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Red Seal Occupational Standard

Mobile Crane Operator

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PROGRAM PROGRAMME
EXCELLENCE
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RED SEAL OCCUPATIONAL STANDARD

MOBILE CRANE OPERATOR

Title: Mobile Crane Operator

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FOREWORD

The Canadian Council of Directors of Apprenticeship (CCDA) recognizes this Red Seal Occupational Standard (RSOS) as the Red Seal standard for the Mobile Crane Operator trade.

Background

The first National Conference on Apprenticeship in Trades and Industries, held in Ottawa in 1952, recommended that the federal government be requested to cooperate with provincial and territorial apprenticeship committees and officials in preparing analyses of a number of skilled occupations. Employment and Social Development Canada (ESDC) sponsors the Red Seal Program, which, under the guidance of the CCDA, develops a national occupational standard for each of the Red Seal trades.

Standards have the following objectives:

- to describe and group the tasks performed by skilled workers;
- to identify which tasks are performed in every province and territory;
- to develop instruments for use in the preparation of Interprovincial Red Seal Examinations and assessment tools for apprenticeship and certification authorities;
- to develop common tools for apprenticeship on-the-job and technical training in Canada;
- to facilitate the mobility of apprentices and skilled workers in Canada;
- to supply employers, employees, associations, industries, training institutions and governments with occupational standards.

Any questions, comments, or suggestions for changes, corrections, or revisions to this standard or any of its related products may be forwarded to:

Trades and Apprenticeship Division
Apprenticeship and Sectoral Initiatives Directorate
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This standard was prepared by the Apprenticeship and Sectoral Initiatives Directorate of ESDC. The coordinating, facilitating and processing of this standard were undertaken by employees of the standards development team of the Trades and Apprenticeship Division and of Saskatchewan, the host jurisdiction for this trade.

STRUCTURE OF THE OCCUPATIONAL STANDARD

This standard contains the following sections:

Methodology: an overview of the process for development, review, validation and weighting of the standard

Description of the Mobile Crane Operator trade: an overview of the trade's duties, work environment, job requirements, similar occupations and career progression

Trends in the Mobile Crane Operator trade: some of the trends identified by industry as being the most important for workers in this trade

Essential Skills Summary: an overview of how each of the nine essential skills is applied in this trade

Roles and Opportunities for Skilled Trades in a Sustainable Future: an overarching description of how in the context of climate change, skilled trades play a large role in implementing solutions and adjusting to changes in the world. In addition to highlighting the importance of this awareness, the standard may also contain more details on activities, skills and knowledge elements that are specific to the trade

Industry Expected Performance: description of the expectations regarding the level of performance of the tasks, including information related to specific codes, regulations and standards that must be observed

Language Requirements: description of the language requirements for working and studying in this trade in Canada

Pie Chart of Red Seal Examination Weightings: a graph which depicts the national percentages of exam questions assigned to the major work activities

Task Matrix: a chart which outlines graphically the major work activities, tasks and sub-tasks of this standard

Harmonization of Apprenticeship Training: the aspects of apprenticeship training that participating provinces and territories have agreed upon to substantively align apprenticeship systems across Canada

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

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

Task Descriptor: a general description of the task

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

Skills:

Performance Criteria: description of the activities that are done as the sub-task is performed

Evidence of Attainment: proof that the activities of the sub-task meet the expected performance of a tradesperson who has reached journeyperson level

Knowledge:

Learning Outcomes: describes what should be learned relating to a sub-task while participating in technical or in-school training

Learning Objectives: topics to be covered during technical or in-school training in order to meet the learning outcomes for the sub-task

Range of Variables: elements and examples (not all inclusive) that provide a more in-depth description of a term used in the performance criteria, evidence of attainment, learning outcomes, or learning objectives

Appendix A – Acronyms: a list of acronyms used in the standard with their full name

Appendix B – Tools and Equipment / Outils et équipement: a non-exhaustive list of tools and equipment used in this trade

Appendix C – Glossary / Glossaire: definitions or explanations of selected technical terms used in the standard

METHODOLOGY

Development of the Standard

A draft standard is developed by a broad group of trade representatives, including tradespeople, instructors and employers at a National Workshop led by a team of facilitators. This draft standard breaks down all the tasks performed in the occupation and describes the knowledge and abilities required for a tradesperson to demonstrate competence in the trade.

Harmonization of Apprenticeship Training

An analysis of all provinces' and territories' apprenticeship programs is performed and recommendations are made on harmonizing the name of the trade, the hours of training required and the number of levels of training. Provinces and territories consult with their respective industry stakeholders on these elements and revisions are discussed until consensus is reached. Following the development of the workshop draft of the RSOS, participants discuss and come to consensus on the sequence of training topics, as expressed in the new standard. Their sequencing recommendations are reviewed by stakeholders in participating provinces and territories and further discussions are convened to reach consensus and to identify any exceptions.

Online Survey

Stakeholders are asked to review and validate the activities described in the new standard via an online survey. These stakeholders are invited to participate in this consultation through apprenticeship authorities, as well as national stakeholder groups.

Draft Review

The RSOS development team forwards a copy of the standard to provincial and territorial authorities who consult with industry representatives to review it. Their recommendations are assessed and incorporated into the standard.

Validation and Weighting

Participating provinces and territories also consult with industry to validate and weight the document for the purpose of planning the makeup of the Red Seal Interprovincial Examination for the trade. They validate and weight the major work activities (MWA), tasks and sub-tasks, of the standard as follows:

MWA	Each jurisdiction assigns a percentage of questions to each MWA for an examination that would cover the entire trade.
TASKS	Each jurisdiction assigns a percentage of exam questions to each task within a MWA.
SUB-TASKS	Each jurisdiction indicates, with a YES or NO, whether or not each sub-task is performed by skilled workers within the occupation in its jurisdiction.

The results of this exercise are submitted to the RSOS development team who then analyzes the data and incorporates it into the document. The RSOS provides the individual jurisdictional validation results as well as the national averages of all responses. The national averages for MWA and task weighting guide the Interprovincial Red Seal Examination plan for the trade.

The validation of the RSOS is used to identify common core sub-tasks across Canada for the occupation. If at least 70% of the responding jurisdictions' industry performs a sub-task, it shall be considered common core. Interprovincial Red Seal Examination questions are limited to the common core sub-tasks identified through this validation process.

Definitions for Validation and Weighting

YES	sub-task performed by qualified workers in the occupation in that province or territory
NO	sub-task not performed by qualified workers in the occupation in that province or territory
NV	standard Not Validated by that province or territory
ND	trade Not Designated in a province or territory
NOT COMMON CORE (NCC)	sub-task, task or MWA performed less than 70% of responding jurisdictions; these will not be tested by the Interprovincial Red Seal Examination for the trade
NATIONAL AVERAGE %	average percentage of questions assigned to each MWA and task in Interprovincial Red Seal Examination for the trade

Provincial/Territorial Abbreviations

NL	Newfoundland and Labrador
NS	Nova Scotia
PE	Prince Edward Island
NB	New Brunswick
QC	Quebec
ON	Ontario
MB	Manitoba
SK	Saskatchewan
AB	Alberta
BC	British Columbia
NT	Northwest Territories
YT	Yukon Territory
NU	Nunavut

DESCRIPTION OF THE MOBILE CRANE OPERATOR TRADE

“Mobile Crane Operator” is this trade’s official Red Seal occupational title approved by the CCDA. This standard covers tasks performed by mobile crane operators.

Mobile crane operators operate mobile cranes to lift, move, position and place materials and equipment. They perform pre-operational inspections. They calculate crane capacities, determine load weight, and set up, position and stabilize the crane before the lift. Mobile crane operators have the additional responsibilities of disassembling, traveling and transporting mobile cranes. They may also participate in rigging procedures. They also perform some routine maintenance and housekeeping of the crane equipment such as lubricating and cleaning.

Mobile cranes are used in many industry sectors. They are very commonly used in the construction of buildings and the assembly of large equipment. They are used in locations such as construction sites, warehouses, factories, mines, oil rigs, refineries, railway yards, ships, windmill farms and ports. Mobile crane operators may be employed by rental companies, construction firms, manufacturers, public utilities, transport sector companies, ship builders, cargo-handlers, airports, railways, mines and in the forestry, marine, residential, oil and gas sectors.

Mobile cranes come in different types such as crawlers, floating platform-mounted, ring-mounted, truck-mounted, rough-terrain (RT) and all-terrain (AT). The boom of the crane may be lattice or telescopic. Some mobile cranes are fitted with equipment, including piledriver, clamshell, dragline, wrecking ball, magnet and personnel basket, which can perform specialized functions. They may be outfitted with heavy lift attachments, tower attachments and jibs.

Some mobile crane operators specialize in different crane functions. In some cases, an operator may work for years on a single large site, operating a single type and size of mobile crane. Mobile crane operators working for rental companies may rarely work on the same site more than once and may routinely perform a variety of tasks with different types and sizes of mobile cranes.

The majority of the work in this trade is outdoors. Key attributes for people entering the trade are strong communication skills, mechanical aptitude, mathematical ability, excellent visual and depth perception and a high degree of hand-foot-eye coordination. The operation of some mobile cranes is physically demanding as is the handling of accessories.

Mobile crane operators interact with other tradespeople, contractors and customers.

The skills of mobile crane operators are transferable to operating other heavy equipment. With experience, mobile crane operators may move into careers such as business owners, supervisors, trainers and job coordinators.

TRENDS IN THE MOBILE CRANE OPERATOR TRADE

TECHNOLOGY

The advancement in engineering and computerized crane control and monitoring systems allow for a safer work environment and ease of operation. These advancements make operating cranes more efficient, safer and more cost effective. Due to the continuing development of new systems, there is a greater need for computer literacy training.

PRODUCTS/MATERIALS

There are new environmentally friendly technologies such as higher quality finishes and coatings on metal boom sections and polytetrafluoroethylene (PTFE) sliders and rollers that allow for reduced maintenance on telescopic booms.

HEALTH AND SAFETY

Safety is the number one concern of mobile crane operators, owners and contractors. Mobile crane operators may be required to take site-specific safety training to be familiar with the company, contractor and jobsite safety requirements. The regulatory environment in which Canada's crane industry operates continues to grow more complex and more rigorous, covering issues such as due diligence and liability.

ENVIRONMENTAL

Mineral-based oils may be used more often as they have less of an impact on point of release as compared to synthetic oils. All new diesel engine cranes are required to be fitted with a selective catalyst reduction (SCR) system that uses diesel exhaust fluid (DEF) to reduce nitric oxide (NOx) emissions in diesel engines.

ESSENTIAL SKILLS SUMMARY

Essential skills are needed for work, learning and life. They provide the foundation for learning all other skills and enable people to evolve with their jobs and adapt to workplace change.

Through extensive research, the Government of Canada and other national and international agencies have identified and validated nine essential skills. These skills are used in nearly every occupation and throughout daily life in different ways.

The application of these skills may be described throughout this document within the skills and knowledge which support each sub-task of the trade. The following are summaries of the requirements in each of the essential skills, taken from the essential skills profile.

READING

In their daily work, mobile crane operators read and comprehend several types of texts. These include safety and work procedures as well as more complex hoisting regulations and manufacturers' operating manuals.

DOCUMENT USE

Mobile crane operators use workplace documents such as logbooks, load charts, hazard assessments and workplace policies and procedures to carry out their job. They must be familiar with regulations relating to hoisting, rigging and safe work environments. They must have the ability to read and interpret manufacturers' specifications and load charts for the model of crane they are using. Depending on site-specific requirements, they may obtain information from engineered and construction drawings and plans.

WRITING

Mobile crane operators use writing skills to record comments or notes in logbooks or work records. They write messages to colleagues or management to give work details or reply to requests for technical information. They may also write longer descriptions and explanations for various reporting and data collection forms.

ORAL COMMUNICATION

Mobile crane operators use oral communication skills to coordinate work with site crews. Clear communication of technical and complex information is very important to avoid injuries and promote efficiency. Mobile crane operators also use communication skills when instructing apprentices, co-workers and on-site work crews. Good listening and visual skills are also required to communicate with riggers, signallers and other operators during lifts. Operators use verbal communication and hand signals to communicate the speed of lift movements and precise positioning of loads.

NUMERACY

Mobile crane operators use a range of math skills in their daily work. These include mathematical and physics concepts such as conversions, geometry, algebraic calculations, measurement and calculation of load and lift requirements. They use code books, load charts and manufacturers' specifications to further determine procedures, limits and the necessary equipment for rigging and hoisting.

THINKING

Mobile crane operators must use decision-making skills to perform work planning and prioritizing. The decisions they make about the sequence of work have implications for everyone on site. Mobile crane operators require strong analytical skills to effectively use their equipment. They should be able to use systems thinking to consider how multiple aspects of the industry interrelate, for example using “cause-and-effect” logic.

Mobile crane operators use problem solving skills to choose setup locations and crane configurations for specific jobs. During lifts mobile crane operators make operational decisions to start, stop and vary the speed and direction of lifts to ensure safe movement and placement of a load. They evaluate the safety of lifts before and during lifts, and stop work if necessary.

WORKING WITH OTHERS

To be effective, mobile crane operators must establish close and ongoing job-task coordination with other workers on the job site. They work closely with clients to plan lifts and ensure that their activities are coordinated with those of on-site crews. They are in close communication with riggers, signallers and supervisors to coordinate lifts and load placements. Mobile crane operators work in close coordination with other operators when performing multiple crane lifts and when in close proximity with other cranes and heavy equipment.

DIGITAL TECHNOLOGY

Mobile crane operators are increasingly required to interpret electronic data transmitted from load moment indicator (LMI), anemometers and electronic scales to a display located in the cab of the crane. Controls for the mobile crane may also involve computerized applications. Electronic logging devices (ELD) may be used by mobile crane operators when driving to log hours. There are additional digital technology being applied to online learning in this trade. Mobile crane operators may be required to operate a crane by using remote-controlled technology.

CONTINUOUS LEARNING

As construction methods and crane technology are advancing, mobile crane operators must keep abreast of these developments and maintain the mindset of a learner. There are requirements for site- or crane-specific training and regulatory changes that may require additional training to ensure compliance and safe working conditions.

Roles and Opportunities for Skilled Trades in a Sustainable Future

Climate change affects all of us. Trades play a large role in implementing solutions and adjusting to changes in the world.

Throughout this standard, there may be specific references to tasks, skills and knowledge that clearly show this trade's role in a more sustainable future. Each trade has different roles to play and contributions to make in their own way.

For example:

- Construction tradespeople need to consider the materials they are using, building methods, and improvements to mechanical and electrical installations. There are important changes to codes and standards to help meet the climate change goals and commitments set for 2030 and 2050. Retrofits and new construction of low-energy buildings provide enormous opportunities for workers in this sector. Concepts, such as energy efficiency and regarding buildings as systems are foundational.

- Automotive and mechanical trades are seeing a shift towards the electrification of vehicles and equipment. As a result, new skills and knowledge will be required for tradespeople working in this sector. There are mandates for sales of new light-duty zero-emission vehicles (ZEV) in Canada, with the goal of achieving 100% ZEV sales by 2035. Due to this mandate, the demand for these vehicles is growing quickly among consumers and fleets. With this escalating demand, the need for skilled workers to maintain and repair these vehicles is also increasing.

- In industrial and resource sectors, there is pressure to move towards increased electrification of industrial processes. Many industrial and commercial facilities are also being upgraded to improve energy efficiency in areas such as lighting systems, and new production processes and technologies. There are also opportunities in carbon capture, utilization and storage (CCUS), as well as the production and export of low-carbon hydrogen.

- Trades in the service sector may also need to be aware of responsible sourcing, as well as efficient use of products and materials. New ways of working better are always a part of the job.

There are fast-moving changes in guidelines, codes, regulations and specifications. Many are being implemented for the purpose of energy efficiency and climate change. Those that affect specific trades may be mentioned within the standard. Examples of these guidelines and legislation include:

- The National Energy Code of Canada for Buildings (NECB).

- The Canadian Net-Zero Emissions Accountability Act (CNZEAA).

- programs that encourage sustainable building design and construction such as Leadership in Energy and Environmental Design (LEED) and the Zero Carbon Building (ZCB) standards.

- the Montreal Protocol for phasing out R22 refrigerants.

- energy efficiency programs such as ENERGY STAR.

- principles of the United Nations Declaration for the Rights of Indigenous Peoples pertaining to energy sector development.

Apprentices and tradespeople need to increase their climate literacy and reinforce their own understanding of energy issues and environmental practices. It is important for them to understand why these changes are happening and their effect on trades' work. While individual tradespeople and apprentices may not be able to choose certain elements like; the architectural design of buildings, building material selection, regulatory requirements, use of electric vehicles and technologies, they must understand the impact of using these elements in their work. Impacts include using environmentally friendly products and following requirements related to the disposal and recycling of materials.

In apprenticeship, as well as in ongoing professional development, employers and instructors should encourage learning about these concepts, why they are important, how they are implemented, and the overarching targets they are aiming to achieve.

All in all, it's about doing the work better and building a better world.

INDUSTRY EXPECTED PERFORMANCE

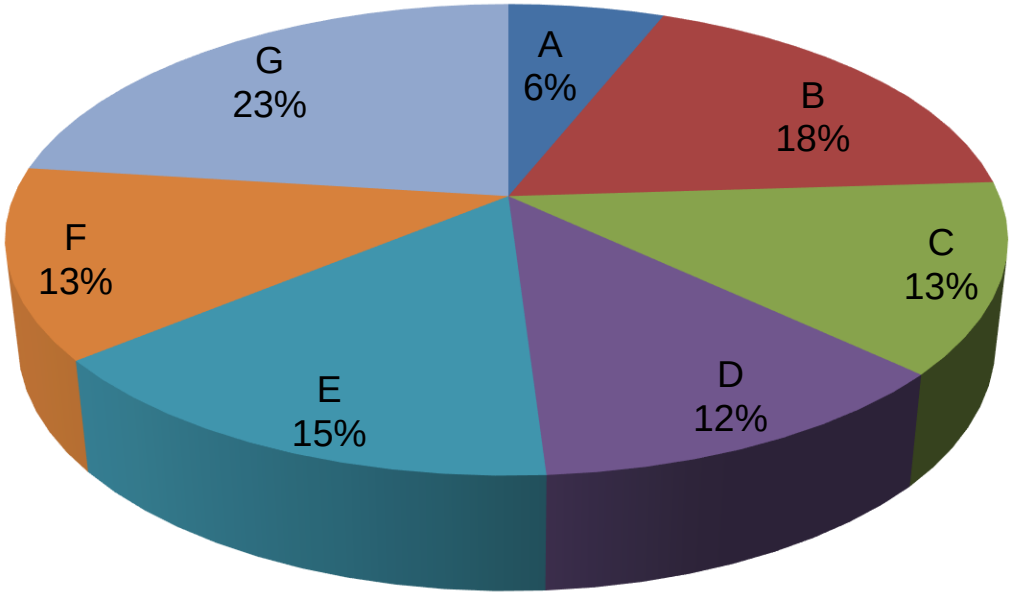
All tasks must be performed according to the applicable jurisdictional regulations and standards. All relevant health and safety standards must be respected and observed. Work should be performed efficiently and to a high quality without material waste or environmental damage. All requirements of employers, engineers, designers, manufacturers, clients and quality control policies must be met. At a journeyperson level of performance, all tasks must be done with minimal direction and supervision. As a journeyperson progresses in their career there is an expectation they continue to upgrade their skills and knowledge to maintain pace with industry and promote continuous learning in their trade through mentoring of apprentices.

LANGUAGE REQUIREMENTS

It is expected that journeypersons are able to understand and communicate in either English or French, which are Canada's official languages. English or French are the common languages of business as well as languages of instruction in apprenticeship programs.

PIE CHART

OF RED SEAL EXAMINATION WEIGHTINGS



MWA A	Performs common occupational skills	6%
MWA B	Performs hoisting calculations	18%
MWA C	Inspects and maintains crane	13%
MWA D	Performs rigging	12%
MWA E	Plans lift, prepares site and sets up crane	15%
MWA F	Assembles, disassembles and transports crane	13%
MWA G	Operates crane	23%

This pie chart represents a breakdown of the interprovincial Red Seal examination. Percentages are based on the collective input from workers from the trade from across Canada. The Task Matrix on the next pages indicates the breakdown of tasks and sub-tasks within each Major Work Activity and the breakdown of questions assigned to the Tasks. The Interprovincial examination for this trade has 110 questions.

MOBILE CRANE OPERATOR

TASK MATRIX

A – Performs common occupational skills — 6%

Task A-1 **Performs safety-related functions** **61%**	**A-1.01 Maintains a safe work environment**	**A-1.02 Uses personal protective equipment (PPE) and safety equipment**	**A-1.03 Uses documentation**
Task A-2 **Uses communication and mentoring techniques** **39%**	**A-2.01 Uses communication techniques**	**A-2.02 Uses mentoring techniques**	

B – Performs hoisting calculations — 18%

Task B-3 **Determines load weights** **29%**	**B-3.01 Identifies weight**	**B-3.02 Calculates weight**
Task B-4 **Calculates crane capacity** **40%**	**B-4.01 Determines radius and crane configuration**	**B-4.02 Interprets load charts**
Task B-5 **Performs rigging calculations** **31%**	**B-5.01 Performs sling angle calculations**	**B-5.02 Performs working load limit (WLL) calculations**

C – Inspects and maintains crane

13%

Task C-6 **Performs pre-operational checks and regular inspections** **41%**	**C-6.01 Inspects engine systems**	**C-6.02 Inspects air systems**	**C-6.03 Inspects electrical systems**
	C-6.04 Inspects hydraulic systems	**C-6.05 Inspects chassis/car body and running gear components**	**C-6.06 Inspects outriggers and counterweights**
	C-6.07 Inspects boom components and attachments	**C-6.08 Inspects hoisting systems**	
Task C-7 **Performs operational and continual checks** **39%**	**C-7.01 Checks operating controls**	**C-7.02 Inspects monitoring and warning systems**	**C-7.03 Monitors running lines, hoist ropes and standing ropes**
	C-7.04 Monitors gauges and warning systems	**C-7.05 Monitors support base**	
Task C-8 **Performs minor crane maintenance** **20%**	**C-8.01 Changes oil and filter**	**C-8.02 Greases crane**	**C-8.03 Lubricates wire ropes**
	C-8.04 Makes adjustments and replacements		

D – Performs rigging 12%

Task D-9 **Inspects, maintains and stores slings and hardware** **47%**	**D-9.01 Lubricates slings and hardware**	**D-9.02 Identifies deficiencies in slings and hardware**	**D-9.03 Disposes of damaged slings and hardware**
	D-9.04 Stores slings and hardware		
Task D-10 **Follows rigging procedures** **53%**	**D-10.01 Selects required rigging**	**D-10.02 Rigs loads**	**D-10.03 Monitors rigging**

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

Task E-11 **Performs pre-lift planning** **53%**	**E-11.01 Participates in routine, engineered and specialty lift planning**	**E-11.02 Evaluates risks and hazards**	
Task E-12 **Sets up crane** **47%**	**E-12.01 Performs final site inspection**	**E-12.02 Positions crane**	**E-12.03 Completes setup**

F – Assembles, disassembles and transports crane 13%

Task F-13 **Loads and unloads components for transport** **19%**	**F-13.01 Loads crane and components**	**F-13.02 Unloads crane and components**	
Task F-14 **Drives cranes on public roadways** **14%**	**F-14.01 Performs pre-trip planning**	**F-14.02 Prepares crane for transport**	**F-14.03 Drives cranes**
Task F-15 **Assembles and disassembles lattice boom cranes** **27%**	**F-15.01 Installs tracks on car body (lattice boom)**	**F-15.02 Installs superstructure/upperworks (lattice boom)**	**F-15.03 Installs outrigger boxes (lattice boom)**

	F-15.04 Installs boom base (lattice boom)	F-15.05 Installs counterweights (lattice boom)	F-15.06 Assembles main boom, tip and boom attachments (lattice boom)
	F-15.07 Installs hook blocks and overhaul ball (lattice boom)	F-15.08 Removes hook blocks and overhaul ball (lattice boom)	F-15.09 Disassembles main boom, tip and boom attachments (lattice boom)
	F-15.10 Removes counterweights (lattice boom)	F-15.11 Removes boom base (lattice boom)	F-15.12 Removes superstructure/upperworks (lattice boom)
	F-15.13 Removes tracks from car body (lattice boom)	F-15.14 Removes outrigger boxes (lattice boom)	
Task F-16 **Assembles and disassembles telescopic boom cranes** **29%**	F-16.01 Installs tracks on car body (telescopic boom)	F-16.02 Installs outrigger boxes (telescopic boom)	F-16.03 Installs superstructure/upperworks (telescopic boom)
	F-16.04 Installs main boom (telescopic boom)	F-16.05 Installs hook blocks and overhaul ball (telescopic boom)	F-16.06 Installs counterweights (telescopic boom)
	F-16.07 Installs jibs and inserts (telescopic boom)	F -16.08 Removes jibs and inserts (telescopic boom)	F-16.09 Removes counterweights (telescopic boom)
	F-16.10 Removes hook blocks and overhaul ball (telescopic boom)	F-16.11 Removes main boom (telescopic boom)	F-16.12 Removes outrigger boxes (telescopic boom)
	F-16.13 Removes tracks from car body (telescopic boom)	F-16.14 Removes superstructure/upperworks (telescopic boom)	
Task F-17 **Assembles and disassembles specialty equipment and attachments** **11%**	F-17.01 Assembles specialty equipment and attachments	F-17.02 Disassembles specialty equipment and attachments	

G – Operates crane

23%

Task G-18 **Performs common craning operations** **20%**	**G-18.01 Configures load moment indicator (LMI)**	**G-18.02 Mobilizes crane on jobsite**	
Task G-19 **Operates friction drive lattice boom cranes** **10%**	**G-19.01 Operates friction drive crawler-mounted lattice boom cranes**	**G-19.02 Operates friction drive truck-mounted lattice boom cranes**	
Task G-20 **Operates hydraulic drive lattice boom cranes** **21%**	**G-20.01 Operates hydraulic drive crawler-mounted lattice boom cranes**	**G-20.02 Operates hydraulic drive truck-mounted lattice boom cranes**	
Task G-21 **Operates telescopic boom cranes** **21%**	**G-21.01 Operates crawler-mounted telescopic cranes**	**G-21.02 Operates rubber tire-mounted telescopic cranes**	
Task G-22 **Performs specialty craning operations** **17%**	**G-22.01 Operates crane with piledriving equipment**	**G-22.02 Performs duty cycle operations**	**G-22.03 Operates cranes on floating platforms**
	G-22.04 Performs multi-crane lifts	**G-22.05 Uses personnel hoisting equipment**	
Task G-23 **Secures crane** **11%**	**G-23.01 Secures crane for short term**	**G-23.02 Secures crane for long term**	

HARMONIZATION OF APPRENTICESHIP TRAINING

Provincial and territorial apprenticeship authorities are each responsible for their respective apprenticeship programs. In the spirit of continual improvement, and to facilitate mobility among apprentices in Canada, participating authorities have agreed to work towards harmonizing certain aspects of their programs where possible. After consulting with their stakeholders in the trade, they have reached consensus on the following elements. Note that implementation of these elements may vary from jurisdiction to jurisdiction, depending on their own circumstances. For more information on the implementation in any province and territory, please contact that jurisdiction's apprenticeship authority.

1. Trade name

The official Red Seal name for this trade is Mobile Crane Operator.

2. Number of Levels of Apprenticeship

The number of levels of technical training recommended for this trade is 3.

3. Total Training Hours During Apprenticeship Training

The total hours of training, including both on-the-job and in-school training for this trade is 5400.

4. Sequencing Topics and Related Sub-tasks

The topic titles in the table below are placed in a column for each apprenticeship level for technical training. Each topic is accompanied by the sub-tasks and their reference number. The topics in the grey shaded cells represent those that are covered "in context" with other training in the subsequent years.

Level 1	Level 2	Level 3
	Context	Context
	Safety-Related Functions	Safety-Related Functions
Safety-Related Functions 1.01 Maintains a safe work environment 1.02 Uses personal protective equipment (PPE) and safety equipment 1.03 Uses Documentation	Note: 1.03 was originally under "Organizes Work" which now no longer exists. The sub-task remains in L1 and in context.	
Communication Techniques 2.01 Uses communication techniques		**Mentoring Techniques** 2.02 Uses mentoring techniques
Load Weights 3.01 Identifies the weight 3.02 Calculates weight	**Load Weights** 3.01 Identifies the weight 3.02 Calculates weight	**Load Weights** 3.01 Identifies the weight 3.02 Calculates weight
Crane Capacity Calculations 4.01 Determines radius and crane configuration 4.02 Interprets load charts	**Crane Capacity Calculations** 4.01 Determines radius and crane configuration 4.02 Interprets load charts	**Crane Capacity Calculations** 4.01 Determines radius and crane configuration 4.02 Interprets load charts
Rigging Calculations 5.01 Performs sling angle calculations 5.02 Performs working load limit (WLL) calculations	**Rigging Calculations** 5.01 Performs sling angle calculations 5.02 Performs working load limit (WLL) calculations	**Rigging Calculations** 5.01 Performs sling angle calculations 5.02 Performs working load limit (WLL) calculations

Level 1	Level 2	Level 3
Pre-operational Checks and Regular Inspections 6.01 Inspects engine systems 6.02 Inspects air systems 6.03 Inspects electrical systems 6.04 Inspects hydraulic systems 6.05 Inspects chassis/car body and running gear components 6.06 Inspects outriggers and counterweights 6.07 Inspects boom components and attachments 6.08 Inspects hoisting systems	**Pre-operational Checks and Regular Inspections** 6.01 Inspects engine systems 6.02 Inspects air systems 6.03 Inspects electrical systems 6.04 Inspects hydraulic systems 6.05 Inspects chassis/car body and running gear components 6.06 Inspects outriggers and counterweights 6.07 Inspects boom components and attachments 6.08 Inspects hoisting systems	**Pre-operational Checks and Regular Inspections** 6.01 Inspects engine systems 6.02 Inspects air systems 6.03 Inspects electrical systems 6.04 Inspects hydraulic systems 6.05 Inspects chassis/car body and running gear components 6.06 Inspects outriggers and counterweights 6.07 Inspects boom components and attachments 6.08 Inspects hoisting systems
Operational and Continual Checks 7.01 Checks operating controls 7.02 Inspects monitoring and warning systems 7.03 Monitors running lines, hoist ropes and standing ropes 7.04 Monitors gauges and warning systems 7.05 Monitors support base	**Operational and Continual Checks** 7.01 Checks operating controls 7.02 Inspects monitoring and warning systems 7.03 Monitors running lines, hoist ropes and standing ropes 7.04 Monitors gauges and warning systems 7.05 Monitors support base	**Operational and Continual Checks** 7.01 Checks operating controls. 7.02 Inspects monitoring and warning systems 7.03 Monitors running lines, hoist ropes and standing ropes 7.04 Monitors gauges and warning systems 7.05 Monitors support base
Minor Crane Maintenance 8.01 Changes oil and filters 8.02 Greases crane 8.03 Lubricates wire ropes 8.04 Makes minor adjustments and replacements	**Minor Crane Maintenance** 8.02 Greases crane 8.03 Lubricates wire ropes 8.04 Makes minor adjustments and replacements	**Minor Crane Maintenance** 8.02 Greases crane 8.03 Lubricates wire ropes 8.04 Makes minor adjustments and replacements
Slings and Hardware 9.01 Lubricates slings and hardware 9.02 Identifies deficiencies in slings and hardware 9.03 Disposes of damaged slings and hardware 9.04 Stores slings and hardware	**Slings and Hardware** 9.01 Lubricates slings and hardware 9.02 Identifies deficiencies in slings and hardware 9.03 Disposes of damaged slings and hardware 9.04 Stores slings and hardware	
Rigging Procedures 10.01 Selects required rigging 10.02 Rigs load 10.03 Monitors rigging	**Rigging Procedures** 10.01 Selects required rigging 10.02 Rigs load 10.03 Monitors rigging	**Rigging Procedures** 10.01 Selects required rigging 10.02 Rigs load 10.03 Monitors rigging
Pre-lift Planning 11.01 Participates in routine, engineered and specialty lift planning 11.02 Evaluates risks and hazards	**Pre-lift Planning** 11.01 Participates in routine, engineered and specialty lift planning 11.02 Evaluates risks and hazards	**Pre-lift Planning** 11.01 Participates in routine, engineered and specialty lift planning 11.02 Evaluates risks and hazards
Crane Setup 12.01 Performs final site inspection 12.02 Positions crane 12.03 Completes setup	**Crane Setup** 12.01 Performs final site inspection 12.02 Positions crane 12.03 Completes setup	**Crane Setup** 12.01 Performs final site inspection 12.02 Positions crane 12.03 Completes setup
Components for Transport (Loading/Unloading) 13.01 Loads crane and components 13.02 Unloads crane and components		**Components for Transport (Loading/Unloading)** 13.01 Loads crane and components 13.02 Unloads crane and components
Cranes on Public Roadways 14.01 Performs pre-trip planning 14.02 Prepares crane for transport 14.03 Drives cranes		

