection ○ Rejection
3. Describe procedure for removing damaged slings and/or rigging hardware from service	<ul style="list-style-type: none"> • Regulations • Manufacturers' manuals • Company policy
4. Report damaged slings and rigging hardware to appropriate personnel	<ul style="list-style-type: none"> • Requirements for reporting defects • Regulations • Manufacturers' manuals • Company policy

Line (GAC): C USE RIGGING
Competency: C3 Maintain and store slings and rigging hardware

Objectives

To be competent in this area, the individual must be able to:

- Describe proper storage and maintenance of slings and rigging hardware in accordance with manufacturers’ recommendations.

LEARNING TASKS

CONTENT

<p>1. Describe how to perform routine maintenance on slings</p>	<ul style="list-style-type: none"> • Regulations • Manufacturers’ manual • Company policy • Wire rope <ul style="list-style-type: none"> ○ Lubrication • Synthetic • Chain <ul style="list-style-type: none"> ○ Record testing • Metal mesh • Environmental conditions
<p>2. Describe how to perform routine maintenance on various types of rigging hardware</p>	<ul style="list-style-type: none"> • Regulations • Manufacturers’ manual • Company policy • Common <ul style="list-style-type: none"> ○ Shackles ○ Hooks • Below hook lifting devices • Environmental conditions
<p>3. Describe the criteria for storing slings and rigging hardware</p>	<ul style="list-style-type: none"> • Regulations • Manufacturers’ manual • Company policy • Environmental conditions

Line (GAC): C USE RIGGING
Competency: C4 Perform rigging

Objectives

To be competent in this area, the individual must be able to:

- Determine rigging capacity.
- Determine rigging appropriate for load composition.
- Perform rigging on a basic load.

LEARNING TASKS

CONTENT

- | | |
|---|---|
| <ol style="list-style-type: none"> 1. Determine load weight
 2. Identify centre of gravity
 3. Determine sling type, hardware, and capacity
 4. Verify any special lift instructions
 5. Perform rigging | <ul style="list-style-type: none"> • Marked on load • Documents • Calculations
 • Centre of gravity theory • Mark on load • Documents
 • Regulations • Manufacturers’ manual • Company policy • Weight of load • Working Load Limit (WLL) calculations <ul style="list-style-type: none"> ○ Sling angle ○ Number of slings ○ Type of hitches • Manufacturers’ ID tag • Rigging guides • Manual calculations
 • Lift plan <ul style="list-style-type: none"> ○ Engineered ○ Critical • Supplier specifications
 • Regulations • Manufacturers’ manual • Company policy • Lift plan • Rigging |
|---|---|

Achievement Criteria

Performance	The learner will be able to rig a basic load.
Conditions	The learner will be given <ul style="list-style-type: none">• Regulations• Hoisting device• Rigging• Lift plan• Load.
Criteria	The learner will be evaluated on <ul style="list-style-type: none">• Rigging the load as per regulations and industry standards.

Line (GAC): D PERFORM HOISTING CALCULATIONS

Competency: D1 Determine load weights

Objectives

To be competent in this area, the individual must be able to:

- Determine weight of basic-shaped load.
- Determine crane loads.

LEARNING TASKS

CONTENT

- | | |
|---|---|
| <ol style="list-style-type: none"> 1. Demonstrate the functions of a scientific calculator to perform mathematical calculations 2. Perform fundamental mathematical functions 3. Determine and apply formula needed for basic object shapes 4. Determine ground bearing capacity 5. Identify factors that contribute to load weight 6. Calculate load weights 7. Verify load weights | <ul style="list-style-type: none"> • Manufacturers' instructions • Formulas • Number rounding • Fraction to decimal conversion • Metric and imperial conversion • Pythagorean theorem • Circumference • Area • Volume • Supporting surface • Crane force/exertion • Ice • Water • Mud • Snow • Load frozen to ground • Lifting in water • Unit of measurement • Volume of an object • Weight of a cubic unit of an object • Gross weight of a load • Engineer's drawing • Blueprint • Bill of lading • Calculation |
|---|---|

Line (GAC):	D	PERFORM HOISTING CALCULATIONS
Competency:	D2	Use a crane capacity chart for a telescoping boom crane

Objectives

To be competent in this area, the individual must be able to:

- Interpret a basic telescoping load chart for an articulated crane and a stiff-boom crane.

LEARNING TASKS

1. Demonstrate knowledge of load charts, their characteristics, and applications

CONTENT

- Boom type
 - Telescoping boom
 - Articulated boom (folding boom)
- Terminology
- Crane configuration
- Components of load charts
- Factors that influence crane capacity
 - Levelness of crane
 - Wind
 - Eccentric reeving
 - Excessive parts of line
 - Improper set-up
 - Dynamic loading
 - Age of equipment
 - Crane configuration
 - LMI programming

2. Interpret a telescoping boom crane load chart

- Crane configuration
 - Outrigger options
 - Counterweights
- Load chart calculations
 - Main boom capacity
 - Jib/boom extension capacity
 - Line pull WLL
 - Maximum radius
 - Deductions
 - Range diagram
 - Quadrants of operation
- Load
 - Gross
 - Net
- Capacity
 - Gross
 - Net

Line (GAC): E PERFORM CRANE INSPECTION AND MAINTENANCE
Competency: E1 Use tools for basic crane maintenance

Objectives

To be competent in this area, the individual must be able to:

- Select appropriate tools to perform basic maintenance on a crane.

LEARNING TASKS

CONTENT

<p>1. Identify the tools required to perform basic maintenance</p>	<ul style="list-style-type: none"> • PPE • Grease gun • Adjustable wrenches • Combination wrenches • Sockets • Mallets • Screwdrivers • Hammers • Vice grips • Pliers • Pry bars • Ladders • Measuring devices
<p>2. Describe the function of the tools required for basic maintenance</p>	<ul style="list-style-type: none"> • Manufacturers' manual • Supplier's information • Company policy
<p>3. Select the appropriate tools for an application</p>	<ul style="list-style-type: none"> • Manufacturers' manual • Supplier's information • Company policy

Line (GAC): E PERFORM CRANE INSPECTION AND MAINTENANCE

Competency: E2 Perform basic crane maintenance

Objectives

To be competent in this area, the individual must be able to:

- Perform basic maintenance on a crane.

