

Apprenticeship and Industry Training

Crane and Hoisting Equipment Operator- Mobile Crane Operator/Boom Truck Operator Apprenticeship Course Outline

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Apprenticeship
and Industry
Training

ALBERTA ADVANCED EDUCATION

Crane and Hoisting Equipment Operator - Mobile Crane Operator/Boom Truck Operator Course Outline

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Course Outline

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Apprenticeship

Apprenticeship is post-secondary education with a difference. Apprenticeship begins with finding an employer. Employers hire apprentices, pay their wages and provide on-the-job training and work experience. Approximately 80 per cent of an apprentice's time is spent on the job under the supervision of a certified journeyman or qualified tradesperson. The other 20 per cent involves technical training provided at, or through, a post-secondary institution – usually a college or technical institute.

To become certified journeymen, apprentices must learn theory and skills, and they must pass examinations. Requirements for certification—including the content and delivery of technical training—are developed and updated by the Alberta Apprenticeship and Industry Training Board on the recommendation of Crane and Hoisting Equipment Operator Provincial Apprenticeship Committee.

The graduate of the Mobile Crane/Boom Truck apprenticeship program is a certified journeyman who will be able to:

- maintain tools and equipment.
- demonstrate safe work practices.
- recognize and mitigate hazardous conditions related to boom truck/mobile crane operation.
- interpret and apply load charts, manufacturers manual and other related documentation.
- apply reference use, management and organizational skills.
- set-up boom truck/mobile crane for a lift.
- rig the load for lifting.
- hoist as per signals.
- operate the boom truck/mobile crane to lift and set the load
- prepare the boom truck/mobile crane for travel.
- understand the fundamentals of operating a small business.
- perform assigned tasks in accordance with quality and production standards required by industry.

Apprenticeship and Industry Training System

Industry-Driven

Alberta's apprenticeship and industry training system is an industry-driven system that ensures a highly skilled, internationally competitive workforce in more than 50 designated trades and occupations. This workforce supports the economic progress of Alberta and its competitive role in the global market. Industry (employers and employees) establishes training and certification standards and provides direction to the system through an industry committee network and the Alberta Apprenticeship and Industry Training Board. The Alberta government provides the legislative framework and administrative support for the apprenticeship and industry training system.

Alberta Apprenticeship and Industry Training Board

The Alberta Apprenticeship and Industry Training Board provides a leadership role in developing Alberta's highly skilled and trained workforce. The Board's primary responsibility is to establish the standards and requirements for training and certification in programs under the Apprenticeship and Industry Training Act. The Board also provides advice to the Minister of Advanced Education on the needs of Alberta's labour market for skilled and trained workers, and the designation of trades and occupations.

The thirteen-member Board consists of a chair, eight members representing trades and four members representing other industries. There are equal numbers of employer and employee representatives.

Industry Committee Network

Alberta's apprenticeship and industry training system relies on a network of industry committees, including local and provincial apprenticeship committees in the designated trades, and occupational committees in the designated occupations. The network also includes other committees such as provisional committees that are established before the designation of a new trade or occupation comes into effect. All trade committees are composed of equal numbers of employer and employee representatives. The industry committee network is the foundation of Alberta's apprenticeship and industry training system.

Local Apprenticeship Committees (LAC)

Wherever there is activity in a trade, the Board can set up a local apprenticeship committee. The Board appoints equal numbers of employee and employer representatives for terms of up to three years. The committee appoints a member as presiding officer. Local apprenticeship committees:

- monitor apprenticeship programs and the progress of apprentices in their trade, at the local level
- make recommendations to their trade's provincial apprenticeship committee (PAC) about apprenticeship and certification in their trade
- promote apprenticeship programs and training and the pursuit of careers in their trade
- make recommendations to the Board about the appointment of members to their trade's PAC
- help settle certain kinds of disagreements between apprentices and their employers
- carry out functions assigned by their trade's PAC or the Board

Provincial Apprenticeship Committees (PAC)

The Board establishes a provincial apprenticeship committee for each trade. It appoints an equal number of employer and employee representatives, and, on the PAC's recommendation, a presiding officer - each for a maximum of two terms of up to three years. Most PACs have nine members but can have as many as twenty-one. Provincial apprenticeship committees:

- make recommendations to the Board about:
 - standards and requirements for training and certification in their trade
 - courses and examinations in their trade
 - apprenticeship and certification
 - designation of trades and occupations
 - regulations and orders under the Apprenticeship and Industry Training Act
- monitor the activities of local apprenticeship committees in their trade
- determine whether training of various kinds is equivalent to training provided in an apprenticeship program in their trade
- promote apprenticeship programs and training and the pursuit of careers in their trade
- consult with other committees under the Apprenticeship and Industry Training Act about apprenticeship programs, training and certification and facilitate cooperation between different trades and occupations
- consult with organizations, associations and people who have an interest in their trade and with employers and employees in their trade
- may participate in resolving certain disagreements between employers and employees
- carry out functions assigned by the Board

Crane and Hoisting Equipment Operator PAC Members at Time of Publication

Mr. S. Fryer	Edmonton.....	Presiding Officer
Mr. S. Gibson	Ft. Saskatchewan.....	Employer
Mr. J. Kidd	Ft. McMurray	Employer
Mr. D. Secord	Spruce Grove	Employer
Mr. T. Tessier	Calgary	Employer
Mr. M. Iliffe.....	Devon.....	Employee
Mr. D. Stanley.....	Calgary.....	Employee
Mr. M. Stokes	Beaumont.....	Employee

Alberta Government

Alberta Advanced Education works with industry, employer and employee organizations and technical training providers to:

- facilitate industry's development and maintenance of training and certification standards
- provide registration and counselling services to apprentices and employers
- coordinate technical training in collaboration with training providers
- certify apprentices and others who meet industry standards

Apprenticeship Safety

Safe working procedures and conditions, incident/injury prevention, and the preservation of health are of primary importance in apprenticeship programs in Alberta. These responsibilities are shared and require the joint efforts of government, employers, employees, apprentices and the public. Therefore, it is imperative that all parties are aware of circumstances that may lead to injury or harm.

Safe learning experiences and healthy environments can be created by controlling the variables and behaviours that may contribute to or cause an incident or injury. By practicing a safe and healthy attitude, everyone can enjoy the benefit of an incident and injury free environment.

Alberta Apprenticeship and Industry Training Board Safety Policy

The Alberta Apprenticeship and Industry Training Board (board) fully supports safe learning and working environments and emphasizes the importance of safety awareness and education throughout apprenticeship training- in both on-the- job training and technical training. The board also recognizes that safety awareness and education begins on the first day of on-the-job training and thereby is the initial and ongoing responsibility of the employer and the apprentice as required under workplace health and safety training. However the board encourages that safe workplace behaviour is modeled not only during on-the-job training but also during all aspects of technical training, in particular, shop or lab instruction. Therefore the board recognizes that safety awareness and training in apprenticeship technical training reinforces, but does not replace, employer safety training that is required under workplace health and safety legislation.

The board has established a policy with respect to safety awareness and training:

The board promotes and supports safe workplaces, which embody a culture of safety for all apprentices, employers and employees. Employer required safety training is the responsibility of the employer and the apprentice, as required under legislation other than the *Apprenticeship and Industry Training Act*.

The board's complete document on its 'Apprenticeship Safety Training Policy' is available at www.tradesecrets.alberta.ca; access the website and conduct a search for 'safety training policy'.

Implementation of the policy includes three common safety learning outcomes and objectives for all trade course outlines. These common learning outcomes ensure that each course outline utilizes common language consistent with workplace health and safety terminology. Under the title of 'Standard Workplace Safety', this first section of each trade course outline enables the delivery of generic safety training; technical training providers will provide trade specific examples related to the content delivery of course outline safety training.

Occupational Health and Safety

A tradesperson is often exposed to more hazards than any other person in the work force and therefore should be familiar with and apply the Occupational Health and Safety Act, Regulations and Code when dealing with personal safety and the special safety rules that apply to all daily tasks.

Occupational Health and Safety (A division of Alberta Human Services) conducts periodic inspections of workplaces to ensure that safety regulations for industry are being observed.

Additional information is available at www.humanservices.alberta.ca

Technical Training

Apprenticeship technical training is delivered by the technical institutes and colleges in the public post-secondary system throughout Alberta. The colleges and institutes are committed to delivering the technical training component of Alberta apprenticeship programs in a safe, efficient and effective manner. All training providers place a strong emphasis on safety that complements safe workplace practices towards the development of a culture of safety for all trades.

The technical institutes and colleges work with Alberta's Apprenticeship and Industry Training Board, industry committees and Alberta Advanced Education to enhance access and responsiveness to industry needs through the delivery of the technical training component of apprenticeship programs across the Province. They develop curriculum from the course outlines established by industry and provide technical training to apprentices.