Level 1	Level 2	Level 3
Lattice Boom Cranes (Assemble/Disassemble) 15.01 Installs tracks on car body (lattice boom) 15.02 Installs superstructure/upperworks (lattice boom) 15.03 Installs outrigger boxes (lattice boom) 15.04 Installs boom base (lattice boom) 15.05 Installs counterweights (lattice boom) 15.06 Assembles main boom, tip and boom attachments (lattice boom) 15.07 Installs hook blocks and overhaul ball (lattice boom) 15.08 Removes hook blocks and overhaul ball (lattice boom) 15.09 Disassembles main boom, tip and boom attachments (lattice boom) 15.10 Removes counterweights (lattice boom) 15.11 Removes boom base (lattice boom) 15.12 Removes superstructure/upperworks (lattice boom) 15.13 Removes tracks from car body (lattice boom) 15.14 Removes outrigger boxes (lattice boom)	**Lattice Boom Cranes (Assemble/Disassemble)** 15.06 Assembles main boom, tip and boom attachments (lattice boom) 15.07 Installs hook blocks and overhaul ball (lattice boom) 15.08 Removes hook blocks and overhaul ball (lattice boom) 15.09 Disassembles main boom, tip and boom attachments (lattice boom)	**Lattice Boom Cranes (Assemble/Disassemble)** 15.05 Installs counterweights (lattice boom) 15.06 Assembles main boom, tip and boom attachments (lattice boom) 15.07 Installs hook blocks and overhaul ball (lattice boom) 15.08 Removes hook blocks and overhaul ball (lattice boom) 15.09 Disassembles main boom, tip and boom attachments (lattice boom) 15.10 Removes counterweights (lattice boom)
Telescopic Boom Crane (Assembles/Disassembles) 16.01 Installs tracks on car body (telescopic boom) 16.02 Installs outrigger boxes (telescopic boom) 16.04 Installs main boom (telescopic boom) 16.05 Installs hook blocks and overhaul ball (telescopic boom) 16.06 Installs counterweights (telescopic boom) 16.07 Installs jibs and inserts (telescopic boom) 16.08 Removes jibs and inserts (telescopic boom) 16.09 Removes counterweights (telescopic boom) 16.10 Removes hook blocks and overhaul ball (telescopic boom) 16.11 Removes main boom (telescopic boom) 16.12 Removes outrigger boxes (telescopic boom) 16.13 Removes tracks from car body (telescopic boom)	**Telescopic Boom Crane (Assembles/Disassembles)** 16.05 Installs hook blocks and overhaul ball (telescopic boom) 16.07 Installs jibs and inserts (telescopic boom) 16.08 Removes jibs and inserts (telescopic boom) 16.10 Removes hook blocks and overhaul ball (telescopic boom)	**Telescopic Boom Crane (Assembles/Disassembles)** 16.03 Installs superstructure/upperworks (telescopic boom) 16.05 Installs hook blocks and overhaul ball (telescopic boom) 16.07 Installs jibs and inserts (telescopic boom) 16.08 Removes jibs and inserts (telescopic boom) 16.10 Removes hook blocks and overhaul ball (telescopic boom) 16.14 Removes superstructure/upperworks (telescopic boom)
		Specialty Equipment and Attachments (Assembles/Disassembles) 17.01 Assembles specialty equipment and attachments 17.02 Disassembles specialty equipment and attachments
Common Craning Operations 18.01 Configures load moment indicator (LMI) 18.02 Mobilizes crane on jobsite	**Common Craning Operations** 18.01 Configures load moment indicator (LMI) 18.02 Mobilizes crane on jobsite	**Common Craning Operations** 18.01 Configures load moment indicator (LMI) 18.02 Mobilizes crane on jobsite

Level 1	Level 2	Level 3
Friction Drive Lattice Boom Cranes 19.01 Operates friction drive crawler-mounted lattice boom cranes 19.02 Operates friction drive truck-mounted lattice boom cranes	**Friction Drive Lattice Boom Cranes** 19.01 Operates friction drive crawler-mounted lattice boom cranes 19.02 Operates friction drive truck-mounted lattice boom cranes	**Friction Drive Lattice Boom Cranes** 19.01 Operates friction drive crawler-mounted lattice boom cranes 19.02 Operates friction drive truck-mounted lattice boom cranes
Hydraulic Drive Lattice Boom Cranes 20.01 Operates hydraulic drive crawler-mounted lattice boom cranes 20.02 Operates hydraulic drive truck-mounted lattice boom cranes	**Hydraulic Drive Lattice Boom Cranes** 20.01 Operates hydraulic drive crawler-mounted lattice boom cranes 20.02 Operates hydraulic drive truck-mounted lattice boom cranes	**Hydraulic Drive Lattice Boom Cranes** 20.01 Operates hydraulic drive crawler-mounted lattice boom cranes 20.02 Operates hydraulic drive truck-mounted lattice boom cranes
Telescopic Boom Cranes 21.01 Operates crawler-mounted telescopic cranes 21.02 Operates rubber tire-mounted telescopic cranes	**Telescopic Boom Cranes** 21.01 Operates crawler-mounted telescopic cranes 21.02 Operates rubber tire-mounted telescopic cranes	**Telescopic Boom Cranes** 21.01 Operates crawler-mounted telescopic cranes 21.02 Operates rubber tire-mounted telescopic cranes
	Specialty Craning Operations 22.04 Performs multi-crane lifts	**Specialty Craning Operations** 22.01 Operates crane with piledriving equipment 22.02 Performs duty cycle operations 22.03 Operates cranes on floating platforms 22.04 Performs multi-crane lifts 22.05 Uses personnel hoisting equipment
Crane (Secure) 23.01 Secures crane for short term 23.02 Secures crane for long term	**Crane (Secure)** 23.01 Secures crane for short term 23.02 Secures crane for long term	**Crane (Secure)** 23.01 Secures crane for short term 23.02 Secures crane for long term

MAJOR WORK ACTIVITY A

Performs common occupational skills

TASK A-1 Performs safety-related functions

TASK DESCRIPTOR

Mobile crane operators must recognize any changing conditions in their work environment that could affect safety.

A-1.01 Maintains safe work environment

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	yes	yes	yes	yes	yes	NV	NV	NV

	SKILLS	
	Performance Criteria	**Evidence of Attainment**
A-1.01.01P	clean oil or grease off deck of crane	oil or grease is cleaned off deck of crane to avoid slip hazards
A-1.01.02P	clean windows	windows are cleaned to ensure good visibility
A-1.01.03P	remove worn, damaged and defective ***tools and equipment*** from service	worn, damaged and defective ***tools and equipment*** are removed from service
A-1.01.04P	tighten loose bolts	loose bolts are tightened on ***crane components*** according to manufacturers' specifications and limitations
A-1.01.05P	maintain 3-point contact for stability during access and egress	3-point contact is maintained for stability during access and egress
A-1.01.06P	perform ***housekeeping*** tasks	***housekeeping*** tasks are performed according to site requirements and ***jurisdictional regulations*** to avoid injury to self and to others
A-1.01.07P	handle chemicals with care	chemicals are handled with care according to manufacturers' instructions and Workplace Hazardous Materials Information System (WHMIS) requirements
A-1.01.08P	control access to work area	access to work area is controlled by installing ***barriers***

A-1.01.09P	host toolbox and field level risk assessment (FLRA) meetings and follow recommendations	toolbox and FLRA meeting recommendations are followed
A-1.01.10P	identify and report potential ***hazards***	potential ***hazards*** are identified and reported according to company policies and ***jurisdictional regulations***
A-1.01.11P	dispose of hazardous materials	hazardous materials are disposed of according to ***jurisdictional regulations***
A-1.01.12P	follow public health order by jurisdictional authorities	public health order by jurisdictional authorities are followed as a measure of safety

RANGE OF VARIABLES

tools and equipment include: hand tools, power tools, components for propane torches

crane components include: ladders, hand railings, fenders

housekeeping includes: removing debris from cab and around the crane, removing snow from winches and deck

jurisdictional regulations include: WHMIS, Canadian Standards Association (CSA), *Transportation of Dangerous Goods* (TDG), Occupational Health and Safety (OH&S), American Society of Mechanical Engineers (ASME), American National Standards Institute (ANSI), Web Sling and Tie Down Association (WSTDA)

barriers include: barricade tape, pylons, concrete barriers

	KNOWLEDGE	
	Learning Outcomes	**Learning Objectives**
A-1.01.01L	demonstrate knowledge of safe work practices and procedures	describe safety policies, procedures and requirements
		identify potential ***hazards*** and describe safe work practices
		describe standard emergency procedures
		describe first aid practices
		describe procedures used to dispose of hazardous materials
		identify types of ***barriers*** used to control access to work area and when they are required
		describe ***operator's responsibilities*** in maintaining a safe working environment
A-1.01.02L	demonstrate knowledge of induced currents, power line hazards and high-voltage electrical equipment	define terminology associated with induced currents, power lines and high-voltage electrical equipment
		identify hazards and describe safe work practices when operating cranes near sources of induced currents, power lines and high-voltage electrical equipment
		describe jurisdictional limits of approach to power lines

		interpret signage related to high-voltage electrical equipment
		describe procedures used when contact occurs with high-voltage electrical equipment
A-1.01.03L	demonstrate knowledge of regulatory requirements pertaining to safety	identify and interpret workplace health regulations pertaining to safety

RANGE OF VARIABLES

hazards include: chemicals, discharge/spills, fire, high tension wires, environmental conditions, heights, energy sources (hydraulic, electrical, pneumatic), overhead (power lines, cranes/other equipment, obstructions), mobile machinery (trucks, cranes, mobile equipment), rotating equipment (belts, pulleys, sheaves, sprockets, chains, pinch points, guards)

barriers include: barricade tape, pylons, concrete barriers

operator's responsibilities include: full control of equipment controls, hoist within limits, safe handling of loads, secure loads, inspecting and maintaining equipment

A-1.02 Uses personal protective equipment (PPE) and safety equipment

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	yes	yes	yes	yes	yes	NV	NV	NV

SKILLS

	Performance Criteria	Evidence of Attainment
A-1.02.01P	select and use PPE and safety equipment	PPE and safety equipment are selected and used according to task, site-specific requirements, manufacturers' specifications and jurisdictional ***standards and regulations***
A-1.02.02P	check PPE for proper fit	PPE is checked that it fits properly according to manufacturers' specifications
A-1.02.03P	inspect PPE and safety equipment for wear and ***defects***	PPE and safety equipment are inspected for wear and ***defects***
A-1.02.04P	identify and remove from service all worn, damaged and defective PPE and safety equipment	PPE and safety equipment are removed from service according to manufacturers' specifications
A-1.02.05P	replace deficient PPE and safety equipment	deficient PPE and safety equipment are replaced
A-1.02.06P	clean, maintain and store PPE and safety equipment	PPE and safety equipment are cleaned, maintained and stored according to manufacturers' specifications and site-specific requirements

RANGE OF VARIABLES

defects include: abrasions, tears, cracks, deformations
standards and regulations include: WHMIS, OH&S, CSA, ASME, ANSI

	KNOWLEDGE	
	Learning Outcomes	**Learning Objectives**
A-1.02.01L	demonstrate knowledge of PPE and safety equipment, their applications, limitations, maintenance, storage and procedures for use	identify types of PPE and safety equipment and describe their applications, limitations, maintenance, storage and procedures for use
A-1.02.02L	demonstrate knowledge of inspection requirements for PPE and safety equipment	describe importance of expiry dates on PPE and safety equipment
		identify potential ***defects*** and adjustments with PPE and safety equipment
A-1.02.03L	demonstrate knowledge of regulatory requirements pertaining to PPE and safety equipment	describe ***standards and regulations*** pertaining to use of PPE and safety equipment
		describe certification and training requirements for PPE and safety equipment

RANGE OF VARIABLES

defects include: abrasions, tears, cracks, deformations
standards and regulations include: WHMIS, OH&S, CSA, ASME, ANSI

A-1.03 Uses documentation

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	yes	yes	yes	yes	yes	NV	NV	NV

	SKILLS	
	Performance Criteria	**Evidence of Attainment**
A-1.03.01P	document lift responsibilities of personnel involved in lift on FLRA or hazard assessment	lift responsibilities of personnel involved in lift are documented on FLRA or hazard assessment according to site and company policies
A-1.03.02P	record information in daily log book	information is recorded in daily log book
A-1.03.03P	check off in log book working condition of components	working condition of components is checked off in log book according to ***standards and regulations***

A-1.03.04P	fill out maintenance request forms	maintenance request forms are filled out according to scheduled or unscheduled maintenance needs or concerns
A-1.03.05P	fill out driver's daily log book	driver's daily log book is filled out according to transport regulations
A-1.03.06P	interpret engineered lift drawings	engineered lift drawings are interpreted
A-1.03.07P	interpret safety-related documentation	safety-related documentation is interpreted
A-1.03.08P	check crane, rigging and attachments' certification for expiry dates and report if expired	crane, rigging and attachments' certification for expiry dates are checked and reported if expired

RANGE OF VARIABLES

standards and regulations include: CSA, OH&S, WHMIS

	KNOWLEDGE	
	Learning Outcomes	**Learning Objectives**
A-1.03.01L	demonstrate knowledge of safety-related and ***work-related documentation*** and their applications	define terminology associated with safety-related and ***work-related documentation***
		identify types of safety-related and ***work-related documentation*** and describe their applications
A-1.03.02L	demonstrate knowledge of procedures used to interpret and prepare safety-related and ***work-related documentation***	explain responsibilities associated with completing safety-related and ***work-related documentation***
		describe procedures used to interpret and complete safety-related and ***work-related documentation***
A-1.03.03L	demonstrate knowledge of regulatory requirements pertaining to safety-related and ***work-related documentation***	identify ***standards and regulations*** pertaining to safety-related and ***work-related documentation***
		explain mobile crane operator's jurisdictional legal responsibilities

RANGE OF VARIABLES

work-related documentation include: log books, engineered lift drawings, lift plan, manufacturers' specifications (load charts, operator manuals), permits, job scope analysis (JSA), site orientation, work orders, maintenance schedules and records, policies

standards and regulations include: CSA, OH&S, WHMIS

TASK A-2 Uses communication and mentoring techniques

TASK DESCRIPTOR

Learning in the trades is done primarily in the workplace with tradespeople passing on their skills and knowledge to apprentices, as well as sharing knowledge among themselves. Apprenticeship is, and always has been about mentoring – learning workplace skills and passing them on. Because of the importance of this to the trade, this task covers the activities related to communication in the workplace and mentoring skills.

Communication in this trade is vital so that all personnel involved in the lift is aware of what is happening.

A-2.01 Uses communication techniques

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	yes	yes	yes	yes	yes	NV	NV	NV

	SKILLS	
	Performance Criteria	**Evidence of Attainment**
A-2.01.01P	demonstrate communication practices with individuals or in a group	instructions and messages are interpreted by all parties involved in communication
A-2.01.02P	listen using ***active listening*** practices	***active listening*** practices are utilized
A-2.01.03P	speak clearly using correct industry terminology to ensure understanding	understanding of message is confirmed by both parties
A-2.01.04P	receive and respond to feedback on work	response to feedback indicates understanding and corrective measures are taken
A-2.01.05P	explain and provide feedback	explanation and feedback is provided and task is carried out as directed
A-2.01.06P	use questioning to improve communication	questions enhance understanding, on-the-job training and goal setting
A-2.01.07P	participate in safety and information meetings	meetings are attended, information is relayed to the workforce, and is applied
A-2.01.08P	use hand signals	hand signals are used according to industry standards
A-2.01.09P	use ***radio communication when required***	radio communication is used when required
A-2.01.10P	coordinate lift responsibilities	lift responsibilities are coordinated with crew members and other tradespeople in work area and at pre-lift meetings
A-2.01.11P	confirm roles and responsibilities of crew members for crane transport	roles and responsibilities of crew members that will be participating in the transport and organizing of escort vehicles are confirmed

RANGE OF VARIABLES

active listening includes: hearing, interpreting, reflecting, responding, paraphrasing

radio communication when required includes: in blind lifts, personnel basket lifts, multiple crane lifts, when vision is obscured, as per jurisdictional or client requirements

	KNOWLEDGE	
	Learning Outcomes	**Learning Objectives**
A-2.01.01L	demonstrate knowledge of trade terminology	define terminology used in the trade
A-2.01.02L	demonstrate knowledge of effective communication practices	describe the importance of using effective verbal and non-verbal communication with ***people in the workplace***
		identify ***sources of information*** to effectively communicate
		identify communication and ***learning styles***
		describe effective listening and speaking skills
		identify ***personal responsibilities and attitudes*** that contribute to on-the-job success
		identify the value of diversity in the workplace
		identify communication that constitutes bullying, ***harassment*** and ***discrimination***
		describe standard hand signals
		describe radio communication and when it should be used
		identify ***types of communication devices*** and describe their purpose and operation
		describe procedures used to communicate during hoisting operations
		explain purpose of site communication plan

RANGE OF VARIABLES

people in the workplace include: other tradespeople, colleagues, apprentices, supervisors, clients, manufacturers, general public

sources of information include: regulations, occupational health and safety requirements, jurisdictional requirements, prints, drawings, specifications, company and client documentation

learning styles include: reflection, seeing it, hearing it, trying it

personal responsibilities and attitudes include: asking questions, working safely, accepting constructive feedback, time management and punctuality, respect for authority, good stewardship of materials, tools and property, efficient work practice

harassment includes: objectionable conduct, comment or display made either on a one-time or continuous basis that demeans, belittles, or causes personal humiliation or embarrassment to the recipient

discrimination is prohibited based on: race, national or ethnic origin, colour, religion, age, sex, sexual orientation, gender identity or expression, marital status, family status, disability, genetic characteristics, pardoned conviction

types of communication devices include: portable and stationary radios, mobile phones and mobility devices, computers, crane horn

A-2.02 Uses mentoring techniques

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	yes	yes	yes	yes	yes	NV	NV	NV

SKILLS

	Performance Criteria	Evidence of Attainment
A-2.02.01P	identify and communicate learning objective and point of lesson	apprentice or learner can explain the objective and point of the lesson
A-2.02.02P	link lesson to other lessons and the job	lesson order and unplanned learning opportunities are defined
A-2.02.03P	demonstrate performance of a skill to an apprentice or learner	***steps required to demonstrate a skill*** are performed
A-2.02.04P	set up conditions required for an apprentice or learner to practice a skill	***practice conditions*** are set up so that the skill can be practiced safely by the apprentice or learner
A-2.02.05P	assess apprentice or learner's ability to perform tasks with increasing independence	performance of apprentice or learner improves with practice to a point where skill can be done with little supervision
A-2.02.06P	give supportive and corrective feedback	apprentice or learner adopts best practice after having been given supportive or corrective feedback
A-2.02.07P	support apprentices or learners in pursuing technical training opportunities	technical training is completed within timeframe prescribed by apprenticeship authority

A-2.02.08P	support anti-***harassment*** in the workplace	workplace is ***harassment*** and ***discrimination***-free
A-2.02.09P	assess apprentice or learner suitability to the trade during probationary period	apprentice or learner is given feedback that helps them identify their own strengths and weaknesses and suitability for the trade

RANGE OF VARIABLES

steps required to demonstrate a skill include: understanding the who, what, where, when, why, and how, explaining, showing, giving encouragement, following up to ensure skill is performed correctly

practice conditions means: guided, limited independence, full independence

harassment includes: objectionable conduct, comment or display made either on a one-time or continuous basis that demeans, belittles, or causes personal humiliation or embarrassment to the recipient

discrimination is prohibited based on: race, national or ethnic origin, colour, religion, age, sex, sexual orientation, gender identity or expression, marital status, family status, disability, genetic characteristics, pardoned conviction

	KNOWLEDGE	
	Learning Outcomes	**Learning Objectives**
A-2.02.01L	demonstrate knowledge of strategies for learning skills in the workplace	describe the importance of individual experience
		describe the shared responsibilities for workplace learning
		determine one's own learning preferences and explain how these relate to learning new skills
		describe the importance of different types of skills in the workplace
		describe the importance of ***essential skills*** in the workplace
		identify different ***learning styles***
		identify different ***learning needs*** and strategies to meet them
		identify ***strategies to assist in learning a skill***
A-2.02.02L	demonstrate knowledge of strategies for ***teaching*** workplace ***skills***	identify different roles played by a workplace mentor
		describe ***teaching skills*** and leadership skills
		explain the importance of identifying the point of a lesson
		identify how to choose a good time to present a lesson
		explain the importance of linking the lessons

	identify the components of the skill (the context)
	describe considerations in setting up opportunities for skill practice
	explain the importance of providing feedback
	identify techniques for giving effective feedback
	describe a skills assessment
	identify methods of assessing progress
	explain how to adjust a lesson to different situations

RANGE OF VARIABLES

essential skills are: reading, document use, writing, oral communication, numeracy, thinking, working with others, digital technology, continuous learning

learning styles include: reflection, seeing it, hearing it, trying it

learning needs include: learning disabilities, learning preferences, language proficiency

strategies to assist in learning a skill include: understanding the basic principles of instruction, developing coaching skills, being mature and patient, providing feedback

teaching skills include: identifying the point of the lesson, linking the lesson, demonstrating the skill, providing practice, giving feedback, assessing skills and progress

MAJOR WORK ACTIVITY B
Performs hoisting calculations

TASK B-3 Determines load weights

TASK DESCRIPTOR

A mobile crane operator must be able to calculate accurately the load weight and centre of gravity of an object as it is vital to the safe operation of mobile cranes.

B-3.01 Identifies weight

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	yes	yes	yes	yes	yes	NV	NV	NV

	SKILLS	
	Performance Criteria	**Evidence of Attainment**
B-3.01.01P	determine weight of load to be lifted	weight of load to be lifted is determined according to unit weight of material to be lifted
B-3.01.02P	verify unit of measurement (metric or imperial) when missing or incorrect on ***source of load weight information***	unit of measurement (metric or imperial) is verified when missing or incorrect on ***source of load weight information***
B-3.01.03P	confirm weight of load to be lifted	it is verified that no adjustments, modifications or changes in conditions that may affect weight of load to be lifted have been made
B-3.01.04P	compare load calculations to ***sources of load weight information***	load calculations are compared to ***sources of load weight information*** to confirm actual weight to be lifted

RANGE OF VARIABLES

sources of load weight information include: bills of lading, stamped weights, engineered drawings, previous lift history, blueprints

	KNOWLEDGE	
	Learning Outcomes	**Learning Objectives**
B-3.01.01L	demonstrate knowledge of procedures used to identify weight of objects and ***basic shaped loads***	define terminology associated with determining weight of objects and ***basic shaped loads***
		identify types of ***sources of load weight information***
		identify and apply formulas for conversion between imperial and metric systems
		identify ***factors contributing to load weight***

RANGE OF VARIABLES

basic shaped loads include: cubes, cylinders, pyramid, rectangle, pipe

sources of load weight information include: bills of lading, stamped weights, engineered drawings, previous lift history, blueprints

factors contributing to load weight include: ice, water, mud, load frozen to ground, lifting in water, snow, crating, wind, incomplete demolition, friction, added components

B-3.02 Calculates weight

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	yes	yes	yes	yes	yes	NV	NV	NV

	SKILLS	
	Performance Criteria	**Evidence of Attainment**
B-3.02.01P	determine and apply formulas needed for object shape	formulas are determined and applied according to object shape
B-3.02.02P	perform ***calculation***	***calculation*** is performed according to formula

RANGE OF VARIABLES

calculation is: volume times unit weight of material

	KNOWLEDGE	
	Learning Outcomes	**Learning Objectives**
B-3.02.01L	demonstrate knowledge of procedures used to calculate weight of objects and ***basic shaped loads***	explain importance of determining weight of an object and ***basic shaped load*** and its relevance in lifting operations
		identify ***factors contributing to load weight***

		describe procedures used to determine ***basic shaped loads***
		perform ***calculation*** and apply formula to calculate weight of objects and ***basic shaped loads***
		identify ***considerations*** used to determine weight of objects and ***basic shaped loads***
B-3.02.02L	demonstrate knowledge of centre of gravity	describe conditions that affect centre of gravity
		determine centre of gravity of objects
		identify ***factors contributing to centre of gravity***
		perform calculations to determine centre of gravity in objects

RANGE OF VARIABLES

basic shaped loads include: cubes, cylinders, pyramid, rectangle, pipe

factors contributing to load weight include: ice, water, mud, load frozen to ground, lifting in water, snow, crating, wind, incomplete demolition, friction, added components

calculation is: volume times unit weight of material

considerations include: volume of object, weight of material

factors contributing to centre of gravity include***:*** shifting liquids, ice, water, mud, load frozen to ground, lifting in water, snow, crating, wind, incomplete demolition, friction, component distribution

TASK B-4 Calculates crane capacity

TASK DESCRIPTOR

Mobile crane operators calculate crane capacities. This involves interpreting load charts, range diagrams and manufacturers' specifications and instructions. Important considerations are radius and crane configuration.

B-4.01 Determines radius and crane configuration

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	yes	yes	yes	yes	yes	NV	NV	NV

	SKILLS	
	Performance Criteria	**Evidence of Attainment**
B-4.01.01P	measure horizontal distance from centre of rotation to centre of gravity of suspended load	horizontal distance from centre of rotation to centre of gravity of suspended load is measured
B-4.01.02P	use range diagram to determine boom length and jib/attachment offsets needed	range diagram is used to determine boom length and jib/attachment offsets needed to ensure radius and tip height can be achieved
B-4.01.03P	determine ***crane configurations***	***crane configurations*** are determined according to site and lift conditions, and ***manufacturers' specifications and instructions***
B-4.01.04P	determine main boom angle	main boom angle is determined according to range diagram, radius and operator aides
B-4.01.05P	determine jib/attachment angle	jib/attachment angle is determined according to range diagram, radius and operator aides

RANGE OF VARIABLES

crane configurations include: counterweight, crawler, outrigger, boom, attachments

manufacturers' specifications and instructions include: load charts, configuration charts, hoist rope specifications, assembly/disassembly charts

	KNOWLEDGE	
	Learning Outcomes	**Learning Objectives**
B-4.01.01L	demonstrate knowledge of determining radius and ***crane configurations***	define terminology associated with radius and ***crane configurations***
		identify ***methods used to measure radius***
		describe procedures used to determine ***crane configurations*** and main boom angle
		identify ***manufacturers' specifications and instructions***
B-4.01.02L	demonstrate knowledge of regulatory requirements pertaining to ***crane configurations***	identify ***codes, standards and regulations*** pertaining to radius and ***crane configurations***

RANGE OF VARIABLES

crane configurations include: counterweight, crawler, outrigger, boom, attachments

methods used to measure radius include: measuring device, dry run

manufacturers' specifications and instructions include: load charts, configuration charts, hoist rope specifications, assembly/disassembly charts

codes, standards and regulations include: CSA, OH&S, ASME

B-4.02 Interprets load charts

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	yes	yes	yes	yes	yes	NV	NV	NV

	SKILLS	
	Performance Criteria	**Evidence of Attainment**
B-4.02.01P	determine crane gross capacity	crane gross capacity is determined according to ***crane configurations*** and corresponding load charts
B-4.02.02P	refer to load charts for reductions of gross capacity	load charts are referred to for reductions of gross capacity
B-4.02.03P	calculate gross load and net capacity	gross load and net capacity are calculated
B-4.02.04P	locate warnings	warnings are located according to load charts, range diagrams and manufacturers' notes
B-4.02.05P	de-rate crane gross capacity	crane gross capacity is de-rated using various site and regulatory restrictions, and manufacturers' specifications

RANGE OF VARIABLES

crane configurations include: counterweight, crawler, outrigger, boom, attachments

	KNOWLEDGE	
	Learning Outcomes	**Learning Objectives**
B-4.02.01L	demonstrate knowledge of load charts, their characteristics and applications	define ***terminology*** associated with load charts
		identify ***components of load charts***, and describe their characteristics and applications
B-4.02.02L	demonstrate knowledge of interpreting load charts	describe procedures used to interpret ***components of load charts*** required to plan lifts
		identify ***factors that influence crane capacity*** in lifting operations and describe their impact
		perform calculations to determine crane's main boom configuration capacity
		perform calculations to determine crane's jib or extension configuration capacity
		perform calculations to determine line pull, working load limit (WLL), minimum parts of line and size of hook block
		perform calculations to determine maximum working radius
		perform calculations to determine capacity deductions found in manufacturers' notes

RANGE OF VARIABLES

terminology includes: gross capacity, net capacity, gross load, net load, radius, boom length, angle

components of load charts include: notes (factors affecting capacity), capacity charts, range diagram, technical data, parts of line, weights of deductions, quadrants of operation, crane configurations (on outriggers, on rubber, crawlers extended or retracted, counterweight, boom/jib), notes/technical data (line weight calculation/deduction), boom length and radius, boom deflection

factors that influence crane capacity include: attachments, configurations, capacity deductions, duty cycle, manufacturers' notes (wind, temperature), out of level, ground conditions

TASK B-5 Performs rigging calculations

TASK DESCRIPTOR

Accurate rigging calculations are important for the proper selection and use of rigging and hardware to ensure safe hoisting operations.

B-5.01 Performs sling angle calculations

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	yes	yes	yes	yes	yes	NV	NV	NV

SKILLS

	Performance Criteria	Evidence of Attainment
B-5.01.01P	determine rigging capacity	rigging capacity is determined according to manufacturers' identification tags, rigging guides and performing manual calculations
B-5.01.02P	calculate angle of each sling leg	angle of each sling leg is calculated to determine effect of angle on tension of sling and rigging hardware
B-5.01.03P	calculate equal sling leg tension	equal sling leg tension is calculated according to sling length and hook height
B-5.01.04P	calculate unequal sling leg tension	unequal sling leg tension is calculated according to location of centre of gravity, sling length and hook height

KNOWLEDGE

	Learning Outcomes	Learning Objectives
B-5.01.01L	demonstrate knowledge of slings, ***hardware***, sling configurations, their characteristics, applications and capacities	define terminology associated with slings and their ***hardware***
		identify hazards and describe safe work practices pertaining to slings
		identify ***types of sling configurations***, and describe their characteristics and applications
		identify ***types of slings*** and their ***hardware***, and describe their sizes, characteristics, applications and capacities
		explain sling angles and their effect on sling capacities

B-5.01.02L	demonstrate knowledge of performing sling angle calculations	describe procedures used to determine sling angle
		perform calculations to interpret load on slings used at an angle
		describe procedures used to determine appropriate sling size for a given load
		perform calculations using sling tension formulas
		perform calculations using field formulas and sling angle charts
		identify elements of ***lift data*** used to perform hoisting calculations
B-5.01.03L	demonstrate knowledge of regulatory requirements pertaining to rigging	identify ***codes, standards and regulations*** pertaining to rigging

RANGE OF VARIABLES

hardware includes: shackles, lifting eyes, beams, rigging blocks
types of sling configurations include: choker, basket, vertical, bridle
types of slings include: steel, synthetic
lift data includes: available rigging, pick points, load size, weight and centre of gravity
codes, standards and regulations include: CSA, OH&S, ASME

B-5.02 Performs working load limit (WLL) calculations

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	yes	yes	yes	yes	yes	NV	NV	NV

	SKILLS	
	Performance Criteria	**Evidence of Attainment**
B-5.02.01P	determine ***factors*** that affect capacity of sling	***factors*** that affect capacity of sling are determined
B-5.02.02P	interpret engineers' and manufacturers' specifications	engineers' and manufacturers' specifications are interpreted
B-5.02.03P	calculate rigging capacity and sling tension	rigging capacity and sling tension are calculated using formulas

RANGE OF VARIABLES

factors include: choke, basket, vertical configuration, bridle configuration, D:d ratio, sharp edges, angle of choke

	KNOWLEDGE	
	Learning Outcomes	**Learning Objectives**
B-5.02.01L	demonstrate knowledge of WLL, their characteristics and applications	define terminology associated with WLL
		identify and describe deduction factors that cause reduction in capacity to sling or wire rope
B-5.02.02L	demonstrate knowledge of performing WLL calculations	perform calculations to determine WLLs of slings
		identify ***considerations*** used to determine WLLs

RANGE OF VARIABLES

considerations include: manufacturers' specifications, codes and standards, rigging applications

MAJOR WORK ACTIVITY C

Inspects and maintains crane

TASK C-6 Performs pre-operational checks and regular inspections

TASK DESCRIPTOR

Safety is the primary reason for thorough inspection and maintenance. Mobile crane operators may do adjustments and maintenance, but major repairs should be performed by qualified technicians.