LEARNING TASKS

CONTENT

- | | |
|---|--|
| <p>1. Describe factors of the operator’s maintenance responsibilities</p> | <ul style="list-style-type: none"> • Regulations • Manufacturers’ manual • Company policy • Environmental |
| <p>2. Interpret maintenance information from manufacturers’ manuals</p> | <ul style="list-style-type: none"> • Inspection frequency • Servicing schedules • Fluid and lubricant selection • Company policy |
| <p>3. Inspect structural components</p> | <ul style="list-style-type: none"> • Manufacturers’ manuals <ul style="list-style-type: none"> ○ Bolts ○ Wedges ○ Cotter keys ○ Cotter pins ○ Guard rails ○ Welds |
| <p>4. Perform preventative crane maintenance</p> | <ul style="list-style-type: none"> • Manufacturers’ manuals <ul style="list-style-type: none"> ○ Grease fittings ○ Open gears ○ Fluid levels ○ Belt maintenance ○ Tire pressure ○ Outrigger and stabilizer maintenance ○ Boom maintenance ○ Steering system maintenance ○ Air tank drainage ○ Control mechanisms <ul style="list-style-type: none"> ▪ Slack adjusters ▪ Rollers ▪ Cables ▪ Brakes ▪ Clutches |

LEARNING TASKS**CONTENT**

- | | |
|--|---|
| 5. Clean crane components | <ul style="list-style-type: none">• Batteries• Cab• Windows• Wheels• Tracks |
| 6. Repair or replace defective components | <ul style="list-style-type: none">• Manufacturers' manuals• Company policy |
| 7. Report defects and deficiencies to supervisor | <ul style="list-style-type: none">• Regulations• Company policy |
| 8. Record maintenance performed and requested in the logbook | <ul style="list-style-type: none">• Regulations• Company policy• Manufacturers' manuals |

Line (GAC): E **PERFORM CRANE INSPECTION AND MAINTENANCE**
Competency: E3 **Identify pre-operational inspection components**

Objectives

To be competent in this area, the individual must be able to:

- Identify pre-operational inspection components.
- Identify component defects and malfunctions.

LEARNING TASKS

CONTENT

- | | |
|-----------------------------------|--|
| 1. Identify engine components | <ul style="list-style-type: none"> • Manufacturers' manuals <ul style="list-style-type: none"> ○ Electrical system ○ Lubrication ○ Fuel delivery ○ Air compressor ○ Cooling system ○ Instrumentation • Defects and malfunctions |
| 2. Identify braking components | <ul style="list-style-type: none"> • Manufacturers' manuals <ul style="list-style-type: none"> ○ Pneumatic ○ Hydraulic • Defects and malfunctions |
| 3. Identify carrier components | <ul style="list-style-type: none"> • Truck • Crane • Crawler • Defects and malfunctions |
| 4. Identify suspension components | <ul style="list-style-type: none"> • Manufacturers' manuals <ul style="list-style-type: none"> ○ Hydraulic ○ Pneumatic ○ Mechanical • Defects and malfunctions |
| 5. Identify drive components | <ul style="list-style-type: none"> • Manufacturers' manuals <ul style="list-style-type: none"> ○ Hydraulic ○ Friction ○ Drive-line systems • Defects and malfunctions |

LEARNING TASKS

CONTENT

- | | |
|--|--|
| 6. Identify steering components | <ul style="list-style-type: none">• Manufacturers' manuals<ul style="list-style-type: none">○ Rubber tire○ Crawler• Defects and malfunctions |
| 7. Identify hoisting system components | <ul style="list-style-type: none">• Manufacturers' manuals<ul style="list-style-type: none">○ Hydraulic○ Friction• Defects and malfunctions |
| 8. Identify electrical components | <ul style="list-style-type: none">• Manufacturers' manuals<ul style="list-style-type: none">○ Lights○ Crane accessories (12/24V)• Defects and malfunctions |
| 9. Identify crane components | <ul style="list-style-type: none">• Manufacturers' manuals<ul style="list-style-type: none">○ Boom○ Instrumentation○ Attachments○ Safety devices<ul style="list-style-type: none">▪ LMI▪ A2B○ Running and standing lines• Defects and malfunctions |

Line (GAC): E **PERFORM CRANE INSPECTION AND MAINTENANCE**
Competency: E4 **Perform a pre-operational inspection for a lattice boom crane**

Objectives

To be competent in this area, the individual must be able to:

- Describe pre-operation inspection for a hydraulic lattice boom crane.
- Describe pre-operation inspection for a friction lattice boom crane.

LEARNING TASKS

CONTENT

- | | |
|---|--|
| <p>1. Describe pre-operation inspection for hydraulic lattice boom crane</p> | <ul style="list-style-type: none"> • Regulations • Manufacturers' manual • Company policy • Documentation • Structural • Mechanical • Control systems |
| <p>2. Describe pre-operation inspection for a friction lattice boom crane</p> | <ul style="list-style-type: none"> • Regulations • Manufacturers' manual • Company policy • Documentation • Structural • Mechanical • Control systems |

Line (GAC):	E	PERFORM CRANE INSPECTION AND MAINTENANCE
Competency:	E5	Perform a pre-operational inspection for a telescoping boom crane

Objectives

To be competent in this area, the individual must be able to:

- Describe a pre-operation inspection for a telescoping boom wheeled crane.
- Describe a pre-operation inspection for a telescoping boom crawler crane.
- Perform a pre-operation inspection for a telescoping boom crane.

LEARNING TASKS

CONTENT

1. Describe pre-operation inspection for telescoping boom wheeled crane	<ul style="list-style-type: none"> • Documentation • Regulations • Manufacturers' manual • Company policy • Structural • Mechanical • Control systems
2. Describe pre-operation inspection for a telescoping boom crawler crane	<ul style="list-style-type: none"> • Documentation • Regulations • Manufacturers' manual • Company policy • Structural • Mechanical • Control systems
3. Perform a pre-operation inspection for a telescoping boom crane	<ul style="list-style-type: none"> • Documentation • Regulations • Manufacturers' manual • Company policy • Structural • Mechanical • Control systems

Achievement Criteria

Performance	The learner will be able to perform a pre-operational inspection on a telescoping boom crane.
Conditions	The learner will be given <ul style="list-style-type: none"> • Telescoping boom crane.
Criteria	The learner will be evaluated on <ul style="list-style-type: none"> • Successfully completing all pre-operation inspection points.