The following technical training providers deliver <trade name> apprenticeship training:

Northern Alberta Institute of Technology Northern Lakes College
(NAIT)
Southern Alberta Institute of Technology
(SAIT)
Keyano College

Procedures for Recommending Revisions to the Course Outline

Advanced Education has prepared this course outline in partnership with the <trade name> Provincial Apprenticeship Committee.

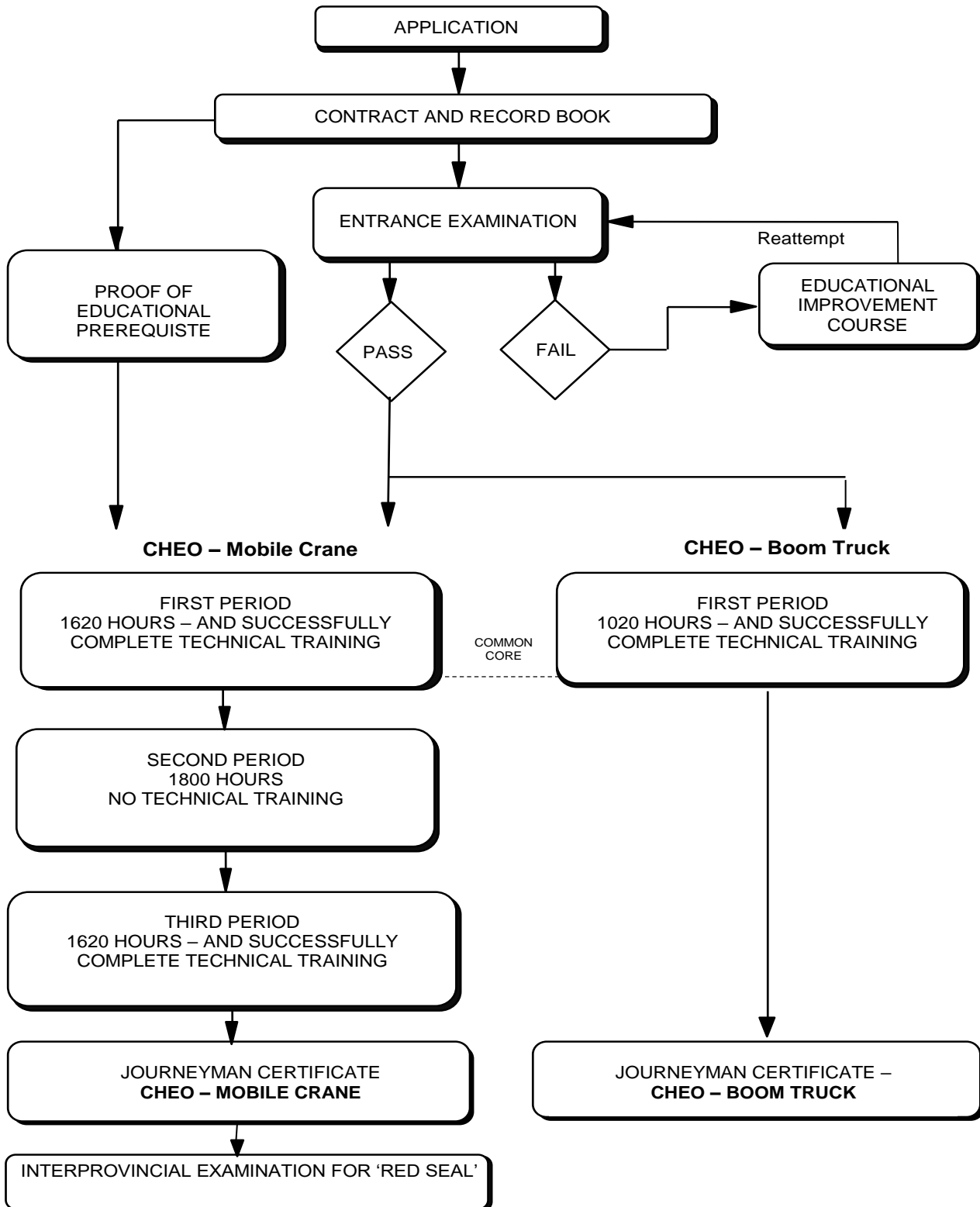
This course outline was approved on December 15, 2017 by the Alberta Apprenticeship and Industry Training Board on a recommendation from the Provincial Apprenticeship Committee. The valuable input provided by representatives of industry and the institutions that provide the technical training is acknowledged.

