

# **National Occupational Standards For Operating Engineers**

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## **CONCRETE PUMP OPERATOR**



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## **Introduction**

The Construction Sector Council (CSC) is one of 40 sector councils in Canada. Sector councils are industry-led, labour/management partnership organizations designed to address human resource development issues within specific industries.

The primary objective of the CSC is the development of a highly-skilled workforce and a safe workplace environment, contributing to the organizational productivity and individual prosperity of the members of the construction industry. The development of national occupational standards for operating engineer occupations is one of the many ways the CSC is meeting this objective.

The CSC acknowledges all of the subject matter experts who provided their valuable time and efforts toward the definition and validation of these national occupational standards. Without their combined contributions, the development of these occupational analyses (OAs) would not have been possible. A complete list of the subject matter experts can be found at the back of this document.

An OA has the following objectives:

- to identify and group the tasks performed by skilled workers in particular occupations
- to identify those tasks that are performed by skilled workers in every province and territory
- to develop instruments for use in the assessment and training leading to the certification of skilled workers
- to facilitate the mobility, in Canada, of trainees and skilled workers
- to supply employers and employees, and their associations, industries, training institutions, and governments with analysis of the tasks performed in particular occupations

Therefore, the standards define the skills, knowledge, and abilities required for an occupation and against which the qualifications of an individual in that occupation can be assessed.

The vision of the Construction Sector Council is to reach a point where operators who demonstrate the skills, knowledge, and abilities in the national occupational standards will possess the nationally recognized credentials and those credentials will assist the operator in obtaining employment anywhere in Canada.

## Foreword

Operating engineer occupations can be grouped into three broad areas—hoist and crane operators, construction heavy equipment operators, and industrial equipment operators. Within each of these broad categories, there are several operating engineer occupations.

### **1. *Hoist and Crane Operators***

Crane operators' work tends to be centred in the construction industry. Operators work on a broad range of building sites including high-rise residential, institutional, and commercial structures, as well as most large industrial sites and many types of heavy engineering projects. The Statistics Canada Labour Force Survey (LFS) identifies around 4,000 crane operators in the construction industry across Canada. There are cyclical variations in employment, with low levels below 3,000 jobs in the mid-1990s and peak levels near 5,000.

### **2. *Construction Heavy Equipment Operators***

Heavy equipment operators are largely concentrated in the construction industry. Operators work on a variety of jobs from residential, institutional, and commercial structures to most large industrial sites and most types of heavy engineering. The LFS identifies around 37,000 equipment operators employed in the construction industry across Canada. This occupation is one of the larger trades in the industry, comparable in size to the workforce for electricians, pipe trades, and masonry trades. There are cyclical variations in employment, with low levels below 27,000 jobs in the early 1990s and peak levels near 40,000.

### **3. *Industrial Equipment Operators***

Industrial equipment operators encompass a variety of occupations ranging from forklift operators and environmental workers to tractor trailer drivers. The demand for environmental workers is increasing as knowledge, awareness, and regulations proliferate. Forklift training has taken on added importance due to safety regulations that require trained or certified forklift operators.

The mobility and accessibility of operating engineers is difficult if not impossible if there are no jurisdictional agreements on national occupational standards. The project to develop occupational analyses for national occupational standards for 29 operating engineer occupations began in January 2004 and was completed in March 2005.

## **Development of the Occupational Analysis**

A draft analysis was developed by a knowledgeable team of consultants (process experts) who, with the assistance of a committee of subject matter experts in the field, identified all the tasks performed in the occupation. In order to facilitate an efficient and effective process, the 29 occupations were grouped according to commonalities. Profile meetings, with both process and subject matter experts, were held for each grouping between January and March 2004 in:

- Edmonton, Alberta
  - Excavating, Feb 5 & 6
  - Paving, Feb 9 & 10
- Morrisburg, Ontario
  - Grading, Feb 24 & 25
  - Crane and Hoisting, Mar 1 & 2
  - HAZMAT, Mar 3 & 4
  - Plant Operations, Mar 23 & 24
  - Concrete Pumping, Mar 25 & 26
- Montreal, Quebec
  - Hauling, Feb 26 & 27
- Vancouver, British Columbia
  - Utilities, Mar 16 & 17
  - Material Handling, Mar 18 & 19
- Quebec City, Quebec
  - Profile Completion Forum, Mar 29 – 31

The draft OAs were then distributed to more subject matter experts and stakeholders across Canada for review and input between June and September 2004. They were also posted on a website where subject matter experts were invited to provide feedback.