Line (GAC): **E PERFORM CRANE INSPECTION AND MAINTENANCE**
Competency: **E6 Inspect, maintain, and use crane wire rope**

Objectives

To be competent in this area, the individual must be able to:

- Describe types and applications of crane wire rope.
- Inspect and maintain crane wire rope.

LEARNING TASKS

CONTENT

- | | |
|--|--|
| 1. Describe types of crane wire rope | <ul style="list-style-type: none"> • Cable <ul style="list-style-type: none"> ○ Construction ○ Application ○ Classification |
| 2. Describe crane wire rope applications | <ul style="list-style-type: none"> • Manufacturers’ manual • Regulations • Company policy |
| 3. Inspect crane wire rope | <ul style="list-style-type: none"> • Manufacturers’ manual • Regulations • Company policy |
| 4. Maintain crane wire rope | <ul style="list-style-type: none"> • Manufacturers’ manual • Regulations • Company policy |

Achievement Criteria

Performance	The learner will be able to create an ordinary lift plan.
Conditions	The learner will be given <ul style="list-style-type: none">• Crane• Load• Site conditions.
Criteria	The learner will be evaluated on <ul style="list-style-type: none">• Compliance to regulations and Manufacturers' guidelines.

Line (GAC): F **PLAN A LIFT**
Competency: F2 **Perform engineered and critical lift plan**

Objectives

To be competent in this area, the individual must be able to:

- Describe regulatory definitions of a critical lift plan.
- Describe elements of a critical lift plan.

LEARNING TASKS

CONTENT

1. Describe regulatory definitions of a critical lift plan	<ul style="list-style-type: none"> • Regulations • Company policy
2. Describe elements of a critical lift plan	<ul style="list-style-type: none"> • Regulations • Company policy
3. Describe elements of an engineered lift plan	<ul style="list-style-type: none"> • Regulations • Company policy • Information <ul style="list-style-type: none"> ○ Rigging ○ Crane ○ Load

Line (GAC): **G PERFORM COMMON CRANE OPERATIONS**
Competency: **G2 Perform a pre-operational set-up for a telescopic boom crane**

Objectives

To be competent in this area, the individual must be able to:

- Perform a telescopic boom crane set-up.

LEARNING TASKS

CONTENT

1. Describe telescopic boom crane set-up	<ul style="list-style-type: none"> • Regulations • Manufacturers’ manual • Company policy • Safety device programming
2. Describe elements of a lift plan	<ul style="list-style-type: none"> • Regulations • Company policy • Lift plan
3. Perform a telescopic boom crane set-up	<ul style="list-style-type: none"> • Regulations • Manufacturers’ manual • Company policy • Safety device programming • Lift plan

Achievement Criteria

Performance	The learner will be able to perform a telescopic boom crane set-up.
Conditions	The learner will be given <ul style="list-style-type: none"> • Telescopic boom crane • Manufacturers’ manual • Regulations • Lift plan.
Criteria	The learner will be evaluated on crane set-up as per <ul style="list-style-type: none"> • Manufacturers’ manual • Regulations • Lift plan.

Line (GAC): **G PERFORM COMMON CRANE OPERATIONS**
Competency: **G3 Perform a lattice boom crane set-up**

Objectives

To be competent in this area, the individual must be able to:

- Describe a lattice boom crane set-up.

LEARNING TASKS

1. Describe lattice boom crane set-up

2. Describe elements of a lift plan

CONTENT

- Regulations
 - Manufacturers' manual
 - Company policy
 - Safety device programming
-
- Regulations
 - Company policy
 - Lift plan

Line (GAC): **G PERFORM COMMON CRANE OPERATIONS**
Competency: **G4 Perform telescoping boom crane operations and hoisting techniques**

Objectives

To be competent in this area, the individual must be able to:

- Describe telescoping boom crane operations techniques.
- Perform telescoping boom crane operations.

LEARNING TASKS

CONTENT

- | | |
|---|--|
| 1. Describe telescoping boom crane operations | <ul style="list-style-type: none"> • Regulations • Manufacturers’ manual • Company policy • Supporting surfaces • Lift plans • On-site mobilization • Operational aids |
| 2. Describe telescoping boom crane techniques | <ul style="list-style-type: none"> • Manufacturers’ manual <ul style="list-style-type: none"> ○ Boom deflection • Environmental <ul style="list-style-type: none"> ○ Conditions ○ Hazard • Lift plan • On-site mobilization |
| 3. Perform telescoping boom crane operation | <ul style="list-style-type: none"> • Regulations • Manufacturers’ manual • Company policy • Lift plan • Continual checks |

Achievement Criteria

- | | |
|-------------|--|
| Performance | The learner will be able to demonstrate load control while performing a pick and carry of a load. |
| Conditions | The learner will be given <ul style="list-style-type: none"> • Telescoping boom crane • Load • Lift plan. |
| Criteria | The learner will be evaluated on <ul style="list-style-type: none"> • Load control • Compliance with regulations and/or company policy • Manufacturers’ manual. |

Line (GAC): **G PERFORM COMMON CRANE OPERATIONS**
Competency: **G5 Perform lattice boom crane operations and hoisting techniques**

Objectives

To be competent in this area, the individual must be able to:

- Describe hydraulic lattice boom crane operations and techniques.
- Describe friction lattice boom crane operations and techniques.

LEARNING TASKS

CONTENT

1. Describe hydraulic lattice boom crane operations	<ul style="list-style-type: none"> • Regulations • Manufacturers’ manual • Company policy • Supporting surfaces • Lift plans • On-site mobilization • Operational aids • Continual checks
2. Describe hydraulic lattice boom crane techniques	<ul style="list-style-type: none"> • Manufacturers’ manual <ul style="list-style-type: none"> ○ Boom deflection • Environmental <ul style="list-style-type: none"> ○ Conditions ○ Hazard • Lift plan • On-site mobilization
3. Describe friction lattice boom crane operations	<ul style="list-style-type: none"> • Regulations • Manufacturers’ manual • Company policy • Supporting surfaces • Lift plans • On-site mobilization • Operational aids • Continual checks
4. Describe friction lattice boom crane techniques	<ul style="list-style-type: none"> • Manufacturers’ manual <ul style="list-style-type: none"> ○ Friction systems ○ Drive systems • Environmental <ul style="list-style-type: none"> ○ Conditions ○ Hazard • Lift plan • On-site mobilization

Line (GAC): G PERFORM COMMON CRANE OPERATIONS

Competency: G6 Secure crane

Objectives

To be competent in this area, the individual must be able to:

- Secure a crane for short term periods.
- Secure a crane for long term periods.