Any concerned individual or group in the province of Alberta may make recommendations for change by writing to:

Crane and Hoisting Equipment Operator Provincial Apprenticeship Committee
c/o Industry Programs and Standards
Apprenticeship and Industry Training
Advanced Education
10th floor, Commerce Place
10155 102 Street NW
Edmonton AB T5J 4L5

It is requested that recommendations for change refer to specific areas and state references used. Recommendations for change will be placed on the agenda for regular meetings of the Crane and Hoisting Equipment Operator Provincial Apprenticeship Committee.

Apprenticeship Route toward Certification



**Crane and Hoisting Equipment Operator-
Mobile Crane Operator / Boom Truck Operator
FIRST PERIOD – Common Core
(6 Weeks 30 Hours per Week – Total of 180 Hours)**

SECTION ONE

**STANDARD WORKPLACE
SAFETY, MATERIALS AND
TOOLS**
24 HOURS



A	B	C
Safety Legislation, Regulations & Industry Policy in the Trades 3 Hours	Climbing, Lifting, Rigging and Hoisting 5 Hours	Hazardous Materials and Fire Protection 3 Hours
D	E	
Apprenticeship Training Program 1 Hours	Codes and Regulations 12 Hours	

SECTION TWO

**INTRODUCTION TO BOOM
TRUCKS AND CRANES, CODES
AND DOCUMENTATION**
22 HOURS



A	B	C
Types of Boom Trucks 2 Hours	Boom Truck Components 2 Hours	Types of Mobile Cranes 2 Hours
D	E	F
Mobile Crane Components 4 Hours	Hoisting Equipment Maintenance 10 Hours	Documentation 2 Hours

SECTION THREE

**RIGGING EQUIPMENT AND
PROCEDURES**
40 HOURS



A	B	C
Types of Slings 2 Hours	Rigging Hardware and Accessories 2 Hours	Rigging Calculations 18 Hours
D	E	
Rigging Procedures 6 Hours	Crane Signals and Communication 12 Hours	

SECTION FOUR

**LOAD CHART READING AND
INTERPRETATION**
30 HOURS



A
Load Charts 30 Hours

SECTION FIVE

EQUIPMENT OPERATION
40 HOURS



A	B	C
Equipment Transportation 2 Hours	Site Preparation 2 Hours	Loading and Unloading Equipment 2 Hours
D	E	F
Assembly and Disassembly of Hoisting Equipment 3 Hours	Equipment Set Up 12 Hours	Principles of Operation 2 Hours
G	H	I
Lift Planning 6 Hours	Lift Operations 10 Hours	Leaving Crane Unattended 1 Hour

SECTION SIX

SPECIALTY LIFTS AND NEW TECHNOLOGY, WORKPLACE COACHING, ALBERTA'S INDUSTRY NETWORK
24 HOURS



A

Multi-Crane Lifts
10 Hours

B

Personnel Baskets
6 Hours

C

New Technology
4 Hours

D

Workplace Coaching Skills
3 Hours

E

Alberta's Industry Network
1 Hour

**THIRD PERIOD – Mobile Crane Operator
(6 Weeks 30 Hours per Week – Total of 180 Hours)**

SECTION ONE

LATTICE BOOM CRANES 22 HOURS	A	B	C
	Types of Lattice Boom Cranes 4 Hours	Lattice Boom Components 6 Hours	Lattice Boom Inspection and Maintenance 6 Hours

D
Mobile Telescopic Cranes 6 Hours

SECTION TWO

CRANE ATTACHMENTS AND CRANE ASSEMBLY 33 HOURS	A	B	C
	Jibs 3 Hours	Heavy Lift Attachments 6 Hours	Specialty Accessories 2 Hours

D	E	F
Site Preparation 6 Hours	Loading and Unloading Cranes and Components 6 Hours	Crane Assembly and Disassembly 10 Hours

SECTION THREE

ADVANCED RIGGING 32 HOURS	A	B	C
	Specialty Rigging Equipment 6 Hours	Advanced Rigging Procedures 6 Hours	Advanced Rigging Calculations 20 Hours

SECTION FOUR

ADVANCED LIFT PLANNING AND OPERATION 60 HOURS	A	B	C
	Critical Lift Planning 10 Hours	Multi-Crane Lifts 25 Hours	Single Crane Operations 25 Hours

SECTION FIVE

LOAD CHART, LIFTING OPERATIONS, RED SEAL 33 HOURS	A	B	C
	Advanced Load Chart Interpreting 25 Hours	Lift Dynamics 6 Hours	Interprovincial Standards Red Seal Program 2 Hours

NOTE: The hours stated are for guidance and should be adhered to as closely as possible. However, adjustments must be made for rate of apprentice learning, statutory holidays, registration and examinations for the training establishment and Apprenticeship and Industry Training.