C-6.01 Inspects engine systems

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	yes	yes	yes	yes	yes	NV	NV	NV

	SKILLS	
	Performance Criteria	**Evidence of Attainment**
C-6.01.01P	check engine system	engine system is checked for ***damage*** and maintenance is recorded according to regulatory requirements
C-6.01.02P	measure belt tension and check belt condition	belt tension is measured and belt condition is checked for ***signs of fatigue***
C-6.01.03P	verify ***components*** are secure	***components*** are secure
C-6.01.04P	check ***engine fluids***	***engine fluids*** are checked to ensure operating levels
C-6.01.05P	check air filter	air filter is checked to determine level of restriction in air intake system and to ensure system is sealed
C-6.01.06P	check operation of air intake emergency shut off valve	air intake emergency shut off valve is operational
C-6.01.07P	record defects, deficiencies, adjustments, repairs and maintenance in crane log book	defects, deficiencies, adjustments, repairs and maintenance are recorded in crane log book according to company policies and jurisdictional regulations
C-6.01.08P	report defects and deficiencies	defects and deficiencies are reported to supervisor according to company policies

RANGE OF VARIABLES

damages include: leaks, cracks, worn hoses, out of adjustment (loose)
signs of fatigue include: cracks, wear, corrosion, distortion, deformation
components include: alternator, pumps, starter, engine accessories
engine fluids include: fuel, oil, coolant

	KNOWLEDGE	
	Learning Outcomes	**Learning Objectives**
C-6.01.01L	demonstrate knowledge of engines and drive systems, their ***components***, purpose, operation, characteristics and applications	define terminology associated with engines, drive systems and their ***components***
		identify hazards and describe safe work practices pertaining to engines, drive systems and their ***components***
		identify ***types of engine and drive systems*** and their ***components***, and describe their purpose, operation, characteristics and applications
		identify potential ***damage*** in engine systems
C-6.01.02L	demonstrate knowledge of procedures used to inspect and maintain engines, drive systems, and their ***components***	identify tools and equipment to inspect and maintain engines, drive systems, and their ***components***, and describe their applications and procedures for use
		describe procedures used to inspect and maintain engines, drive systems and their ***components***
C-6.01.03L	demonstrate knowledge of regulatory requirements pertaining to engines, drive systems and their ***components***	identify codes, standards and regulations pertaining to engines, drive systems and their ***components***

RANGE OF VARIABLES

components include: alternator, pumps, starter, engine accessories
types of engine and drive systems include: gas, diesel, propane, automatic, manual, hydraulic, mechanical, electrical
damages include: leaks, cracks, worn hoses, out of adjustment (loose)

C-6.02 Inspects air systems

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	yes	yes	yes	yes	yes	NV	NV	NV

	SKILLS	
	Performance Criteria	**Evidence of Attainment**
C-6.02.01P	identify air system ***failures***	air system ***failures*** are identified and recorded according to regulatory requirements
C-6.02.02P	check brake system for air leaks	brake system is checked for air leaks by application
C-6.02.03P	test compressor's cut-in/cut-out and recovery times	compressor's cut-in/cut-out and recovery times are tested according to jurisdictional regulations
C-6.02.04P	check air tanks for corrosion and listen for leaks	air tanks are checked for corrosion and leaks are listened for
C-6.02.05P	check hoses and lines	hoses and lines are checked for ***signs of fatigue***
C-6.02.06P	purge air tank	air tank is purged
C-6.02.07P	record defects, deficiencies, adjustments, repairs and maintenance in crane log book	defects, deficiencies, adjustments, repairs and maintenance are recorded in crane log book according to company policies and jurisdictional regulations
C-6.02.08P	report defects and deficiencies	defects and deficiencies are reported to supervisor according to company policies

RANGE OF VARIABLES

failures include: air leaks, blockages, frozen lines
signs of fatigue include: cracks, wear, corrosion, kinks

	KNOWLEDGE	
	Learning Outcomes	**Learning Objectives**
C-6.02.01L	demonstrate knowledge of air systems, their ***components***, purpose, operation, characteristics and applications	define terminology associated with air systems and their ***components***
		identify hazards and describe safe work practices pertaining to air systems and their ***components***
		identify types of air systems and their ***components***, and describe their purpose, operation, characteristics and applications
		identify potential ***failures*** in air systems

C-6.02.02L	demonstrate knowledge of procedures used to inspect and maintain air systems and their ***components***	identify tools and equipment to inspect and maintain air systems and their ***components***, and describe their applications and procedures for use
		describe procedures used to inspect and maintain air systems and their ***components***
C-6.02.03L	demonstrate knowledge of regulatory requirements pertaining to air systems and their ***components***	identify codes, standards and regulations pertaining to air systems and their ***components***
		identify jurisdictional regulations for pre- and post-trip inspections and required documentation

RANGE OF VARIABLES

components include: air lines, compressors, belts, dryer systems, air tanks, brake actuators (brake chambers)

failures include: air leaks, blockages, frozen lines

C-6.03 Inspects electrical systems

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	yes	yes	yes	yes	yes	NV	NV	NV

	SKILLS	
	Performance Criteria	**Evidence of Attainment**
C-6.03.01P	verify function of electrical system ***components***	electrical system ***components*** are tested and functional
C-6.03.02P	recognize signs of electrical system ***failures and deficiencies***	electrical system ***failures and deficiencies*** are identified, corrected and recorded according to regulatory requirements
C-6.03.03P	record defects, deficiencies, adjustments, repairs and maintenance in crane log book	defects, deficiencies, adjustments, repairs and maintenance are recorded in crane log book according to company policies and jurisdictional regulations
C-6.03.04P	report defects and deficiencies	defects and deficiencies are reported to supervisor according to company policies

RANGE OF VARIABLES

components include: charging system, lights, signals, alternators, starters, belts, batteries, gauges, wires, fuses, circuit breakers

failures and deficiencies include: poor ground, bad connections, chafing, corrosion, under-rated fuses and breakers, broken wires

	KNOWLEDGE	
	Learning Outcomes	**Learning Objectives**
C-6.03.01L	demonstrate knowledge of electrical systems, their ***components***, purpose, operation, characteristics and applications	define terminology associated with electrical systems and their ***components***
		identify hazards and describe safe work practices pertaining to electrical systems and their ***components***
		identify types of electrical systems and their ***components***, and describe their purpose, operation, characteristics and applications
		identify potential ***failures and deficiencies*** in electrical systems
C-6.03.02L	demonstrate knowledge of procedures used to inspect and maintain electrical systems and their ***components***	identify tools and equipment inspect and maintain electrical systems and their ***components***, and describe their applications and procedures for use
		describe procedures used to inspect and maintain electrical systems and their ***components***
C-6.03.03L	demonstrate knowledge of regulatory requirements pertaining to electrical systems and their ***components***	identify codes, standards and regulations pertaining to electrical systems and their ***components***
		identify jurisdictional regulations for pre- and post-trip inspections and required documentation

RANGE OF VARIABLES

components include: charging system, lights, signals, alternators, starters, belts, batteries, gauges, wires, fuses, circuit breakers

failures and deficiencies include: poor ground, bad connections, chafing, corrosion, under-rated fuses and breakers, broken wires

C-6.04 Inspects hydraulic systems

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	yes	yes	yes	yes	yes	NV	NV	NV

SKILLS

	Performance Criteria	Evidence of Attainment
C-6.04.01P	check hydraulic oil level	hydraulic oil level is checked using sight gauge according to manufacturers' specifications
C-6.04.02P	check hoses and lines	hoses and lines are checked for routing, leaks and ***signs of fatigue***
C-6.04.03P	check hydraulic oil filter gauge	hydraulic oil filter gauge is checked to determine level of restriction in return system
C-6.04.04P	check cylinders for leaks and wear	cylinders are checked for leaks and wear
C-6.04.05P	recognize signs of hydraulic system ***failures and deficiencies***	hydraulic system ***failures and deficiencies*** are identified and recorded according to regulatory requirements
C-6.04.06P	record defects, deficiencies, adjustments, repairs and maintenance in crane log book	defects, deficiencies, adjustments, repairs and maintenance are recorded in crane log book according to company policies and jurisdictional regulations
C-6.04.07P	report defects and deficiencies	defects and deficiencies are reported to supervisor according to company policies

RANGE OF VARIABLES

signs of fatigue include: cracks, wear, chafing, corrosion

failures and deficiencies include: low oil, leaking hoses, cavitation, filter restriction, contamination, drive line noise (unusual noise), high temperatures

KNOWLEDGE

	Learning Outcomes	Learning Objectives
C-6.04.01L	demonstrate knowledge of hydraulic systems, their ***components***, purpose, operation, characteristics and applications	define terminology associated with hydraulic systems and their ***components***
		identify hazards and describe safe work practices pertaining to hydraulic systems and their ***components***
		identify ***types of hydraulic systems*** and their ***components***, and describe their purpose, operation, characteristics and applications

		identify ***types of hydraulic pump systems*** and describe their purpose, operation, characteristics and applications
		types of hydraulic pumps and describe their purpose, operation, characteristics and applications
		identify types of hydraulic oils and describe their ***properties***
		identify potential ***failures and deficiencies*** found in hydraulic systems
		explain power transfer principles of hydraulic systems
C-6.04.02L	demonstrate knowledge of procedures used to inspect and maintain hydraulic systems and their ***components***	identify tools and equipment to inspect and maintain hydraulic systems and their ***components***, and describe their applications and procedures for use
		describe procedures used to inspect and maintain hydraulic systems and their ***components***
C-6.04.03L	demonstrate knowledge of regulatory requirements pertaining to hydraulic systems and their ***components***	identify codes, standards and regulations pertaining to hydraulic systems and their ***components***
		identify jurisdictional regulations for pre- and post-trip inspections and required documentation

RANGE OF VARIABLES

components include: hoses, pumps, motors, filters, tanks, cylinders, valves

types of hydraulic systems include: closed centre, open centre

types of hydraulic pump systems include: direct drive, belt drive

types of hydraulic pumps include: variable displacement, fixed displacement, gear, piston, vane

properties include: viscosity, anti-foaming, anti-corrosion

failures and deficiencies include: low oil, leaking hoses, cavitation, filter restriction, contamination, drive line noise (unusual noise), high temperatures

C-6.05 Inspects chassis/car body and running gear components

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	yes	yes	yes	yes	yes	NV	NV	NV

	SKILLS	
	Performance Criteria	**Evidence of Attainment**
C-6.05.01P	check tire pressure and condition	tire pressure and condition are checked
C-6.05.02P	identify track ***damage*** or ***deficiencies***	track is inspected for ***damage*** or ***deficiencies***
C-6.05.03P	identify ***chassis/car body and running gear*** system and ***components*** for ***damage*** or ***deficiencies***	***chassis/car body and running gear*** system and ***components*** are inspected for ***damage*** or ***deficiencies***
C-6.05.04P	verify steering system operation and integrity	steering system operation and integrity are verified
C-6.05.05P	check adjustment and wear on brake systems	adjustment and wear on brake systems are checked
C-6.05.06P	check for ***deficiencies***	***deficiencies*** are identified and recorded according to regulatory requirements and company policies
C-6.05.07P	check ***operator cab components***	***operator cab components*** are functioning
C-6.05.08P	verify that non-destructive testing of components and attachments has been conducted	non-destructive testing of components and attachments have been conducted according to jurisdictional regulations
C-6.05.09P	record ***defects***, ***deficiencies***, adjustments, repairs and maintenance in crane log book	***defects***, ***deficiencies***, adjustments, repairs and maintenance are recorded in crane log book according to company policies and jurisdictional regulations
C-6.05.10P	report ***defects*** and ***deficiencies***	***defects*** and ***deficiencies*** are reported to supervisor according to company policies

RANGE OF VARIABLES

damages (track) include: cracked pads; broken pins; worn chains, sprockets, idlers, rollers, track frame, track tensioner and drive motor

deficiencies include: loose or broken brake chambers, leaking cylinders, broken springs

chassis/car body and running gear components include: steering, braking mechanisms, suspension (cylinders, accumulators, springs), drive train, tracks, wheels

damages (chassis/car body and running gear) include: loose universal joints, leaking seals, broken fittings, cracks

operator cab components include: wipers, heaters, defrosters, mirrors

	KNOWLEDGE	
	Learning Outcomes	**Learning Objectives**
C-6.05.01L	demonstrate knowledge of ***chassis/car body and running gear components***, their purpose, operation, characteristics and applications	define terminology associated with ***chassis/car body and running gear components***
		identify hazards and describe safe work practices pertaining to ***chassis/car body and running gear components***
		identify ***chassis/car body and running gear components***, and describe their purpose, operation, characteristics and applications
		identify ***damage*** and ***deficiencies*** found in ***chassis/car body and running gear components***
C-6.05.02L	demonstrate knowledge of procedures used to inspect and maintain ***chassis/car body and running gear components***	identify tools and equipment to inspect and maintain ***chassis/car body and running gear components***, and describe their applications and procedures for use
		describe procedures used to inspect and maintain ***chassis/car body and running gear components***
C-6.05.03L	demonstrate knowledge of regulatory requirements pertaining to ***chassis/car body and running gear components***	identify codes, standards and regulations pertaining to ***chassis/car body and running gear components***
		identify jurisdictional regulations for pre- and post-trip inspections and required documentation

RANGE OF VARIABLES

chassis/car body and running gear components include: steering, braking mechanisms, suspension (cylinders, accumulators, springs), drive train, tracks, wheels

damage (chassis/car body and running gear) includes: loose universal joints, leaking seals, broken fittings, cracks

deficiencies include: loose or broken brake chambers, leaking cylinders, broken springs

C-6.06 Inspects outriggers and counterweights

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	yes	yes	yes	yes	yes	NV	NV	NV

SKILLS

	Performance Criteria	Evidence of Attainment
C-6.06.01P	verify configuration, position and security of counterweights, outrigger beams, boxes and floats	configuration, position and security of counterweights, outrigger beams, boxes and floats are verified
C-6.06.02P	inspect outrigger boxes, beams, wear pads, jacks and floats	outrigger boxes, beams, wear pads, jacks and floats are inspected for damage or deficiencies
C-6.06.03P	inspect to counterweights and lifting lugs	counterweights and lifting lugs are inspected for damage or deficiencies
C-6.06.04P	verify that non-destructive testing of ***components*** and attachments has been conducted	non-destructive testing of ***components*** and attachments has been conducted, and documented proof of inspection is available and verified according to jurisdictional regulations
C-6.06.05P	inspect crane mats and blocking	crane mats and blocking are inspected for physical conditions, and in relation to crane float size and ground conditions
C-6.06.06P	record defects, deficiencies, adjustments, repairs and maintenance in crane log book	defects, deficiencies, adjustments, repairs and maintenance are recorded in crane log book according to company policies and jurisdictional regulations
C-6.06.07P	report defects and deficiencies	defects and deficiencies are reported to supervisor according to company policies

RANGE OF VARIABLES

components include: boxes, beams, jacks, floats, hoses

KNOWLEDGE

	Learning Outcomes	Learning Objectives
C-6.06.01L	demonstrate knowledge of outriggers and counterweights, their ***components***, purpose, operation, characteristics and applications	define terminology associated with outriggers, counterweights and their ***components***
		identify hazards and describe safe work practices pertaining to outriggers, counterweights and their ***components***
		identify types of outriggers and their ***components***, and describe their purpose, operation, characteristics and applications

		identify ***types of counterweights*** and describe their purpose, operation, characteristics and applications
		identify damage or deficiencies in outriggers, counterweights and their ***components***
C-6.06.02L	demonstrate knowledge of procedures used to inspect and maintain outriggers, counterweights and their ***components***	identify tools and equipment inspect and maintain outriggers, counterweights and their ***components***, and describe their applications and procedures for use
		describe procedures used to inspect and maintain outriggers, counterweights and their ***components***
C-6.06.03L	demonstrate knowledge of regulatory requirements pertaining to outriggers, counterweights and their ***components***	identify codes, standards and regulations pertaining to outriggers, counterweights and their ***components***
		identify jurisdictional regulations for pre- and post-trip inspections and required documentation

RANGE OF VARIABLES

components include: boxes, beams, jacks, floats, hoses
types of counterweights include: fixed, stackable, removable, bumper, superlift (auxiliary counterweight)

C-6.07 Inspects boom components and attachments

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	yes	yes	yes	yes	yes	NV	NV	NV

	SKILLS	
	Performance Criteria	**Evidence of Attainment**
C-6.07.01P	check ***components*** and ***attachments*** for damage and ***deficiencies***	***components*** and ***attachments*** are checked for damage and ***deficiencies***
C-6.07.02P	verify that non-destructive testing of ***components*** and ***attachments*** has been conducted	non-destructive testing of ***components*** and ***attachments*** has been conducted and proof of inspection is documented according to jurisdictional regulations
C-6.07.03P	verify that ***attachments*** are safely stowed and secured	***attachments*** are safely stowed and secured according to ***manufacturers' specifications and instructions***

C-6.07.04P	record defects, ***deficiencies***, adjustments, repairs and maintenance in crane log book	defects, ***deficiencies***, adjustments, repairs and maintenance are recorded in crane log book according to company policies and jurisdictional regulations
C-6.07.05P	report defects and ***deficiencies***	defects and ***deficiencies*** are reported to supervisor according to company policies

RANGE OF VARIABLES

components include: sections, pendant lines and bars, wear pads, telescopic cylinders, telescopic cables, telescopic chain systems, pinned boom components, manual section

attachments include: luffing jibs, swing-away jibs, extensions, auxiliary sheaves

deficiencies include: cracks, corrosion, dents, scoring, bent lacing, bent main chords, loose and unsecured objects, damaged pendant lines and bars, worn wear pads, missing pins and keepers

manufacturers' specifications and instructions include: load charts, configuration charts, hoist rope specifications, assembly/disassembly charts

	KNOWLEDGE	
	Learning Outcomes	**Learning Objectives**
C-6.07.01L	demonstrate knowledge of boom ***components*** and ***attachments***, their purpose, operation, characteristics and applications	define terminology associated with boom ***components*** and ***attachments***
		identify hazards and describe safe work practices pertaining to boom ***components*** and ***attachments***
		identify ***types of booms*** and describe their purpose, operation, characteristics and applications
		identify types of boom ***components*** and ***attachments***, and describe their purpose, operation, characteristics and applications
		identify damage and ***deficiencies*** in boom ***components*** and ***attachments***
C-6.07.02L	demonstrate knowledge of procedures used to inspect and maintain boom ***components*** and ***attachments***	identify tools and equipment inspect and maintain boom ***components*** and ***attachments***, and describe their applications and procedures for use
		describe procedures used to inspect and maintain boom ***components*** and ***attachments***
C-6.07.03L	demonstrate knowledge of regulatory requirements pertaining to boom ***components*** and ***attachments***	identify codes, standards and regulations pertaining to boom ***components*** and ***attachments***

	identify jurisdictional regulations for non-destructive testing and complete tear-down inspections
	identify jurisdictional regulations for pre- and post-trip inspections and required documentation

RANGE OF VARIABLES

components include: sections, pendant lines and bars, wear pads, telescopic cylinders, telescopic cables, telescopic chain systems, pinned boom components, manual section

attachments include: luffing jibs, swing-away jibs, extensions, auxiliary sheaves

types of booms are lattice and telescopic

deficiencies include: cracks, corrosion, dents, scoring, bent lacing, bent main chords, loose and unsecured objects, damaged pendant lines and bars, worn wear pads, missing pins and keepers

C-6.08 Inspects hoisting systems

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	yes	yes	yes	yes	yes	NV	NV	NV

SKILLS

	Performance Criteria	Evidence of Attainment
C-6.08.01P	check condition of hoist rope for lubrication and ***damage***	condition of hoist rope is checked for lubrication and ***damage***
C-6.08.02P	verify that hoist rope is spooling correctly on drum	hoist rope is spooled correctly on drum
C-6.08.03P	check reeving of hoist rope around sheaves	hoist rope around sheaves is reeved according to manufacturers' specifications
C-6.08.04P	check end terminations	end terminations are visually checked according to ***industry standards*** and manufacturers' specifications
C-6.08.05P	inspect hook block and ball	hook block and ball are inspected for cracks and deformities according to manufacturers' specifications and instructions, and hook throat openings are within manufacturers' specifications
C-6.08.06P	measure sheave tolerances	sheave tolerances are measured
C-6.08.07P	check lubrication of sheaves and swivels	lubrication of sheaves and swivels are checked
C-6.08.08P	verify operation of hook latch and positive latch	hook latch and positive latch are operational

C-6.08.09P	verify that non-destructive testing of hoisting system ***components*** has been conducted	non-destructive testing of hoisting system ***components*** has been conducted, and documented proof of inspection is available and verified according to jurisdictional regulations
C-6.08.10P	record defects, deficiencies, adjustments, repairs and maintenance in crane log book	defects, deficiencies, adjustments, repairs and maintenance are recorded in crane log book according to company policies and jurisdictional regulations
C-6.08.11P	report defects and deficiencies	defects and deficiencies are reported to supervisor according to company policies

RANGE OF VARIABLES

damage includes: wear, bird caging, broken wires, damaged core, crushing, reduction in diameter, kinks, corrosion, twisting

industry standards include: CSA, ASME

components include: clutches, brakes, pumps, hook blocks, overhaul balls, wedge sockets, clamps, sheaves, winches, motors

	KNOWLEDGE	
	Learning Outcomes	**Learning Objectives**
C-6.08.01L	demonstrate knowledge of hoisting systems, their ***components***, purpose, operation, characteristics and applications	define terminology associated with hoisting systems and their ***components***
		identify hazards and describe safe work practices pertaining to hoisting systems and their ***components***
		identify hoisting system ***components*** and describe their purpose, operation, characteristics and applications
		identify ***types of hoist rope construction***, and describe their purpose, operation, characteristics and applications
		identify potential ***damage*** found in hoisting systems ***components***
		identify inspection, rejection and removal from service criteria
C-6.08.02L	demonstrate knowledge of procedures used to inspect and maintain hoisting systems and their ***components***	identify tools and equipment used to inspect and maintain hoisting systems and their ***components***, and describe their applications and procedures for use
		describe procedures used to inspect and maintain hoisting systems and their ***components***
C-6.08.03L	demonstrate knowledge of regulatory requirements pertaining to hoisting systems and their ***components***	identify codes, standards and regulations pertaining to hoisting systems and their ***components***

	identify jurisdictional regulations for systems inspection intervals
	identify jurisdictional regulations for pre- and post-trip inspections and required documentation

RANGE OF VARIABLES

components include: clutches, brakes, pumps, hook blocks, overhaul balls, wedge sockets, clamps, sheaves, winches, motors

types of hoist rope construction include: synthetic, rotation resistant, regular lay, alternating lay, lang lay

damage includes: wear, bird caging, broken wires, damaged core, crushing, reduction in diameter, kinks, corrosion, twisting

TASK C-7 Performs operational and continual checks

TASK DESCRIPTOR

Mobile crane operators perform regular inspections and maintenance to keep the crane in good working order. Ongoing monitoring of displays and warning systems is important in order to stay aware of changing conditions that may affect safe and efficient operation.

C-7.01 Checks operating controls

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	yes	yes	yes	yes	yes	NV	NV	NV

	SKILLS	
	Performance Criteria	**Evidence of Attainment**
C-7.01.01P	verify that ***operating controls*** activate ***crane functions***	***operating controls*** activate ***crane functions*** according to manufacturers' specifications
C-7.01.02P	verify that ***swing brakes*** are functioning	***swing brakes*** are functioning according to manufacturers' specifications
C-7.01.03P	record defects, deficiencies, adjustments, repairs and maintenance in crane log book	defects, deficiencies, adjustments, repairs and maintenance are recorded in crane log book according to company policies and jurisdictional regulations
C-7.01.04P	report defects and deficiencies	defects and deficiencies are reported to supervisor according to company policies

RANGE OF VARIABLES

operating controls include: levers, joysticks, foot brakes, swing brakes, positive swing locks, boom pawls

crane functions include: boom, winch, swing, telescope

swing brakes include: manual, electric, positive lock

	KNOWLEDGE	
	Learning Outcomes	**Learning Objectives**
C-7.01.01L	demonstrate knowledge of ***operating controls***, their purpose, characteristics and applications	define terminology associated with ***operating controls***
		identify hazards and describe safe work practices pertaining to ***operating controls***
		identify types of ***operating controls***, and describe their purpose, characteristics and applications
		identify potential defects and deficiencies found in ***operating controls***
C-7.01.02L	demonstrate knowledge of procedures used to check ***operating controls***	identify tools and equipment used to check ***operating controls***, and describe their applications and procedures for use
		describe procedures used to check ***operating controls***
		describe procedures used to document and report defects and deficiencies found in ***operating controls***
C-7.01.03L	demonstrate knowledge of regulatory requirements pertaining to inspection of cranes	identify codes, standards and regulations pertaining to inspection of cranes

RANGE OF VARIABLES

operating controls include: levers, joysticks, foot brakes, swing brakes, positive swing locks, boom pawls

C-7.02 Inspects monitoring and warning systems

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	yes	yes	yes	yes	yes	NV	NV	NV

SKILLS

	Performance Criteria	Evidence of Attainment
C-7.02.01P	check installation and connections of anti-two block system	anti-two block system is functioning according to manufacturers' specifications
C-7.02.02P	test anti-two block system	anti-two block system is tested to confirm operation of audible alarm and function disabling features
C-7.02.03P	check installation and connections of ***warning systems***	***warning systems*** are functioning according to manufacturers' specifications
C-7.02.04P	test ***warning systems***	***warning systems*** are tested to confirm operation of audible alarm and function disabling features
C-7.02.05P	check limit switches	limit switches are functioning according to manufacturers' specifications
C-7.02.06P	check load moment indicator (LMI) system and mechanical indicators for boom angle, boom length and radius	LMI system and mechanical indicators are checked for boom angle, boom length and radius according to manufacturers' specifications
C-7.02.07P	record defects, deficiencies, adjustments, repairs and maintenance in crane log book	defects, deficiencies, adjustments, repairs and maintenance are recorded in crane log book according to company policies and jurisdictional regulations
C-7.02.08P	report defects and deficiencies	defects and deficiencies are reported to supervisor according to company policies

RANGE OF VARIABLES

warning systems include: back-up alarms, by-pass switches, horns, swing indicators (alarms or lights), cut-out switches

KNOWLEDGE

	Learning Outcomes	Learning Objectives
C-7.02.01L	demonstrate knowledge of monitoring and ***warning systems***, their purpose, characteristics and applications	define terminology associated with monitoring and ***warning systems***
		identify hazards and describe safe work practices pertaining to monitoring and ***warning systems***
		identify types of monitoring and ***warning systems***, and describe their purpose, characteristics and applications

		identify potential defects and deficiencies in monitoring and ***warning systems***
C-7.02.02L	demonstrate knowledge of procedures used to inspect monitoring and ***warning systems***	identify tools and equipment used to inspect monitoring and ***warning systems***, and describe their applications and procedures for use
		describe procedures used to inspect and troubleshoot monitoring and ***warning systems***
		describe procedures used to document and report defects and deficiencies found in monitoring and ***warning systems***
C-7.02.03L	demonstrate knowledge of regulatory requirements pertaining to inspection of cranes	identify codes, standards and regulations pertaining to inspection of cranes

RANGE OF VARIABLES

warning systems include: back-up alarms, by-pass switches, horns, swing indicators (alarms or lights), cut-out switches

C-7.03 Monitors running lines, hoist ropes and standing ropes

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	yes	yes	yes	yes	yes	NV	NV	NV

	SKILLS	
	Performance Criteria	**Evidence of Attainment**
C-7.03.01P	verify hoist ropes are spooling correctly on drums	hoist ropes are spooling correctly on drums taking into consideration adverse ***environmental conditions***
C-7.03.02P	monitor variations in drum rotation speed	variations in drum rotation speed are monitored using mirrors or ***instruments*** in order to accommodate winch speed requirements
C-7.03.03P	monitor operational performance of running lines, boom-hoist drum and pendants	operational performance of running lines, boom-hoist drum and pendants are monitored taking into consideration adverse ***environmental conditions***
C-7.03.04P	identify ***hoist rope defects***	***hoist rope defects*** are identified

C-7.03.05P	record defects, deficiencies, adjustments, repairs and maintenance in crane log book	defects, deficiencies, adjustments, repairs and maintenance are recorded in crane log book according to company policies and jurisdictional regulations
C-7.03.06P	report defects and deficiencies	defects and deficiencies are reported to supervisor according to company policies

RANGE OF VARIABLES

environmental conditions include: wind, ice build-up, extreme cold temperatures, lightning, thawing, precipitation

instruments include: mechanical indicators, display monitors

hoist rope defects include: wear, bird caging, broken wires, damaged core, crushing, reduction in diameter, kinks, corrosion, twisting

	KNOWLEDGE	
	Learning Outcomes	**Learning Objectives**
C-7.03.01L	demonstrate knowledge of running lines, hoist ropes and standing ropes, their purpose, characteristics and applications	define terminology associated with running lines, hoist ropes and standing ropes
		identify hazards and describe safe work practices pertaining to running lines, hoist ropes and standing ropes
		identify types of running lines, hoist ropes and standing ropes, and describe their purpose, characteristics and applications
		identify potential defects and deficiencies found in running lines, hoist ropes and standing ropes
		identify ***environmental conditions*** that can affect spooling, and performance of running lines, boom-hoist drum and pendants
C-7.03.02L	demonstrate knowledge of procedures used to monitor running lines, hoist ropes and standing ropes	identify tools and equipment used to monitor running lines, hoist ropes and standing ropes, and describe their applications and procedures for use
		describe procedures used to monitor running lines, hoist ropes and standing ropes
		describe procedures used to document and report defects and deficiencies found in running lines, hoist ropes and standing ropes
C-7.03.03L	demonstrate knowledge of regulatory requirements pertaining to inspection of cranes	identify codes, standards and regulations pertaining to inspection of cranes

RANGE OF VARIABLES

environmental conditions include: wind, ice build-up, extreme cold temperatures, lightning, thawing, precipitation

C-7.04 Monitors gauges and warning systems

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	yes	yes	yes	yes	yes	NV	NV	NV

SKILLS

	Performance Criteria	Evidence of Attainment
C-7.04.01P	read gauges and interpret in-cab warning systems	gauges are read and in-cab warning systems are interpreted
C-7.04.02P	monitor information displayed by LMI system	information displayed by LMI system is continually monitored
C-7.04.03P	record defects, deficiencies, adjustments, repairs and maintenance in crane log book	defects, deficiencies, adjustments, repairs and maintenance are recorded in crane log book according to company policies and jurisdictional regulations
C-7.04.04P	report defects and deficiencies	defects and deficiencies are reported to supervisor according to company policies

KNOWLEDGE

	Learning Outcomes	Learning Objectives
C-7.04.01L	demonstrate knowledge of gauges and warning systems, their purpose, characteristics and applications	define terminology associated with gauges and warning systems
		identify hazards and describe safe work practices pertaining to gauges and warning systems
		identify types of gauges and warning systems, and describe their purpose, characteristics and applications
		identify potential defects and deficiencies in gauges and warning systems
C-7.04.02L	demonstrate knowledge of procedures used to monitor gauges and warning systems	identify tools and equipment used to monitor gauges and warning systems, and describe their applications and procedures for use
		describe procedures used to monitor gauges and warning systems

		describe procedures used to document and report defects and deficiencies found in gauges and warning systems
C-7.04.03L	demonstrate knowledge of regulatory requirements pertaining to inspection of cranes	identify codes, standards and regulations pertaining to inspection of cranes

C-7.05 Monitors support base

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	yes	yes	yes	yes	yes	NV	NV	NV

SKILLS

	Performance Criteria	Evidence of Attainment
C-7.05.01P	monitor ground conditions	outrigger pads, mats and crawler tracks are constantly monitored for change in ground conditions under and surrounding support base, taking into consideration ***environmental conditions***
C-7.05.02P	monitor crane level	crane level is monitored for accuracy according to manufacturers' allowable range
C-7.05.03P	record defects, deficiencies, adjustments, repairs and maintenance in crane log book	defects, deficiencies, adjustments, repairs and maintenance are recorded in crane log book according to company policies and jurisdictional regulations
C-7.05.04P	report defects and deficiencies	defects and deficiencies are reported to supervisor according to company policies

RANGE OF VARIABLES

environmental conditions include: wind, ice build-up, extreme cold temperatures, lightning, thawing, precipitation

KNOWLEDGE

	Learning Outcomes	Learning Objectives
C-7.05.01L	demonstrate knowledge of support bases, their purpose, characteristics and applications	define terminology associated with support bases
		identify hazards and describe safe work practices pertaining to support bases
		identify types of support bases, and describe their purpose, characteristics and applications

		identify potential defects and deficiencies in support bases
C-7.05.02L	demonstrate knowledge of procedures used to monitor support bases	identify tools and equipment used to monitor support bases, and describe their applications and procedures for use
		describe procedures used to monitor support bases
		describe procedures used to document and report defects and deficiencies found in support bases
C-7.05.03L	demonstrate knowledge of regulatory requirements pertaining to inspection of cranes	identify codes, standards and regulations pertaining to inspection of cranes

TASK C-8 Performs minor crane maintenance

TASK DESCRIPTOR

Mobile crane operators may do minor maintenance, but major repairs should be performed by qualified technicians.