LEARNING TASKS

CONTENT

<p>1. Describe the procedure for securing a crane for short term periods</p>	<ul style="list-style-type: none"> • Regulations • Manufacturers’ manual • Company policy
<p>2. Describe the procedure for securing a crane for long term periods</p>	<ul style="list-style-type: none"> • Regulations • Manufacturers’ manual • Company policy
<p>3. Perform the procedure for securing a crane for short term periods</p>	<ul style="list-style-type: none"> • Regulations • Manufacturers’ manual • Company policy
<p>4. Perform the procedure for securing a crane for long term periods</p>	<ul style="list-style-type: none"> • Regulations • Manufacturers’ manual • Company policy

Achievement Criteria

<p>Performance</p>	<p>The learner will be able to perform the shutdown procedure for securing a crane for short-term and long-term periods.</p>
<p>Conditions</p>	<p>The learner will be given</p> <ul style="list-style-type: none"> • Regulations • Company policy • Manufacturers’ manual • Crane.
<p>Criteria</p>	<p>The individual is able to</p> <ul style="list-style-type: none"> • Perform correct procedure for securing the unattended crane for short-term and long-term periods.

Line (GAC): **H ASSEMBLE, DISASSEMBLE, AND TRANSPORT A CRANE**
Competency: **H1 Perform crane transportation**

Objectives

To be competent in this area, the individual must be able to:

- Describe crane Commercial Transport Regulations.
- Determine the procedure to prepare a rubber-tired crane for travel.
- Determine the procedure to prepare a crawler crane for transport.

LEARNING TASKS

CONTENT

1. Describe Commercial Transport Regulations	<ul style="list-style-type: none"> • Regulations
2. Determine the procedure to prepare a rubber-tired crane for travel	<ul style="list-style-type: none"> • Regulations • Manufacturers’ manual • Company policy
3. Determine the procedure to prepare a crawler crane for transport	<ul style="list-style-type: none"> • Regulations • Manufacturers’ manual • Company policy

Line (GAC): H ASSEMBLE, DISASSEMBLE, AND TRANSPORT A CRANE

Competency: H2 Assemble and disassemble a crane

Objectives

To be competent in this area, the individual must be able to:

- Describe the procedure for the assembly and disassembly of a telescopic boom crane.
- Describe the procedure for the assembly and disassembly of a lattice boom crane.
- Describe the procedure for transporting crane components.

LEARNING TASKS

CONTENT

1. Describe the procedure for the assembly and disassembly of a telescopic boom crane

- Regulations
- Company policy
- Manufacturers’ manual
 - Assembly/disassembly
 - Track
 - Outrigger
 - Superstructure
 - Main boom
 - Hook blocks
 - Counterweights
 - Jibs and inserts

2. Describe the procedure for the assembly and disassembly of a lattice boom crane

- Regulations
- Company policy
- Manufacturers’ manual
 - Assembly/disassembly
 - Track
 - Outrigger
 - Superstructure
 - Main boom
 - Hook blocks
 - Counterweights
 - Jibs and inserts

3. Describe the procedure for transporting crane components

- Regulations
- Manufacturers’ manual
- Company policy

Line (GAC):	I	USE SPECIALIZED OPERATIONS
Competency:	II	Operate with a suspended work platform

Objectives

To be competent in this area, the individual must be able to:

- Describe operating with a suspended work platform.

LEARNING TASKS

1. Describe the regulations regarding suspended work platforms

2. Describe operating with a suspended work platform

CONTENT

- Regulations
- Manufacturers' manual
- Company policy

- Regulations
- Manufacturers' manual
- Company policy
- Lift plan

Level 2

Mobile Crane Operator

Line (GAC): C USE RIGGING
Competency: C4 Perform rigging

Objectives

To be competent in this area, the individual must be able to:

- Determine rigging configuration for a non-symmetrical load.
- Use rigging on a non-symmetrical load.

LEARNING TASKS

CONTENT

1. Determine load weight	<ul style="list-style-type: none"> • Mark on load • Documents • Calculations
2. Calculate centre of gravity for non-symmetrical load	<ul style="list-style-type: none"> • Offset centre of gravity theory • Mark on load • Documents • Calculations • Test lift
3. Determine sling type, hardware, and capacity for non-symmetrical load	<ul style="list-style-type: none"> • Regulations • Manufacturers’ manuals • Company policy • Weight of load • Working Load Limit (WLL) calculations <ul style="list-style-type: none"> ○ Sling angle ○ Number of slings ○ Type of hitches • Manufacturers’ ID tag • Rigging guides • Manual calculations
4. Use rigging for non-symmetrical load	<ul style="list-style-type: none"> • Load weight • Centre of gravity • Capacity <ul style="list-style-type: none"> ○ Sling type • Hardware
5. Verify any special lift instructions	<ul style="list-style-type: none"> • Lift plan • Supplier specifications

Achievement Criteria

Performance	The learner will be able to <ul style="list-style-type: none">• Calculate and install rigging on a non-symmetrical load.
Conditions	The learner will be given <ul style="list-style-type: none">• Rigging selection• Non-symmetrical load• Hoisting device.
Criteria	The learner will be evaluated on <ul style="list-style-type: none">• Correct load calculations

Line (GAC): **D PERFORM HOISTING CALCULATIONS**
Competency: **D1 Determine load weights**

Objectives

To be competent in this area, the individual must be able to:

- Identify factors contributing to load weights.
- Determine weight of load for a complex-shaped object.

LEARNING TASKS

1. Determine and apply formula needed for complex object shape

2. Calculate load weights

3. Verify load weights

CONTENT

- Circumference
- Area
- Volume

- Unit of measurement
- Volume of an object
- Weight of a cubic unit of an object
- Gross weight of a load
 - Submerged
 - Non-submerged

- Engineer’s drawing
- Blueprint
- Bill of lading
- Calculation

Line (GAC): **D PERFORM HOISTING CALCULATIONS**
Competency: **D3 Use a crane capacity chart for a lattice boom crane**

Objectives

To be competent in this area, the individual must be able to:

- Interpret hydraulic and friction lattice boom crane load charts.