The combined input from the review was collated in October 2004. Recommendations were assessed and incorporated into the final draft, which included the identification of common core tasks performed in all occupations. Validation meetings were held for each grouping, with process and subject matter experts, between October 2004 and January 2005 in:

2004:

- Saskatoon, Saskatchewan
  - Utilities, Oct 20 – 22
  - Material Handling (including HAZMAT), Oct 26 – 29
- Halifax, Nova Scotia
  - Grading, Nov 2 – 5
- St John's, Newfoundland
  - Crane and Hoisting (including Concrete Pump), Nov 15 – 19
- Winnipeg, Manitoba
  - Excavating, Nov 23 – 25
  - Hauling, Nov 30 – Dec 3

2005:

- Vancouver, British Columbia
  - Paving, Jan 5 – 7
  - Plant Operations, Jan 10 – 12
- Victoria, British Columbia
  - Validation Forum, Feb 21 – 23

The OAs were then edited, translated, and published in both official languages.

## **Scope of the Occupational Analysis**

This occupational analysis identifies all of the tasks that a qualified operator must be able to perform. The performance of these tasks is dependent on a range of related activities, described in the body of the analysis as subtasks. The analysis is composed mainly of tasks that operators perform frequently, including such tasks as cleaning, driving, and maintenance.

Most operators have a range of experience on different types of equipment. Regardless of the type of equipment, the duties of the operator remain relatively constant. Accomplishment of the operator's tasks depends largely on knowledge of the equipment and its components, experience in a wide variety of situations, and an ability to determine the most appropriate means of proceeding with the work.

Though not described in the analysis, other important attributes of operators include mechanical aptitude, mathematical ability, excellent vision, and a high degree of physical coordination. Operators are also often called upon to perform their jobs in extremely difficult conditions.

Although this analysis is not a training document, it is worthwhile noting that aspiring operators may find it useful to reflect on their own abilities to deal with lengthy periods of physical restriction and isolation coupled with frequent subjection to pressures of time and productivity. Operators are often required to demonstrate the ability to concentrate for long periods of time while enduring physical discomfort and inclement weather conditions.

Heavy equipment is used in virtually every facet of the construction sector. In some cases, an operator may work for years on a single site, such as a plant, and may, during that time, operate only one type of equipment and therefore perform similar and relatively constant tasks. Operators who work for contractors may rarely work on the same site more than once and may perform a tremendous variety of tasks using a wide range of equipment types and sizes. The work of an operator often overlaps with that of other equipment operators.

## **Structure of the Occupational Analysis**

To facilitate the understanding of the nature of the occupation, the work performed is divided into the following divisions:

- A. BLOCK**            the largest division within the analysis and reflects a distinct operation relevant to the occupation
- B. TASK**             the distinct activity that, combined with others, makes up the logical and necessary steps the operator is required to perform to complete a specific assignment within a BLOCK
- C. SUBTASK**        the smallest distinct, measurable, and observable activities into which it is practical to divide any work activity; combined with other SUBTASKS, these fully describe the logical steps required to complete a TASK

The importance of a task describes the benefits that operators, employers, and the public receive as a result of an operator's ability to perform the task.

*Trends* are any shifts or changes that are occurring in the industry and affect the task.

*Supporting Knowledge and Abilities* are the elements of skill and knowledge that an individual must acquire to perform the task adequately.

*Tools and Supplies* are those items that are needed to perform the skill.

**BLOCK A      PROFESSIONALISM**  
**Task 1        Acts Professionally**

This task is important because it helps to:

- present positive image of industry
- demonstrate personal integrity and competence
- instill confidence and maintain relations with general public, site personnel, owners/clients, and their clients
- maintain employment and advance in industry

Trends:

- Employers and employees are placing more emphasis on company/personnel fit in relation to attitudes and values.
- There is less tolerance for unprofessional behaviour, including workplace violence, substance abuse, and harassment.
- There is increased awareness of the importance of a balanced lifestyle.
- There is an increasing demand for knowledgeable and experienced operators that have the interpersonal skills and desire to advance to supervisory and management levels.
- Individuals need to continually upgrade their knowledge and skills because of technological advances and new methodologies.