C-8.01 Changes oil and filter

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	yes	yes	yes	no	yes	NV	NV	NV

	SKILLS	
	Performance Criteria	**Evidence of Attainment**
C-8.01.01P	drain and replace oil	oil is drained and replaced according to manufacturers' specifications, and company policies and procedures
C-8.01.02P	remove and replace filters	filters are removed and replaced according to manufacturers' specifications, and company policies and procedures
C-8.01.03P	dispose of oil and filters	used oil and filters are disposed of according to jurisdictional regulations
C-8.01.04P	record defects, deficiencies, adjustments, repairs and maintenance in crane log book	defects, deficiencies, adjustments, repairs and maintenance are recorded in crane log book according to company policies and jurisdictional regulations
C-8.01.05P	report defects and deficiencies	defects and deficiencies are reported to supervisor according to company policies

	KNOWLEDGE	
	Learning Outcomes	**Learning Objectives**
C-8.01.01L	demonstrate knowledge of oil and filters, their characteristics and applications	define terminology associated with oil and filters
		identify hazards and describe safe work practices pertaining to oil and filters
		identify types of oils and viscosities, and describe their characteristics and applications
		identify types of filters, drain plugs, filler caps and shutoff valves and describe their locations, characteristics and applications
C-8.01.02L	demonstrate knowledge of procedures used to change oil and filters	identify tools and equipment used to change oil and filters, and describe their applications and procedures for use
		describe procedures used to change oil and filters
		explain purpose of a spill kit
C-8.01.03L	demonstrate knowledge of regulatory requirements pertaining to maintenance of cranes	identify codes, standards and regulations pertaining to maintenance of cranes
		identify used oil and filter disposal requirements

C-8.02 Greases crane

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	yes	yes	yes	yes	yes	NV	NV	NV

	SKILLS	
	Performance Criteria	**Evidence of Attainment**
C-8.02.01P	locate grease points	grease points are located according to manufacturers' specifications
C-8.02.02P	apply grease to identified points	grease is applied to identified points using ***tools*** according to manufacturers' specifications
C-8.02.03P	record defects, deficiencies, adjustments, repairs and maintenance in crane log book	defects, deficiencies, adjustments, repairs and maintenance are recorded in crane log book according to company policies and jurisdictional regulations
C-8.02.04P	report defects and deficiencies	defects and deficiencies are reported to supervisor according to company policies

RANGE OF VARIABLES

tools include: grease guns, auto-grease systems, brushes, rollers, aerosol spray cans

	KNOWLEDGE	
	Learning Outcomes	**Learning Objectives**
C-8.02.01L	demonstrate knowledge of grease, its characteristics and applications	define terminology associated with grease
		identify hazards and describe safe work practices pertaining to grease
		identify types of grease, and describe their characteristics and applications
C-8.02.02L	demonstrate knowledge of procedures used to grease cranes	identify ***tools*** used to grease cranes, and describe their applications and procedures for use
		describe procedures used to grease cranes
C-8.02.03L	demonstrate knowledge of regulatory requirements pertaining to maintenance of cranes	identify codes, standards and regulations pertaining to maintenance of cranes

RANGE OF VARIABLES

tools include: grease guns, auto-grease systems, brushes, rollers, aerosol spray cans

C-8.03 Lubricates wire ropes

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	yes	yes	yes	yes	yes	NV	NV	NV

	SKILLS	
	Performance Criteria	**Evidence of Attainment**
C-8.03.01P	identify need for lubrication	need for lubrication is identified according to changing operational conditions
C-8.03.02P	apply lubricant	lubricant is applied according to manufacturers' specifications using ***methods***
C-8.03.03P	record defects, deficiencies, adjustments, repairs and maintenance in crane log book	defects, deficiencies, adjustments, repairs and maintenance are recorded in crane log book according to company policies and jurisdictional regulations
C-8.03.04P	report defects and deficiencies	defects and deficiencies are reported to supervisor according to company policies

RANGE OF VARIABLES

methods include: spraying, brushing

	KNOWLEDGE	
	Learning Outcomes	**Learning Objectives**
C-8.03.01L	demonstrate knowledge of lubricants, their characteristics and applications	define terminology associated with lubricants
		identify hazards and describe safe work practices pertaining to lubricants
		identify ***types of lubricants***, and describe their characteristics and applications
C-8.03.02L	demonstrate knowledge of procedures used to lubricate wire ropes	identify tools and equipment used to apply lubricants, and describe their applications and procedures for use
		describe procedures and ***methods*** used to lubricate wire ropes
C-8.03.03L	demonstrate knowledge of regulatory requirements pertaining to maintenance of cranes	identify codes, standards and regulations pertaining to maintenance of cranes

RANGE OF VARIABLES

types of lubricants include: wire rope dressing, boom lubricant
methods include: spraying, brushing

C-8.04 Makes adjustments and replacements

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	yes	yes	yes	yes	yes	NV	NV	NV

	SKILLS	
	Performance Criteria	**Evidence of Attainment**
C-8.04.01P	drain air tanks	air tanks are drained according to manufacturers' specifications
C-8.04.02P	replace hoses	hoses are replaced according to manufacturers' specifications
C-8.04.03P	replace ***electrical components***	***electrical components*** are replaced according to manufacturers' specifications
C-8.04.04P	adjust and replace wear pads	wear pads are adjusted and replaced according to manufacturers' specifications
C-8.04.05P	confirm carrier brakes have been adjusted	carrier brakes have been adjusted according to manufacturers' specifications

C-8.04.06P	adjust track tension	track tension is adjusted according to manufacturers' specifications
C-8.04.07P	boost or replace dead battery	dead battery is boosted or replaced
C-8.04.08P	adjust tire pressure	tire pressure is adjusted according to manufacturers' specifications
C-8.04.09P	record defects, deficiencies, adjustments, repairs and maintenance in crane log book	defects, deficiencies, adjustments, repairs and maintenance are recorded in crane log book according to company policies and jurisdictional regulations
C-8.04.10P	report defects and deficiencies	defects and deficiencies are reported to supervisor according to company policies

RANGE OF VARIABLES

electrical components include: bulbs, fuses, relays, solenoids

	KNOWLEDGE	
	Learning Outcomes	**Learning Objectives**
C-8.04.01L	demonstrate knowledge of procedures used to make minor adjustments and replacements to cranes	identify tools and equipment used to make minor adjustments and replacements to cranes, and describe their applications and procedures for use
		describe procedures used to make minor adjustments and replacements to cranes
		identify ***types of electrical systems*** and describe their characteristics and applications
		describe procedures used to control hazardous energy (lock-out and tag-out procedures)
		identify hazards and describe safe work practices used when making minor adjustments and replacements to cranes
C-8.04.02L	demonstrate knowledge of regulatory requirements pertaining to maintenance of cranes	identify codes, standards and regulations pertaining to maintenance of cranes

RANGE OF VARIABLES

types of electrical systems include: series and parallel battery configurations, 12- and 24-volt electrical system

MAJOR WORK ACTIVITY D
Performs rigging

TASK D-9 Inspects, maintains and stores slings and hardware

TASK DESCRIPTOR

Mobile crane operators are involved in rigging to ensure that it is done safely and properly. While mobile crane operators may not be doing the rigging, they must possess knowledge of rigging procedures related to inspection, maintenance and storage of slings. Mobile crane operators have the obligation to perform due diligence and refuse an unsafe lift.

D-9.01 Lubricates slings and hardware

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	yes	yes	yes	yes	yes	NV	NV	NV

	SKILLS	
	Performance Criteria	**Evidence of Attainment**
D-9.01.01P	inspect slings and hardware	slings and hardware are inspected to determine if they require lubrication
D-9.01.02P	select and apply lubricant	lubricant is selected and applied according to ***factors***

RANGE OF VARIABLES

factors include: working conditions, environmental requirements, manufacturers' specifications

	KNOWLEDGE	
	Learning Outcomes	**Learning Objectives**
D-9.01.01L	demonstrate knowledge of slings and hardware lubrication requirements	define terminology associated with lubrication of slings and hardware
		identify hazards and describe safe work practices pertaining to lubrication of slings and hardware
		identify lubrication requirements for ***types of slings*** and ***types of hardware***

		identify ***types of lubricants***, and describe their purpose, characteristics and applications
D-9.01.02L	demonstrate knowledge of procedures used to lubricate slings and hardware	identify tools and equipment used to lubricate slings and hardware, and describe their applications and procedures for use
		describe procedures used to lubricate slings and hardware
D-9.01.03L	demonstrate knowledge of standards and manufacturers' specifications pertaining to lubrication of slings and hardware	identify standards and manufacturers' specifications pertaining to lubrication of slings and hardware

RANGE OF VARIABLES

types of slings include: steel, synthetic
types of hardware include: shackles, spreader beams, lifting beams
types of lubricants include: wire rope dressing, aerosol sprays

D-9.02 Identifies deficiencies in slings and hardware

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	yes	yes	yes	yes	yes	NV	NV	NV

SKILLS

	Performance Criteria	Evidence of Attainment
D-9.02.01P	visually inspect slings for ***damage***	slings are visually inspected for ***damage*** according to jurisdictional regulations and manufacturers' specifications
D-9.02.02P	visually inspect hardware for ***damage***	hardware is visually inspected for ***damage*** according to jurisdictional regulations and manufacturers' specifications
D-9.02.03P	document and report ***damage***	damaged items are documented and reported according to company policies

RANGE OF VARIABLES

damage (slings) includes: broken wires, cuts, nicks, stretching, worn links, crushing, missing identification tags, kinking, ultraviolet (UV) degradation
damage (hardware) includes: distortion, missing or damaged hook latches, pins not seating properly, cuts, nicks, mismatched hardware

	KNOWLEDGE	
	Learning Outcomes	**Learning Objectives**
D-9.02.01L	demonstrate knowledge of procedures used to identify deficiencies in slings and hardware	identify tools and equipment used to inspect slings and hardware, and describe their applications and procedures for use
		describe procedures used to identify, document and report deficiencies in slings and hardware
		identify potential ***damage*** in slings and hardware
D-9.02.02L	demonstrate knowledge of regulatory requirements pertaining to inspection of slings and hardware	identify codes, standards and regulations pertaining to inspection of slings and hardware

RANGE OF VARIABLES

damage (slings) includes: broken wires, cuts, nicks, stretching, worn links, crushing, missing identification tags, kinking, ultraviolet (UV) degradation

damage (hardware) includes: distortion, missing or damaged hook latches, pins not seating properly, cuts, nicks, mismatched hardware

D-9.03 Disposes of damaged slings and hardware

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	yes	yes	yes	yes	yes	NV	NV	NV

	SKILLS	
	Performance Criteria	**Evidence of Attainment**
D-9.03.01P	remove damaged slings and hardware from service	damaged slings and hardware are removed from service according to jurisdictional regulations, manufacturers' and site specifications
D-9.03.02P	tag/mark damaged slings and hardware before destruction	damaged slings and hardware are tagged/marked before destruction according to company policies
D-9.03.03P	destroy damaged slings and hardware to prevent further use	damaged slings and hardware are destroyed to prevent further use according to jurisdictional regulations and company policies
D-9.03.04P	report removal and destruction of damaged items	removal and destruction of damaged items is reported according to jurisdictional regulations and company policies

	KNOWLEDGE	
	Learning Outcomes	**Learning Objectives**
D-9.03.01L	demonstrate knowledge of procedures used to remove and destroy damaged slings and hardware	identify tools and equipment used to remove and destroy damaged slings and hardware, and describe their applications and procedures for use
		describe procedures used to destroy damaged slings and hardware
D-9.03.02L	demonstrate knowledge of regulatory requirements pertaining to removal and destruction of damaged slings and hardware	identify codes, standards and regulations pertaining to removal and destruction of damaged slings and hardware

D-9.04 Stores slings and hardware

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	yes	yes	yes	yes	yes	NV	NV	NV

	SKILLS	
	Performance Criteria	**Evidence of Attainment**
D-9.04.01P	inspect storage area to prevent damage to rigging equipment	storage area is inspected to confirm that damage to rigging equipment from ***environmental and site conditions*** is prevented
D-9.04.02P	organize rigging in designated storage area considering ***factors***	rigging is organized in designated storage area according to ***factors***

RANGE OF VARIABLES

environmental and site conditions include: UV damage, extreme heat, dust, chemicals, abrasion, salt water

factors include: equipment pairing, placement, type and capacity of equipment

	KNOWLEDGE	
	Learning Outcomes	**Learning Objectives**
D-9.04.01L	demonstrate knowledge of procedures used to store slings and hardware	identify tools and equipment used to store slings and hardware, and describe their applications and procedures for use
		describe procedures used to store slings and hardware
		identify ***environmental and site conditions*** and ***factors*** that may influence storage location

		identify ***hazards*** associated with storage of slings and hardware
D-9.04.02L	demonstrate knowledge of regulatory requirements pertaining to storage of slings and hardware	identify codes, standards and regulations pertaining to storage of slings and hardware

RANGE OF VARIABLES

environmental and site conditions include: UV damage, extreme heat, dust, chemicals, abrasion, salt water

factors include: equipment pairing, placement, type and capacity of equipment

hazards include: weight, dimension, stored energy, broken wires

TASK D-10 Follows rigging procedures

TASK DESCRIPTOR

Mobile crane operators are involved in rigging to ensure that it is performed safely and properly. While mobile crane operators may not be doing the rigging, they must possess knowledge of rigging procedures. Mobile crane operators have the obligation to perform due diligence and refuse an unsafe lift.

D-10.01 Selects required rigging

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	yes	yes	yes	yes	yes	NV	NV	NV

	SKILLS	
	Performance Criteria	**Evidence of Attainment**
D-10.01.01P	determine rigging requirements to handle load	rigging requirements to handle load are determined according to ***factors***
D-10.01.02P	check identification tag on rigging equipment or manufacturer's specifications	identification tag on rigging equipment or manufacturer's specifications are checked to confirm equipment is adequate for application
D-10.01.03P	inspect rigging for deficiencies	deficiencies on rigging are detected according to standards, manufacturers' instructions and regulatory rejection criteria

RANGE OF VARIABLES

factors include: load characteristics (weight, centre of gravity, lifting points, dimensions), sharp edges, rigging equipment composition, height limitations, destination, sling tension, share of load, environmental conditions, rigging guides and charts, rigging lift plans

	KNOWLEDGE	
	Learning Outcomes	**Learning Objectives**
D-10.01.01L	demonstrate knowledge of rigging, its characteristics and applications	define terminology associated with rigging
		identify hazards and describe safe work practices pertaining to rigging
		interpret information pertaining to rigging found on identification tags, drawings and specifications
		identify types of rigging and non-routine rigging and describe their applications
D-10.01.02L	demonstrate knowledge of procedures used to select required rigging	identify tools and equipment relating to rigging, and describe their applications and procedures for use
		describe procedures used to select required rigging
		identify ***factors*** to consider when rigging material/equipment for hoisting
		explain WLL
D-10.01.03L	demonstrate knowledge of regulatory requirements pertaining to rigging	identify codes, standards and regulations pertaining to rigging
		identify training and certification requirements pertaining to rigging

RANGE OF VARIABLES

factors include: load characteristics (weight, centre of gravity, lifting points, dimensions), sharp edges, rigging equipment composition, height limitations, destination, sling tension, share of load, environmental conditions, rigging guides and charts, rigging lift plans

D-10.02 Rigs loads

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	yes	yes	yes	yes	yes	NV	NV	NV

	SKILLS	
	Performance Criteria	**Evidence of Attainment**
D-10.02.01P	locate centre of gravity of load	centre of gravity of load is located
D-10.02.02P	apply rigging to load	rigging is applied to load using ***configurations*** and ***components*** according to load requirements
D-10.02.03P	verify rigging position	rigging position is verified by applying tension to rigging and making necessary adjustments
D-10.02.04P	confirm absence of ***loose debris and hazardous materials*** on and around the load	absence of ***loose debris and hazardous materials*** on and around the load is confirmed
D-10.02.05P	select tag lines and confirm they are positioned to facilitate control of load	tag lines are selected and are positioned to facilitate control of load

RANGE OF VARIABLES

configurations include: basket, choker, hitches, multi-leg bridle, below-the-hook lifting devices, hardware
components include: lifting bars, beams, slings, rigging hardware
loose debris and hazardous materials include: nails, dunnage, rocks

	KNOWLEDGE	
	Learning Outcomes	**Learning Objectives**
D-10.02.01L	demonstrate knowledge of rigging techniques	define terminology associated with rigging
		identify hazards and describe safe work practices pertaining to rigging
		identify types of rigging, and describe their characteristics and applications
		explain how sling angles and configuration affect load on rigging and compression on load
		describe effect of temperature and chemicals on sling type
		identify types of knots, hitches and splices used with fibre ropes and describe their applications and procedures used to tie them

		identify types of hitches used with slings and describe their applications and procedures for use
		describe ***hazards*** and ***environmental conditions*** which may affect rigging
		describe ***procedures used to equalize sling tension***
		describe ***procedures used to ensure work area is safe for hoisting***
D-10.02.02L	demonstrate knowledge of lifting theory and forces	explain centre of gravity of load and its impact on lifting
		identify units of measure and symbols pertaining to lifting plans and load charts
		identify and describe lift studies and lift plans
D-10.02.03L	demonstrate knowledge of procedures used to rig loads	identify tools and equipment relating to rigging, and describe their applications and procedures for use
		describe procedures and ***configurations*** used to rig loads
		identify ***types of hitches*** and describe their characteristics and applications
D-10.02.04L	demonstrate knowledge of regulatory requirements pertaining to rigging	identify codes, standards and regulations pertaining to rigging
		identify training and certification requirements pertaining to rigging

RANGE OF VARIABLES

hazards include: acids, caustic substances, sharp edges

environmental conditions include: temperature, UV

procedures used to equalize sling tension include: use of snatch blocks, attachment blocks, equalizer plate and chain falls

procedures used to ensure work area is safe for hoisting include: supervising lift, securing work area, communicating with personnel involved

configurations include: basket, choker, hitches, multi-leg bridle, below-the-hook lifting devices, hardware

types of hitches include: vertical, choker, basket, multi-leg bridle

D-10.03 Monitors rigging

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	yes	yes	yes	yes	yes	NV	NV	NV

	SKILLS	
	Performance Criteria	**Evidence of Attainment**
D-10.03.01P	identify rigging ***hazards*** during lifting and landing load	rigging ***hazards*** are identified during lifting and landing load
D-10.03.02P	watch tag lines and advise rigger to prevent ***hazards***	tag lines are watched and rigger is advised to prevent ***hazards***
D-10.03.03P	lower load to adjust, change and orientate rigging to address deficiencies	load is lowered to adjust, change and orientate rigging to address deficiencies

RANGE OF VARIABLES

hazards include: obstacles impacting clearances, overhead power lines, entanglement, tangled and knotted tag lines, injury, potential slippage, catching on other objects

	KNOWLEDGE	
	Learning Outcomes	**Learning Objectives**
D-10.03.01L	demonstrate knowledge of procedures used to monitor rigging	describe procedures used to monitor rigging
		identify possible rigging ***hazards***
D-10.03.02L	demonstrate knowledge of regulatory requirements pertaining to rigging	identify codes, standards and regulations pertaining to rigging
		identify training and certification requirements pertaining to rigging

RANGE OF VARIABLES

hazards include: obstacles impacting clearances, overhead power lines, entanglement, tangled and knotted tag lines, injury, potential slippage, catching on other objects

MAJOR WORK ACTIVITY E

Plans lift, prepares site and sets up crane

TASK E-11 Performs pre-lift planning

TASK DESCRIPTOR

Mobile crane operators coordinate lift responsibilities with crew members and other tradespeople at pre-lift meetings. This is a crucial step in planning lifts.

Pre-lift plans can run from a brief informal plan to a detailed process involving many parties such as companies, engineers, customers and sub-contractors.

E-11.01 Participates in routine, engineered and specialty lift planning

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	yes	yes	yes	yes	yes	NV	NV	NV

	SKILLS	
	Performance Criteria	**Evidence of Attainment**
E-11.01.01P	confirm requirement for engineered drawings	requirement for engineered drawings is confirmed according to company policies and site-specific requirements
E-11.01.02P	interpret and verify engineered drawings and site-specific requirements	engineered drawings and site-specific requirements are interpreted and verified to ensure lift proceeds as planned
E-11.01.03P	verify ***lift conditions***	***lift conditions*** are verified

RANGE OF VARIABLES

lift conditions include: environmental conditions; crane configuration, location and setup; signalling responsibilities; load weight; tail swing; load path; clearances; ground conditions

	KNOWLEDGE	
	Learning Outcomes	**Learning Objectives**
E-11.01.01L	demonstrate knowledge of procedures used to plan lifts	define terminology associated with pre-lift planning
		identify ***types of specialty lifts*** and describe their characteristics and applications

		identify ***sources of information*** relevant to pre-lift planning
		interpret information pertaining to lifting operations found on engineered drawings and manufacturers' specifications
		identify ***lift conditions*** to be considered in pre-lift planning
		identify sequence of job tasks to be performed
		identify ***components of a pre-lift plan***
E-11.01.02L	demonstrate knowledge of regulatory requirements pertaining to pre-lift planning	identify codes, standards and regulations pertaining to pre-lift planning

RANGE OF VARIABLES

types of specialty lifts include: multi-crane lifts, personnel lifts, standing loads

sources of information include: supervisor, documentation (lift plans), drawings, related professionals, clients, manufacturers

lift conditions include: environmental conditions; crane configuration, location and setup; signalling responsibilities; load weight; tail swing; load path; clearances; ground conditions

components of a pre-lift plan include: crane selection, location and setup; blocking and matting requirements; ground preparation; on-site mobility requirements; communication plan; personnel responsibilities; barrier requirements; grounding and bonding requirements; load weight and location of center of gravity; rigging configuration; scheduling; tools and equipment; company/site policies; site drawing

E-11.02 Evaluates risks and hazards

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	yes	yes	yes	yes	yes	NV	NV	NV

SKILLS

	Performance Criteria	Evidence of Attainment
E-11.02.01P	identify ***hazards***	***hazards*** are identified
E-11.02.02P	consult local utilities to verify location and minimum safe approach distance to utilities	local utilities are consulted to verify location and minimum safe approach distance to utilities
E-11.02.03P	recommend controls to eliminate or minimize risks and ***hazards***	controls are recommended to eliminate or minimize risks and ***hazards***

RANGE OF VARIABLES

hazards include: overhead power lines, underground infrastructure, underground utilities, obstacles impacting clearances, ground conditions, environmental conditions

	KNOWLEDGE	
	Learning Outcomes	**Learning Objectives**
E-11.02.01L	demonstrate knowledge of procedures used to evaluate risks and ***hazards***	define terminology associated with pre-lift planning
		identify ***hazards*** and describe safe work practices pertaining to pre-lift planning
		identify ***considerations and requirements*** for completing pre-lift planning
E-11.02.02L	demonstrate knowledge of regulatory requirements pertaining to pre-lift planning	identify codes, standards and regulations pertaining to pre-lift planning

RANGE OF VARIABLES

hazards include: overhead power lines, underground infrastructure, underground utilities, obstacles impacting clearances, ground conditions, environmental conditions

considerations and requirements include: risk assessment, site assessment (site/soil conditions, crane access, obstructions, electrical hazards), permits

TASK E-12 Sets up crane

TASK DESCRIPTOR

Mobile crane operators set up cranes according to pre-lift plans and manufacturers' specifications. Proper setup and positioning of the crane is the basis of all safe lifting operations.

E-12.01 Performs final site inspection

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	yes	yes	yes	yes	yes	NV	NV	NV

	SKILLS	
	Performance Criteria	**Evidence of Attainment**
E-12.01.01P	ensure site ***hazards*** have been minimized or eliminated and no new ***hazards*** have been introduced since completing pre-lift planning	site ***hazards*** have been minimized or eliminated and no new ***hazards*** have been introduced since completing pre-lift planning
E-12.01.02P	identify and report ***variations*** in engineered drawings	***variations*** in engineered drawings are identified and reported

RANGE OF VARIABLES

hazards include: overhead power lines, underground infrastructure, underground utilities, obstacles impacting clearances, ground conditions, environmental conditions

variations include: an obstacle introduced into lift path, change in size or weight of lift, change of radius

	KNOWLEDGE	
	Learning Outcomes	**Learning Objectives**
E-12.01.01L	demonstrate knowledge of procedures used to prepare worksite for crane operations	define terminology associated with worksite preparation
		identify ***hazards*** and describe safe work practices pertaining to worksite preparation
		interpret ***information*** pertaining to worksite preparation found on drawings and specifications
		describe procedures used to perform final site inspection
E-12.01.02L	demonstrate knowledge of regulatory requirements pertaining to worksite preparations for crane operations	identify codes, standards and regulations pertaining to worksite preparations for crane operations

RANGE OF VARIABLES

hazards include: overhead power lines, underground infrastructure, underground utilities, obstacles impacting clearances, ground conditions, environmental conditions

information includes: lift plans, site plans, manufacturers' specifications, utilities locations, engineered drawings, ground bearing pressures

E-12.02 Positions crane

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	yes	yes	yes	yes	yes	NV	NV	NV

	SKILLS	
	Performance Criteria	**Evidence of Attainment**
E-12.02.01P	measure radius and refer to manufacturers' load chart specifications	radius is measured and manufacturers' load chart specifications are referred to
E-12.02.02P	follow engineered drawing and establish points of reference	points of reference are established according to engineered drawing

E-12.02.03P	determine crane location according to ***factors***	crane location is determined according to ***factors***
E-12.02.04P	orientate crane for placement of outriggers and crawlers	crane is oriented for placement of outriggers and crawlers

RANGE OF VARIABLES

factors include: load size, load weight, load path, tail swing, obstacles, clearance dimensions, type of operation, load chart capacity

	KNOWLEDGE	
	Learning Outcomes	**Learning Objectives**
E-12.02.01L	demonstrate knowledge of procedures used to position cranes	define terminology associated with positioning of cranes
		identify ***hazards*** and describe safe work practices pertaining to positioning of cranes
		identify tools and equipment used for positioning operations and describe their applications and procedures for use
		describe procedures used to determine crane location and setup
		describe procedures used to troubleshoot issues pertaining to positioning operations
		interpret information pertaining to positioning of cranes found on drawings and specifications
		identify ***factors*** to be considered for positioning of cranes
E-12.02.02L	demonstrate knowledge of regulatory requirements pertaining to positioning of cranes	identify codes, standards and regulations pertaining to positioning of cranes

RANGE OF VARIABLES

hazards include: unlevelled ground, soft ground, underground utilities, pinch points, availability and condition of blocking materials

factors include: load size, load weight, load path, tail swing, obstacles, clearance dimensions, type of operation, load chart capacity

E-12.03 Completes setup

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	yes	yes	yes	yes	yes	NV	NV	NV

SKILLS

	Performance Criteria	Evidence of Attainment
E-12.03.01P	determine ***setup***	***setup*** is determined according to manufacturers' specifications and lift plan
E-12.03.02P	determine blocking and crane matting requirements based on ground conditions	blocking and crane matting requirements are determined according to ground conditions or geotechnical engineering/lift plan
E-12.03.03P	level crane	crane is levelled using outriggers or shimming/blocking tracks
E-12.03.04P	confirm crane is level	crane is confirmed to be level by using ***tools and equipment***

RANGE OF VARIABLES

setup includes: outrigger position, crawlers extended or retracted, boom length, counterweight configurations

tools and equipment include: level, crane's computerized display, load line as a plumb bob

KNOWLEDGE

	Learning Outcomes	Learning Objectives
E-12.03.01L	demonstrate knowledge of procedures used to complete set up of cranes	define terminology associated with positioning of cranes
		identify ***hazards*** and describe safe work practices pertaining to blocking and levelling of cranes
		identify ***tools and equipment*** used for blocking and levelling operations and describe their applications and procedures for use
		describe procedures used to determine blocking and matting requirements
		describe procedures used to perform blocking and levelling operations
		describe procedures used to troubleshoot issues pertaining to blocking and levelling operations

		interpret geotechnical engineering/lift plan and describe procedures to confirm configurations
E-12.03.02L	demonstrate knowledge of regulatory requirements pertaining to positioning of cranes	identify codes, standards and regulations pertaining to positioning of cranes

RANGE OF VARIABLES

hazards include: unlevelled ground, soft ground, underground utilities, pinch points, availability and condition of blocking materials

tools and equipment include: level, crane's computerized display, load line as a plumb bob

MAJOR WORK ACTIVITY F

Assembles, disassembles and transports crane

TASK F-13 Loads and unloads components for transport

TASK DESCRIPTOR

The crane and components need to be selected for the job and then loaded or driven onto trailers for transport to the jobsite to then be unloaded for assembly.

F-13.01 Loads crane and components

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	yes	yes	yes	yes	yes	NV	NV	NV

	SKILLS	
	Performance Criteria	**Evidence of Attainment**
F-13.01.01P	identify and select crane ***components*** to be loaded	crane ***components*** to be loaded are identified and selected according to required configuration of crane
F-13.01.02P	identify and select trailers to be loaded	trailers to be loaded are identified and selected according to weights and dimensions of ***components***
F-13.01.03P	select assist crane	assist crane is selected according to weights and radius of components being loaded
F-13.01.04P	determine lifting points	lifting points are determined according to manufacturers' specifications
F-13.01.05P	determine sequence of loading crane ***components***	sequence of loading crane ***components*** is determined according to weights and dimensions
F-13.01.06P	direct assist crane operator and crew for crane ***component*** placement	assist crane operator and crew are directed for crane ***component*** placement
F-13.01.07P	remove ***components*** from crane	***components*** are removed from crane to satisfy jurisdictional weight and dimension requirements for transport

F-13.01.08P	distribute crane and ***component*** weight on ***transport equipment***	crane and ***component*** weight on ***transport equipment*** are distributed according to jurisdictional regulations
F-13.01.09P	secure crane and ***components*** on ***transport equipment***	crane and ***components*** are secured on ***transport equipment*** according to ***jurisdictional regulations***
F-13.01.10P	drive crane onto ***transport equipment*** considering ***factors***	crane is driven onto ***transport equipment*** considering ***factors***
F-13.01.11P	confirm all crane ***components*** have been loaded	all crane ***components*** have been loaded

RANGE OF VARIABLES

components include: superstructure, carrier/car body, outriggers, crawler tracks, booms, jibs, counterweights, job boxes, mats, hook blocks, overhaul ball, pendant lines, hoist ropes
transport equipment includes: flatbeds, lowbeds, floating platforms, rail cars, boom launcher trailer
jurisdictional regulations include: highway legislation, road regulations, National Safety Code (NSC)
factors include: type of crane, type of transport equipment, site conditions

	KNOWLEDGE	
	Learning Outcomes	**Learning Objectives**
F-13.01.01L	demonstrate knowledge of mobile cranes, their characteristics and applications	define terminology associated with mobile cranes
		identify hazards and describe safe work practices pertaining to mobile cranes
		identify ***types of mobile cranes*** and describe their characteristics and applications
		identify ***types of engines in mobile cranes*** and describe their characteristics and applications
		identify crane ***components*** and describe their characteristics and applications
F-13.01.02L	demonstrate knowledge of procedures used to load cranes and ***components*** for transport	define terminology associated with crane transportation
		identify hazards and describe safe work practices pertaining to loading cranes and ***components***
		interpret charts, drawings and specifications relating to crane transportation
		identify tools and equipment used to load cranes and describe their applications and procedures for use
		identify requirements and describe procedures used to prepare cranes for transport

		describe procedures used to load cranes and ***components*** for transport travel
		identify ***types of rigging equipment*** used to load cranes and ***components***, and describe their characteristics and applications
		identify ***types of tie downs*** used to load cranes and ***components***, and describe their characteristics and applications
		identify types of ***transport equipment*** used to transport cranes and ***components***, and describe their characteristics and applications
		describe placement procedures used to avoid damage
		describe loading sequence for transportation
F-13.01.03L	demonstrate knowledge of regulatory requirements pertaining to crane transportation	identify codes, standards and regulations pertaining to crane transportation

RANGE OF VARIABLES

types of mobile cranes include: hydraulic and lattice boom (truck mounted, all-terrain [AT], rough-terrain [RT], crawler)

types of engines in mobile cranes include: gas, diesel, propane

components include: superstructure, carrier/car body, outriggers, crawler tracks, booms, jibs, counterweights, job boxes, mats, hook blocks, overhaul ball, pendant lines, hoist ropes

types of rigging equipment include: synthetic, wire rope slings, chain slings, shackles, hooks

types of tie downs include: chains, cables, turnbuckles, synthetic belts, binders

transport equipment includes: flatbeds, lowbeds, floating platforms, rail cars, boom launcher trailer

F-13.02 Unloads crane and components

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	yes	yes	yes	yes	yes	NV	NV	NV

SKILLS

	Performance Criteria	Evidence of Attainment
F-13.02.01P	identify and select sequence of trailers to be unloaded	sequence of trailers to be unloaded is identified and selected
F-13.02.02P	confirm all ***components*** have been delivered and have not been damaged in transport	all ***components*** have been delivered and were not damaged in transport

F-13.02.03P	select assist crane	assist crane is selected according to weights and radius of load
F-13.02.04P	determine lifting points	lifting points are determined according to manufacturers' specifications
F-13.02.05P	determine sequence of crane ***components*** to be unloaded	sequence of crane ***components*** to be unloaded is determined
F-13.02.06P	identify location to assemble crane	location to assemble crane is identified
F-13.02.07P	unlash crane and ***components*** on ***transport equipment***	crane and ***components*** on ***transport equipment*** are unlashed
F-13.02.08P	drive crane off ***transport equipment*** considering ***factors***	crane is driven off ***transport equipment*** considering ***factors***
F-13.02.09P	direct assist crane operator and crew for crane ***component*** unloading	assist crane operator and crew are directed for crane ***component*** unloading

RANGE OF VARIABLES

components include: superstructure, carrier/car body, outriggers, crawler tracks, booms, jibs, counterweights, job boxes, mats, hook blocks, overhaul ball, pendant lines, hoist ropes

transport equipment includes: flatbeds, lowbeds, floating platforms, rail cars, boom launcher trailer

factors include: type of crane, type of transport equipment, site conditions

	KNOWLEDGE	
	Learning Outcomes	**Learning Objectives**
F-13.02.01L	demonstrate knowledge of procedures used to unload cranes and ***components*** after transport	define terminology associated with crane and ***components*** and their transportation
		identify hazards and describe safe work practices pertaining to unloading cranes and ***components***
		interpret charts, drawings and specifications relating to crane transportation
		identify tools and equipment used to unload cranes and describe their applications and procedures for use
		describe procedures used to unload cranes and ***components***
		describe removal sequence for assembly
		describe blocking procedures to prevent injury and equipment damage
		describe ***site preparation procedures***

		identify types of ***transport equipment*** used to transport cranes and ***components***, and describe their characteristics and applications
F-13.02.02L	demonstrate knowledge of regulatory requirements pertaining to crane transportation	identify codes, standards and regulations pertaining to crane transportation

RANGE OF VARIABLES

components include: superstructure, carrier/car body, outriggers, crawler tracks, booms, jibs, counterweights, job boxes, mats, hook blocks, overhaul ball, pendant lines, hoist ropes

site preparation procedures include: adequate space, traffic control, permits, allowable ground-bearing pressure

transport equipment includes: flatbeds, lowbeds, floating platforms, rail cars, boom launcher trailer

TASK F-14 Drives cranes on public roadways

TASK DESCRIPTOR

Cranes are self-propelled for driving on public roadways. Disassembly of some cranes may be necessary to comply with jurisdictional regulations.

Pre-trip planning is necessary and it includes confirming roles and responsibilities of crew members that will be participating in the transport and organizing escort vehicles.