LEARNING TASKS

1. Demonstrate knowledge of load charts, their characteristics, and applications

2. Interpret a hydraulic lattice boom crane load chart

3. Interpret a friction lattice boom crane load chart

CONTENT

- Terminology
- Crane configuration
- Components of load charts
- Factors that influence crane capacity
 - Levelness of crane
 - Wind
 - Eccentric reeving
 - Excessive parts of line
 - Improper set-up
 - Dynamic loading
 - Age of equipment
 - Crane configuration
 - LMI programming
- Crane configuration
- Load chart calculations
 - Main boom capacity
 - Jib/boom extension capacity
 - Line pull WLL
 - Maximum radius
 - Deductions
- Load
 - Gross
 - Net
- Capacity
 - Gross
 - Net
- Crane configuration
- Load chart calculations
 - Main boom capacity
 - Jib/boom extension capacity
 - Line pull WLL
 - Maximum radius

LEARNING TASKS

CONTENT

- Deductions
- Load
 - Gross
 - Net
- Capacity
 - Gross
- Net

Line (GAC): E PERFORM CRANE INSPECTION AND MAINTENANCE

Competency: E4 Perform a pre-operational inspection for a lattice boom crane

Objectives

To be competent in this area, the individual must be able to:

- Perform a pre-operation inspection on a hydraulic lattice boom crane.
- Perform a pre-operation inspection on a friction lattice boom crane.

LEARNING TASKS

1. Describe pre-operation inspection for friction lattice boom truck crane

2. Describe pre-operation inspection for a friction lattice boom crawler crane

3. Perform a pre-operation inspection on a friction lattice boom crane

CONTENT

- Documentation
- Regulations
- Manufacturers' manual
- Structural
- Mechanical
- Control systems

- Documentation
- Regulations
- Manufacturers' manual
- Structural
- Mechanical
- Control systems

- Documentation
- Regulations
- Manufacturers' manual
- Structural
- Mechanical
- Control systems

Achievement Criteria 1

- | | |
|-------------|---|
| Performance | The learner will be able to perform a pre-operation inspection on a hydraulic lattice boom crane. |
| Conditions | The learner will be given <ul style="list-style-type: none">• Hydraulic Lattice boom crane. |
| Criteria | The learner will be evaluated on <ul style="list-style-type: none">• Successfully completing all pre-operation inspection points. |

Achievement Criteria 2

- | | |
|-------------|---|
| Performance | The learner will be able to perform a pre-operation inspection on a friction lattice boom crane. |
| Conditions | The learner will be given <ul style="list-style-type: none">• Friction Lattice boom crane. |
| Criteria | The learner will be evaluated on <ul style="list-style-type: none">• Successfully completing all pre-operation inspection points. |

Line (GAC): G PERFORM COMMON CRANE OPERATIONS

Competency: G3 Perform a lattice boom crane set-up

Objectives

To be competent in this area, the individual must be able to:

- Perform a lattice boom crane set-up.

LEARNING TASKS

CONTENT

1. Describe lattice boom crane set-up

- Regulations
- Manufacturers’ manual
- Company policy
- Safety device programming

2. Describe elements of a lift plan

- Regulations
- Company policy
- Lift plan

3. Perform a lattice boom crane set-up

- Regulations
- Manufacturers’ manual
- Company policy
- Safety device programming
- Lift plan

Achievement Criteria

Performance The learner will be able to perform a lattice boom crane set-up.

Conditions The learner will be given

- Lattice boom crane
- Manufacturers’ manual
- Regulations
- Lift plan.

Criteria The learner will be evaluated on crane set-up as per

- Manufacturers’ manual
- Regulations
- Lift plan.

- Line (GAC):** I **USE SPECIALIZED OPERATIONS**
Competency: I3 **Operate a crane with piledriving equipment and duty cycle operations**

Objectives

To be competent in this area, the individual must be able to:

- Describe piledriving equipment.

LEARNING TASKS

1. Describe piledriving equipment

2. Describe duty cycle operation equipment

CONTENT

- Regulations
 - Manufacturers' manuals
 - Company policy
-
- Regulations
 - Manufacturers' manuals
 - Company policy

Level 3

Mobile Crane Operator

Line (GAC): F **PLAN A LIFT**
Competency: F2 **Perform engineered and critical lift plan**

Objectives

To be competent in this area, the individual must be able to:

- Complete a critical lift plan.

LEARNING TASKS

CONTENT

<p>1. Describe regulatory definitions of a critical lift plan</p>	<ul style="list-style-type: none"> • Regulations • Company policy
<p>2. Describe elements of a critical lift plan</p>	<ul style="list-style-type: none"> • Regulations • Company policy
<p>3. Describe elements of an engineered lift plan</p>	<ul style="list-style-type: none"> • Regulations • Company policy • Information <ul style="list-style-type: none"> ○ Rigging ○ Crane • Load
<p>4. Complete a critical lift plan</p>	<ul style="list-style-type: none"> • Regulations • Company policy

Achievement Criteria

<p>Performance</p>	<p>The learner will be able to</p> <ul style="list-style-type: none"> • Complete a critical lift plan.
<p>Conditions</p>	<p>The learner will be given</p> <ul style="list-style-type: none"> • Regulations • Company policy • Critical lift scenario.
<p>Criteria</p>	<p>The learner will be evaluated on</p> <ul style="list-style-type: none"> • Compliance with regulations and/or company policy.

Line (GAC): **G PERFORM COMMON CRANE OPERATIONS**
Competency: **G5 Perform lattice boom crane operations and hoisting techniques**

Objectives

To be competent in this area, the individual must be able to:

- Perform hydraulic lattice boom crane operation.
- Perform friction lattice boom crane operation.