	Subtasks	Supporting Knowledge and Abilities	Tools and Supplies
1.01	Demonstrates work ethic	Knowledge of: <ul style="list-style-type: none"> <li>• principles of work ethic and expectations, such as be punctual, prepared for work, co-operative, honest, productive, and respectful</li> </ul> Ability to: <ul style="list-style-type: none"> <li>• follow principles of work ethic in all situations</li> </ul>	
1.02	Is aware of factors affecting personal health	Knowledge of: <ul style="list-style-type: none"> <li>• factors affecting personal health</li> <li>• own current mental, emotional, and physical state</li> <li>• own limitations</li> <li>• factors/situations/conditions that cause stress in professional and personal life</li> <li>• working conditions on construction site</li> <li>• impact of fatigue on job performance</li> </ul>	
1.03	Resolves problems or disagreements with others	Knowledge of: <ul style="list-style-type: none"> <li>• company policies and procedures</li> <li>• applicable legislation, such as harassment</li> <li>• conflict resolution techniques</li> </ul>	

Ability to:

- communicate effectively
- use calm approach
- be open-minded and flexible
- determine cause of problem or disagreement
- discuss and resolve issues
- walk away from conflict if necessary

1.04 Participates in professional development

Knowledge of:

- industry trends
- areas requiring ongoing learning, such as new equipment, technologies, techniques, and industry practices

Ability to:

- assess own knowledge and skills
- acquire information about training opportunities
- learn through various methods, such as on-the-job training, reading, courses, co-workers

1.05 Works with others

Knowledge of:

- own role and responsibilities
- roles and responsibilities of others in industry

Ability to:

- work as team member to achieve common goals
- keep open mind
- participate in workplace meetings
- communicate clearly and accurately
- co-ordinate job-related activities
- co-operate with others

1.06 Works independently

Knowledge of:

- company policies and procedures, such as work-alone plan
- applicable legislation, such as responsibilities of supervisor/owner and site personnel
- own role and responsibilities
- own capabilities and limitations
- work assignment, location, and working conditions

Ability to:

- confirm and clarify assignment
- take initiative, such as anticipate and prepare for next steps in job
- identify and resolve potential and actual problems
- communicate with other site personnel
- co-ordinate work with others
- complete assignment

**BLOCK A      PROFESSIONALISM**  
**Task 2        Uses Communication Skills**

This task is important because it helps to:

- work safely and efficiently
- reduce errors and miscommunication
- comply with applicable legislation and insurance requirements
- represent company and industry in professional manner
- summon help in emergency
- prevent injury, save lives, and limit damage to equipment and property

Trends:

- There is an increased use of communication devices to increase productivity and improve safety.
- There is an increasing legislative requirement for documentation and participation in job site meetings.

	Subtasks	Supporting Knowledge and Abilities	Tools and Supplies
2.01	Speaks and listens effectively	<p>Knowledge of:</p> <ul style="list-style-type: none"> <li>• importance of effective communication</li> <li>• industry terms</li> <li>• roles of individuals on job site, such as supervisor, inspector, other tradespeople</li> </ul> <p>Ability to:</p> <ul style="list-style-type: none"> <li>• listen carefully to what is said</li> <li>• confirm understanding, such as repeat or paraphrase instructions</li> <li>• communicate message clearly and accurately to others</li> <li>• exchange information with others, such as supervisor, signaller, general public, inspectors, other operators and tradespeople</li> </ul>	
2.02	Uses documentation	<p>Knowledge of:</p> <ul style="list-style-type: none"> <li>• company policies and procedures</li> <li>• applicable legislation, such as Access to Information Act</li> <li>• own role and responsibilities</li> <li>• types of documentation required, such as log books, safety reports, maintenance reports, inspection reports, time cards</li> <li>• importance of complete, legible, and accurate documentation</li> <li>• where documentation is stored</li> <li>• industry terms</li> </ul>	