**FIRST PERIOD TECHNICAL TRAINING – COMMON CORE
CRANE AND HOISTING EQUIPMENT OPERATOR – MOBILE CRANE OPERATOR TRADE/
BOOM TRUCK OPERATOR TRADE
COURSE OUTLINE**

UPON SUCCESSFUL COMPLETION OF THIS PROGRAM THE APPRENTICE SHOULD BE ABLE TO PERFORM THE FOLLOWING OUTCOMES AND OBJECTIVES.

SECTION ONE:STANDARD WORKPLACE SAFETY, MATERIALS & TOOLS.....24 HOURS

A. Safety Legislation, Regulations & Industry Policy in the Trades 3 Hours

Outcome: ***Apply legislation, regulations and practices ensuring safe work in this trade.***

1. Demonstrate the application of the Occupational Health and Safety Act, Regulation and Code.
2. Describe the employer’s and employee’s role with Occupational Health and Safety (OH&S) regulations, Worksite Hazardous Materials Information Systems (WHMIS), fire regulations, Workers Compensation Board regulations and related advisory bodies and agencies.
3. Describe industry practices for hazard assessment and control procedures.
4. Describe the responsibilities of worker and employers to apply emergency procedures.
5. Describe tradesperson attitudes with respect to housekeeping, personal protective equipment and emergency procedures.
6. Describe the roles and responsibilities of employers and employees with the selection and use of personal protective equipment (PPE).
7. Maintain required PPE for tasks.
8. Use required PPE for tasks.

B. Climbing, Lifting, Rigging and Hoisting..... 5 Hours

Outcome: ***Use industry standard practices for climbing, lifting, rigging and hoisting in this trade.***

1. Describe manual lifting procedures.
2. Describe rigging hardware and associated safety factors.
3. Select equipment for rigging loads.
4. Describe hoisting and load moving procedures.
5. Maintain personal protective equipment (PPE) for climbing, lifting and load moving equipment.
6. Use PPE for climbing, lifting and load moving equipment.

C. Hazardous Materials & Fire Protection 3 Hours

Outcome: ***Apply industry standard practices for hazardous materials and fire protection in this trade.***

1. Describe roles, responsibilities, features and practices related to the Workplace Hazardous Materials Information System (WHMIS) program.
2. Describe three key elements of WHMIS.
3. Describe handling, storing and transporting procedures for hazardous material.
4. Describe venting procedures when working with hazardous materials.
5. Describe hazards, classes, procedures and equipment related to fire protection.

D. Apprenticeship Training Program..... 1 Hour

Outcome: *Manage an apprenticeship to earn journeyman certification.*

1. Describe the contractual responsibilities of the apprentice, employer and Alberta Apprenticeship and Industry Training.
2. Describe the purpose of the apprentice record book.
3. Describe the procedure for changing employers during an active apprenticeship.
4. Describe the purpose of the course outline.
5. Describe the procedure for progressing through an apprenticeship.
6. Describe advancement opportunities in this trade.

E. Codes and Regulations..... 12 Hours

Outcome: *Interpret codes and regulations.*

1. Explain Alberta’s trade regulations for the crane and hoisting equipment operator trade.
2. Explain transportation rules and regulations.
3. Identify the sections of Occupational Health and Safety code that apply to hoisting equipment.
4. Interpret codes and standards for hoisting equipment.

SECTION TWO: INTRODUCTION TO BOOM TRUCKS AND CRANES22 HOURS

A. Types of Boom Trucks..... 2 Hours

Outcome: *Identify the structural and operational characteristics of boom trucks.*

1. Describe fixed station telescopic boom trucks.
2. Describe swing cab telescopic boom trucks.
3. Describe articulating boom trucks.

B. Boom Truck Components..... 2 Hours

Outcome: *Describe boom truck components.*

1. Describe the truck chassis.
2. Describe outriggers and stabilizers.
3. Describe the upperworks of a boom truck.

C. Types of Mobile Crane 2 Hours

Outcome: *Identify the structural and operational characteristics of mobile cranes.*

1. Describe carry deck cranes.
2. Describe rough terrain cranes.
3. Describe all terrain cranes.
4. Describe truck mounted cranes.
5. Describe crawler mounted cranes.
6. Describe lattice boom cranes.