LEARNING TASKS

CONTENT

- | | |
|---|---|
| 1. Lift planning | <ul style="list-style-type: none"> • Regulations • Manufacturers’ manual • Company policy • Load composition • Crane configuration |
| 2. Perform pre-operation inspection | <ul style="list-style-type: none"> • Regulations • Manufacturers’ manual • Company policy |
| 3. Perform hydraulic lattice boom crane operation | <ul style="list-style-type: none"> • Regulations • Manufacturers’ manual • Company policy • Lift plan • Crane controls |
| 4. Perform friction lattice boom crane operation | <ul style="list-style-type: none"> • Regulations • Manufacturers’ manual • Company policy • Lift plan • Crane controls |

Achievement Criteria 1

Performance	The learner will be able to demonstrate load control in a timely manner per industry standard (as per BC Crane Safety).
Conditions	The learner will be given <ul style="list-style-type: none"> • Hydraulic Lattice boom crane • Load • Lift plan • Timed to industry standard.
Criteria	The learner will be evaluated on <ul style="list-style-type: none"> • Load control • Compliance with regulations and/or company policy • Manufacturers’ manual • Within time allowed by industry standard (as per BC Crane Safety).

Achievement Criteria 2

Performance	The learner will be able to demonstrate load control.
Conditions	The learner will be given <ul style="list-style-type: none"> • Friction Lattice boom crane • Load • Lift plan.
Criteria	The learner will be evaluated on <ul style="list-style-type: none"> • Load control • Compliance with regulations and/or company policy • Manufacturers’ manual.

Line (GAC): H ASSEMBLE, DISASSEMBLE, AND TRANSPORT A CRANE

Competency: H2 Assemble and disassemble a crane

Objectives

To be competent in this area, the individual must be able to:

- Create an assembly and disassembly plan for a lattice boom crane.
- Assemble and disassemble a lattice boom crane.

LEARNING TASKS

CONTENT

- | | |
|--|--|
| <p>1. Create an assembly and disassembly plan for a lattice boom crane</p> | <ul style="list-style-type: none"> • Regulations • Manufacturers’ manuals • Company policy • Commercial Transportation Regulations |
| <p>2. Assemble and disassemble a lattice boom crane</p> | <ul style="list-style-type: none"> • Regulations • Manufacturers’ manual • Company policy |

Achievement Criteria

Performance The learner will be able to create an assembly and disassembly plan for a lattice boom crane.

- Conditions** The learner will be given
- Regulations
 - Manufacturers’ manuals
 - Company policy
 - Commercial Transportation Regulations
 - Plan scenario.

- Criteria** The learner will be evaluated on
- Adherence to Manufacturers’ manual and company policy
 - Work within confines of the Commercial Transportation Regulations.

Line (GAC): H ASSEMBLE, DISASSEMBLE, AND TRANSPORT A CRANE

Competency: H3 Assemble and disassemble specialty equipment and attachments

Objectives

To be competent in this area, the individual must be able to:

- Create an assembly and disassembly plan for a crane attachment.
- Assemble and disassemble a crane attachment.

LEARNING TASKS

CONTENT

1. Create an assembly and disassembly plan for a crane attachment

- Regulations
- Manufacturers’ manuals
- Company policy
- Commercial Transportation Regulations

2. Assemble and disassemble a crane attachment

- Regulations
- Manufacturers’ manuals
- Company policy

Achievement Criteria

Performance The learner will be able to

- Create an assembly and disassembly plan for a jib or luffer
- Assemble and disassemble a crane attachment.

Conditions The learner will be given

- Regulations
- Manufacturers’ manuals
- Company policy
- Crane
- Attachment
- Assistance as required.

Criteria The learner will be evaluated on

- Adherence to Manufacturers’ manual and company policy
- Safe work procedures.

Line (GAC): I **USE SPECIALIZED OPERATIONS**
Competency: II **Operate with a suspended work platform**

Objectives

To be competent in this area, the individual must be able to:

- Operate with a suspended work platform.

LEARNING TASKS

1. Operate with a suspended work platform

CONTENT

- Regulations
- Manufacturers’ manual
- Company policy
- Lift plan

Achievement Criteria

Performance The learner will be able to operate with a suspended work platform.

Conditions The learner will be given

- Regulations
- Manufacturers’ manuals
- Company policy
- Crane and suspended work platform
- Lift plan
- Qualified Supervisor.

Criteria The learner will be evaluated on

- Adherence to regulations and company policy
- Safe work procedures.

Line (GAC):	I	USE SPECIALIZED OPERATIONS
Competency:	I3	Operate a crane with piledriving equipment and duty cycle operations

Objectives

To be competent in this area, the individual must be able to:

- Describe duty cycle operations.
- Operate a crane with piledriving equipment.

LEARNING TASKS

1. Describe piledriving operations

2. Describe duty cycle operations

CONTENT

- Regulations
 - Manufacturers’ manuals
 - Company policy
 - Lift plan
-
- Regulations
 - Manufacturers’ manuals
 - Company policy
 - Lift plan

Achievement Criteria

Performance The learner will be able to drive a pile.

Conditions The learner will be given

- Manufacturers’ instructions/recommendations
- Crane
- Piledriving equipment
- Pile

Criteria The learner will be evaluated on

- Ability to follow manufacturers’ instructions
- Ability to follow lift instructions
- Adhere to applicable regulations

Line (GAC): I **USE SPECIALIZED OPERATIONS**
Competency: I4 **Perform multiple crane lifts**

Objectives

To be competent in this area, the individual must be able to:

- Create a multiple crane lift plan.
- Perform a multiple crane lift.

LEARNING TASKS

1. Create a multiple crane lift plan

2. Perform a multiple crane lift

CONTENT

- Regulations
- Manufacturers’ manuals
- Company policy

- Regulations
- Manufacturers’ manuals
- Company policy
- Lift plan

Achievement Criteria

Performance The learner will be able to

- Create a multiple crane lift plan
- Perform a multiple crane lift.

Conditions The learner will be given

- Regulations
- Manufacturers’ manuals
- Company policy
- Load
- Two mobile cranes
- Rigging
- Assistance as required (i.e., signal person).

Criteria The learner will be evaluated on

- Adherence to regulations and company policy
- Safe work procedures
- Clear and concise lift plan
- Correct crane communication
- Load control.