F-14.01 Performs pre-trip planning

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	yes	yes	yes	yes	yes	NV	NV	NV

	SKILLS	
	Performance Criteria	**Evidence of Attainment**
F-14.01.01P	confirm application for permit has been made	application for permit has been made
F-14.01.02P	interpret permits and confirm route	permits are interpreted and route is confirmed considering ***factors***
F-14.01.03P	verify route	route is verified using ***map tools***
F-14.01.04P	confirm crane is ready for transport	crane is ready for transport considering ***factors***
F-14.01.05P	schedule and confirm time of transport	time of transport is scheduled and confirmed

RANGE OF VARIABLES

factors (route) include: jurisdictional regulations, travel times, lanes of traffic, rush hours, road conditions (grades, terrain, ice, mud), bridge capacities, clearances, load types, turning radius for boom dollies, boom tip and superstructures

map tools include: internet, global positioning system (GPS), printed map

factors (crane ready for transport) include: licensing, registration, insurance, permits

	KNOWLEDGE	
	Learning Outcomes	**Learning Objectives**
F-14.01.01L	demonstrate knowledge of procedures used to perform pre-trip planning	identify ***factors*** for selecting transportation routes
		interpret charts, drawings and ***specifications*** relating to crane transportation
		identify types of ***map tools*** used for pre-trip planning, and describe their characteristics and applications
F-14.01.02L	demonstrate knowledge of regulatory requirements pertaining to crane transportation	identify codes, standards, ***restrictions and regulations*** pertaining to crane transportation

RANGE OF VARIABLES

factors (route) include: jurisdictional regulations, travel times, lanes of traffic, rush hours, road conditions (grades, terrain, ice, mud), bridge capacities, clearances, load types, turning radius for boom dollies, boom tip and superstructures

specifications include: travel mode, weights and dimensions

map tools include: internet, GPS, printed map

restrictions and regulations include: weight, height, width and requirement for escort vehicles, hours of service

F-14.02 Prepares crane for transport

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	yes	yes	yes	yes	yes	NV	NV	NV

	SKILLS	
	Performance Criteria	**Evidence of Attainment**
F-14.02.01P	remove components	components are removed according to ***jurisdictional regulations***
F-14.02.02P	install boom in boom dolly or remove boom from crane	boom in boom dolly is installed or boom is removed from crane
F-14.02.03P	set crane to ***travel mode***	crane is set to ***travel mode***

F-14.02.04P	verify ***safety equipment***	***safety equipment*** is verified
F-14.02.05P	perform pre-trip inspection and complete required documentation	pre-trip inspection is performed and required documentation is completed according to company policies and jurisdictional regulations

RANGE OF VARIABLES

jurisdictional regulations include: NSC, weights and dimensions
travel mode includes: steering, boom float, suspension adjustments, swing brake requirements
safety equipment includes: road flares, fire extinguishers, reflectors

	KNOWLEDGE	
	Learning Outcomes	**Learning Objectives**
F-14.02.01L	demonstrate knowledge of procedures used to prepare cranes for transport	define terminology associated with crane transportation
		identify hazards and describe safe work practices pertaining to crane transportation
		interpret charts, drawings and specifications relating to crane transportation
		identify tools and equipment used for crane transportation and describe their applications and procedures for use
		describe procedures used to perform pre-trip inspection and complete required documentation
		describe procedures used to remove components
F-14.02.02L	demonstrate knowledge of regulatory requirements pertaining to crane transportation	identify codes, standards, ***jurisdictional regulations*** pertaining to crane transportation

RANGE OF VARIABLES

jurisdictional regulations include: NSC, weights and dimensions

F-14.03 Drives cranes

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	yes	yes	yes	yes	yes	NV	NV	NV

	SKILLS	
	Performance Criteria	**Evidence of Attainment**
F-14.03.01P	navigate roads	roads are navigated considering ***factors*** according to ***jurisdictional regulations***
F-14.03.02P	obey driving regulations and manufacturers' instructions	driving regulations and manufacturers' instructions are obeyed while driving crane

RANGE OF VARIABLES

factors include: weights and dimensions, crane size, road width, bridge weight, overpass height restrictions, weather conditions, driving conditions

jurisdictional regulations include: NSC, weights and dimensions

	KNOWLEDGE	
	Learning Outcomes	**Learning Objectives**
F-14.03.01L	demonstrate knowledge of procedures used to drive cranes	define terminology associated with crane transportation
		identify hazards and describe safe work practices pertaining to driving cranes
		interpret charts, drawings and specifications relating to driving cranes
F-14.03.02L	demonstrate knowledge of regulatory requirements pertaining to crane transportation	identify codes, standards, ***jurisdictional regulations*** pertaining to crane transportation

RANGE OF VARIABLES

jurisdictional regulations include: NSC, weights and dimensions

TASK F-15 Assembles and disassembles lattice boom cranes

TASK DESCRIPTOR

Mobile crane operators need to disassemble cranes in order to transport them to and from jobsites. Disassembly of the crane may be necessary to comply with jurisdictional road regulations. Mobile crane operators assemble the cranes once on site.

F-15.01 Installs tracks on car body (lattice boom)

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	yes	yes	yes	yes	yes	NV	NV	NV

	SKILLS	
	Performance Criteria	**Evidence of Attainment**
F-15.01.01P	check that car body is level	car body is levelled
F-15.01.02P	remove blocking and safety chains between drive sprockets and pads	blocking and safety chains between drive sprockets and pads are removed
F-15.01.03P	extend/retract tracks	tracks are extended/retracted according ***manufacturers' specifications and instructions***
F-15.01.04P	position track onto car body	track is positioned onto car body using ***auxiliary lift equipment*** or ***manufacturers' specifications and instructions*** for self-assembly
F-15.01.05P	install ***fasteners***	***fasteners*** are installed according to ***manufacturers' specifications and instructions*** to secure track on car body
F-15.01.06P	join hydraulic/mechanical connections	hydraulic/mechanical connections are joined according to ***manufacturers' specifications and instructions*** to complete drive/outrigger circuits
F-15.01.07P	adjust track and chain tension	track and chain tension is adjusted according to ***manufacturers' specifications and instructions***

RANGE OF VARIABLES

manufacturers' specifications and instructions include: load charts, configuration charts, hoist rope specifications, assembly/disassembly charts

auxiliary lift equipment includes: forklifts, boom trucks, assist cranes

fasteners include: bolts, pins and keepers, wedges

	KNOWLEDGE	
	Learning Outcomes	**Learning Objectives**
F-15.01.01L	demonstrate knowledge of lattice boom cranes, their ***components***, characteristics and applications	define terminology associated with lattice boom cranes and their ***components***
		identify lattice boom crane ***components*** requiring assembly
F-15.01.02L	demonstrate knowledge of procedures used to install tracks on car body of lattice boom cranes	identify tools and equipment used to install tracks on car body of lattice boom cranes and describe their applications and procedures for use
		identify ***hazards*** and describe safe work practices pertaining to installation of tracks on car body of lattice boom cranes
		interpret ***manufacturers' specifications and instructions*** relating to installation of tracks on car body of lattice boom cranes
		describe procedures used to install tracks on car body of lattice boom cranes
		describe capabilities and limitations of ***auxiliary lift equipment***
		identify types of ***fasteners*** used in installation of tracks on car body of lattice boom cranes
F-15.01.03L	demonstrate knowledge of regulatory requirements pertaining to assembly of lattice boom cranes	identify codes, standards and regulations pertaining to assembly of lattice boom cranes

RANGE OF VARIABLES

components include: tracks, car body, carrier, superstructure/upperworks, outrigger boxes, boom base, boom and jib, counterweights, hoist ropes, hook blocks, overhaul balls, gantry, A-frame, mast, inner and outer bail, boom back stop, boom tip

hazards include: pinch points, falling hazards, open machinery, mechanical failure

manufacturers' specifications and instructions include: load charts, configuration charts, hoist rope specifications, assembly/disassembly charts

auxiliary lift equipment includes: forklifts, boom trucks, assist cranes

fasteners include: bolts, pins and keepers, wedges

F-15.02 Installs superstructure/upperworks (lattice boom)

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	yes	yes	yes	no	yes	NV	NV	NV

	SKILLS	
	Performance Criteria	**Evidence of Attainment**
F-15.02.01P	inspect for ***defects***	***defects*** are inspected and reported according to ***manufacturers' specifications and instructions***, jurisdictional regulations and company policies
F-15.02.02P	support with blocking suitable for ***ground conditions*** and level crane	crane is supported with blocking suitable for ***ground conditions*** and levelled using ***equipment*** to facilitate removal of superstructure/upperworks
F-15.02.03P	clean surfaces and apply lubricant to pins and connection points	surfaces are cleaned and lubricant is applied to pins and connection points according to ***manufacturers' specifications and instructions*** to allow assembly
F-15.02.04P	position superstructure/upperworks onto car body/carrier	superstructure/upperworks is positioned onto car body/carrier according to ***manufacturers' specifications and instructions***
F-15.02.05P	install ***fasteners***	***fasteners*** are installed according to ***manufacturers' specifications and instructions*** to secure superstructure/upperworks on car body/carrier
F-15.02.06P	connect hydraulic lines and electrical connections	hydraulic lines and electrical connections are connected according to ***manufacturers' specifications and instructions*** to complete circuits

RANGE OF VARIABLES

defects include: worn bolts, pins and bushings

manufacturers' specifications and instructions include: load charts, configuration charts, hoist rope specifications, assembly/disassembly charts

ground conditions include: gravel, clay, peat, silt, asphalt, concrete

equipment includes: jacks, assist cranes

fasteners include: bolts, pins and keepers, wedges

	KNOWLEDGE	
	Learning Outcomes	**Learning Objectives**
F-15.02.01L	demonstrate knowledge of procedures used to install superstructure/upperworks on lattice boom cranes	identify tools and equipment used to install superstructure/upperworks on lattice boom cranes and describe their applications and procedures for use
		identify ***hazards*** and describe safe work practices pertaining to installation of superstructure/upperworks on lattice boom cranes
		interpret ***manufacturers' specifications and instructions*** relating to installation of superstructure/upperworks on lattice boom cranes
		identify types of possible ***defects*** found in superstructure/upperworks on lattice boom cranes
		describe procedures used to install superstructure/upperworks on lattice boom cranes
		identify types of ***fasteners*** used in installation of superstructure/upperworks on lattice boom cranes
		describe hydraulic and electrical connections required to attach superstructure/upperworks onto car body/carrier
F-15.02.02L	demonstrate knowledge of regulatory requirements pertaining to assembly of lattice boom cranes	identify codes, standards and regulations pertaining to assembly of lattice boom cranes

RANGE OF VARIABLES

hazards include: pinch points, falling hazards, open machinery, mechanical failure

manufacturers' specifications and instructions include: load charts, configuration charts, hoist rope specifications, assembly/disassembly charts

defects include: worn bolts, pins and bushings

fasteners include: bolts, pins and keepers, wedges

F-15.03 Installs outrigger boxes (lattice boom)

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	yes	yes	yes	no	yes	NV	NV	NV

SKILLS

	Performance Criteria	Evidence of Attainment
F-15.03.01P	position and secure outrigger box	outrigger box is positioned and secured according to ***manufacturers' specifications and instructions***
F-15.03.02P	inspect for ***defects***	***defects*** are inspected and reported according to ***manufacturers' specifications and instructions***, jurisdictional regulations and company policies
F-15.03.03P	clean fittings	fittings are cleaned to avoid oil contamination and ensure ease of installation
F-15.03.04P	connect hoses and electrical wiring	hoses and electrical wiring are connected according to ***manufacturers' specifications and instructions***
F-15.03.05P	install ***fasteners***	***fasteners*** are installed according to ***manufacturers' specifications and instructions***

RANGE OF VARIABLES

manufacturers' specifications and instructions include: load charts, configuration charts, hoist rope specifications, assembly/disassembly charts

defects include: damaged hoses, fittings and cylinders; corrosion; cracks

fasteners include: bolts, pins and keepers, wedges

KNOWLEDGE

	Learning Outcomes	Learning Objectives
F-15.03.01L	demonstrate knowledge of procedures used to install outrigger boxes on lattice boom cranes	identify tools and equipment used to install outrigger boxes on lattice boom cranes and describe their applications and procedures for use
		identify ***hazards*** and describe safe work practices pertaining to installation of outrigger boxes on lattice boom cranes
		interpret ***manufacturers' specifications and instructions*** relating to installation of outrigger boxes on lattice boom cranes
		identify types of possible ***defects*** in outrigger boxes on lattice boom cranes

		describe procedures used to install outrigger boxes on lattice boom cranes
		identify types of ***fasteners*** used in installation of outrigger boxes on lattice boom cranes
		describe hydraulic and electrical connections required to attach outrigger boxes to lattice boom cranes
		describe capabilities and limitations of self-erecting procedures
F-15.03.02L	demonstrate knowledge of regulatory requirements pertaining to assembly of lattice boom cranes	identify codes, standards and regulations pertaining to assembly of lattice boom cranes

RANGE OF VARIABLES

hazards include: pinch points, falling hazards, open machinery, mechanical failure

manufacturers' specifications and instructions include: load charts, configuration charts, hoist rope specifications, assembly/disassembly charts

defects include: damaged hoses, fittings and cylinders; corrosion; cracks

fasteners include: bolts, pins and keepers, wedges

F-15.04 Installs boom base (lattice boom)

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	yes	yes	yes	yes	yes	NV	NV	NV

SKILLS

	Performance Criteria	Evidence of Attainment
F-15.04.01P	clean and lubricate pins and bushings	pins and bushings are cleaned and lubricated according to ***manufacturers' specifications and instructions*** to allow assembly
F-15.04.02P	inspect for ***defects***	***defects*** are detected and reported according to ***manufacturers' specifications and instructions***, jurisdictional regulations and company policies
F-15.04.03P	raise gantry, A-frame or live mast to working position	gantry, A-frame or live mast are raised to working position according to ***manufacturers' specifications and instructions***

F-15.04.04P	position and secure boom base onto superstructure/upperworks	boom base is positioned onto superstructure/upperworks using assist crane or self-installation and secured according to ***manufacturers' specifications and instructions***
F-15.04.05P	install ***fasteners***	***fasteners*** are installed according to ***manufacturers' specifications and instructions***
F-15.04.06P	connect hoses and electrical wiring	hoses and electrical wiring are connected according to ***manufacturers' specifications and instructions*** to complete circuits

RANGE OF VARIABLES

manufacturers' specifications and instructions include: load charts, configuration charts, hoist rope specifications, assembly/disassembly charts

defects include: damaged hoses, fittings and cylinders; cracks; corrosion; dents

fasteners include: heel pins, keeper pins, bridle connections, bolts

	KNOWLEDGE	
	Learning Outcomes	**Learning Objectives**
F-15.04.01L	demonstrate knowledge of procedures used to install boom bases on lattice boom cranes	identify tools and equipment used to install boom bases on lattice boom cranes and describe their applications and procedures for use
		identify ***hazards*** and describe safe work practices pertaining to installation of boom bases on lattice boom cranes
		interpret ***manufacturers' specifications and instructions*** relating to installation of boom bases on lattice boom cranes
		identify types of possible ***defects*** in boom bases on lattice boom cranes
		describe procedures used to install boom bases on lattice boom cranes
		identify types of ***fasteners*** used in installation of boom bases on superstructure/upperworks
		describe hydraulic and electrical connections required to attach boom bases to superstructure/upperworks
F-15.04.02L	demonstrate knowledge of regulatory requirements pertaining to assembly of lattice boom cranes	identify codes, standards and regulations pertaining to assembly of lattice boom cranes

RANGE OF VARIABLES

hazards include: pinch points, falling hazards, open machinery, mechanical failure

manufacturers' specifications and instructions include: load charts, configuration charts, hoist rope specifications, assembly/disassembly charts

defects include: damaged hoses, fittings and cylinders; cracks; corrosion; dents

fasteners include: heel pins, keeper pins, bridle connections, bolts

F-15.05 Installs counterweights (lattice boom)

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	yes	yes	yes	yes	yes	NV	NV	NV

	SKILLS	
	Performance Criteria	**Evidence of Attainment**
F-15.05.01P	inspect for ***defects***	***defects*** are inspected and reported according to ***manufacturers' specifications and instructions***, jurisdictional regulations and company policies
F-15.05.02P	determine installation sequence and placement of counterweights	installation sequence and placement of counterweights are determined according to ***manufacturers' specifications and instructions***
F-15.05.03P	place counterweights on crane (tray or base plate)	counterweights on crane (tray or base plate) are placed according to ***manufacturers' specifications and instructions***
F-15.05.04P	raise and lower assembled counterweights into position	assembled counterweights are raised and lowered into position according to ***manufacturers' specifications and instructions***
F-15.05.05P	install ***fasteners***	***fasteners*** are installed according to ***manufacturers' specifications and instructions*** to secure assembled counterweights

RANGE OF VARIABLES

defects include: broken bolts, damaged threads and pins, cracks, broken lifting lugs or eyes

manufacturers' specifications and instructions include: load charts, configuration charts, hoist rope specifications, assembly/disassembly charts

fasteners include: pins, bolts, stack, cylinders, chains

	KNOWLEDGE	
	Learning Outcomes	**Learning Objectives**
F-15.05.01L	demonstrate knowledge of procedures used to install counterweights on lattice boom cranes	identify tools and equipment used to install counterweights on lattice boom cranes, and describe their applications and procedures for use
		identify ***hazards*** and describe safe work practices pertaining to installation of counterweights on lattice boom cranes
		interpret ***manufacturers' specifications and instructions*** relating to installation of counterweights on lattice boom cranes
		identify types of possible ***defects*** in counterweights on lattice boom cranes
		describe procedures used to determine sequence and placement of counterweights on lattice boom cranes
		identify types of ***fasteners*** used in installation of counterweights
F-15.05.02L	demonstrate knowledge of regulatory requirements pertaining to assembly of lattice boom cranes	identify codes, standards and regulations pertaining to assembly of lattice boom cranes

RANGE OF VARIABLES

hazards include: pinch points, falling hazards, mechanical failure, suspended loads

manufacturers' specifications and instructions include: load charts, configuration charts, hoist rope specifications, assembly/disassembly charts

defects include: broken bolts, damaged threads and pins, cracks, broken lifting lugs or eyes

fasteners include: pins, bolts, stack, cylinders, chains

F-15.06 Assembles main boom, tip and boom attachments (lattice boom)

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	yes	yes	yes	yes	yes	NV	NV	NV

SKILLS

	Performance Criteria	Evidence of Attainment
F-15.06.01P	inspect for ***defects***	***defects*** are inspected and reported according to ***manufacturers' specifications and instructions***, jurisdictional regulations and company policies
F-15.06.02P	determine installation sequence of main boom, tip and jib sections	installation sequence of main boom, tip and jib sections is determined according to ***manufacturers' specifications and instructions***
F-15.06.03P	use blocking to suit ***ground conditions***	blocking is used to suit ***ground conditions***
F-15.06.04P	lay out and connect main boom, tip and jib sections (including ***boom components*** and wiring)	main boom, tip and jib sections (including ***boom components*** and wiring) are laid out and connected according to ***manufacturers' specifications and instructions***
F-15.06.05P	configure boom and ***boom attachments***	boom and ***boom attachments*** are configured according to ***manufacturers' specifications and instructions***

RANGE OF VARIABLES

defects include: damaged chords, lacings, pendants, sheaves, pins and bushings; corrosion

manufacturers' specifications and instructions include: load charts, configuration charts, hoist rope specifications, assembly/disassembly charts

ground conditions include: gravel, clay, peat, silt, asphalt, concrete

boom components include: pendant (steel/cable), walkway, sheaves, boom sections, load cells, boom angle sensors, limit switches

boom attachments include: auxiliary, jibs (luffing, fixed), masts, reeving, mid-fall, pile drive, grab bucket

	KNOWLEDGE	
	Learning Outcomes	**Learning Objectives**
F-15.06.01L	demonstrate knowledge of procedures used to assemble main boom, tip, and their ***components*** and ***attachments*** on lattice boom cranes	identify tools and equipment used to assemble main boom and tip, and their ***components*** and ***attachments*** on lattice boom cranes, and describe their applications and procedures for use
		identify ***hazards*** and describe safe work practices pertaining to assembly of main boom and tip, and their ***components*** and ***attachments*** on lattice boom cranes
		interpret ***manufacturers' specifications and instructions*** relating to assembly of boom and tip, and their ***components*** and ***attachments*** on lattice boom cranes
		identify types of possible ***defects*** in boom and tip, and their ***components*** and ***attachments*** on lattice boom cranes
		describe procedures used to determine sequence, lay out and installation of main boom and tip, and their ***components*** and ***attachments*** on lattice boom cranes
		describe procedures used to determine blocking required based on ***ground conditions***
		describe procedures used to configure boom and ***boom attachments***
F-15.06.02L	demonstrate knowledge of regulatory requirements pertaining to assembly of lattice boom cranes	identify codes, standards and regulations pertaining to assembly of lattice boom cranes

RANGE OF VARIABLES

boom components include: pendant (steel/cable), walkway, sheaves, boom sections, load cells, boom angle sensors, limit switches

boom attachments include: auxiliary, jibs (luffing, fixed), masts, reeving, mid-fall, pile drive, grab bucket

hazards include: pinch points, falling hazards, mechanical failure

manufacturers' specifications and instructions include: load charts, configuration charts, hoist rope specifications, assembly/disassembly charts

defects include: damaged chords, lacings, pendants, sheaves, pins and bushings; corrosion

ground conditions include: gravel, clay, peat, silt, asphalt, concrete

F-15.07 Installs hook blocks and overhaul ball (lattice boom)

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	yes	yes	yes	yes	yes	NV	NV	NV

SKILLS

	Performance Criteria	Evidence of Attainment
F-15.07.01P	determine required block or ball overhaul weight	required block or ball overhaul weight is determined to match boom length and reeving
F-15.07.02P	inspect hook block and overhaul ball for size and WLL	hook block and overhaul ball are inspected for size and WLL according to ***manufacturers' specifications and instructions***
F-15.07.03P	spool out stored hoist rope off of winch	stored hoist rope is spooled out off of winch according to ***manufacturers' specifications and instructions***
F-15.07.04P	cut and seize hoist rope if required	hoist rope is cut and seized if required using cable cutting equipment according to ***manufacturers' specifications and instructions***
F-15.07.05P	reeve hook block with required parts of hoist rope to lift calculated weight	hook block is reeved with required parts of hoist rope according to ***manufacturers' specifications and instructions*** to lift calculated weight
F-15.07.06P	terminate hoist rope ends	hoist rope ends are terminated according to ***manufacturers' specifications and instructions*** using ***connections***
F-15.07.07P	install ***fasteners***	***fasteners*** are installed according to ***manufacturers' specifications and instructions***

RANGE OF VARIABLES

manufacturers' specifications and instructions include: load charts, configuration charts, hoist rope specifications, assembly/disassembly charts

connections include: wedge sockets, button sockets

fasteners include: pins and keepers, wire rope clips

	KNOWLEDGE	
	Learning Outcomes	**Learning Objectives**
F-15.07.01L	demonstrate knowledge of procedures used to install hook blocks and overhaul ball on lattice boom cranes	identify tools and equipment used to install hook blocks and overhaul ball on lattice boom cranes, and describe their applications and procedures for use
		identify ***hazards*** and describe safe work practices pertaining to installation of hook blocks and overhaul ball on lattice boom cranes
		interpret ***manufacturers' specifications and instructions*** relating to installation of hook blocks and overhaul ball on lattice boom cranes
		describe procedures used to install hook blocks and overhaul ball on lattice boom cranes
		identify types of ***fasteners*** used in installation of hook blocks and overhaul ball on lattice boom cranes
F-15.07.02L	demonstrate knowledge of regulatory requirements pertaining to assembly of lattice boom cranes	identify codes, standards and regulations pertaining to assembly of lattice boom cranes

RANGE OF VARIABLES

hazards include: pinch points, falling hazards, mechanical failure, suspended loads, broken wires, entanglement, stored energy

manufacturers' specifications and instructions include: load charts, configuration charts, hoist rope specifications, assembly/disassembly charts

fasteners include: pins and keepers, wire rope clips

F-15.08 Removes hook blocks and overhaul ball (lattice boom)

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	yes	yes	yes	yes	yes	NV	NV	NV

	SKILLS	
	Performance Criteria	**Evidence of Attainment**
F-15.08.01P	remove and store ***fasteners***	***fasteners*** are removed and stored according to ***manufacturers' specifications and instructions***
F-15.08.02P	dismantle ***connections***	***connections*** are dismantled according to ***manufacturers' specifications and instructions***

F-15.08.03P	remove hoist rope from hook block	hoist rope is removed from hook block according to ***manufacturers' specifications and instructions***
F-15.08.04P	spool hoist rope onto winch	hoist rope is spooled onto winch according to ***manufacturers' specifications and instructions***
F-15.08.05P	secure hoist rope on drum	hoist rope is secured on drum according to industry standards to preserve spooling

RANGE OF VARIABLES

fasteners include: pins and keepers, wire rope clips

manufacturers' specifications and instructions include: load charts, configuration charts, hoist rope specifications, assembly/disassembly charts

connections include: wedge sockets, button sockets

	KNOWLEDGE	
	Learning Outcomes	**Learning Objectives**
F-15.08.01L	demonstrate knowledge of procedures used to remove hook blocks and overhaul ball on lattice boom cranes	identify tools and equipment used to remove hook blocks and overhaul ball on lattice boom cranes, and describe their applications and procedures for use
		identify ***hazards*** and describe safe work practices pertaining to removal of wire ropes, hook blocks and overhaul ball on lattice boom cranes
		interpret ***manufacturers' specifications and instructions*** relating to removal of hook blocks and overhaul ball on lattice boom cranes
		describe procedures used to remove hook blocks and overhaul ball on lattice boom cranes
		identify types of ***fasteners*** used with hook blocks and overhaul ball on lattice boom cranes
F-15.08.02L	demonstrate knowledge of regulatory requirements pertaining to disassembly of lattice boom cranes	identify codes, standards and regulations pertaining to disassembly of lattice boom cranes

RANGE OF VARIABLES

hazards include: pinch points, falling hazards, mechanical failure, suspended loads, broken wires, entanglement, stored energy

manufacturers' specifications and instructions include: load charts, configuration charts, hoist rope specifications, assembly/disassembly charts

fasteners include: pins and keepers, wire rope clips

F-15.09 Disassembles main boom, tip and boom attachments (lattice boom)

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	yes	yes	yes	yes	yes	NV	NV	NV

SKILLS

	Performance Criteria	Evidence of Attainment
F-15.09.01P	lower main boom, tip and ***boom attachments*** onto blocking suitable for ***ground conditions***	main boom, tip and ***boom attachments*** are lowered onto blocking suitable for ***ground conditions***
F-15.09.02P	dismantle main boom, tip and ***boom attachment*** sections (including ***boom components*** and wiring)	main boom, tip and ***boom attachment*** sections (including ***boom components*** and wiring) are dismantled according to ***manufacturers' specifications and instructions***
F-15.09.03P	remove and store ***fasteners*** and ***boom components***	***fasteners*** and ***boom components*** are removed and stored according to ***manufacturers' specifications and instructions***

RANGE OF VARIABLES

boom attachments include: auxiliary, jibs (luffing, fixed), masts, reeving, mid-fall, pile drive, grab bucket

ground conditions include: gravel, clay, peat, silt, asphalt, concrete

boom components include: pendant (steel/cable), walkway, sheaves

manufacturers' specifications and instructions include: load charts, configuration charts, hoist rope specifications, assembly/disassembly charts

fasteners include: pins and keepers, wire rope clips

KNOWLEDGE

	Learning Outcomes	Learning Objectives
F-15.09.01L	demonstrate knowledge of procedures used to disassemble main boom, tip and their ***components*** and ***attachments*** on lattice boom cranes	identify tools and equipment used to disassemble main boom, tip and their ***components*** and ***attachments*** on lattice boom cranes, and describe their applications and procedures for use
		identify ***hazards*** and describe safe work practices pertaining to disassembly of main boom, tip and their ***components*** and ***attachments*** on lattice boom cranes
		interpret ***manufacturers' specifications and instructions*** relating to disassembly of main boom, tip and their ***components*** and ***attachments*** on lattice boom cranes
		describe procedures used to disassemble main boom, tip and their ***components*** and ***attachments*** on lattice boom cranes

		describe procedures used to determine blocking required based on ***ground conditions***
F-15.09.02L	demonstrate knowledge of regulatory requirements pertaining to disassembly of lattice boom cranes	identify codes, standards and regulations pertaining to disassembly of lattice boom cranes

RANGE OF VARIABLES

boom components include: pendant (steel/cable), walkway, sheaves
boom attachments include: auxiliary, jibs (luffing, fixed), masts, reeving, mid-fall, pile drive, grab bucket
hazards include: pinch points, falling hazards, mechanical failure, suspended loads
manufacturers' specifications and instructions include: load charts, configuration charts, hoist rope specifications, assembly/disassembly charts
ground conditions include: gravel, clay, peat, silt, asphalt, concrete

F-15.10 Removes counterweights (lattice boom)

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	yes	yes	yes	yes	yes	NV	NV	NV

	SKILLS	
	Performance Criteria	**Evidence of Attainment**
F-15.10.01P	remove and store ***fasteners***	***fasteners*** are removed and stored according to ***manufacturers' specifications and instructions***
F-15.10.02P	raise and lower counterweight assembly out of position	counterweight assembly is raised and lowered out of position according to ***manufacturers' specifications and instructions***
F-15.10.03P	disassemble counterweight assembly	counterweight assembly is disassembled according to ***manufacturers' specifications and instructions***

RANGE OF VARIABLES

fasteners include: pins, bolts, stack, cylinders, chains
manufacturers' specifications and instructions include: load charts, configuration charts, hoist rope specifications, assembly/disassembly charts

	KNOWLEDGE	
	Learning Outcomes	**Learning Objectives**
F-15.10.01L	demonstrate knowledge of procedures used to remove counterweights on lattice boom cranes	identify tools and equipment used to remove counterweights on lattice boom cranes, and describe their applications and procedures for use
		identify ***hazards*** and describe safe work practices pertaining to removal of counterweights on lattice boom cranes
		interpret ***manufacturers' specifications and instructions*** relating to removal of counterweights on lattice boom cranes
		describe procedures used to remove counterweights on lattice boom cranes
F-15.10.02L	demonstrate knowledge of regulatory requirements pertaining to disassembly of lattice boom cranes	identify codes, standards and regulations pertaining to disassembly of lattice boom cranes

RANGE OF VARIABLES

hazards include: pinch points, falling hazards, mechanical failure, suspended loads

manufacturers' specifications and instructions include: load charts, configuration charts, hoist rope specifications, assembly/disassembly charts

F-15.11 Removes boom base (lattice boom)

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	yes	yes	yes	yes	yes	NV	NV	NV

	SKILLS	
	Performance Criteria	**Evidence of Attainment**
F-15.11.01P	disconnect hoses and electrical wiring	hoses and electrical wiring are disconnected according to ***manufacturers' specifications and instructions***
F-15.11.02P	support base	base is supported according to ***manufacturers' specifications and instructions***
F-15.11.03P	remove and store ***fasteners***	***fasteners*** are removed and stored according to ***manufacturers' specifications and instructions***

F-15.11.04P	lift boom base off superstructure/upperworks	boom base is lifted off superstructure/upperworks according to ***manufacturers' specifications and instructions***
F-15.11.05P	lower gantry, A-frame and live mast to stowed position	gantry, A-frame and live mast are lowered to stowed position according to ***manufacturers' specifications and instructions***

RANGE OF VARIABLES

manufacturers' specifications and instructions include: load charts, configuration charts, hoist rope specifications, assembly/disassembly charts

fasteners include: heel pins, keeper pins, bridle connections, bolts

	KNOWLEDGE	
	Learning Outcomes	**Learning Objectives**
F-15.11.01L	demonstrate knowledge of procedures used to remove boom base from lattice boom cranes	identify tools and equipment used to remove boom base from lattice boom cranes, and describe their applications and procedures for use
		identify ***hazards*** and describe safe work practices pertaining to removal of boom base from lattice boom cranes
		interpret ***manufacturers' specifications and instructions*** relating to removal of boom base from lattice boom cranes
		describe procedures used to remove boom base from lattice boom cranes
F-15.11.02L	demonstrate knowledge of regulatory requirements pertaining to disassembly of lattice boom cranes	identify codes, standards and regulations pertaining to disassembly of lattice boom cranes

RANGE OF VARIABLES

hazards include: pinch points, falling hazards, open machinery, mechanical failure, stored energy (hydraulic or mechanical)

manufacturers' specifications and instructions include: load charts, configuration charts, hoist rope specifications, assembly/disassembly charts

F-15.12 Removes superstructure/upperworks (lattice boom)

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	yes	yes	yes	no	yes	NV	NV	NV

SKILLS

	Performance Criteria	Evidence of Attainment
F-15.12.01P	support with blocking suitable for ***ground conditions*** and level crane	crane is supported with blocking suitable for ***ground conditions*** and levelled using ***equipment*** to facilitate removal of superstructure/upperworks
F-15.12.02P	disassemble superstructure/upperworks	superstructure/upperworks is disassembled according to ***manufacturers' specifications and instructions***
F-15.12.03P	disconnect hydraulic lines and electrical connections	hydraulic lines and electrical connections are disconnected according to ***manufacturers' specifications and instructions***
F-15.12.04P	remove and store ***fasteners***	***fasteners*** are removed and stored according to ***manufacturers' specifications and instructions***
F-15.12.05P	remove superstructure/upperworks from car body/carrier	superstructure/upperworks is removed from car body/carrier according to ***manufacturers' specifications and instructions***

RANGE OF VARIABLES

ground conditions include: gravel, clay, peat, silt, asphalt, concrete

equipment includes: jacks, assist cranes

manufacturers' specifications and instructions include: load charts, configuration charts, hoist rope specifications, assembly/disassembly charts

fasteners include: bolts, pins and keepers, wedges

KNOWLEDGE

	Learning Outcomes	Learning Objectives
F-15.12.01L	demonstrate knowledge of procedures used to remove superstructure/upperworks from lattice boom cranes	identify tools and equipment used to remove of superstructure/upperworks from lattice boom cranes, and describe their applications and procedures for use
		identify ***hazards*** and describe safe work practices pertaining to removal of superstructure/upperworks from lattice boom cranes

		interpret ***manufacturers' specifications and instructions*** relating to removal of superstructure/upperworks from lattice boom cranes
		describe procedures used to remove superstructure/upperworks from lattice boom cranes
		describe procedures used to determine blocking required based on ***ground conditions***
F-15.12.02L	demonstrate knowledge of regulatory requirements pertaining to disassembly of lattice boom cranes	identify codes, standards and regulations pertaining to disassembly of lattice boom cranes

RANGE OF VARIABLES

hazards include: pinch points, falling hazards, open machinery, mechanical failure

manufacturers' specifications and instructions include: load charts, configuration charts, hoist rope specifications, assembly/disassembly charts

ground conditions include: gravel, clay, peat, silt, asphalt, concrete

F-15.13 Removes tracks from car body (lattice boom)

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	yes	yes	yes	yes	yes	NV	NV	NV

SKILLS

	Performance Criteria	Evidence of Attainment
F-15.13.01P	extend/retract tracks	tracks are extended/retracted according to ***manufacturers' specifications and instructions***
F-15.13.02P	support with blocking suitable for ***ground conditions*** and level crane	crane is supported with blocking suitable for ***ground conditions*** and levelled using ***equipment*** according to ***manufacturers' specifications and instructions***
F-15.13.03P	disconnect hydraulic/mechanical connections for drive/outrigger systems	hydraulic/mechanical connections for drive/outrigger systems are disconnected according to ***manufacturers' specifications and instructions***
F-15.13.04P	support weight of track	weight of track is supported according to ***manufacturers' specifications and instructions***

F-15.13.05P	remove and store ***fasteners***	***fasteners*** are removed and stored according to ***manufacturers' specifications and instructions***
F-15.13.06P	lift track off car body	track is lifted off car body according to ***manufacturers' specifications and instructions***

RANGE OF VARIABLES

manufacturers' specifications and instructions include: load charts, configuration charts, hoist rope specifications, assembly/disassembly charts

ground conditions include: gravel, clay, peat, silt, asphalt, concrete

equipment includes: jacks, auxiliary lift equipment

fasteners include: bolts, pins and keepers, wedges

	KNOWLEDGE	
	Learning Outcomes	**Learning Objectives**
F-15.13.01L	demonstrate knowledge of procedures used to remove tracks from car body on lattice boom cranes	identify tools and equipment used to remove tracks from car body on lattice boom cranes, and describe their applications and procedures for use
		identify ***hazards*** and describe safe work practices pertaining to removal of tracks from car body on lattice boom cranes
		interpret ***manufacturers' specifications and instructions*** relating to removal of tracks from car body on lattice boom cranes
		describe procedures used to remove tracks from car body on lattice boom cranes
		describe procedures used to determine blocking required based on ***ground conditions***
F-15.13.02L	demonstrate knowledge of regulatory requirements pertaining to disassembly of lattice boom cranes	identify codes, standards and regulations pertaining to disassembly of lattice boom cranes

RANGE OF VARIABLES

hazards include: pinch points, falling hazards, open machinery, mechanical failure

manufacturers' specifications and instructions include: load charts, configuration charts, hoist rope specifications, assembly/disassembly charts

ground conditions include: gravel, clay, peat, silt, asphalt, concrete

F-15.14 Removes outrigger boxes (lattice boom)

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	yes	yes	yes	no	yes	NV	NV	NV

SKILLS

	Performance Criteria	Evidence of Attainment
F-15.14.01P	support weight of outrigger box	weight of outrigger box is supported according to ***manufacturers' specifications and instructions***
F-15.14.02P	remove and store ***fasteners***	***fasteners*** are removed and stored according to ***manufacturers' specifications and instructions***
F-15.14.03P	disconnect hoses and electrical wiring	hoses and electrical wiring are disconnected according to ***manufacturers' specifications and instructions***
F-15.14.04P	lift outrigger box from carrier	outrigger box is lifted from carrier according to ***manufacturers' specifications and instructions***

RANGE OF VARIABLES

manufacturers' specifications and instructions include: load charts, configuration charts, hoist rope specifications, assembly/disassembly charts

fasteners include: bolts, pins and keepers, wedges

KNOWLEDGE

	Learning Outcomes	Learning Objectives
F-15.14.01L	demonstrate knowledge of procedures used to remove outrigger boxes on lattice boom cranes	identify tools and equipment used to remove outrigger boxes on lattice boom cranes, and describe their applications and procedures for use
		identify ***hazards*** and describe safe work practices pertaining to removal of outrigger boxes on lattice boom cranes
		interpret ***manufacturers' specifications and instructions*** relating to removal of outrigger boxes on lattice boom cranes
		describe procedures used to remove outrigger boxes on lattice boom cranes
F-15.14.02L	demonstrate knowledge of regulatory requirements pertaining to disassembly of lattice boom cranes	identify codes, standards and regulations pertaining to disassembly of lattice boom cranes

RANGE OF VARIABLES

hazards include: pinch points, falling hazards, open machinery, mechanical failure

manufacturers' specifications and instructions include: load charts, configuration charts, hoist rope specifications, assembly/disassembly charts

TASK F-16 Assembles and disassembles telescopic boom cranes

TASK DESCRIPTOR

Mobile crane operators need to disassemble cranes in order to transport them to and from jobsites. Disassembly of the cranes may be necessary to comply with jurisdictional road regulations. Mobile crane operators assemble the cranes once on site. Any configuration changes require inspection. Effective communication skills are essential to ensure safety and efficiency when assembling and disassembling telescopic boom cranes.