D. Mobile Crane Components 4 Hours

Outcome: **Describe mobile crane components.**

1. Describe wheeled carriers.
2. Describe crawler carriers.
3. Describe upperworks of mobile cranes.
4. Describe the composition and characteristics of wire rope.

E. Hoisting Equipment Maintenance..... 10 Hours

Outcome: **Maintain hoisting equipment.**

1. Describe tools used to assemble and maintain hoisting equipment.
2. Identify maintenance on engines.
3. Identify maintenance on hydraulic systems.
4. Identify maintenance on air systems.
5. Identify maintenance on mechanical components and structures.
6. Identify maintenance on electrical systems.
7. Describe the types and characteristics of lubricant.
8. Identify the lubrication points on each components.

F. Documentation 2 Hours

Outcome: **Complete documentation.**

1. Complete a daily crane log book.
2. Complete maintenance request form.
3. Complete a hazard assessment.

SECTION THREE: RIGGING EQUIPMENT AND PROCEDURES40 HOURS

A. Types of Slings 2 Hours

Outcome: **Describe the types and functions of slings.**

1. Describe slings used for rigging loads.
2. Describe Working Load Limits (WLL) for slings.
3. Interpret codes for slings and accessories.
4. Describe rigging configurations.
5. Describe the inspection of slings.
6. Describe rejection criteria for slings.
7. Describe the storage and maintenance of slings.

B. Rigging Hardware and Accessories 2 Hours

Outcome: *Describe types and functions of rigging hardware and accessories.*

1. Describe the use of rigging hardware.
2. Describe the use of rigging accessories.

C. Rigging Calculations 18 Hours

Outcome: *Calculate rigging capacities.*

1. Define capacities for configurations.
2. Determine capacity reducing factors.

D. Rigging Procedures 6 Hours

Outcome: *Rig loads.*

1. Explain characteristics of a load.
2. Determine center of gravity of the load.
3. Determine load weight.
4. Determine rigging configuration.
5. Rig the load.

E. Crane Signals and Communication 12 Hours

Outcome: *Signal the crane.*

1. Perform crane hand signals.
2. Perform verbal signals.

SECTION FOUR: LOAD CHART READING AND INTERPRETATION30 HOURS

A. Load Charts 30 Hours

Outcome: *Interpret load charts for hoisting equipment.*

1. Determine gross and net load.
2. Determine gross and net capacities.
3. Determine percentage of gross capacity.
4. Perform load chart calculations.
5. Interpret range diagrams.
6. Analyze an engineered lift plan.
7. Define the parameters of a lift.

SECTION FIVE:.....EQUIPMENT OPERATION.....40 HOURS

A. Equipment Transportation..... 2 Hours

Outcome: *Prepare crane for travel on public roads and site.*

1. Explain transportation regulations for hoisting equipment in Alberta.
2. Determine manufacturer’s transportation procedures.

B. Site Preparation 2 Hours

Outcome: *Prepare site for hoisting equipment.*

1. Recognize ground site conditions.
2. Identify site hazards (powerlines, underground utilities, buildings).
3. Calculate ground bearing pressure.
4. Determine space requirements for assembly and disassembly.
5. Determine space requirements for lifting operations.

C. Loading and Unloading Hoisting Equipment 2 Hours

Outcome: *Describe loading and unloading hoisting equipment.*

1. Determine orientation of the crane on the trailer.
2. Determine crane configuration.
3. Describe loading and unloading procedures.
4. Describe crane and component tie down procedures.

D. Assembly and Disassembly of Hoisting Equipment 3 Hours

Outcome: *Configure hoisting equipment components.*

1. Identify crane components.
2. Describe the function of crane components.
3. Describe the assembly of a jib to manufactures specifications.
4. Demonstrate wire rope block reeving methods.
5. Perform a pre-operational inspection.

E. Equipment Set-Up 12 Hours

Outcome: *Set-up hoisting equipment.*

1. Perform pre-operational inspection.
2. Set-up and level hoisting equipment.
3. Configure the hoisting equipment.
4. Function test all controls and limit switches.

F. Principles of Operation 2 Hours

Outcome: *Describe the principles of operation.*

1. Describe the principles of leverage.
2. Describe load moment.

3. Explain center of gravity.
4. Explain the mechanical advantage reeving.
5. Describe stability versus structural capacity.
6. Describe quadrants of operation.
7. Describe dynamic and static loading.
8. Describe the effect of the load on the hoisting equipment.
9. Describe the effects of various forces on the hoisting equipment.