Line (GAC): I **USE SPECIALIZED OPERATIONS**
Competency: I5 **Operate a crane on a floating platform**

Objectives

To be competent in this area, the individual must be able to:

- Describe operating a crane on a floating platform

LEARNING TASKS

CONTENT

- | | |
|---|---|
| <p>1. Describe crane floating-platform characteristics</p> | <ul style="list-style-type: none"> • Regulations • Manufacturers’ manuals • Company policy • Engineering documents |
| <p>2. Describe considerations of operating a crane on a floating platform</p> | <ul style="list-style-type: none"> • Regulations • Manufacturers’ manuals • Company policy • Engineering documents • Environmental considerations <ul style="list-style-type: none"> ○ Tide ○ Swell ○ Wind • Load <ul style="list-style-type: none"> ○ Submerged ○ Non-submerged |

Section 4

ASSESSMENT GUIDELINES

Assessment Guidelines – Level 1

Level 1 Grading Sheet: Subject Competency and Weightings

PROGRAM: IN-SCHOOL TRAINING:		MOBILE CRANE OPERATOR LEVEL 1	
LINE	SUBJECT COMPETENCIES	THEORY WEIGHTING	PRACTICAL WEIGHTING
A	USE COMMON OCCUPATIONAL SKILLS	15%	20%
B	DEFINE CRANE TYPES AND COMPONENT TERMINOLOGY	10%	0%
C	USE RIGGING	20%	25%
D	PERFORM HOISTING CALCULATIONS	15%	0%
E	PERFORM CRANE INSPECTION AND MAINTENANCE	5%	20%
F	PLAN A LIFT	15%	5%
G	PERFORM COMMON CRANE OPERATIONS	10%	30%
H	ASSEMBLE, DISASSEMBLE, AND TRANSPORT A CRANE	5%	0%
I	USE SPECIALIZED OPERATIONS	5%	0%
	Total	100%	100%
In-school theory/practical subject competency weighting		70%	30%
Final in-school percentage score		IN-SCHOOL %	

All apprentices who complete Level 1 of the Mobile Crane Operator program with a FINAL level mark of 70% or greater will write the Mobile Crane Operator Level 1 Standardized Written Exam as their final assessment.

SkilledTradesBC will enter the apprentices' Mobile Crane Operator Level 1 Standardized Written Exam mark in SkilledTradesBC Portal. A minimum mark of 70% on the examination is required for a pass.

Assessment Guidelines – Level 2

Level 2 Grading Sheet: Subject Competency and Weightings

PROGRAM: IN-SCHOOL TRAINING:		MOBILE CRANE OPERATOR LEVEL 2	
LINE	SUBJECT COMPETENCIES	THEORY WEIGHTING	PRACTICAL WEIGHTING
C	USE RIGGING	20%	40%
D	PERFORM HOISTING CALCULATIONS	30%	0%
E	PERFORM CRANE INSPECTION AND MAINTENANCE	10%	20%
G	PERFORM COMMON CRANE OPERATIONS	25%	40%
I	USE SPECIALIZED OPERATIONS	15%	0%
	Total	100%	100%
In-school theory/practical subject competency weighting		30%	70%
Final in-school percentage score		IN-SCHOOL %	

Assessment Guidelines – Level 3

Level 3 Grading Sheet: Subject Competency and Weightings

PROGRAM: IN-SCHOOL TRAINING:		MOBILE CRANE OPERATOR LEVEL 3	
LINE	SUBJECT COMPETENCIES	THEORY WEIGHTING	PRACTICAL WEIGHTING
A	USE COMMON OCCUPATIONAL SKILLS	10%	0%
F	PLAN A LIFT	20%	20%
G	PERFORM COMMON CRANE OPERATIONS	20%	25%
H	ASSEMBLE, DISASSEMBLE, AND TRANSPORT A CRANE	30%	25%
I	USE SPECIALIZED OPERATIONS	20%	30%
	Total	100%	100%
In-school theory/practical subject competency weighting		10%	90%
Final in-school percentage score		IN-SCHOOL %	

All apprentices who complete Level 3 of the Mobile Crane Operator program with a FINAL level mark of 70% or greater will write the Mobile Crane Operator Level 3 Standardized Written exam and the Interprovincial Red Seal examination as their final assessment.

SkilledTradesBC will enter the apprentice’s Mobile Crane Operator Level 3 Standardized Written Exam and Red Seal Interprovincial examination marks in the SkilledTradesBC Portal. A minimum mark of 70% on both examinations is required for a pass.

Section 5

TRAINING PROVIDER STANDARDS

Facility Requirements

Classroom Area

- 400 square feet of classroom space (40 square feet per student).
- Temperature, noise, ventilation, and lighting are maintained at appropriate levels.
- Storage space is functional and sufficient for instructional materials, supplies, and equipment.
- Facilities have adequate floor area and ceiling height.
- Lighting control (windows and fixtures) for screen viewing.
- Tables, comfortable chairs.
- Whiteboards with marking pens and erasers.

Shop Area

- Access to sufficient land necessary to operate multiple pieces of equipment at the same time (suggested minimum of 10 acres).
- A safety review of the program's facility and equipment is conducted annually and meets applicable safety standards/regulations.
- Clear of all hazards (power lines, underground services, etc.)

Lab Requirements

- This section does not apply.

Student Facilities

- Facilities shall offer a safe and productive learning environment.
- Meets applicable zoning bylaws for technical instruction and education.
- Meets WorkSafeBC requirements.

Instructor's Office Space

- Meets applicable zoning bylaws for technical instruction and education.
- Meets WorkSafeBC requirements.

Other

- This section does not apply.

Tools and Equipment

The crane and equipment used for training should be representative of the appropriate crane certification classification.

Personal Protective Equipment (PPE)

Student

- Coveralls
- Safety glasses
- Safety boots
- Hard hat
- Gloves
- High visibility vest
- Weather appropriate clothing

Training provider

- Ear plugs
- Face shields
- Masks (particle/vapour)
- Fall protection

Safety Equipment

- Fire extinguishers
- First aid kit
- Spill kit
- Eyewash station
- Emergency procedures

Hand Tools

- Adjustable wrench
- Combination wrenches
- Ratchet and socket set
- Pliers (various types)
- Screwdrivers (various types)
- Vise grips
- Hammers
- Pry bar
- Grease gun
- Tire pressure gauge
- Vernier calipers
- Wire brush

- Cable cutter
- Shovel

Miscellaneous materials – Training Provider

- Calculator
- Pencil
- Eraser
- Sharpener

Miscellaneous Props for Training

- Two-way radios
- Loads
 - Symmetrical
 - Non symmetrical
 - Man basket
 - Tandem
- Rigging and rigging hardware
- Tag line
- Tape measure
- Carpenter level
- Pylons
- Targets
- Training scenarios