Ability to:

- access and store documents as required
- provide complete, legible, and accurate information in documents in timely manner
- read and interpret equipment inspection documentation from previous shifts before conducting pre-operational inspection

2.03 Communicates using signals

Knowledge of:

- company policies and procedures
- applicable legislation
- role and responsibilities of signallers
- signallers on job site
- audible and warning signals used on job site
- hand signals

Ability to:

- identify and work with signallers
- communicate using audible signals, such as back-up alarm, site emergency horn
- communicate using hand signals

2.04 Uses electronic communication equipment

Knowledge of:

- manufacturers' specifications and operating instructions
- company policies and procedures
- applicable legislation
- types of communication equipment used on job site

Ability to:

- check communication devices to verify operating condition, such as complete radio check
- deliver and receive messages using communication equipment
- follow communication protocol

*Communication devices*

**BLOCK B SAFETY**  
**Task 3 Interprets Applicable Legislation and Policies**

This task is important because it helps to:

- ensure health and safety of workers and public
- comply with applicable legislation
- prevent damage to property and environment
- decrease potential of litigation

Trends:

- There is an increasing amount of training and documentation required by amended and new legislation.
- There is an increasing demand for standardized national legislation to reduce confusion and duplication caused by differences between jurisdictions. Lack of standardized legislation may lead to fatalities and accidents, and to damage of equipment, property, and the environment.
- There is an increasing expectation that operators will be knowledgeable about relevant legislation.

Subtasks	Supporting Knowledge and Abilities	Tools and Supplies
3.01 Interprets federal, provincial/territorial, and municipal legislation	<p>Knowledge of:</p> <ul style="list-style-type: none"> <li>• applicable federal, provincial/territorial, and municipal legislation, such as Highway Traffic Act, Occupational Health and Safety Act</li> <li>• where relevant legislation can be located</li> </ul> <p>Ability to:</p> <ul style="list-style-type: none"> <li>• locate relevant sections in legislation</li> <li>• read legislation</li> <li>• seek clarification of legislation</li> </ul>	
3.02 Interprets permits, licences, and insurance requirements	<p>Knowledge of:</p> <ul style="list-style-type: none"> <li>• applicable permits, licences, and insurance requirements</li> <li>• authorities having jurisdiction</li> </ul> <p>Ability to:</p> <ul style="list-style-type: none"> <li>• locate permits, licences, and insurance documentation, such as over-dimensional permits, ground disturbance permits, air emissions permits, water use permits</li> <li>• read permits, licences, and insurance documentation</li> <li>• seek clarification on permits, licences, and insurance documentation</li> </ul>	<i>Permits, licences, insurance documentation</i>

3.03 Interprets environmental legislation

Knowledge of:

- relevant environmental legislation
- authorities having jurisdiction, such as department of fisheries, ministry of environment, municipality
- potential environmental damage caused by construction activities

Ability to:

- locate applicable permits on job site
- read environmental legislation
- seek clarification of environmental legislation

3.04 Interprets company policies and procedures

Knowledge of:

- where copies of company policies and procedures can be located

Ability to:

- read company policies and procedures
- stay current with company policies and procedures
- seek clarification on company policies and procedures

**BLOCK B SAFETY**  
**Task 4 Works Safely**

This task is important because it helps to:

- protect self and others from injury or death
- comply with applicable legislation
- prevent damage to equipment and environment
- reduce unscheduled downtime

Trends:

- Legislation relating to PPE and training is frequently being amended to protect employees, employers, the environment, and the general public.
- The industry is involved in improving safety on job sites to reduce accidents.