F-16.01 Installs tracks on car body (telescopic boom)

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	yes	yes	yes	no	yes	NV	NV	NV

	SKILLS	
	Performance Criteria	**Evidence of Attainment**
F-16.01.01P	check that car body is level	car body is levelled
F-16.01.02P	remove blocking and safety chains between drive sprockets and pads	blocking and safety chains between drive sprockets and pads are removed
F-16.01.03P	extend/retract tracks	tracks are extended/retracted according ***manufacturers' specifications and instructions***
F-16.01.04P	position track onto car body	track is positioned onto car body using ***auxiliary lift equipment*** or ***manufacturers' specifications and instructions*** for self-assembly
F-16.01.05P	install ***fasteners***	***fasteners*** are installed according to ***manufacturers' specifications and instructions*** to secure track on car body
F-16.01.06P	join hydraulic/mechanical connections	hydraulic/mechanical connections are joined according to ***manufacturers' specifications and instructions*** to complete drive/outrigger circuits
F-16.01.07P	adjust track tension	track tension is adjusted according to ***manufacturers' specifications and instructions***

RANGE OF VARIABLES

manufacturers' specifications and instructions include: load charts, configuration charts, hoist rope specifications, assembly/disassembly charts

auxiliary lift equipment includes: forklifts, boom trucks, assist cranes

fasteners include: bolts, pins and keepers, wedges

	KNOWLEDGE	
	Learning Outcomes	**Learning Objectives**
F-16.01.01L	demonstrate knowledge of telescopic boom cranes, their ***components***, characteristics and applications	define terminology associated with telescopic boom cranes and their ***components***
		identify telescopic boom crane ***components*** requiring assembly
F-16.01.02L	demonstrate knowledge of procedures used to install tracks on car body of telescopic boom cranes	identify tools and equipment used to install tracks on car body of telescopic boom cranes and describe their applications and procedures for use
		identify ***hazards*** and describe safe work practices pertaining to installation of tracks on car body of telescopic boom cranes
		interpret ***manufacturers' specifications and instructions*** relating to installation of tracks on car body of telescopic boom cranes
		describe procedures used to install tracks on car body of telescopic boom cranes
		describe capabilities and limitations of ***auxiliary lift equipment***
		identify types of ***fasteners*** used in installation of tracks on car body of telescopic boom cranes
F-16.01.03L	demonstrate knowledge of regulatory requirements pertaining to assembly of telescopic boom cranes	identify codes, standards and regulations pertaining to assembly of telescopic boom cranes

RANGE OF VARIABLES

components include: tracks, car body, carrier, superstructure/upperworks, outrigger boxes, boom and jib, counterweights, hoist ropes, hook blocks, overhaul balls, attachments

hazards include: pinch points, falling hazards, open machinery, mechanical failure

manufacturers' specifications and instructions include: load charts, configuration charts, hoist rope specifications, assembly/disassembly charts

auxiliary lift equipment includes: forklifts, boom trucks, assist cranes

fasteners include: bolts, pins and keepers, wedges

F-16.02 Installs outrigger boxes (telescopic boom)

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	yes	yes	yes	no	yes	NV	NV	NV

SKILLS

	Performance Criteria	Evidence of Attainment
F-16.02.01P	position outrigger box	outrigger box is positioned according to ***manufacturers' specifications and instructions***
F-16.02.02P	inspect for ***defects***	***defects*** are detected and reported according to ***manufacturers' specifications and instructions***, jurisdictional regulations and company policies
F-16.02.03P	clean fittings	fittings are cleaned to avoid oil contamination and ensure ease of installation
F-16.02.04P	connect hoses and electrical wiring	hoses and electrical wiring are connected according to ***manufacturers' specifications and instructions***
F-16.02.05P	install ***fasteners***	***fasteners*** are installed according to ***manufacturers' specifications and instructions***

RANGE OF VARIABLES

manufacturers' specifications and instructions include: load charts, configuration charts, hoist rope specifications, assembly/disassembly charts

defects include: damaged hoses, fittings and cylinders; corrosion; cracks

fasteners include: bolts, pins and keepers, wedges

KNOWLEDGE

	Learning Outcomes	Learning Objectives
F-16.02.01L	demonstrate knowledge of telescopic boom cranes, their components, characteristics and applications	define terminology associated with telescopic boom cranes and their components
F-16.02.02L	demonstrate knowledge of procedures used to install outrigger boxes on telescopic boom cranes	identify tools and equipment used to install outrigger boxes on telescopic boom cranes and describe their applications and procedures for use
		identify ***hazards*** and describe safe work practices pertaining to installation of outrigger boxes on telescopic boom cranes

		interpret ***manufacturers' specifications and instructions*** relating to installation of outrigger boxes on telescopic boom cranes
		identify types of possible ***defects*** found in outrigger boxes on telescopic boom cranes
		describe procedures used to install outrigger boxes on telescopic boom cranes
		identify types of ***fasteners*** used in installation of outrigger boxes on telescopic boom cranes
		describe hydraulic and electrical connections required to attach outrigger boxes to telescopic boom cranes
F-16.02.03L	demonstrate knowledge of regulatory requirements pertaining to assembly of telescopic boom cranes	identify codes, standards and regulations pertaining to assembly of telescopic boom cranes

RANGE OF VARIABLES

hazards include: pinch points, falling hazards, open machinery, mechanical failure

manufacturers' specifications and instructions include: load charts, configuration charts, hoist rope specifications, assembly/disassembly charts

defects include: damaged hoses, fittings and cylinders; corrosion; cracks

fasteners include: bolts, pins and keepers, wedges

F-16.03 Installs superstructure/upperworks (telescopic boom)

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	yes	yes	yes	no	yes	NV	NV	NV

SKILLS

	Performance Criteria	Evidence of Attainment
F-16.03.01P	inspect for ***defects***	***defects*** are detected and reported according to ***manufacturers' specifications and instructions***, jurisdictional regulations and company policies
F-16.03.02P	clean surfaces and apply lubricant to pins and connection points	surfaces are cleaned and lubricant is applied to pins and connection points according to ***manufacturers' specifications and instructions*** to allow assembly

F-16.03.03P	position superstructure/upperworks onto car body/carrier	superstructure/upperworks is positioned onto car body/carrier according to ***manufacturers' specifications and instructions***
F-16.03.04P	install ***fasteners***	***fasteners*** are installed according to ***manufacturers' specifications and instructions*** to secure superstructure/upperworks on car body/carrier
F-16.03.05P	connect hydraulic lines and electrical connections	hydraulic lines and electrical connections are connected according to ***manufacturers' specifications and instructions***

RANGE OF VARIABLES

defects include: worn bolts, pins and bushings

manufacturers' specifications and instructions include: load charts, configuration charts, hoist rope specifications, assembly/disassembly charts

fasteners include: bolts, pins and keepers, wedges

	KNOWLEDGE	
	Learning Outcomes	**Learning Objectives**
F-16.03.01L	demonstrate knowledge of procedures used to install superstructure/upperworks on telescopic boom cranes	identify tools and equipment used to install superstructure/upperworks on telescopic boom cranes and describe their applications and procedures for use
		identify ***hazards*** and describe safe work practices pertaining to installation of superstructure/upperworks on telescopic boom cranes
		interpret ***manufacturers' specifications and instructions*** relating to installation of superstructure/upperworks on telescopic boom cranes
		identify types of possible ***defects*** in superstructure/upperworks on telescopic boom cranes
		describe procedures used to install superstructure/upperworks on telescopic boom cranes
		identify types of ***fasteners*** used in installation of superstructure/upperworks on telescopic boom cranes

		describe hydraulic and electrical connections required to attach superstructure/upperworks onto car body/carrier
F-16.03.02L	demonstrate knowledge of regulatory requirements pertaining to assembly of telescopic boom cranes	identify codes, standards and regulations pertaining to assembly of telescopic boom cranes

RANGE OF VARIABLES

hazards include: pinch points, falling hazards, open machinery, mechanical failure

manufacturers' specifications and instructions include: load charts, configuration charts, hoist rope specifications, assembly/disassembly charts

defects include: worn bolts, pins and bushings

fasteners include: bolts, pins and keepers, wedges

F-16.04 Installs main boom (telescopic boom)

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	yes	yes	yes	yes	yes	NV	NV	NV

SKILLS

	Performance Criteria	Evidence of Attainment
F-16.04.01P	operate boom launcher or use assist cranes	boom launcher is operated or assist cranes are used according to ***manufacturers' specifications and instructions*** to secure main boom to superstructure/upperworks
F-16.04.02P	connect hydraulic lines and electrical connections	hydraulic lines and electrical connections are connected according to ***manufacturers' specifications and instructions*** to complete circuits
F-16.04.03P	install ***fasteners***	***fasteners*** are installed according to ***manufacturers' specifications and instructions*** to secure boom

RANGE OF VARIABLES

manufacturers' specifications and instructions include: load charts, configuration charts, hoist rope specifications, assembly/disassembly charts

fasteners include: bolts, pins and keepers

	KNOWLEDGE	
	Learning Outcomes	**Learning Objectives**
F-16.04.01L	demonstrate knowledge of procedures used to install main boom on telescopic boom cranes	identify tools and equipment used to install main boom on telescopic boom cranes and describe their applications and procedures for use
		identify ***hazards*** and describe safe work practices pertaining to installation of main boom on telescopic boom cranes
		interpret ***manufacturers' specifications and instructions*** relating to installation of main boom on telescopic boom cranes
		describe procedures used to install main boom on telescopic boom cranes
		identify types of ***fasteners*** used in installation of main boom on telescopic boom cranes
		describe hydraulic and electrical connections required to attach main boom to telescopic boom cranes
F-16.04.02L	demonstrate knowledge of regulatory requirements pertaining to assembly of telescopic boom cranes	identify codes, standards and regulations pertaining to assembly of telescopic boom cranes

RANGE OF VARIABLES

hazards include: pinch points, falling hazards, open machinery, mechanical failure

manufacturers' specifications and instructions include: load charts, configuration charts, hoist rope specifications, assembly/disassembly charts

fasteners include: bolts, pins and keepers

F-16.05 Installs hook blocks and overhaul ball (telescopic boom)

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	yes	yes	yes	yes	yes	NV	NV	NV

SKILLS

	Performance Criteria	Evidence of Attainment
F-16.05.01P	position main boom for installation	main boom is positioned according to ***manufacturers' specifications and instructions***
F-16.05.02P	determine block and ball overhaul weight	block and ball overhaul weight is determined according to length of boom and reeving configuration
F-16.05.03P	inspect hook block and overhaul ball for size and WLL	hook block and overhaul ball are inspected for size and WLL according to ***manufacturers' specifications and instructions***
F-16.05.04P	spool out stored hoist rope off of winch	stored hoist rope is spooled out off of winch according to ***manufacturers' specifications and instructions***
F-16.05.05P	cut and seize hoist rope if required	hoist rope is cut and seized if required using cable cutting equipment according to ***manufacturers' specifications and instructions***
F-16.05.06P	reeve hook block with required parts of hoist rope to lift calculated weight	hook block is reeved with required parts of hoist rope according to ***manufacturers' specifications and instructions*** to lift calculated weight
F-16.05.07P	terminate hoist rope ends	hoist rope ends are terminated according to ***manufacturers' specifications and instructions*** using ***connections***
F-16.05.08P	install ***fasteners***	***fasteners*** are installed according to ***manufacturers' specifications and instructions***

RANGE OF VARIABLES

manufacturers' specifications and instructions include: load charts, configuration charts, hoist rope specifications, assembly/disassembly charts

connections include: wedge sockets, button sockets

fasteners include: pins and keepers, wire rope clips

	KNOWLEDGE	
	Learning Outcomes	**Learning Objectives**
F-16.05.01L	demonstrate knowledge of procedures used to install hook blocks and overhaul ball on telescopic boom cranes	identify tools and equipment used to install hook blocks and overhaul ball on telescopic boom cranes and describe their applications and procedures for use
		identify ***hazards*** and describe safe work practices pertaining to installation of hook blocks and overhaul ball on telescopic boom cranes
		interpret ***manufacturers' specifications and instructions*** relating to installation of hook blocks and overhaul ball on telescopic boom cranes
		describe procedures used to install hook blocks and overhaul ball on telescopic boom cranes
		identify types of ***fasteners*** used in installation of hook blocks and overhaul ball on telescopic boom cranes
		identify WLL and size of hook block and overhaul ball
F-16.05.02L	demonstrate knowledge of regulatory requirements pertaining to assembly of telescopic boom cranes	identify codes, standards and regulations pertaining to assembly of telescopic boom cranes

RANGE OF VARIABLES

hazards include: pinch points, falling hazards, mechanical failure, suspended loads, stored energy, broken wires, entanglement

manufacturers' specifications and instructions include: load charts, configuration charts, hoist rope specifications, assembly/disassembly charts

fasteners include: pins and keepers, wire rope clips

F-16.06 Installs counterweights (telescopic boom)

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	yes	yes	yes	yes	yes	NV	NV	NV

SKILLS

	Performance Criteria	Evidence of Attainment
F-16.06.01P	inspect for ***defects***	***defects*** are detected and reported according to ***manufacturers' specifications and instructions***, jurisdictional regulations and company policies
F-16.06.02P	determine installation sequence and placement of counterweights	installation sequence and placement of counterweights are determined according to ***manufacturers' specifications and instructions***
F-16.06.03P	place counterweights on crane	counterweights are placed on crane according to ***manufacturers' specifications and instructions***
F-16.06.04P	raise assembled counterweights into position	assembled counterweights are raised into position according to ***manufacturers' specifications and instructions***
F-16.06.05P	install ***fasteners***	***fasteners*** are installed according to ***manufacturers' specifications and instructions*** to secure assembled counterweights

RANGE OF VARIABLES

defects include: broken bolts, damaged threads and pins, cracks, damaged lifting lugs and eyes

manufacturers' specifications and instructions include: load charts, configuration charts, hoist rope specifications, assembly/disassembly charts

fasteners include: pins, bolts, stack, cylinders, chains

KNOWLEDGE

	Learning Outcomes	Learning Objectives
F-16.06.01L	demonstrate knowledge of procedures used to install counterweights on telescopic boom cranes	identify tools and equipment used to install counterweights on telescopic boom cranes, and describe their applications and procedures for use
		identify ***hazards*** and describe safe work practices pertaining to installation of counterweights on telescopic boom cranes

		interpret ***manufacturers' specifications and instructions*** relating to installation of counterweights on telescopic boom cranes
		identify types of possible ***defects*** in counterweights on telescopic boom cranes
		describe procedures used to determine sequence and placement of counterweights on telescopic boom cranes
		identify types of ***fasteners*** used in installation of counterweights
F-16.06.02L	demonstrate knowledge of regulatory requirements pertaining to assembly of telescopic boom cranes	identify codes, standards and regulations pertaining to assembly of telescopic boom cranes

RANGE OF VARIABLES

hazards include: pinch points, falling hazards, mechanical failure, suspended loads

manufacturers' specifications and instructions include: load charts, configuration charts, hoist rope specifications, assembly/disassembly charts

defects include: broken bolts, damaged threads and pins, cracks, damaged lifting lugs and eyes

fasteners include: pins, bolts, stack, cylinders, chains

F-16.07 Installs jibs and inserts (telescopic boom)

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	yes	yes	yes	yes	yes	NV	NV	NV

	SKILLS	
	Performance Criteria	**Evidence of Attainment**
F-16.07.01P	inspect for ***defects***	***defects*** are detected and reported according to ***manufacturers' specifications and instructions***, jurisdictional regulations and company policies
F-16.07.02P	install inserts	inserts are installed according to ***manufacturers' specifications and instructions***
F-16.07.03P	erect and secure jib into working position	jib is erected and secured into working position according to ***manufacturers' specifications and instructions***
F-16.07.04P	adjust offset	offset is adjusted according to ***manufacturers' specifications and instructions*** to meet lift requirements

F-16.07.05P	connect ***hydraulic*** and ***electrical components***	***hydraulic*** and ***electrical components*** are connected according to ***manufacturers' specifications and instructions***
F-16.07.06P	install ***fasteners***	***fasteners*** are installed according to ***manufacturers' specifications and instructions***
F-16.07.07P	extend telescopic jib extensions	telescopic jib extensions are extended according to ***manufacturers' specifications and instructions***

RANGE OF VARIABLES

defects include: bent lacings, damaged chords, broken electrical wires, dents, loose or damaged wire connections, leaking hydraulic system and connections

manufacturers' specifications and instructions include: load charts, configuration charts, hoist rope specifications, assembly/disassembly charts

hydraulic components include: cylinders, motors, hoses

electrical components include: anemometer, anti-two block, lights, wiring, wiring connections

fasteners include: pins and keepers

	KNOWLEDGE	
	Learning Outcomes	**Learning Objectives**
F-16.07.01L	demonstrate knowledge of procedures used to install jibs and inserts on telescopic boom cranes	identify tools and equipment used to install jibs and inserts on telescopic boom cranes and describe their applications and procedures for use
		identify ***hazards*** and describe safe work practices pertaining to installation of jibs and inserts on telescopic boom cranes
		interpret ***manufacturers' specifications and instructions*** relating to installation of jibs and inserts on telescopic boom cranes
		describe procedures used to install jibs and inserts on telescopic boom cranes
		identify types of ***fasteners*** used in installation of jibs and inserts on telescopic boom cranes
		describe hydraulic and electrical connections required to attach jibs and inserts to telescopic boom cranes
F-16.07.02L	demonstrate knowledge of regulatory requirements pertaining to assembly of telescopic boom cranes	identify codes, standards and regulations pertaining to assembly of telescopic boom cranes

RANGE OF VARIABLES

hazards include: pinch points, falling hazards, mechanical failure, suspended loads

manufacturers' specifications and instructions include: load charts, configuration charts, hoist rope specifications, assembly/disassembly charts

fasteners include: pins and keepers

F-16.08 Removes jibs and inserts (telescopic boom)

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	yes	yes	yes	yes	yes	NV	NV	NV

	SKILLS	
	Performance Criteria	**Evidence of Attainment**
F-16.08.01P	retract telescopic jib extensions	telescopic jib extensions are retracted according to ***manufacturers' specifications and instructions***
F-16.08.02P	disconnect ***electrical*** and ***hydraulic components***	***electrical*** and ***hydraulic components*** are disconnected according to ***manufacturers' specifications and instructions***
F-16.08.03P	remove and store ***fasteners***	***fasteners*** are removed and stored according to ***manufacturers' specifications and instructions***
F-16.08.04P	return offset to stowed position	offset is returned to stowed position according to ***manufacturers' specifications and instructions***
F-16.08.05P	remove inserts	inserts are removed according to ***manufacturers' specifications and instructions***
F-16.08.06P	stow and secure jib for travel	jib is stowed and secured for travel according to ***manufacturers' specifications and instructions***

RANGE OF VARIABLES

manufacturers' specifications and instructions include: load charts, configuration charts, hoist rope specifications, assembly/disassembly charts

electrical components include: anemometer, anti-two block, lights

hydraulic components include: cylinders, motors

fasteners include: pins and keepers

	KNOWLEDGE	
	Learning Outcomes	**Learning Objectives**
F-16.08.01L	demonstrate knowledge of procedures used to remove jibs and inserts on telescopic boom cranes	identify tools and equipment used to remove jibs and inserts on telescopic boom cranes, and describe their applications and procedures for use
		identify ***hazards*** and describe safe work practices pertaining to removal of jibs and inserts on telescopic boom cranes
		interpret ***manufacturers' specifications and instructions*** relating to removal of jibs and inserts on telescopic boom cranes
		describe procedures used to remove jibs and inserts on telescopic boom cranes
		identify types of ***fasteners*** used in removal of jibs and inserts on telescopic boom cranes
		describe hydraulic and electrical connections required to remove jibs and inserts to telescopic boom cranes
F-16.08.02L	demonstrate knowledge of regulatory requirements pertaining to disassembly of telescopic boom cranes	identify codes, standards and regulations pertaining to disassembly of telescopic boom cranes

RANGE OF VARIABLES

hazards include: pinch points, falling hazards, mechanical failure, suspended loads

manufacturers' specifications and instructions include: load charts, configuration charts, hoist rope specifications, assembly/disassembly charts

fasteners include: pins and keepers

electrical components include: anemometer, anti-two block, lights

hydraulic components include: cylinders, motors

F-16.09 Removes counterweights (telescopic boom)

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	yes	yes	yes	yes	yes	NV	NV	NV

	SKILLS	
	Performance Criteria	**Evidence of Attainment**
F-16.09.01P	remove and store ***fasteners***	***fasteners*** are removed and stored according to ***manufacturers' specifications and instructions***
F-16.09.02P	lower counterweight assembly out of position	counterweight assembly is lowered out of position according to ***manufacturers' specifications and instructions***
F-16.09.03P	disassemble counterweight assembly	counterweight assembly is disassembled according to ***manufacturers' specifications and instructions***

RANGE OF VARIABLES

fasteners include: pins, bolts, cylinders, chains

manufacturers' specifications and instructions include: load charts, configuration charts, hoist rope specifications, assembly/disassembly charts

	KNOWLEDGE	
	Learning Outcomes	**Learning Objectives**
F-16.09.01L	demonstrate knowledge of procedures used to remove counterweights on telescopic boom cranes	identify tools and equipment used to remove counterweights on telescopic boom cranes, and describe their applications and procedures for use
		identify ***hazards*** and describe safe work practices pertaining to removal of counterweights on telescopic boom cranes
		interpret ***manufacturers' specifications and instructions*** relating to removal of counterweights on telescopic boom cranes
		describe procedures used to remove counterweights on telescopic boom cranes
F-16.09.02L	demonstrate knowledge of regulatory requirements pertaining to disassembly of telescopic boom cranes	identify codes, standards and regulations pertaining to disassembly of telescopic boom cranes

RANGE OF VARIABLES

hazards include: pinch points, falling hazards, mechanical failure, suspended loads

manufacturers' specifications and instructions include: load charts, configuration charts, hoist rope specifications, assembly/disassembly charts

F-16.10 Removes hook blocks and overhaul ball (telescopic boom)

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	yes	yes	yes	yes	yes	NV	NV	NV

SKILLS

	Performance Criteria	Evidence of Attainment
F-16.10.01P	remove and store ***fasteners***	***fasteners*** are removed and stored according to ***manufacturers' specifications and instructions***
F-16.10.02P	dismantle ***connections***	***connections*** are dismantled according to ***manufacturers' specifications and instructions***
F-16.10.03P	remove hoist rope from hook block	hoist rope is removed from hook block
F-16.10.04P	spool hoist rope onto winch	hoist rope is spooled onto winch according to ***manufacturers' specifications and instructions***
F-16.10.05P	secure line on drum	line on drum is secured to preserve spooling

RANGE OF VARIABLES

fasteners include: pins and keepers, wire rope clips

manufacturers' specifications and instructions include: load charts, configuration charts, hoist rope specifications, assembly/disassembly charts

connections include: wedge sockets, button sockets

KNOWLEDGE

	Learning Outcomes	Learning Objectives
F-16.10.01L	demonstrate knowledge of procedures used to remove hook blocks and overhaul ball from telescopic boom cranes	identify tools and equipment used to remove hook blocks and overhaul ball from telescopic boom cranes, and describe their applications and procedures for use
		identify ***hazards*** and describe safe work practices pertaining to removal of hook blocks and overhaul ball from telescopic boom cranes

		interpret ***manufacturers' specifications and instructions*** relating to removal of hook blocks and overhaul ball from telescopic boom cranes
		describe procedures used to remove hook blocks and overhaul ball from telescopic boom cranes
		identify types of ***fasteners*** used with hook blocks and overhaul ball
F-16.10.02L	demonstrate knowledge of regulatory requirements pertaining to disassembly of telescopic boom cranes	identify codes, standards and regulations pertaining to disassembly of telescopic boom cranes

RANGE OF VARIABLES

hazards include: pinch points, falling hazards, mechanical failure, suspended loads, broken wires, stored energy, entanglement

manufacturers' specifications and instructions include: load charts, configuration charts, hoist rope specifications, assembly/disassembly charts

fasteners include: pins and keepers, wire rope clips

F-16.11 Removes main boom (telescopic boom)

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	yes	yes	yes	yes	yes	NV	NV	NV

	SKILLS	
	Performance Criteria	**Evidence of Attainment**
F-16.11.01P	ensure weight of main boom is supported by ***auxiliary lift equipment*** or boom launcher	weight of main boom is supported by ***auxiliary lift equipment*** or boom launcher according to ***manufacturers' specifications and instructions***
F-16.11.02P	remove and store ***fasteners***	***fasteners*** are removed and stored according to ***manufacturers' specifications and instructions***
F-16.11.03P	disconnect hydraulic lines and electrical connections	hydraulic lines and electrical connections are disconnected according to ***manufacturers' specifications and instructions***

RANGE OF VARIABLES

auxiliary lift equipment includes: forklifts, boom trucks, assist cranes, boom launcher

manufacturers' specifications and instructions include: load charts, configuration charts, hoist rope specifications, assembly/disassembly charts

fasteners include: pins and keepers, bolts, other hardware

	KNOWLEDGE	
	Learning Outcomes	**Learning Objectives**
F-16.11.01L	demonstrate knowledge of procedures used to remove main boom from telescopic boom cranes	identify tools and equipment used to remove main boom from telescopic boom cranes, and describe their applications and procedures for use
		identify ***hazards*** and describe safe work practices pertaining to removal of main boom from telescopic boom cranes
		interpret ***manufacturers' specifications and instructions*** relating to removal of main boom from telescopic boom cranes
		describe procedures used to remove main boom from telescopic boom cranes
		describe capabilities and limitations of ***auxiliary lift equipment***
F-16.11.02L	demonstrate knowledge of regulatory requirements pertaining to disassembly of telescopic boom cranes	identify codes, standards and regulations pertaining to disassembly of telescopic boom cranes

RANGE OF VARIABLES

hazards include: pinch points, falling hazards, mechanical failure, suspended loads

manufacturers' specifications and instructions include: load charts, configuration charts, hoist rope specifications, assembly/disassembly charts

auxiliary lift equipment includes: forklifts, boom trucks, assist cranes, boom launcher

F-16.12 Removes outrigger boxes (telescopic boom)

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	yes	yes	yes	no	yes	NV	NV	NV

SKILLS

	Performance Criteria	Evidence of Attainment
F-16.12.01P	ensure weight of outrigger box is supported	weight of outrigger box is supported using ***auxiliary lift equipment*** or is self-supported according to ***manufacturers' specifications and instructions***
F-16.12.02P	remove and store ***fasteners***	***fasteners*** are removed and stored according to ***manufacturers' specifications and instructions***
F-16.12.03P	disconnect hoses and electrical wiring	hoses and electrical wiring are disconnected according to ***manufacturers' specifications and instructions***

RANGE OF VARIABLES

auxiliary lift equipment includes: forklifts, boom trucks, assist cranes, gantry, A-frame, mast

manufacturers' specifications and instructions include: load charts, configuration charts, hoist rope specifications, assembly/disassembly charts

fasteners include: bolts, pins and keepers

KNOWLEDGE

	Learning Outcomes	Learning Objectives
F-16.12.01L	demonstrate knowledge of procedures used to remove outrigger boxes on telescopic boom cranes	identify tools and equipment used to remove outrigger boxes on telescopic boom cranes, and describe their applications and procedures for use
		identify ***hazards*** and describe safe work practices pertaining to removal of outrigger boxes on telescopic boom cranes
		interpret ***manufacturers' specifications and instructions*** relating to removal of outrigger boxes on telescopic boom cranes
		describe procedures used to remove outrigger boxes on telescopic boom cranes

		describe capabilities and limitations of ***auxiliary lift equipment***
F-16.12.02L	demonstrate knowledge of regulatory requirements pertaining to disassembly of telescopic boom cranes	identify codes, standards and regulations pertaining to disassembly of telescopic boom cranes

RANGE OF VARIABLES

hazards include: pinch points, falling hazards, mechanical failure, suspended loads

manufacturers' specifications and instructions include: load charts, configuration charts, hoist rope specifications, assembly/disassembly charts

auxiliary lift equipment includes: forklifts, boom trucks, assist cranes, gantry, A-frame, mast

F-16.13 Removes tracks from car body (telescopic boom)

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	yes	yes	yes	no	yes	NV	NV	NV

SKILLS

	Performance Criteria	Evidence of Attainment
F-16.13.01P	extend/retract tracks	tracks are extended/retracted according to ***manufacturers' specifications and instructions***
F-16.13.02P	support with blocking suitable for ***ground conditions*** and level crane	crane is supported with blocking suitable for ***ground conditions*** and levelled using ***equipment*** according to ***manufacturers' specifications and instructions***
F-16.13.03P	disconnect hydraulic/mechanical connections for drive/outrigger systems	hydraulic/mechanical connections for drive/outrigger systems are disconnected according to ***manufacturers' specifications and instructions***
F-16.13.04P	support weight of track	weight of track is supported according to ***manufacturers' specifications and instructions***
F-16.13.05P	remove and store ***fasteners***	***fasteners*** are removed and stored according to ***manufacturers' specifications and instructions***
F-16.13.06P	remove track from car body	track is removed from car body according to ***manufacturers' specifications and instructions***

RANGE OF VARIABLES

manufacturers' specifications and instructions include: load charts, configuration charts, hoist rope specifications, assembly/disassembly charts

ground conditions include: gravel, clay, peat, silt, asphalt, concrete

equipment includes: jacks, auxiliary lift equipment

fasteners include: bolts, pins and keepers, wedges

	KNOWLEDGE	
	Learning Outcomes	**Learning Objectives**
F-16.13.01L	demonstrate knowledge of procedures used to remove tracks from car body on telescopic boom cranes	identify tools and equipment used to remove tracks from car body on telescopic boom cranes, and describe their applications and procedures for use
		identify ***hazards*** and describe safe work practices pertaining to removal of tracks from car body on telescopic boom cranes
		interpret ***manufacturers' specifications and instructions*** relating to removal of tracks from car body on telescopic boom cranes
		describe procedures used to remove tracks from car body on telescopic boom cranes
		describe procedures used to determine blocking required based on ***ground conditions***
F-16.13.02L	demonstrate knowledge of regulatory requirements pertaining to disassembly of telescopic boom cranes	identify codes, standards and regulations pertaining to disassembly of telescopic boom cranes

RANGE OF VARIABLES

hazards include: pinch points, falling hazards, open machinery, mechanical failure

manufacturers' specifications and instructions include: load charts, configuration charts, hoist rope specifications, assembly/disassembly charts

ground conditions include: gravel, clay, peat, silt, asphalt, concrete

F-16.14 Removes superstructure/upperworks (telescopic boom)

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	yes	yes	yes	no	yes	NV	NV	NV

SKILLS

	Performance Criteria	Evidence of Attainment
F-16.14.01P	support with blocking suitable for ***ground conditions*** and level crane	crane is supported with blocking suitable for ***ground conditions*** and levelled using ***equipment*** to facilitate removal of superstructure/upperworks
F-16.14.02P	disassemble superstructure/upperworks	superstructure/upperworks is disassembled according to ***manufacturers' specifications and instructions***
F-16.14.03P	remove and store ***fasteners***	***fasteners*** are removed and stored according to ***manufacturers' specifications and instructions***
F-16.14.04P	disconnect hydraulic lines and electrical connections	hydraulic lines and electrical connections are disconnected according to ***manufacturers' specifications and instructions***
F-16.14.05P	remove superstructure/upperworks from car body/carrier	superstructure/upperworks is removed from car body/carrier according to ***manufacturers' specifications and instructions***

RANGE OF VARIABLES

ground conditions include: gravel, clay, peat, silt, asphalt, concrete

equipment includes: jacks, assist cranes

manufacturers' specifications and instructions include: load charts, configuration charts, hoist rope specifications, assembly/disassembly charts

fasteners include: bolts, pins and keepers, wedges

KNOWLEDGE

	Learning Outcomes	Learning Objectives
F-16.14.01L	demonstrate knowledge of procedures used to remove superstructure/upperworks from telescopic boom cranes	identify tools and equipment used to remove superstructure/upperworks from telescopic boom cranes, and describe their applications and procedures for use
		identify ***hazards*** and describe safe work practices pertaining to removal of superstructure/upperworks from telescopic boom cranes

		interpret ***manufacturers' specifications and instructions*** relating to removal of superstructure/upperworks from telescopic boom cranes
		describe procedures used to remove superstructure/upperworks from telescopic boom cranes
		describe procedures used to determine blocking required based on ***ground conditions***
F-16.14.02L	demonstrate knowledge of regulatory requirements pertaining to disassembly of telescopic boom cranes	identify codes, standards and regulations pertaining to disassembly of telescopic boom cranes

RANGE OF VARIABLES

hazards include: pinch points, falling hazards, open machinery, mechanical failure

manufacturers' specifications and instructions include: load charts, configuration charts, hoist rope specifications, assembly/disassembly charts

ground conditions include: gravel, clay, peat, silt, asphalt, concrete

TASK F-17 Assembles and disassembles specialty equipment and attachments

TASK DESCRIPTOR

Mobile crane operators need to assemble and disassemble specialty equipment and attachments according to manufacturers' specifications and instructions.