G. Lift Planning 6 Hours

Outcome: Create a lift plan.

1. Determine load weight.
2. Perform site measurements.
3. Determine hoisting equipment configuration for the lift.
4. Determine load radius.
5. Complete load chart calculations.
6. Complete a lift plan drawing.
7. Determine percentage of capacity.
8. Explain a critical lift.

H. Lifting Operations 10 Hours

Outcome: Operate hoisting equipment.

1. Conduct lifting operations as per configuration on outriggers.
2. Explain a pick and carry operation.
3. Describe a multi-crane lift.
4. Describe hoisting personnel.

I. Leave Crane Unattended 1 Hour

Outcome: Secure hoisting equipment.

1. Describe the procedure for leaving a crane unattended for short periods.
2. Describe the procedure for leaving a crane unattended for long periods.
3. Describe the procedure for leaving a crane unattended for extended periods.

**SECTION SIX: SPECIALTY LIFTS AND NEW TECHNOLOGY, WORKPLACE COACHING,24 HOURS
ALBERTA'S INDUSTRY NETWORK**

A. Multi-Crane Lifts 10 Hours

Outcome: Perform a multi-crane lift.

1. Plan a multi-crane lift.
2. Set up a multi-crane lift.
3. Perform a multi-crane lift.

B. Personnel Baskets 6 Hours**Outcome: Describe the use of a personnel basket.**

1. Explain the requirements for attaching a suspended personnel platform to hoisting equipment.
2. Explain the procedures for hoisting a suspended personnel basket.

C. New Technology 4 Hours**Outcome: Describe new hoisting equipment technology.**

1. Describe new technology used in hoisting and rigging equipment.

D. Workplace Coaching Skills..... 3 Hours**Outcome: Use coaching skills when training an apprentice.**

1. Describe the process for coaching an apprentice.

E. Alberta's Industry Network..... 1 Hour**Outcome: Describe the role of the network of industry committees that represent trades and occupations in Alberta.**

1. Describe Alberta's Apprenticeship and Industry Training system.
2. Describe roles and responsibilities of the Alberta Apprenticeship and Industry Training Board, the Government of Alberta and post-secondary institutions.
3. Describe roles and responsibilities of the Provincial Apprenticeship Committees (PACs), Local Apprenticeship Committees (LACs) and Occupational Committees (OCs).

**THIRD PERIOD TECHNICAL TRAINING
CRANE AND HOISTING EQUIPMENT OPERATOR – MOBILE CRANE OPERATOR TRADE
COURSE OUTLINE**

UPON SUCCESSFUL COMPLETION OF THIS PROGRAM THE APPRENTICE SHOULD BE ABLE TO PERFORM THE FOLLOWING OUTCOMES AND OBJECTIVES.

SECTION ONE:..... LATTICE BOOM CRANES..... 22 HOURS

A. Types of Lattice Boom Cranes 4 Hours

Outcome: *Describe types of lattice boom cranes.*

1. Describe truck mounted lattice boom cranes.
2. Describe crawler mounted lattice boom cranes
3. Explain friction drawworks operation.

B. Lattice Boom Crane Components 6 Hours

Outcome: *Describe lattice boom crane components.*

1. Describe truck mounted lattice boom components.
2. Describe crawler mounted lattice boom components.
3. Describe friction drawworks components.

C. Lattice Boom Crane Inspections and Maintenance..... 6 Hours

Outcome: *Inspect and maintain lattice boom cranes.*

1. Describe tools used to assemble and maintain lattice boom.
2. Identify maintenance on engines.
3. Identify maintenance on hydraulic systems.
4. Identify maintenance on air systems.
5. Identify maintenance on mechanical components and structures.
6. Identify maintenance on electrical systems.
7. Describe the types and characteristics of lubricant.
8. Identify the lubrication points on each component.

D. Mobile Telescopic Cranes 6 Hours

Outcome: *Describe types of mobile telescopic cranes.*

1. Describe pinned boom technology.
2. Describe a telescopic boom crawler crane.
3. Describe all terrain suspensions.
4. Describe all terrain removable counter weights.
5. Describe the use of dollies.

SECTION TWO:.....CRANE ATTACHMENTS AND CRANE ASSEMBLY 33 HOURS

A. Jibs 3 Hours

Outcome: **Describe types of jibs.**

1. Describe fixed jibs.
2. Describe hydraulic offset jibs.
3. Describe cable luffing jibs.
4. Describe boom extensions.

B. Heavy Lift Attachments 6 Hours

Outcome: **Describe heavy lift attachments.**

1. Describe ballast wagons and components.
2. Describe ballast trays and components.
3. Describe guyed boom.
4. Describe ringer attachment configurations.
5. Describe a strand jacking system.