	Subtasks	Supporting Knowledge and Abilities	Tools and Supplies
4.01	Uses personal protective equipment (PPE)	<p>Knowledge of:</p> <ul style="list-style-type: none"> <li>• company policies and procedures</li> <li>• applicable legislation</li> <li>• PPE required/recommended by manufacturers' manuals</li> <li>• PPE required for construction sites, such as footwear, hard hats, safety vests, safety glasses</li> <li>• PPE required for specific conditions, such as breathing apparatus for hazardous breathing conditions, dielectric boots and gloves for protection from electrical shock</li> <li>• inspection, care, and use of PPE</li> </ul> <p>Ability to:</p> <ul style="list-style-type: none"> <li>• identify PPE required for job site and situation</li> <li>• ensure PPE meets safety standard requirements, such as Canadian Standards Association (CSA)</li> <li>• inspect PPE for damage, and repair or replace as necessary</li> <li>• ensure PPE fits correctly</li> </ul>	<p><i>Steel-toed footwear, hard hat, safety gloves, appropriate safety glasses, high visibility vest, hearing protection, breathing apparatus, fall protection, and other applicable PPE</i></p>
4.02	Completes required health and safety training	<p>Knowledge of:</p> <ul style="list-style-type: none"> <li>• manufacturers' specifications, such as recommended operating procedures</li> <li>• company policies and procedures</li> <li>• applicable legislation</li> </ul>	

Ability to:

- take required health and safety training, such as confined space entry, Workplace Hazardous Materials Information System (WHMIS), first aid, cardiopulmonary resuscitation (CPR)

**BLOCK B SAFETY**  
**Task 5 Complies with Site Emergency Plan**

This task is important because it helps to:

- protect self
- prevent property damage
- ensure safety of public and job site personnel
- evacuate and secure area efficiently and effectively

Trends:

- Emergency exercises and preparedness activities are becoming more common.

	Subtasks	Supporting Knowledge and Abilities	Tools and Supplies
5.01	Prepares for emergencies	<p>Knowledge of:</p> <ul style="list-style-type: none"> <li>• manufacturers' specifications, such as equipment emergency shut-down procedure</li> <li>• company policies and procedures</li> <li>• site emergency response plan, such as evacuation routes, procedures, contact protocol</li> <li>• types of fires, i.e., Class A, B, C, and D</li> <li>• types of extinguishers</li> <li>• potential and actual hazards on work site</li> <li>• location of fire extinguishers and first aid stations (on equipment and site) and how to use them</li> <li>• inspection requirements for safety equipment and supplies, such as fire extinguisher, first aid kit</li> </ul> <p>Ability to:</p> <ul style="list-style-type: none"> <li>• take emergency response training, such as emergency response exercises, first aid, CPR</li> </ul>	<p><i>Site emergency response plan, fire extinguishers, fire blankets, respirators, masks, fire hoses, first aid kits, stretchers, WHMIS book, and other related tools and gear</i></p>
5.02	Responds to emergencies	<p>Knowledge of:</p> <ul style="list-style-type: none"> <li>• manufacturers' specifications, such as equipment emergency shut-down procedure</li> <li>• company policies and procedures</li> <li>• site emergency response plan, such as evacuation routes, procedures, contact protocol</li> <li>• types of fires, i.e., Class A, B, C, and D</li> <li>• types of extinguishers</li> <li>• potential and actual hazards on work site</li> <li>• location of fire extinguishers and first aid stations (on equipment and site) and how to use them</li> </ul>	<p><i>Fire extinguishers, fire blankets, respirators, masks, fire hoses, first aid kits, stretchers, and other related tools and gear</i></p>

- inspection requirements for safety equipment and supplies, such as fire extinguisher, first aid kit

Ability to:

- follow emergency plan
- communicate or follow instructions
- assess risks and determine course of action
- operate emergency equipment and supplies

**BLOCK C      EQUIPMENT**  
**Task 6        Describes Equipment and Attachments**

This task is important because it helps to:

- use equipment properly and safely
- select correct attachments for materials and working conditions
- communicate with others using correct terms

Trends:

- There is increased variety of concrete pump sizes, applications, and attachments.
- There is increased use of technology in operating concrete pumps.