Minimum Crane Requirements

- Minimum of three cranes, of which one must be/have:
 - Telescopic boom (of which one must be telescopic truck crane or rough terrain crane)
 - Friction Lattice boom (required for Level 2 and 3)
 - Hydraulic Lattice boom (required for Level 2 and 3)
 - Have a minimum lifting capacity of greater than 80 tonnes

Reference Materials**Required Resources**

- WorkSafeBC Occupational Health and Safety Regulation (OHSR)
- CAN/CSA Z150 Safety Code for Mobile Cranes
- ANSI Standard ANSI/ASME B30.5, Mobile and Locomotive Crane or ANSI/ASME B30.22 Articulating Boom Crane
- ANSI Standard ANSI/ASME B30.9 Slings
- ANSI Standard ANSI/ASME B30.10 Hooks
- ANSI Standard ANSI/ASME B30.20 Below-the-Hook Lifting Devices

Recommended Resources

- Rigging Manual, by Donald E. Dickie, P. Eng.
Publisher: Construction Safety Association of Ontario
- IHSA Hoisting and Rigging Safety Manual <http://www.ihsa.ca/>
- Mobile Craning Today
Publisher: Operating Engineers Training Institute of Ontario, <http://www.oetio.com>
- IPT's Crane and Rigging Handbook, by Ronald G. Garby
Publisher: IPT Publishing and Training Ltd. <http://www.iptbooks.com>
- IPT's Crane and Rigging Training Manual, by Ronald G. Garby
Publisher: IPT Publishing and Training Ltd. <http://www.iptbooks.com>

Instructor Requirements

Occupation Qualification

The instructor must possess:

- Unrestricted Proof of Competence from BC Crane Safety and/or Interprovincial Red Seal Certificate appropriate to the crane classification for which they provide training.

Work Experience

Instructors must have a minimum of five years' experience working as a journeyperson Mobile Crane Operator.

Appendices

**Appendix A
Acronyms and Abbreviations**

A2B	Anti-two block
ANSI	American National Standards Institute
ASME	American Society of Mechanical Engineers
CSA	Canadian Standards Association
CSO	Construction Safety Officer
FLRA	Field level risk assessment
IHSA	Infrastructure Health & Safety Association
LMI	Load moment indicator
MSDS	Material safety data sheet
OHS	Occupational Health and Safety
PPE	Personal protective equipment
SCR	Selective catalytic reduction
WLL	Working load limit

Appendix B Summary of Achievement Criteria

Achievement Criteria are included for competencies that require a practical assessment. The intent of including Achievement Criteria in the Program Outline is to ensure consistency in training across the many training institutions in British Columbia. Their purpose is to reinforce the theory and to provide a mechanism for evaluation of the learner’s ability to apply the theory to practice. It is important that these performances be observable and measurable and that they reflect the skills spelled out in the competency. The conditions under which these performances will be observed and measured must be clear to the learner as well as the criteria by which the learner will be evaluated. The learner must also be given the evaluation criteria.

The performance spelled out in the Achievement Criteria is a suggested performance and is not meant to stifle flexibility of delivery. Training providers are welcome to substitute other practical performances that measure similar skills and attainment of the competency. Multiple performances may also be used to replace individual performances where appropriate.

The following tables summarize the practical assessments for each level. **For details, please refer to the Achievement Criteria following the competency in the Program Content section.**

MOBILE CRANE OPERATOR – LEVEL 1 SUMMARY OF ACHIEVEMENT CRITERIA	
SUBJECT COMPETENCY	ACHIEVEMENT CRITERIA TASK
A3 Awareness of energized equipment	The learner will be able to complete a limits of approach document.
A4 Practice effective worksite communications	The learner will be able to direct a crane with hand signals and radio communications.
C4 Perform rigging	The learner will be able to rig a basic load
E5 Perform a pre-operational inspection for a telescoping boom crane	The learner will be able to perform a pre-operation inspection on a telescoping boom crane
F1 Perform ordinary lift planning	The learner will be able to create an ordinary lift plan
G2 Perform a telescopic boom crane set-up	The learner will be able to perform a telescopic boom crane set-up
G4 Perform telescoping boom crane operations and hoisting techniques	The learner will be able to demonstrate load control while performing a pick and carry of a load
G6 Secure unattended crane	The learner will be able to perform the shutdown procedure for leaving a crane unattended for short-term and long-term periods

MOBILE CRANE OPERATOR – LEVEL 2 SUMMARY OF ACHIEVEMENT CRITERIA	
SUBJECT COMPETENCY	ACHIEVEMENT CRITERIA TASK
C4 Perform rigging	The learner will be able to calculate and install rigging on a non-symmetrical load
E4 Perform a pre-operational inspection for a lattice boom crane	<ol style="list-style-type: none"> 1. The learner will be able to perform a pre-operation inspection on a hydraulic lattice boom crane 2. The learner will be able to perform a pre-operation inspection on a friction lattice boom crane
G3 Perform a lattice boom crane set-up	The learner will be able to perform a lattice boom crane set-up

MOBILE CRANE OPERATOR – LEVEL 3 SUMMARY OF ACHIEVEMENT CRITERIA	
SUBJECT COMPETENCY	ACHIEVEMENT CRITERIA TASK
F2 Perform engineered and critical lift plan	The learner will be able to complete a critical lift plan
G5 Perform lattice boom crane operations and hoisting techniques	<ol style="list-style-type: none"> 1. The learner will be able to demonstrate load control in a timely manner per industry standard with a hydraulic lattice boom crane 2. The learner will be able to demonstrate load control with a Friction Lattice boom crane
H2 Assemble and disassemble a crane	The learner will be able to create an assembly and disassembly plan for a lattice boom crane
H3 Assemble and disassemble specialty equipment and attachments	<p>The learner will be able to:</p> <ul style="list-style-type: none"> • Create an assembly and disassembly plan for a jib or luffer • Assemble and disassemble a crane attachment
I1 Operate a suspended work platform	The learner will be able to operate with a suspended work platform
I3 Operate a crane with piledriving equipment and duty cycle operations	The learner will be able to drive a pile.
I4 Perform multiple crane lifts	<p>The learner will be able to:</p> <ul style="list-style-type: none"> • Create a multiple crane lift plan • Perform multiple crane lift