C. Specialty Accessories 2 Hours

Outcome: **Describe specialty accessories.**

1. Describe earth moving accessories.
2. Describe material handling accessories.
3. Describe the use of a demolition ball.
4. Describe pile driving accessories.

D. Site Preparation..... 6 Hours

Outcome: **Prepare site for crane.**

1. Recognize ground site conditions.
2. Identify site hazards (powerlines, underground utilities, buildings).
3. Calculate ground bearing pressure.
4. Determine space requirements for assembly and disassembly.
5. Determine space requirements for lifting operations.

E. Loading and Unloading Cranes and Components 6 Hours

Outcome: **Describe loading and unloading crane components.**

1. Describe loading and unloading of carbody.
2. Describe the loading and unloading of the upperworks.
3. Describe the loading and unloading of track frames.
4. Describe the loading and unloading of boom components.
5. Describe the loading and unloading of counterweights.

F. Crane Assembly and Disassembly 10 Hours

Outcome: *Assemble and disassemble cranes and components.*

1. Describe the sequence of assembly and disassembly of lattice boom cranes.
2. Describe the assembly and disassembly of hydraulic telescopic cranes.

SECTION THREE: ADVANCED RIGGING 32 HOURS

A. Specialty Rigging Equipment 6 Hours

Outcome: *Describe specialty rigging equipment.*

1. Describe the application of specialty rigging equipment (i.e. rolling blocks, jigs, transfer beams).
2. Select appropriate specialty rigging equipment.
3. Describe heavy lift rigging equipment.

B. Advanced Rigging Procedures 6 Hours

Outcome: *Perform advanced rigging procedure.*

1. Describe advanced rigging on an off center of gravity load.
2. Describe the application of multi-point rigging attachments.
3. Describe heavy lift rigging procedures.

C. Advanced Rigging Calculations 20 Hours

Outcome: *Calculate advanced rigging configurations.*

1. Calculate load weights for various shaped loads of different materials.
2. Determine combined center of gravity.
3. Determine the center of gravity for off center of gravity loads.
4. Calculate loads on equalizer beams.

SECTION FOUR: ADVANCED LIFT PLANNING AND OPERATIONS 60 HOURS

A. Critical Lift Planning 10 Hours

Outcome: *Plan a critical lift.*

1. Determine critical lift criteria.
2. Determine the type of critical lift.
3. Create a critical lift plan drawing.
4. Explain the sequence of a critical lift.
5. Explain the hazard controls of a critical lift.

B. Multi-Crane Lift 25 Hours

Outcome: *Plan a multi-crane lift.*

1. Determine the type of multi-crane lift (tailing, straight, maneuvering).
2. Determine share of load.
3. Determine the percentage of capacity for each crane.

4. Explain lift dynamics for standing a load.
5. Explain the sequence of a multi-crane lift.
6. Create a multi-crane lift plan drawing.
7. Perform a multi-crane lift.

C. Single Crane Operations25 Hours

Outcome: Plan a lift.

1. Perform pick and carry operations on rubber.
2. Perform lifts on outriggers.
3. Perform a standing lift.
4. Perform a lift with a jib.

SECTION FIVE:LOAD CHART, LIFTING OPERATIONS AND RED SEAL 33 HOURS

A. Advanced Load Chart Interpreting25 Hours

Outcome: Perform advanced load chart calculations.

1. Perform lift calculations for a critical lift.
2. Perform a lift calculation for an offset jib.
3. Perform a lift calculation for a luffing jib.
4. Perform a lift calculation for load using a specialty attachment.

B. Lift Dynamics6 Hours

Outcome: Describe lift dynamics.

1. Explain the dynamics of duty cycle work.
2. Explain the dynamics of wind during a lift.
3. Explain the dynamics of submerged loads.
4. Explain the dynamics of hoisting on floating surface.
5. Explain the dynamics of hoisting a stuck or frozen load.
6. Explain dynamics of shock loading.
7. Explain the dynamics of standing a load.
8. Explain the dynamics of transferring a load.

C. Interprovincial Standards Red Seal Program2 Hours

Outcome: Use red seal products to challenge an Interprovincial examination.

1. Identify Red Seal products used to develop Interprovincial examinations.
2. Use Red Seal products to prepare for an Interprovincial examination.



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