Subtasks	Supporting Knowledge and Abilities	Tools and Supplies
6.01      Describes types and applications of concrete pumps	Knowledge of: <ul style="list-style-type: none"> <li>• manufacturers' specifications</li> <li>• types of concrete pumps, such as boom pump, line pump</li> <li>• applications for different types of concrete pumps, such as that line pumps are used in locations with limited aerial access, that boom pumps are used where pour location can be accessed from above</li> </ul>	<i>Manufacturers' manuals and literature</i>
6.02      Describes factors that affect pump ratings	Knowledge of: <ul style="list-style-type: none"> <li>• manufacturers' specifications</li> <li>• size of material cylinders in relation to size of differential</li> <li>• capacity of power source (also known as horsepower rating)</li> </ul>	<i>Manufacturers' manuals and literature</i>
6.03      Describes major components of concrete pumps	Knowledge of: <ul style="list-style-type: none"> <li>• manufacturers' specifications</li> <li>• operating systems, such as hydraulic, electrical, lubrication</li> <li>• major components, including power source (such as diesel engine, electric motor), hydraulic pumps, pump kit [water box, differentials, material cylinders, rams (also known as piston cups), hopper with articulating valve, auger, grate, vibrator, control centre], delivery system [such as pipes, elbows, clamps, hooks, reducers, safety lines (also known as whip-checks), hoses], discharge hose, support or base (such as truck deck, tracks), outriggers</li> </ul>	<i>Manufacturers' manuals and literature</i>

## Concrete Pump Operator Occupational Analysis

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6.04	Describes attachments	Knowledge of: <ul style="list-style-type: none"><li>• manufacturers' specifications</li><li>• attachments, such as shotcrete nozzle, placing boom, pedestal, power source</li></ul>	<i>Manufacturers' manuals and literature for attachments</i>
6.05	Describes cleaning tools and supplies	Knowledge of: <ul style="list-style-type: none"><li>• manufacturers' specifications</li><li>• cleaning tools, such as air gun, air line, sponge, blow out cap, water hose, long handle scraper, long bar, power washer</li><li>• cleaning supplies, such as detergent, degreaser</li></ul>	<i>Manufacturers' manuals and literature for tools and supplies</i>
6.06	Describes basic tools and supplies associated with concrete pumps	Knowledge of: <ul style="list-style-type: none"><li>• manufacturers' specifications for tools and supplies</li><li>• basic tools, such as hammer, flashlight, wrenches, screwdrivers, flashlight, grease gun</li><li>• basic supplies, such as rags, window cleaner, grease, oil</li></ul>	<i>Manufacturers' manuals and literature for tools and supplies</i>

**BLOCK D MAINTENANCE**

**Task 7 Performs Pre-Operation Inspection and Daily Service with Power Off**

This task is important because it helps to:

- ensure continuous and safe operation of equipment
- meet manufacturers' specifications, company policies and procedures, and legislation
- prevent damage to equipment
- reduce unscheduled downtime

Trends:

- There is increased due diligence to address safety issues and reduce hazardous work conditions.

	Subtasks	Supporting Knowledge and Abilities	Tools and Supplies
7.01	Inspects and services lubrication system	<p>Knowledge of:</p> <ul style="list-style-type: none"> <li>• manufacturers' specifications, such as correct engine oil</li> <li>• company policies and procedures</li> <li>• applicable legislation</li> <li>• lubrication system, components, and functions</li> <li>• normal operating conditions</li> <li>• spill kit procedures</li> </ul> <p>Ability to:</p> <ul style="list-style-type: none"> <li>• locate components to be inspected</li> <li>• identify service needs, defects, and hazardous conditions through visual inspection</li> <li>• select and use appropriate tools</li> <li>• perform basic service, such as grease fittings, adjust oil levels</li> <li>• perform or arrange for repair or replacement of defective components, such as seals, gaskets, hoses</li> <li>• use spill kit</li> </ul>	<i>Manufacturers' manuals and literature, equipment maintenance documentation, PPE, basic tools and supplies, spill kit</i>
7.02	Inspects and services electrical system	<p>Knowledge of:</p> <ul style="list-style-type: none"> <li>• manufacturers' specifications</li> <li>• company policies and procedures</li> <li>• applicable legislation</li> <li>• electrical system, components (such as alternator, starters, regulators, wiring, fuses), and functions</li> <li>• normal operating conditions</li> </ul> <p>Ability to:</p> <ul style="list-style-type: none"> <li>• locate components to be inspected</li> </ul>	<i>Manufacturers' manuals and literature, equipment maintenance documentation, PPE, basic tools and supplies</i>

- identify service needs, defects, and hazardous conditions through visual inspection
- select and use appropriate tools
- perform basic service, such as add water to battery, clean corroded battery posts
- perform or arrange for repair or replacement of defective components, such as alternator belts