F-17.01 Assembles specialty equipment and attachments

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	yes	yes	yes	no	yes	NV	NV	NV

	SKILLS	
	Performance Criteria	**Evidence of Attainment**
F-17.01.01P	select ***specialty equipment*** and ***attachments***	***specialty equipment*** and ***attachments*** are selected according to job requirements
F-17.01.02P	select assembly area	assembly area is selected according to space required and site conditions

F-17.01.03P	inspect for ***defects***	***defects*** are detected and reported according to ***manufacturers' specifications and instructions***, jurisdictional regulations and company policies
F-17.01.04P	clean and lubricate pins and connection points	pins and connection points are cleaned and lubricated according to ***manufacturers' specifications and instructions***
F-17.01.05P	connect ***attachments*** in sequence	***attachments*** are connected in sequence according to ***manufacturers' specifications and instructions***

RANGE OF VARIABLES

specialty equipment include: piledriver, clamshell bucket, dragline bucket, concrete bucket, wrecking ball, magnet

attachments include: leads, hammers, drills, safety devices, superlift

defects include: damaged chords, lacing and hoist rope

manufacturers' specifications and instructions include: load charts, configuration charts, hoist rope specifications, assembly/disassembly charts

	KNOWLEDGE	
	Learning Outcomes	**Learning Objectives**
F-17.01.01L	demonstrate knowledge of ***specialty equipment***, their ***attachments***, characteristics and applications	define terminology associated with ***specialty equipment*** and their ***attachments***
		identify types of ***specialty equipment*** and their ***attachments***, and describe their characteristics and applications
F-17.01.02L	demonstrate knowledge of procedures used to assemble ***specialty equipment*** and their ***attachments***	identify tools and equipment used to assemble ***specialty equipment*** and their ***attachments***, and describe their applications and procedures for use
		identify ***hazards*** and describe safe work practices pertaining to ***specialty equipment*** and their ***attachments***
		interpret ***manufacturers' specifications and instructions*** relating to assembly of ***specialty equipment*** and their ***attachments***
		identify types of possible ***defects*** found in ***specialty equipment*** and their ***attachments***

		describe procedures used to assemble ***specialty equipment*** and their ***attachments***
F-17.01.03L	demonstrate knowledge of regulatory requirements pertaining to assembly of ***specialty equipment*** and their ***attachments***	identify codes, standards and regulations pertaining to assembly of ***specialty equipment*** and their ***attachments***

RANGE OF VARIABLES

specialty equipment include: piledriver, clamshell bucket, dragline bucket, concrete bucket, wrecking ball, magnet

attachments include: leads, hammers, drills, safety devices, superlift

hazards include: pinch points, falling hazards, open machinery, mechanical failure

manufacturers' specifications and instructions include: load charts, configuration charts, hoist rope specifications, assembly/disassembly charts

defects include: damaged chords, lacing and hoist rope

F-17.02 Disassembles specialty equipment and attachments

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	yes	yes	yes	no	yes	NV	NV	NV

	SKILLS	
	Performance Criteria	**Evidence of Attainment**
F-17.02.01P	select disassembly area	disassembly area is selected according to space required and site conditions
F-17.02.02P	remove ***attachments***	***attachments*** are removed according to ***manufacturers' specifications and instructions***
F-17.02.03P	demobilize ***specialty equipment***	***specialty equipment*** is demobilized according to ***manufacturers' specifications and instructions***
F-17.02.04P	perform post-operational inspection and report damage	post-operational inspection is performed and damage is reported according to ***manufacturers' specifications and instructions***, company policies and jurisdictional regulations

RANGE OF VARIABLES

attachments include: leads, hammers, drills, safety devices, superlift

manufacturers' specifications and instructions include: load charts, configuration charts, hoist rope specifications, assembly/disassembly charts

specialty equipment include: piledriver, clamshell bucket, dragline bucket, concrete bucket, drill, wrecking ball, magnet

	KNOWLEDGE	
	Learning Outcomes	**Learning Objectives**
F-17.02.01L	demonstrate knowledge of procedures used to disassemble ***specialty equipment*** and their ***attachments***	identify tools and equipment used to disassemble ***specialty equipment*** and their ***attachments***, and describe their applications and procedures for use
		identify ***hazards*** and describe safe work practices pertaining to disassembly of ***specialty equipment*** and their ***attachments***
		interpret ***manufacturers' specifications and instructions*** relating to disassembly of ***specialty equipment*** and their ***attachments***
		describe procedures used to disassemble ***specialty equipment*** and their ***attachments***
F-17.02.02L	demonstrate knowledge of regulatory requirements pertaining to disassembly of ***specialty equipment*** and their ***attachments***	identify codes, standards and regulations pertaining to disassembly of ***specialty equipment*** and their ***attachments***

RANGE OF VARIABLES

specialty equipment include: piledriver, clamshell bucket, dragline bucket, concrete bucket, drill, wrecking ball, magnet

attachments include: leads, hammers, drills, safety devices, superlift

hazards include: pinch points, falling hazards, open machinery, mechanical failure

manufacturers' specifications and instructions include: load charts, configuration charts, hoist rope specifications, assembly/disassembly charts

MAJOR WORK ACTIVITY G

Operates crane

TASK G-18 Performs common craning operations

TASK DESCRIPTOR

Configuring the crane and electronic operational aids such as load moment indicators (LMI), rated capacity indicators (RCI) and rated capacity limiters (RCL), and driving cranes on jobsites are common operations performed by all mobile crane operators.

G-18.01 Configures electronic operational aids

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	yes	yes	yes	yes	yes	NV	NV	NV

	SKILLS	
	Performance Criteria	**Evidence of Attainment**
G-18.01.01P	set computer for rig-up and rig-down	computer is set for rig-up and rig-down according to active crane configuration and manufacturers' specifications and instructions
G-18.01.02P	set computer for hoisting operations	computer is set for hoisting operations according to active crane configuration and manufacturers' specifications and instructions
G-18.01.03P	enter and confirm ***data*** in computer	***data*** is entered and confirmed in computer
G-18.01.04P	program range limiting device	range limiting device is programmed according to ***hazards*** and maximum parameters
G-18.01.05P	adjust ***data***	***data*** is adjusted according to ***changes in configuration***

RANGE OF VARIABLES

data includes: boom length/boom type, jib length/jib type/jib offset, winches, parts of line, amount of counterweight, supporting base configuration, attachments

hazards include: powerlines, swing/boom obstructions, overhead obstructions

changes in configuration include: switching between attachments, new obstructions

	KNOWLEDGE	
	Learning Outcomes	**Learning Objectives**
G-18.01.01L	demonstrate knowledge of ***electronic operational aids***, their characteristics and applications	define terminology associated with ***electronic operational aids***
		identify ***hazards*** and describe safe work practices pertaining to use of ***electronic operational aids***
G-18.01.02L	demonstrate knowledge of procedures used to configure ***electronic operational aids***	describe procedures used to configure ***electronic operational aids***
		identify types of ***data*** entered into computer to configure ***electronic operational aids***
		interpret charts, drawings and, manufacturers' specifications and instructions relating to configuration of ***electronic operational aids***
G-18.01.03L	demonstrate knowledge of regulatory requirements pertaining to craning operations	identify standards and regulations pertaining to craning operations
		locate information related to ***electronic operational aids*** in standards and regulations

RANGE OF VARIABLES

electronic operational aids include: LMI, RCI, RCL

hazards include: powerlines, swing/boom obstructions, overhead obstructions

data includes: boom length/boom type, jib length/jib type/jib offset, winches, parts of line, amount of counterweight, supporting base configuration, attachments

G-18.02 Mobilizes crane on jobsite

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	yes	yes	yes	yes	yes	NV	NV	NV

	SKILLS	
	Performance Criteria	**Evidence of Attainment**
G-18.02.01P	identify ***hazards and obstacles***	***hazards and obstacles*** are identified
G-18.02.02P	plan route on jobsite	route on jobsite is planned according to ***site conditions*** and crane configuration
G-18.02.03P	configure crane for travel	crane is configured for travel according to manufacturers' specifications and instructions

G-18.02.04P	request support equipment to prepare ground and route	support equipment is requested to prepare ground and route
G-18.02.05P	set out crane mats and blocking	crane mats and blocking are set out according to ground conditions and crane configuration and manufacturers' specifications
G-18.02.06P	determine need for a signal person in front and back of crane	need for a signal person in front and back of crane is determined according to ***site conditions***, crane configuration, site policies and jurisdictional regulations
G-18.02.07P	engage and disengage controls	controls are engaged and disengaged to operate ***functions*** to move crane
G-18.02.08P	monitor crane	crane is monitored to ensure it stays within parameters during travel according to manufacturers' specifications

RANGE OF VARIABLES

hazards and obstacles include: overhead powerlines, underground utilities, other equipment, excavations

site conditions include: ground conditions (grades, icy conditions, soft ground), location of utilities, limits of approach to powerlines, wind speed

functions include: transmission, steering, brakes, suspension

	KNOWLEDGE	
	Learning Outcomes	**Learning Objectives**
G-18.02.01L	demonstrate knowledge of procedures used to mobilize cranes on jobsite	identify ***hazards and obstacles*** and describe safe work practices pertaining to mobilization of cranes on jobsite
		describe procedures used to mobilize cranes on jobsite
		interpret charts, drawings and specifications relating to mobilization of cranes on jobsite
		describe use of crane mats and blocking
		describe procedures used to determine signalling requirements
		describe importance of planning crane route according to ***site conditions*** and crane configuration
G-18.02.02L	demonstrate knowledge of regulatory requirements pertaining to craning operations	identify standards and regulations pertaining to craning operations

RANGE OF VARIABLES

hazards and obstacles include: overhead powerlines, underground utilities, other equipment, excavations

site conditions include: ground conditions (grades, icy conditions, soft ground), location of utilities, limits of approach to powerlines, wind speed

TASK G-19 Operates friction drive lattice boom cranes

TASK DESCRIPTOR

Mobile crane operators operate friction drive lattice boom cranes, which encompass both crawler-mounted and truck-mounted cranes.

G-19.01 Operates friction drive crawler-mounted lattice boom cranes

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	yes	yes	yes	no	yes	NV	NV	NV

	SKILLS	
	Performance Criteria	**Evidence of Attainment**
G-19.01.01P	perform function test	function test is performed to ensure all crane's functions and devices, including the master clutch, are operational
G-19.01.02P	engage swing, boom, hoist and travel functions in any given direction	swing, boom, hoist and travel functions are engaged in any given direction according to changing site conditions
G-19.01.03P	centre hook block above centre of gravity of load	hook block is centred above centre of gravity of load
G-19.01.04P	maintain control of load during ***functions***	control of load during ***functions*** is maintained while taking into consideration changing site conditions
G-19.01.05P	coordinate clutch and brake operations	clutch and brake operations are coordinated to control load
G-19.01.06P	stop crane while maintaining control of load	crane is stopped while maintaining control of load
G-19.01.07P	steer and travel crane in any direction	crane is steered and travelled in any direction while using travel functions to pick and carry, and travel
G-19.01.08P	engage dogs/pawls	dogs/pawls are engaged to avoid further movement of crane or load

RANGE OF VARIABLES

functions include: changing radius; using hoist, boom, swing and travel controls in combination

	KNOWLEDGE	
	Learning Outcomes	**Learning Objectives**
G-19.01.01L	demonstrate knowledge of friction drive crawler-mounted lattice boom cranes, their ***attachments***, characteristics and applications	define terminology associated with friction drive crawler-mounted lattice boom cranes and their ***attachments***
		identify hazards and describe safe work practices pertaining to friction drive crawler-mounted lattice boom cranes and their ***attachments***
		interpret charts, drawings and ***specifications*** pertaining to friction drive crawler-mounted lattice boom cranes and their ***attachments***
		identify ***types of friction drive systems*** and describe their characteristics and applications
G-19.01.02L	demonstrate knowledge of procedures used to operate friction drive crawler-mounted lattice boom cranes and their ***attachments***	describe procedures used to perform a function test
		describe procedures used to inspect, maintain and troubleshoot friction drive crawler-mounted lattice boom cranes and their ***attachments***
		describe procedures used to operate friction drive crawler-mounted lattice boom cranes and their ***attachments*** with and without a load
		describe procedures used to maintain control of hook block in a safe manner during all ***functions***
		describe procedures used to perform a pick and carry lift
		describe effects of ***ground conditions*** on pick and carry lift operations
		describe effects of ***environmental conditions*** on craning operations
		describe freefall and how to ensure correct operation

G-19.01.03L	demonstrate knowledge of regulatory requirements pertaining to friction drive crawler-mounted lattice boom cranes	identify standards and regulations pertaining to friction drive crawler-mounted lattice boom cranes
		describe training requirements and restrictions for freefall mode

RANGE OF VARIABLES

attachments include: heavy lift, tower, luffing jib

specifications include: load charts, travel tables, range diagrams

types of friction drive systems include: air assisted, hydraulic assisted, electric assisted, variable independent control (VICON), torque converter, direct drive

functions include: changing radius; using hoist, boom, swing and travel controls in combination

ground conditions include: uneven, soft ground

environmental conditions include: wind, rain, snow, lightning, hoar frost, temperature

G-19.02 Operates friction drive truck-mounted lattice boom cranes

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	yes	yes	yes	no	yes	NV	NV	NV

SKILLS

	Performance Criteria	Evidence of Attainment
G-19.02.01P	perform function test	function test is performed to ensure all crane's functions and devices, including master clutch, are operational
G-19.02.02P	engage swing, boom and hoist functions at various speeds in any given direction simultaneously	swing, boom and hoist functions are engaged at various speeds in any given direction simultaneously according to changing site conditions
G-19.02.03P	centre hook block above centre of gravity of load	hook block is centred above centre of gravity of load
G-19.02.04P	maintain control of load during all ***functions***	control of load is maintained during all ***functions***
G-19.02.05P	coordinate clutch and brake operations	clutch and brake operations are coordinated to control load according to manufacturers' specifications and instructions and crane configuration
G-19.02.06P	stop crane while maintaining control of load	crane is stopped while maintaining control of load

G-19.02.07P	steer and travel crane on rubber	crane is steered and travelled on rubber when it is fully assembled according to manufacturers' specifications and instructions and crane configuration
G-19.02.08P	engage dogs/pawls	dogs/pawls are engaged to avoid further movement of load

RANGE OF VARIABLES

functions include: changing radius; using hoist, boom, swing and travel controls in combination

	KNOWLEDGE	
	Learning Outcomes	**Learning Objectives**
G-19.02.01L	demonstrate knowledge of friction drive truck-mounted lattice boom cranes, their ***attachments***, characteristics and applications	define terminology associated with friction drive truck-mounted lattice boom cranes and their ***attachments***
		identify hazards and describe safe work practices pertaining to friction drive truck-mounted lattice boom cranes and their ***attachments***
		interpret charts, drawings and ***specifications*** pertaining to friction drive truck-mounted lattice boom cranes and their ***attachments***
		identify ***types of friction drive systems*** and describe their characteristics and applications
G-19.02.02L	demonstrate knowledge of procedures used to operate friction drive truck-mounted lattice boom cranes and their ***attachments***	describe procedures used to perform a function test
		describe procedures used to inspect, maintain and troubleshoot friction drive truck-mounted lattice boom cranes and their ***attachments***
		describe procedures used to operate friction drive truck-mounted lattice boom cranes and their ***attachments*** with and without a load
		describe procedures used to maintain control of hook block in a safe manner during all ***functions***
		describe effects of ***environmental conditions*** on craning operations
		describe freefall operations

G-19.02.03L	demonstrate knowledge of regulatory requirements pertaining to friction drive truck-mounted lattice boom cranes	identify standards and regulations pertaining to friction drive truck-mounted lattice boom cranes
		describe training requirements and restrictions for freefall mode

RANGE OF VARIABLES

attachments include: heavy lift, tower, luffing jib

specifications include: load charts, travel tables, range diagrams

types of friction drive systems include: air assisted, hydraulic assisted, electric assisted, torque converter, direct drive

functions include: changing radius; using hoist, boom, swing and travel controls in combination

environmental conditions include: wind, rain, snow, lightning, hoar frost, temperature

TASK G-20 Operates hydraulic drive lattice boom cranes

TASK DESCRIPTOR

Mobile crane operators operate hydraulic drive lattice boom cranes, which encompass both crawler-mounted and truck-mounted cranes.

G-20.01 Operates hydraulic drive crawler-mounted lattice boom cranes

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	yes	yes	yes	yes	yes	NV	NV	NV

	SKILLS	
	Performance Criteria	**Evidence of Attainment**
G-20.01.01P	perform function test	function test is performed to ensure all crane's functions and devices are operational
G-20.01.02P	engage swing, boom, hoist and travel functions in any given direction	swing, boom, hoist and travel functions are engaged in any given direction according to changing site conditions
G-20.01.03P	centre hook block above centre of gravity of load	hook block is centred above centre of gravity of load
G-20.01.04P	maintain control of load during ***functions***	control of load during ***functions*** is maintained according to changing site conditions and hoisting requirements

G-20.01.05P	stop crane while maintaining control of load	crane is stopped while maintaining control of load
G-20.01.06P	steer and travel crane in any direction	crane is steered and travelled in any direction by locking, slowing or counter rotating tracks for pick and carry, and travel

RANGE OF VARIABLES

functions include: changing radius; using hoist, boom, swing and travel controls in combination

	KNOWLEDGE	
	Learning Outcomes	**Learning Objectives**
G-20.01.01L	demonstrate knowledge of hydraulic crawler-mounted lattice boom cranes, their ***attachments***, characteristics and applications	define terminology associated with hydraulic crawler-mounted lattice boom cranes and their ***attachments***
		identify hazards and describe safe work practices pertaining to hydraulic crawler-mounted lattice boom cranes and their ***attachments***
		interpret charts, drawings and ***manufacturers' specifications*** pertaining to hydraulic crawler-mounted lattice boom cranes and their ***attachments***
		identify ***types of hydraulic drive systems***, their ***components***, characteristics and applications
G-20.01.02L	demonstrate knowledge of procedures used to operate hydraulic crawler-mounted lattice boom cranes and their ***attachments***	describe procedures used to perform a function test
		describe procedures used to inspect, maintain and troubleshoot hydraulic crawler-mounted lattice boom cranes and their ***attachments***
		describe procedures used to operate hydraulic crawler-mounted lattice boom cranes and their ***attachments*** with and without a load
		describe procedures used to maintain control of hook block in a safe manner during all ***functions***
		describe procedures used to perform a pick and carry lift
		describe effects of ***ground conditions*** on pick and carry lift operations

		describe effects of ***environmental conditions*** on craning operations
		describe freefall operations
G-20.01.03L	demonstrate knowledge of regulatory requirements pertaining to hydraulic crawler-mounted lattice boom cranes	identify standards and regulations pertaining to hydraulic crawler-mounted lattice boom cranes
		describe training requirements and restrictions for freefall mode

RANGE OF VARIABLES

attachments include: heavy lift, jibs
manufacturers' specifications include: load charts, travel tables, range diagrams
types of hydraulic drive systems include: open-centre, closed-centre
components include: pumps, motors, controls, valves
functions include: changing radius; using hoist, boom, swing and travel controls in combination
ground conditions include: uneven, soft ground, grades, icy conditions
environmental conditions include: wind, rain, snow, lightning, hoar frost, temperature

G-20.02 Operates hydraulic drive truck-mounted lattice boom cranes

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	yes	yes	yes	yes	yes	NV	NV	NV

SKILLS

	Performance Criteria	Evidence of Attainment
G-20.02.01P	perform function test	function test is performed to ensure all crane's functions and devices are operational
G-20.02.02P	engage swing, boom and hoist functions at various speeds in any given direction simultaneously	swing, boom and hoist functions are engaged at various speeds in any given direction simultaneously according to changing site conditions
G-20.02.03P	centre hook block above centre of gravity of load	hook block is centred above centre of gravity of load
G-20.02.04P	maintain control of load during all ***functions***	control of load is maintained during all ***functions*** according to changing site conditions and hoisting requirements
G-20.02.05P	stop crane while maintaining control of load	crane is stopped while maintaining control of load

RANGE OF VARIABLES

functions include: changing radius; using hoist, boom, swing and travel controls in combination

	KNOWLEDGE	
	Learning Outcomes	**Learning Objectives**
G-20.02.01L	demonstrate knowledge of hydraulic truck-mounted lattice boom cranes, their ***attachments***, characteristics and applications	define terminology associated with hydraulic truck-mounted lattice boom cranes and their ***attachments***
		identify hazards and describe safe work practices pertaining to hydraulic truck-mounted lattice boom cranes and their ***attachments***
		interpret charts, drawings and ***manufacturers' specifications*** pertaining to hydraulic truck-mounted lattice boom cranes and their ***attachments***
		identify ***types of hydraulic drive systems***, their ***components***, characteristics and applications
G-20.02.02L	demonstrate knowledge of procedures used to operate hydraulic truck-mounted lattice boom cranes and their ***attachments***	describe procedures used to perform a function test
		describe procedures used to inspect, maintain and troubleshoot hydraulic truck-mounted lattice boom cranes and their ***attachments***
		describe procedures used to operate hydraulic truck-mounted lattice boom cranes and their ***attachments*** with and without a load
		describe procedures used to maintain control of hook block in a safe manner during all ***functions***
		describe procedures used to perform a pick and carry lift
		describe effects of ***ground conditions*** on pick and carry lift operations
		describe effects of ***environmental conditions*** on craning operations
		describe freefall operations
G-20.02.03L	demonstrate knowledge of regulatory requirements pertaining to hydraulic truck-mounted lattice boom cranes	identify standards and regulations pertaining to hydraulic truck-mounted lattice boom cranes
		describe training requirements and restrictions for freefall mode

RANGE OF VARIABLES

attachments include: luffing jibs, fixed jibs
manufacturers' specifications include: load charts, travel tables, range diagrams
types of hydraulic drive systems include: open-centre, closed-centre
components include: pumps, motors, controls, valves
functions include: changing radius; using hoist, boom, swing and travel controls in combination
ground conditions include: uneven, soft ground, grades, icy conditions
environmental conditions include: wind, rain, snow, lightning, hoar frost, temperature

TASK G-21 Operates telescopic boom cranes

TASK DESCRIPTOR

Operating telescopic boom cranes encompasses both crawler-mounted and truck-mounted cranes such as AT, RT and carry decks. Boom trucks are mounted on a commercial truck chassis.

G-21.01 Operates crawler-mounted telescopic cranes

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	yes	yes	yes	yes	yes	NV	NV	NV

	SKILLS	
	Performance Criteria	**Evidence of Attainment**
G-21.01.01P	perform function test	function test is performed to ensure all crane's functions and devices are operational
G-21.01.02P	extend and retract boom	boom is extended and retracted according to manufacturers' specifications and instructions
G-21.01.03P	centre hook block above centre of gravity of load	hook block is centred above centre of gravity of load
G-21.01.04P	engage swing, boom and hoist functions at various speeds in any given direction simultaneously	swing, boom and hoist functions are engaged at various speeds in any given direction simultaneously according to changing site conditions
G-21.01.05P	maintain control of load during ***functions***	control of load during ***functions*** is maintained according to changing site conditions and hoisting requirements

G-21.01.06P	stop crane while maintaining control of load	crane is stopped while maintaining control of load
G-21.01.07P	steer and travel crane in any direction	crane is steered and travelled in any direction by locking, slowing or counter rotating tracks for pick and carry, and travel

RANGE OF VARIABLES

functions include: changing radius; changing boom lengths; using hoist, boom, swing and travel controls

	KNOWLEDGE	
	Learning Outcomes	**Learning Objectives**
G-21.01.01L	demonstrate knowledge of crawler-mounted telescopic cranes, their ***attachments***, characteristics and applications	define terminology associated with crawler-mounted telescopic cranes and their ***attachments***
		identify hazards and describe safe work practices pertaining to crawler-mounted telescopic cranes and their ***attachments***
		interpret charts, drawings and ***manufacturers' specifications and instructions*** pertaining to crawler-mounted telescopic cranes and their ***attachments***
		identify types of crawler-mounted telescopic cranes and describe their characteristics and applications
		identify characteristics of telescopic booms
G-21.01.02L	demonstrate knowledge of procedures used to operate crawler-mounted telescopic cranes and their ***attachments***	describe procedures used to perform a function test
		describe procedures used to inspect, maintain and troubleshoot crawler-mounted telescopic cranes and their ***attachments***
		describe procedures used to operate crawler-mounted telescopic cranes and their ***attachments*** with and without a load
		describe procedures used to maintain control of hook block in a safe manner during all ***functions***
		describe procedures used to perform a pick and carry lift
		describe effects of ***ground conditions*** on craning lift operations

		describe effects of ***environmental conditions*** on craning operations
G-21.01.03L	demonstrate knowledge of regulatory requirements pertaining to crawler-mounted telescopic cranes	identify standards and regulations pertaining to crawler-mounted telescopic cranes

RANGE OF VARIABLES

attachments include: jibs, inserts

manufacturers' specifications and instructions include: load and travel charts, travel tables, range diagrams, telescoping charts

functions include: changing radius; changing boom lengths; using hoist, boom, swing and travel controls

ground conditions include: uneven, soft ground, grades, icy conditions

environmental conditions include: wind, rain, snow, lightning, hoar frost, temperature

G-21.02 Operates rubber tire-mounted telescopic cranes

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	yes	yes	yes	yes	yes	NV	NV	NV

SKILLS

	Performance Criteria	Evidence of Attainment
G-21.02.01P	perform function test	function test is performed to ensure all crane's functions and devices are operational
G-21.02.02P	extend and retract boom	boom is extended and retracted according to manufacturers' specifications and instructions
G-21.02.03P	engage swing, boom, hoist and travel functions at various speeds in any given direction simultaneously	swing, boom, hoist and travel functions at various speeds are engaged in any given direction simultaneously according to changing site conditions
G-21.02.04P	centre hook block above centre of gravity of load	hook block is centred above centre of gravity of load
G-21.02.05P	maintain control of load during ***functions***	control of load is maintained during ***functions*** according to changing site conditions and hoisting requirements
G-21.02.06P	stop crane while maintaining control of load	crane is stopped while maintaining control of load
G-21.02.07P	place and secure load on deck of boom truck and carry deck	load is placed and secured on deck of boom truck and carry deck

G-21.02.08P	raise, lower and lock suspension system	suspension systems is raised, lowered and locked for ***operational requirements***
G-21.02.09P	perform pick and carry operations on AT, RT, carry deck and truck-mounted cranes	pick and carry operations are performed on AT, RT, carry deck and truck-mounted cranes according to manufacturers' specifications and instructions

RANGE OF VARIABLES

functions include: changing radius; changing boom lengths; using hoist, boom, swing and travel controls
operational requirements include: to insert pads under outriggers on AT and truck-mounted cranes, to level carrier, to access sites, to increase ground clearance for off-road travel

	KNOWLEDGE	
	Learning Outcomes	**Learning Objectives**
G-21.02.01L	demonstrate knowledge of rubber tire-mounted telescopic cranes, their ***attachments***, characteristics and applications	define terminology associated with rubber tire-mounted telescopic cranes and their ***attachments***
		identify hazards and describe safe work practices pertaining to rubber tire-mounted telescopic cranes and their ***attachments***
		interpret charts, drawings and ***manufacturers' specifications and instructions*** pertaining to rubber tire-mounted telescopic cranes and their ***attachments***
		identify ***types of rubber tire-mounted telescopic cranes*** and describe their characteristics and applications
G-21.02.02L	demonstrate knowledge of procedures used to operate rubber tire-mounted telescopic cranes and their ***attachments***	describe procedures used to perform a function test
		describe procedures used to inspect, maintain and troubleshoot rubber tire-mounted telescopic cranes and their ***attachments***
		describe procedures used to operate rubber tire-mounted telescopic cranes and their ***attachments*** with and without a load
		describe procedures used to maintain control of hook block in a safe manner during all ***functions***
		describe procedures used to perform a pick and carry lift
		describe effects of ***ground conditions*** on craning operations

		describe effects of ***environmental conditions*** on craning operations
G-21.02.03L	demonstrate knowledge of regulatory requirements pertaining to rubber tire-mounted telescopic cranes	identify standards and regulations pertaining to rubber tire-mounted telescopic cranes

RANGE OF VARIABLES

attachments include: guyed boom, jibs, inserts

manufacturers' specifications and instructions include: load and travel charts, travel tables, range diagrams, telescoping charts

types of rubber tire-mounted telescopic cranes include: boom trucks, RT, AT, carry decks, truck-mounted, telehandler (with 360-swing and hoist attachment)

functions include: changing radius; changing boom lengths; using hoist, boom, swing and travel controls

ground conditions include: uneven, soft ground, grades, icy conditions

environmental conditions include: wind, rain, snow, lightning, hoar frost, temperature

TASK G-22 Performs specialty craning operations

TASK DESCRIPTOR

Mobile crane operators are sometimes required to perform specialty operations such as pile driving, multi-crane lifts, floating platforms, personnel lifts and duty cycle operations. Some may specialize in one type of specialty crane operation while others diversify their activities.