7.03 Inspects and services hydraulic system

Knowledge of:

- manufacturers' specifications
- company policies and procedures
- applicable legislation
- hydraulic system, components (such as hydraulic fluid, filters, lines, pumps, fittings), and functions
- normal operating conditions
- spill kit procedures

Ability to:

- locate components to be inspected
- identify service needs, defects, and hazardous conditions through visual inspection
- check sight glass, such as oil level
- select and use appropriate tools
- perform basic service, such as adjust hydraulic oil levels, tighten fittings
- perform or arrange for repair or replacement of defective components, such as lines
- use spill kit

*Manufacturers' manuals and literature, equipment maintenance documentation, PPE, basic tools and supplies, spill kit*

7.04 Inspects and services cooling system

Knowledge of:

- manufacturers' specifications
- company policies and procedures
- applicable legislation
- cooling system, components (such as belts, hoses, radiator, coolant), and functions
- normal operating conditions
- spill kit procedures

Ability to:

- locate components to be inspected
- identify service needs, defects, and hazardous conditions through visual inspection
- select and use appropriate tools

*Manufacturers' manuals and literature, equipment maintenance documentation, PPE, basic tools and supplies, coolant, spill kit*

- perform basic service, such as adjust belt tension, check coolant levels
- perform or arrange for repair or replacement of defective components, such as leaking or broken hoses and belts
- use spill kit

7.05 Inspects and services air intake system

Knowledge of:

- manufacturers' specifications
- company policies and procedures
- applicable legislation
- air intake system, components (such as air filters, air intake system, turbo chargers), and functions
- normal operating conditions

*Manufacturers' manuals and literature, equipment maintenance documentation, PPE, basic tools and supplies, air filters*

Ability to:

- locate components to be inspected
- identify service needs, defects, and hazardous conditions through visual inspection
- select and use appropriate tools
- perform basic service, such as change air filters
- perform or arrange for repair or replacement of defective components, such as air intake hose, clamp

7.06 Inspects and services fuel system

Knowledge of:

- manufacturers' specifications
- company policies and procedures
- applicable legislation
- fuel systems, components (such as fuel pump, injector lines, fuel filters, water separator), and functions
- spill kit procedures
- normal operating conditions

*Manufacturers' manuals and literature, equipment maintenance documentation, PPE, basic tools and supplies*

Ability to:

- locate components to be inspected
- identify service needs, defects, and hazardous conditions through visual inspection
- select and use appropriate tools
- perform basic service, such as refuel vehicle

		<ul style="list-style-type: none"><li>• perform or arrange for repair or replacement of defective components, such as hose, fuel pump</li><li>• use spill kit</li></ul>	
7.07	Inspects and services suspension system	<p>Knowledge of:</p> <ul style="list-style-type: none"><li>• manufacturers' specifications</li><li>• company policies and procedures</li><li>• applicable legislation</li><li>• suspension system, components (such as fittings, air bags, springs, hangers), and functions</li><li>• normal operating conditions</li></ul> <p>Ability to:</p> <ul style="list-style-type: none"><li>• locate components to be inspected</li><li>• identify service needs, defects, and hazardous conditions through visual inspection</li><li>• select and use appropriate tools</li><li>• perform basic service, such as change and grease fittings, tighten mounting bolts</li><li>• perform or arrange for repair or replacement of defective components, such as air bags, springs</li></ul>	<i>Manufacturers' manuals and literature, equipment maintenance documentation, PPE, basic tools and supplies</i>
7.08	Inspects and services drive train	<p>Knowledge of:</p> <ul style="list-style-type: none"><li>• manufacturers' specifications</li><li>• company policies and procedures</li><li>• applicable legislation</li><li>• drive train, components (such as engine, transmission, differentials, tires), and functions</li><li>• normal operating conditions</li></ul> <p>Ability to:</p> <ul style="list-style-type: none"><li>• locate components to be inspected</li><li>• identify service needs, defects, and hazardous conditions through visual inspection</li><li>• select and use appropriate tools</li><li>• perform basic service, such as adjust tire pressure, add transmission and differential fluids</li><li>• perform or arrange for repair or replacement of defective components, such as universal joint, seals, tires</li></ul>	<i>Manufacturers' manuals and literature, equipment maintenance documentation, PPE, basic tools and supplies, hub oil, air pressure gauge</i>