G-22.01 Operates crane with piledriving equipment

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	yes	yes	yes	no	yes	NV	NV	NV

SKILLS

	Performance Criteria	Evidence of Attainment
G-22.01.01P	perform hammer and drill operations	hammer and drill operation is performed with hand-foot-eye coordination according to ***type of hammer and drill***
G-22.01.02P	drive and extract ***pile***	***pile*** is driven and extracted using various ***operations*** according to site engineer's specifications, and manufacturers' specifications and instructions
G-22.01.03P	monitor for changes in ***environmental conditions*** during hammer and drill operation	changes in ***environmental conditions*** are monitored during hammer and drill operation and ***operations*** are stopped if unsafe conditions exist

RANGE OF VARIABLES

types of hammers and drills include: hammers (hydraulic, vibratory, air, diesel, drop), churn drill

piles includes: steel, concrete, wood, H-beam, pipe, sheet

operations include: hoisting pile from ground, setting angle of piledriving, using templates, stabbing piles, cutting piles

environmental conditions include: wind, rain, snow, lightning, hoar frost, temperature

KNOWLEDGE

	Learning Outcomes	Learning Objectives
G-22.01.01L	demonstrate knowledge of piledriving equipment, their attachments, characteristics and applications	define terminology associated with piledriving equipment and their attachments
		identify hazards and describe safe work practices pertaining to piledriving equipment and their attachments

		interpret charts, drawings and specifications pertaining to piledriving equipment and their attachments
		identify ***types of hammers and drills*** on piledriving equipment and describe their characteristics and applications
G-22.01.02L	demonstrate knowledge of procedures used to operate piledriving equipment and their attachments	identify tools and equipment relating to piledriving equipment operations and describe their applications and procedures for use
		describe procedures used to operate piledriving equipment and their attachments
		identify types of ***piles*** and describe their characteristics and applications
		describe procedures used to inspect, maintain and troubleshoot piledriving equipment and their attachments
		describe ***factors*** affecting crane operation
G-22.01.03L	demonstrate knowledge of regulatory requirements pertaining to piledriving equipment	identify standards and regulations pertaining to piledriving equipment

RANGE OF VARIABLES

types of hammers and drills include: hammers (hydraulic, vibratory, air, diesel, drop), churn drill
piles includes: steel, concrete, wood, H-beam, pipe, sheet
factors include: ballast conditions, spud operation, ground conditions, environmental conditions

G-22.02 Performs duty cycle operations

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	yes	yes	yes	no	yes	NV	NV	NV

SKILLS

	Performance Criteria	Evidence of Attainment
G-22.02.01P	manipulate ***functions***	***functions*** are manipulated using hand-foot-eye coordination according to ***type of duty cycle operation***
G-22.02.02P	control load	load is controlled to minimize side loading and to control swing out
G-22.02.03P	de-rate crane	crane is de-rated by reducing crane chart capacities according to manufacturers' specifications for duty cycle operations

G-22.02.04P	monitor for changes in ***environmental conditions*** during duty cycle operations	changes in ***environmental conditions*** are monitored during duty cycle operations and operations are stopped if unsafe conditions exist
G-22.02.05P	monitor rigging and crane ***conditions*** during duty cycle operations	***conditions*** are monitored and adjustments are made according to changing ***conditions***
G-22.02.06P	control load while changing radius	load is controlled while changing radius using hoist and boom controls in combination according to changing site conditions

RANGE OF VARIABLES

functions include: synchronizing drums to wind cable simultaneously, swinging boom, hoisting, changing radius

types of duty cycle operation include: clamshell, dragline, aggregate buckets, magnet, wrecking ball, high volume steel erection

environmental conditions include: wind, rain, snow, lightning, hoar frost, temperature

conditions include: fluid levels and temperatures, proper winch spooling, hoist cable condition, brake and clutch adjustments

	KNOWLEDGE	
	Learning Outcomes	**Learning Objectives**
G-22.02.01L	demonstrate knowledge of duty cycle operations, their characteristics and applications	define terminology associated with duty cycle operations
		identify hazards and describe safe work practices pertaining to duty cycle operations
		interpret charts, drawings and specifications pertaining to duty cycle operations
		identify ***types of duty cycle operations*** and describe their characteristics and applications
G-22.02.02L	demonstrate knowledge of procedures used to perform duty cycle operations	identify tools and equipment relating to duty cycle operations and describe their applications and procedures for use
		describe procedures used to perform duty cycle operations
		describe crane setup and configuration requirements for duty cycle operations
		identify ***duty cycle attachments*** and describe their characteristics and applications

		describe ***factors*** affecting crane operations
G-22.02.03L	demonstrate knowledge of regulatory requirements pertaining to duty cycle operations	identify standards and regulations pertaining to duty cycle operations

RANGE OF VARIABLES

types of duty cycle operation include: clamshell, dragline, aggregate buckets, magnet, wrecking ball, high volume steel erection

duty cycle attachments include: wrecking balls, magnets, grapples, clamshell, dragline and aggregate buckets

factors include: ballast conditions, spud operation, unsafe conditions, ground conditions, type of hoist rope, type of lattice boom (tubular, angle)

G-22.03 Operates cranes on floating platforms

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	yes	yes	yes	no	yes	NV	NV	NV

SKILLS

	Performance Criteria	Evidence of Attainment
G-22.03.01P	verify ***floating platform*** selected is suitable for crane	***floating platform*** selected is suitable for crane
G-22.03.02P	consult ***floating platform*** load charts	***floating platform*** load charts are consulted
G-22.03.03P	load crane on ***floating platform***	crane is loaded on ***floating platform*** according to vessel requirements and specifications, and in collaboration with vessel operator
G-22.03.04P	secure crane and boom to ***floating platform***	crane and boom are secured to ***floating platform*** according to standards and regulations, and in collaboration with vessel operator
G-22.03.05P	monitor for changes in ***environmental conditions*** during ***floating platform*** operations	changes in ***environmental conditions*** are monitored during ***floating platform*** operations and operations are stopped if unsafe conditions exist

G-22.03.06P	monitor level and implement ***measures***	level is monitored and ***measures*** are implemented to compensate for trim and list according to ***floating platform*** load charts
G-22.03.07P	secure crane for transport on ***floating platform***	crane is secured for transport on ***floating platform*** taking into consideration overhead and surrounding obstructions, and water conditions

RANGE OF VARIABLES

floating platforms include: barges, derricks

environmental conditions include: currents, tides, waves, spray, fog, wind, rain, snow, lightning, frost, temperature, swell

measures include: having vessel operator adjust ballast, performing lift more slowly

	KNOWLEDGE	
	Learning Outcomes	**Learning Objectives**
G-22.03.01L	demonstrate knowledge of crane on ***floating platform*** operations, their characteristics and applications	define terminology associated with crane on ***floating platform*** operations
		identify hazards and describe safe work practices pertaining to crane on ***floating platform*** operations
		interpret charts, drawings and specifications pertaining to crane on ***floating platform*** operations
G-22.03.02L	demonstrate knowledge of procedures used to operate crane on ***floating platform***	identify tools and equipment used to operate crane on ***floating platform*** and describe their applications and procedures for use
		describe crane setup and configuration requirements
		describe procedures used to operate crane on ***floating platform***
		describe factors and ***environmental conditions*** affecting crane operation
		describe considerations when working from a ***floating platform***
		describe change in weight when lifting in and out of water
		describe procedures used to secure crane to ***floating platform*** for operation

		describe procedures used to secure crane to ***floating platform*** for transport
G-22.03.03L	demonstrate knowledge of regulatory requirements pertaining to crane on ***floating platform*** operations	identify standards and regulations pertaining to crane on ***floating platform*** operations

RANGE OF VARIABLES

floating platforms include: barges, derricks

environmental conditions include: currents, tides, waves, spray, fog, wind, rain, snow, lightning, frost, temperature, swell

G-22.04 Performs multi-crane lifts

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	yes	yes	yes	yes	yes	NV	NV	NV

SKILLS

	Performance Criteria	Evidence of Attainment
G-22.04.01P	maintain constant ***communication*** with other crane operator(s) and lift supervisor	constant ***communication*** with other crane operator(s) and lift supervisor is maintained
G-22.04.02P	monitor for changes in ***environmental conditions*** during lift	changes in ***environmental conditions*** are monitored during lift and lift is stopped when unsafe
G-22.04.03P	stop lift during ***unsafe conditions***	lift is stopped until ***unsafe conditions*** are resolved
G-22.04.04P	maintain planned load distribution between cranes	planned load distribution is maintained between cranes according to lift plan
G-22.04.05P	follow pre-determined lift sequence	pre-determined lift sequence is followed according to lift plan

RANGE OF VARIABLES

communication includes: radio, hand signals

environmental conditions include: wind, rain, snow, lightning, hoar frost, temperature

unsafe conditions include: miscommunication, mechanical problems, personnel in work areas, overload conditions, uncoordinated movement, shifting centre of gravity (rendering loads, who picks first and sets first), cranes of unequal capacity

	KNOWLEDGE	
	Learning Outcomes	**Learning Objectives**
G-22.04.01L	demonstrate knowledge of multi-crane lift operations, their characteristics and applications	define terminology associated with multi-crane lift operations
		identify hazards and describe ***unsafe conditions*** and ***safe work practices*** pertaining to multi-crane lift operations
		interpret ***charts, drawings and specifications*** pertaining to multi-crane lift operations
G-22.04.02L	demonstrate knowledge of procedures used to perform multi-crane lifts	identify ***tools and equipment*** relating to multi-crane lifts and describe their applications and procedures for use
		describe procedures used to perform multi-crane lifts
		describe equalization and distribution of loading when more than two cranes are used
		describe methods for maintaining a plumb load line during all phases of lift
		describe crane setup and configuration requirements
		describe importance of understanding capacities of cranes involved in lift
		describe how one crane's actions will affect others during a multi-crane lift
		calculate load on each crane during multi-crane lift
		describe ***communication*** involved in multi-crane lifts
G-22.04.03L	demonstrate knowledge of regulatory requirements pertaining to multi-crane lift operations	identify standards and regulations pertaining to multi-crane lift operations

RANGE OF VARIABLES

unsafe conditions include: miscommunication, mechanical problems, personnel in work areas, overload conditions, uncoordinated movement, shifting centre of gravity (rendering loads, who picks first and sets first), cranes of unequal capacity

safe work practices include: pre-lift planning, communication, load sharing

charts, drawings and specifications include: lift plans, manufacturers' specifications and instructions, permits, engineering drawings

tools and equipment include: equalizer beam, triangle lifting device

communication includes: radio, hand signals

G-22.05 Uses personnel hoisting equipment

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	yes	yes	yes	yes	yes	NV	NV	NV

	SKILLS	
	Performance Criteria	**Evidence of Attainment**
G-22.05.01P	verify engineer's requirements for capacity and certification of suspended work platform	engineer's requirements for capacity and certification of suspended work platform are validated
G-22.05.02P	attach ***personnel hoisting equipment***	***personnel hoisting equipment*** is attached according to ***standards and regulations***
G-22.05.03P	review ***lift plan*** with all personnel involved in personnel hoisting	***lift plan*** is reviewed with all personnel involved according to jurisdictional regulations
G-22.05.04P	perform trial lift	trial lift is performed according to ***standards and regulations***
G-22.05.05P	verify crew involved wear fall arrest equipment and tie off	crew involved wear fall arrest equipment and are tied off according to ***standards and regulations***
G-22.05.06P	monitor for changes in ***environmental conditions*** during lift	changes in ***environmental conditions*** are monitored during lift and lift is stopped during unsafe conditions
G-22.05.07P	stop lift during ***unsafe conditions***	lift is stopped during ***unsafe conditions***

RANGE OF VARIABLES

personnel hoisting equipment includes: fixed basket, suspended basket

standards and regulations include: CSA Z150 standard; jurisdictional, site, company and manufacturers' regulations

lift plan includes: confirmation of fall arrest training, crane capacity/configuration, confirmation of trial lift, methods of communication, scope of work, list of personnel involved

environmental conditions include: wind, rain, snow, lightning, hoar frost, temperature

unsafe conditions include: poor communications, change in work scope, condition of hoist cable, poor lighting/visibility

	KNOWLEDGE	
	Learning Outcomes	**Learning Objectives**
G-22.05.01L	demonstrate knowledge of ***personnel hoisting equipment***, their characteristics and applications	define terminology associated with ***personnel hoisting equipment***
		identify hazards and describe safe work practices pertaining to ***personnel hoisting equipment***

		describe information encompassed by ***lift plan***
		interpret crane load charts, drawings and specifications pertaining to ***personnel hoisting equipment***
		identify types of ***personnel hoisting equipment*** and describe their characteristics and applications
G-22.05.02L	demonstrate knowledge of procedures to use ***personnel hoisting equipment***	identify tools and equipment relating to ***personnel hoisting equipment*** and describe their applications and procedures for use
		describe procedures to use ***personnel hoisting equipment***
		describe ***communication*** involved in using ***personnel hoisting equipment***
		describe procedures to rig ***personnel hoisting equipment***
		describe ***personnel hoisting equipment*** setup and configuration requirements
		describe factors affecting ***personnel hoisting equipment*** operations
G-22.05.03L	demonstrate knowledge of regulatory requirements pertaining to ***personnel hoisting equipment***	identify ***standards and regulations*** pertaining to ***personnel hoisting equipment***

RANGE OF VARIABLES

personnel hoisting equipment includes: fixed basket, suspended basket

lift plan includes: confirmation of fall arrest training, crane capacity/configuration, confirmation of trial lift, methods of communication, scope of work, list of personnel involved

communication includes: radio, hand signals

standards and regulations include: CSA Z150 standard; jurisdictional, site, company and manufacturers' regulations

TASK G-23 Secures crane

TASK DESCRIPTOR

Mobile crane operators must secure the crane during short term and long term shutdowns. Short term shut downs are those when the crane is unattended during normal operations through the day. Long term shut downs are overnight or longer.

G-23.01 Secures crane for short term

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	yes	yes	yes	yes	yes	NV	NV	NV

	SKILLS	
	Performance Criteria	**Evidence of Attainment**
G-23.01.01P	lower load to ground	load is lowered to ground
G-23.01.02P	position boom	boom is positioned in a safe location according to ***site conditions***
G-23.01.03P	engage swing brakes, and hoist brakes and dogs/pawls	swing brakes, and hoist brakes and dogs/pawls are engaged according to manufacturers' specifications and site policies
G-23.01.04P	shut off engine and master switches	engine and master switches are shut off according to manufacturers' specifications and company policies
G-23.01.05P	remove key and lock doors	key is removed and doors are locked according to company policies

RANGE OF VARIABLES

site conditions include: work and stop radius, working range obstructions, environmental conditions, empty hook

	KNOWLEDGE	
	Learning Outcomes	**Learning Objectives**
G-23.01.01L	demonstrate knowledge of procedures used to secure crane for short term	define terminology associated with securing cranes
		identify hazards and describe safe work practices pertaining to securing cranes

		describe procedures used to secure cranes before leaving them unattended for short term
G-23.01.02L	demonstrate knowledge of regulatory requirements pertaining to securing of cranes	identify standards and regulations pertaining to securing of cranes

G-23.02 Secures crane for long term

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	yes	NV	yes	yes	yes	yes	yes	NV	NV	NV

SKILLS

	Performance Criteria	Evidence of Attainment
G-23.02.01P	lower load to ground and disconnect from hook block/ball	load is lowered to ground and disconnected from hook block/ball
G-23.02.02P	position crane	crane is positioned according to site and environmental conditions
G-23.02.03P	position boom away from structures	boom is positioned away from structures
G-23.02.04P	engage swing brakes, and hoist brakes and dogs/pawls	swing brakes, and hoist brakes and dogs/pawls are engaged according to manufacturers' specifications and company policies
G-23.02.05P	lower and retract boom and attachments	boom and attachments are lowered and retracted according to manufacturers' specifications
G-23.02.06P	block equipment	equipment is blocked to prevent freezing to ground according to environmental conditions
G-23.02.07P	block boom	boom is blocked according to ground conditions
G-23.02.08P	shut off engine and master switches	engine and master switches are shut off
G-23.02.09P	remove key and lock doors	key is removed and doors are locked according to company policies
G-23.02.10P	remove ladders and steps	ladders and steps are removed to restrict access
G-23.02.11P	erect ***barriers*** around crane	***barriers*** are erected around crane according to site and company policies

RANGE OF VARIABLES

barriers include: barricade tape, pylons, concrete barriers, wood barricades, site entrance gates

	KNOWLEDGE	
	Learning Outcomes	**Learning Objectives**
G-23.02.01L	demonstrate knowledge of procedures used to secure crane for long term	define terminology associated with securing cranes for long term
		identify hazards and describe safe work practices pertaining to securing cranes for long term
		describe procedures used to secure cranes before leaving them unattended for long term
G-23.02.02L	demonstrate knowledge of regulatory requirements pertaining to securing of cranes for long term	identify standards and regulations pertaining to securing of cranes for long term

APPENDIX A
ACRONYMS

AT	all-terrain
CSA	Canadian Standards Association
DEF	diesel exhaust fluid
ELD	electronic logging devices
FLRA	field level risk assessment
GPS	global positioning system
JSA	job scope analysis
LMI	load moment indicator
NSC	National Safety Code
NOx	nitric oxide
OH&S	Occupational Health and Safety
PTFE	polytetrafluoroethylene
PPE	personal protective equipment
RT	rough-terrain
SCR	selective catalyst reduction
TDG	Transportation of Dangerous Goods
UV	ultraviolet
VICON	variable independent control
WHMIS	Workplace Hazardous Materials Information System
WLL	working load limit

APPENDIX B
TOOLS AND EQUIPMENT / OUTILS ET ÉQUIPEMENT

Personal Protective Equipment and Safety Equipment / Équipement de protection individuelle et équipement de sécurité

coveralls	combinaisons
ear-plugs and muffs	bouchons d'oreille et serre-tête antibruit
eye wash station	douche oculaire
face shields	écrans faciaux
fall arrest harness	harnais antichute
fire blankets	couvertures ignifuges
fire extinguishers	extincteurs
fire-retardant coverall	combinaison ignifuge
first aid kit	trousse de premiers soins
gloves	gants
hard hat	casque de sécurité
masks (particles, vapour, disease-preventative)	masques (protection contre la poussière et les vapeurs, prévention des maladies)
reflectors	réflecteurs
respirators	respirateurs
road flares	fusées éclairantes
safety boots	bottes de sécurité
safety glasses and goggles	lunettes de protection
spill kit	équipement de lutte contre le déversement

Hand Tools / Outils à main

adjustable wrenches (various sizes)	clés à ouverture réglable (de diverses tailles)
cable cutter	coupe-câble
cable winder	enrouleur de câble
calculator	calculatrice
flashlight	torche électrique
grease gun	pistolet graisseur
hammers (ball peen, claw, sledge, various sizes)	marteaux (à panne ronde ou fendue, de tailles diverses, masse)
level	niveau
line-up bar, drift pin, T-bar	barre d'alignement, cheville d'assemblage, barre en T
measuring tape	ruban à mesurer
oilcan	burette
pliers (needle nose, slip joint)	pinces (à bec de canard ou à becs pointus)
pry bars	levier
punches (knock-out type, various sizes)	poinçons (emporte-pièces, de diverses tailles)
socket set	jeu de douilles
scrapers (various sizes)	grattoirs (de diverses tailles)
screwdrivers (flat, Phillips, Robertson, various sizes)	tournevis (à embout plat, cruciforme et carré, de tailles diverses)
shovel	pelle

snips (heavy duty wire cutting)	cisailles (pour câble d’acier de gros diamètre)
spud wrenches	clés à mâchoires
tire pressure gauge	manomètre pour pneus
tool box	coffre à outils
vernier caliper	pied à coulisse
vice grips	pinces-étaux
voltmeter/multimeter (basic)	voltmètre/multimètre (de base)
wear gauge (cable and sheave)	indicateur d’usure (câbles et poulies)
wire brush	brosse métallique
wrench sets (open and closed ends, both metric and imperial)	jeu de clés (ouvertes et fermées, impériales et métriques)

Power Tools and Equipment / Outils et équipement mécaniques

angle grinder with wire brush	meuleuse d’angle avec brosse métallique
chain saws	scies à chaîne
electric drills	perceuses électriques
forklift/telehandler	chariot élévateur à fourche/chariot élévateur à bras télescopique
hand-held and stationary radios	postes de radio portatifs et fixes
headphones/radio	écouteurs/radio
hydraulic jacks	vérins hydrauliques
impact wrenches (electric and pneumatic)	clés à chocs (électriques ou pneumatiques)
pressure washer	laveuse à pression
steam cleaner	nettoyeur à vapeur

Hoisting and Rigging Equipment / Équipement de hissage et de gréage

aerial platforms (boom and scissor lifts)	plateformes élévatrices (girafe et ciseaux)
blocks	cales
bridles	brides
cable clips	serre-câbles
chains	chaînes
come-alongs (wire rope or chain) and chain falls (manual or electric)	treuils (à câble ou à chaîne) et palans à chaîne (manuels ou électriques)
equalizer beams	poutres d’égalisation
eye bolts	boulons à œil
hoist rings	anneaux de levage
hook latch	linguet à crochet
hooks	crochets
ladders	échelles
lifting clamps	brides de levage
lines	élingues
pulleys, sheaves and snatch blocks	poulies et moufles ouvrantes
rope guides	guide-câbles
shackles	manilles
slings	élingue
rigging protection (softeners)	protecteurs d’élingue
spreader bars	palonnier
swivels	pivots de rotation
tag lines	câbles stabilisateurs
thimbles	cosses
triangles	triangles
turnbuckles	tendeur
wedge socket	attache à coin

APPENDIX C
GLOSSARY / GLOSSAIRE

air system	any machine system that is dependent on compressed air; the brakes on certain carriers would be an example of this type of system	**système d'air**	tout système dont le fonctionnement dépend de l'air comprimé; les freins de certains transporteurs sont un exemple de ce type de système
all-terrain (AT) crane	all-terrain cranes may have the option to be driven from both the carrier and the upper; they may have a "pick and carry" chart, and can be driven on public roads; they are rubber mounted (on tires); they have hydraulic suspension, which can be adjusted by the operator into "road" or "jobsite"; they may have hydraulic or lattice booms; these cranes usually have multiple axles, some of which may not be driven or steered and are for weight distribution only; they have various steering modes	**grue tout-terrain**	grue pouvant être configurée pour être conduite à partir du transporteur et de la superstructure; les grues tout-terrain peuvent avoir des tableaux de charge et de transport, et peuvent circuler sur les voies publiques; elles sont montées sur des pneus; elles sont équipées d'une suspension hydraulique qui peut être réglée par l'opérateur ou l'opératrice en choisissant la configuration « route » ou « chantier »; elles peuvent être dotées d'une flèche hydraulique ou d'une flèche en treillis; ces grues ont habituellement plusieurs essieux, dont certains sont non moteurs ou sans direction, servant seulement à mieux répartir le poids; elles sont équipées de plusieurs types de direction
boom	part of the crane that extends above the upper works or superstructure and supports the line or lines to which the load is attached	**flèche**	partie d'une grue qui s'élève au-dessus de la superstructure et qui supporte le câble ou les câbles auxquels la charge est fixée
boom configuration	how the boom is utilized; the configuration, for example, may include the addition of extensions, jibs, etc.	**configuration de la flèche**	façon dont la flèche est utilisée; la configuration, par exemple, peut exiger l'ajout de rallonges, de fléchettes, etc.
cable cutter	mechanical or hydraulic device especially designed to cut wire rope	**coupe-câble**	outil mécanique ou hydraulique conçu spécialement pour couper des câbles d'acier

car body	frame of a chassis for a crawler crane to which the tracks and upper works attach	**carrosserie**	cadre du châssis d'une grue sur chenilles auquel sont fixées les chenilles et la superstructure
chassis	part of the carrier that includes the steering and braking mechanisms, suspension, drive train and tracks or wheels	**châssis**	partie du transporteur qui supporte les mécanismes de direction et de freinage, la suspension, la transmission ainsi que les chenilles ou les roues
clamshell	attachment installed at the lifting end of the hoist rope that is designed to open and close in order to move mud, sand or other loose materials	**benne preneuse**	accessoire fixé à l'extrémité d'un câble de levage qui est doté de mâchoires qui s'ouvrent et se referment pour la manutention de boue, de sable ou de matières en vrac
controls	mechanisms that include all levers, brakes, dogs, switches, buttons and other devices that the crane operator physically manipulates	**commandes**	ensemble des mécanismes qui comprend les leviers, les freins, les dispositifs d'immobilisation verrous, les interrupteurs, les boutons et d'autres dispositifs que l'opérateur ou l'opératrice de grue automotrice est appelé à manipuler
counterweight	attachments (usually heavy metal or concrete), usually secured to the rear of the upper works, chassis or attachment; counterweights offset the weight of the extended boom and load	**contrepoids**	accessoires (habituellement en métaux lourds ou en béton) fixé à l'arrière de la superstructure, au châssis ou à l'accessoire ; pour contrebalancer le poids de la flèche déployée et celui de la charge
crawler crane	mobile crane that uses a track-driven carrier	**grue sur chenilles**	grue automotrice portée par un transporteur à chenilles
dragline	attachment installed at, and suspended by, the lifting end of the hoist rope that is designed to scrape earth or other material into it as it is dragged toward the crane by a second drum	**pelle à benne traînante**	accessoire fixé et suspendu à l'extrémité du câble de levage conçu pour se remplir de terre ou d'autre matériau en raclant le sol alors qu'il est ramené vers la grue par un second tambour
drum	cylindrical component that is used to store and dispense line; the line is wound or spooled onto the drum when the operator causes the drum to rotate	**tambour**	composant cylindrique de la grue automotrice dont la rotation permet l'enroulement ou le déroulement du câble de levage; le câble de levage s'enroule autour du tambour lorsque l'opérateur ou l'opératrice active la rotation du tambour

duty cycle	crane operations such as clamshell, magnet, concrete bucket and grapple work, where the operation comprises steady and repetitive work at short cycle time with fairly constant loading levels	**cycle intensif**	manœuvres à la grue telles que le travail à la benne preneuse, à l'électroaimant, à la benne à béton et à la benne articulée, où l'activité comprend un travail régulier et répétitif à un temps de cycle court avec des niveaux de charge assez constants
extend the boom	hydraulic cranes, in most cases, have one or more telescoping sections to the main boom; this is one feature that allows the operator to control the length of the boom	**déployer la flèche**	manœuvre qui consiste à faire sortir les sections télescopiques dont est pourvue la flèche principale de la plupart des grues hydrauliques, pour en accroître la longueur
freefall	capability of a hoist rope on a drum to unwind using only the weight of the load or lifting device attached to the hoist rope	**chute libre**	capacité d'un câble de levage autour d'un tambour de se dérouler grâce au poids de la charge ou de l'appareil de levage attachés au câble de levage
gross load	weight of the load plus other items, such as the hook block, hoist ropes, rigging, etc. (as defined by the crane manufacturer)	**charge lourde**	poids de la charge auquel s'ajoute celui de la moufle, des câbles de levage, de l'équipement de gréage, etc. (selon la définition des fabricants de la grue)
hardware	usually refers to rigging hardware, which can be any of a wide range of bolts, hooks, chains, shackles, clamps, and other mechanical devices used to secure or attach to loads in preparation for hoisting	**accessoires de gréage**	ensemble de boulons, de crochets, de chaînes, de manilles, d'attaches et d'autres organes mécaniques utilisés pour arrimer ou fixer les charges pour leur levage
hoist rope	single line attached to a ball, lift hook, boom hoist or other assembly; the term hoist rope may also be used to describe the compound assembly of lines running through the hook block; these ropes are either wire rope or synthetic material	**câble de levage**	câble simple auquel est attaché une boule de lestage, un crochet de levage ou tout autre dispositif; le câble de levage peut aussi décrire l'ensemble des câbles utilisés dans un mouflage
hoisting	act of manipulating the crane controls in order to move a load	**levage**	action de manœuvrer les commandes de la pour le déplacement d'une charge
hook block	weighted metal block containing sheaves or pulleys, located at the end of the hoist rope on some cranes; the hook block is equipped with a hook for attachment of loads	**moufle**	ensemble métallique lesté composé de poulies situé à l'extrémité du câble de levage de certaines grues; la moufle est munie d'un crochet auquel les charges sont fixées

hydraulic system	system that relies on pressurized oil to make it function; the boom on hydraulic cranes is manipulated through the use of oil under pressure	**système hydraulique**	système dont le fonctionnement est assuré par de l'huile sous pression; les manœuvres de la flèche des grues hydrauliques se font grâce à ce système
levelling	process of positioning the crane so that it is level prior to lifting a load	**mise de niveau**	activité qui consiste à positionner une grue de niveau avant qu'une charge puisse être soulevée
lifting attachments	accessories supplied by manufacturers used to increase crane capacity or boom length or to perform additional crane functions	**accessoires**	éléments fournis par le fabricant et utilisés pour augmenter la capacité de la grue ou la longueur de la flèche, ou pour effectuer toute autre manœuvre avec la grue
log book	book in which the operator is required to record information, such as inspection, maintenance, locations, hours worked as well as damage and repair details	**carnet de bord**	registre dans lequel l'opérateur ou l'opératrice de grue automotrice consigne des renseignements portant sur l'inspection, l'entretien, les lieux de travail, les heures travaillées, les dommages observés et les réparations effectuées
magnet work	attachment installed at the lifting end of the hoist rope in order to lift and move metal	**électroaimant**	accessoire fixé à l'extrémité du câble de levage pour lever et déplacer une charge métallique
multi-crane lifts	lifts which are performed simultaneously by two or more cranes attached to the same load; in some instances, it is impossible to accomplish certain lifts using only one crane	**levage à plusieurs grues**	type de levage qui consiste à attacher une même charge à deux ou plusieurs grues pour son levage; dans certains cas, il est impossible d'effectuer le levage prévu avec une seule grue
net capacity	lift that can be made that is, gross capacity minus attachments, lifting devices, hooks and rigging	**capacité nette**	levage possible par une grue, soit la capacité brute moins les accessoires, les appareils de levage, les crochets et l'équipement de gréage
outriggers	supports that extend from the carrier vehicle to the ground to provide stability; outriggers are composed of beams and jacks	**stabilisateurs**	supports déployés depuis le transporteur de manière à prendre appui sur le sol pour assurer la stabilité de la grue; les stabilisateurs sont composés de poutres et de crics

pawl (dog)	device or control that locks or stops machinery or components (usually winches) from rotating; a pawl locks rotation in one direction; a dog prevents rotation in all directions	**verrou et crochet**	dispositifs ou commande servant à verrouiller ou à arrêter l'équipement ou leurs composants (le plus souvent les treuils) pour en empêcher la rotation; un verrou bloque la rotation dans une direction, un crochet empêche la rotation dans toutes les directions
piledriving	use of the mobile crane to force metal, concrete or wooden pilings into the ground	**battage de pieux**	fonction de la grue automotrice qui sert à enfoncer des pieux de métal, de béton ou de bois dans le sol
radius	horizontal distance from the centre of rotation of a crane to the centre of gravity of load with the load suspended	**rayon**	distance horizontale comprise entre l'axe de rotation de la grue et le centre de gravité de la charge suspendue
reeving	(n.) a rope system in which the rope travels around sheaves; (v.) installing the rope system around the sheaves	**mouflage**	(nom) un système de câble dans lequel le câble circule autour de poulies; (action) l'installation du système de câble autour des poulies
rig	act of attaching loads to the hoisting system	**gréage**	action de fixer une charge à un câble de levage
rig-up/rig-down	assembly and disassembly of crane and components	**montage ou démontage**	installation et désinstallation de la grue et de ses composants
rigger	designated individual whose duty it is to ensure that loads are appropriately attached or rigged to the hoist rope of the crane	**gréeur ou gréeuse**	ouvrier ou ouvrière dont la tâche est de s'assurer que les charges sont bien fixées ou gréées au câble de levage
rough-terrain (RT) crane	rough terrain cranes are rubber-tire mounted and may be two or all-wheel drive and various steering modes; they may have solid suspension on the front axle and oscillating rear axles; RT cranes have off-road capability; they have "on-rubber" and "pick-and-carry" charts	**grue pour terrains accidentés**	les grues pour terrains accidentés sont montées sur pneus et peuvent être à deux roues ou à toutes roues motrices ou directrices; elles peuvent être équipées de suspensions solides à l'avant et d'essieux oscillants à l'arrière; les grues pour terrains accidentés peuvent circuler hors route; on utilise des configurations « sur roues » et de « levage et transport » avec ces grues

sheaves	wheels or pulleys located in a hook block, boom heads, or other parts of the crane boom on which the line runs	**poulies**	roues montées sur une moufle ou accrochées à une tête de flèche ou à d'autres parties de la flèche de la grue dans lesquelles les câbles circulent
signal	approved signs given to the operator by the signaller; the signaller may use hands and arms to relay the information, or may rely on a radio to give verbal cues to the operator	**signaux réglementaires**	signaux normalisés qu'utilise le signaleur ou la signaleuse pour transmet de l'information à l'opérateur ou à l'opératrice de grue; il peut s'agir de signaux manuels, ou encore de consignes verbales transmises par radio
signaller	designated individual who relays information to the crane operator	**signaleur ou signaleuse**	ouvrière ou ouvrier chargé de transmettre des consignes à l'opérateur ou à l'opératrice de grue
sling	any metal or synthetic flexible device used to cradle or support a load	**élingue**	dispositif flexible métallique ou synthétique utilisé pour entourer ou supporter une charge
specialty equipment	equipment used for a specific operation	**équipement spécialisé**	équipement utilisé pour des manœuvres bien précises
spooling	process of winding line either onto or off of a drum on which it is stored	**enroulement**	procédé par lequel le câble est enroulé autour du tambour ou déroulé du tambour autour duquel il est enroulé
superstructure / upperworks	part of the mobile crane above the carrier which rotates and supports the boom, winches, cylinders and other components	**superstructure**	ensemble rotatif reposant sur le transporteur d'une grue automotrice auquel sont fixés la flèche, les treuils, les vérins et d'autres composants
swing (slewing)	rotating the upper works horizontally through part or all of the radius or circle	**rotation**	mouvement horizontal d'une superstructure que l'on fait pivoter sur 360° ou moins
tracks	carrier system used to move certain cranes that require the use of tracks rather than wheels	**chenilles**	système de transport utilisé pour déplacer certaines grues qui exigent l'utilisation de chenilles plutôt que des roues

truck-mounted crane	truck-mounted cranes steer from the front axles only; and a lower deck and smaller tires than AT cranes; they may have either lattice or hydraulic booms; the cranes are rubber mounted (on tires); these cranes must be driven from the carrier; they can be configured to be driven on public roads	**grue sur camion**	grue montée sur un camion dirigé par des essieux directeurs à l'avant seulement; dotée d'un tablier surbaissé et des pneus plus petits que ceux des grues tout-terrain; elles sont également dotées de flèches en treillis ou hydrauliques; elles sont montées sur pneus et doivent être conduites à partir du transporteur; elles peuvent être configurées pour circuler sur les voies publiques
wire rope	material made of many extremely strong and flexible metal alloy wires wound in various configurations to suit a range of conditions; often referred to as cable	**câble d'acier**	câble composé de plusieurs fils d'une variété d'alliage métallique flexible et très résistant enroulés de diverses façons pour répondre à des besoins variés