7.09	Inspects and services braking system	<p>Knowledge of:</p> <ul style="list-style-type: none"><li>• manufacturers' specifications</li><li>• company policies and procedures</li><li>• legislation related to air brakes</li><li>• braking system, components (such as brake chamber, air hoses, slack adjusters, air dryers, air tank), and functions</li><li>• normal operating conditions</li><li>• pneumatic system</li></ul> <p>Ability to:</p> <ul style="list-style-type: none"><li>• locate components to be inspected</li><li>• identify service needs, defects, and hazardous conditions through visual inspection</li><li>• select and use appropriate tools</li><li>• perform basic service, such as close air tank valve</li><li>• perform or arrange for repair or replacement of defective components, such as hose, fitting, air chamber</li></ul>	<i>Manufacturers' manuals and literature, equipment maintenance documentation, PPE, basic tools and supplies</i>
7.10	Inspects and services truck cab	<p>Knowledge of:</p> <ul style="list-style-type: none"><li>• manufacturers' specifications</li><li>• company policies and procedures</li><li>• applicable legislation</li><li>• operator control components (such as seat, instrument panel, communication devices), and functions</li><li>• normal operating conditions</li></ul> <p>Ability to:</p> <ul style="list-style-type: none"><li>• locate components to be inspected</li><li>• identify service needs, defects, and hazardous conditions through visual inspection</li><li>• select and use appropriate tools</li><li>• perform basic service, such as clean windows and mirrors, adjust mirror and seat</li><li>• perform or arrange for repair or replacement of missing or defective components, such as wiper blades</li></ul>	<i>Manufacturers' manuals and literature, equipment maintenance documentation, PPE, basic tools and supplies</i>

## Concrete Pump Operator Occupational Analysis

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7.11	Inspects safety equipment	<p>Knowledge of:</p> <ul style="list-style-type: none"><li>• manufacturers' specifications</li><li>• company policies and procedures</li><li>• applicable legislation</li><li>• required safety equipment, such as reflectors, fire extinguisher, pylons, decals</li><li>• normal operating conditions</li></ul> <p>Ability to:</p> <ul style="list-style-type: none"><li>• locate components to be inspected</li><li>• ensure that safety equipment is present and securely mounted</li><li>• identify service needs, defects, and hazardous conditions through visual inspection</li><li>• arrange for repair or replacement of defective or missing components, such as fire extinguisher</li></ul>	<i>Manufacturers' manuals and literature, equipment maintenance documentation, PPE, basic tools and supplies</i>
7.12	Inspects and services pump kit	<p>Knowledge of:</p> <ul style="list-style-type: none"><li>• manufacturers' specifications</li><li>• company policies and procedures</li><li>• applicable legislation</li><li>• pump kit, components, and functions</li><li>• normal operating conditions</li><li>• spill kit procedures</li></ul> <p>Ability to:</p> <ul style="list-style-type: none"><li>• locate components to be inspected</li><li>• identify service needs, defects, and hazardous conditions through visual inspection, such as check condition of rams</li><li>• refill water tank and water box</li><li>• select and use appropriate tools</li><li>• arrange for repair or replacement of defective or missing components, such as hoses, fittings</li></ul>	<i>Manufacturers' manuals and literature, equipment maintenance documentation, PPE, basic tools and supplies</i>
7.13	Inspects and services power source (if not truck engine)	<p>Knowledge of:</p> <ul style="list-style-type: none"><li>• manufacturers' specifications</li><li>• company policies and procedures</li><li>• applicable legislation</li><li>• power system, components (such as diesel, electric), and functions</li><li>• normal operating conditions</li><li>• refuelling procedures</li><li>• risk of static buildup during refuelling</li><li>• spill kit procedures</li></ul>	<i>Manufacturers' manuals and literature, equipment maintenance documentation, PPE, basic tools and supplies, spill kit</i>

Ability to:

- locate components to be inspected
- identify service needs, defects, and hazardous conditions through visual inspection
- select and use appropriate tools
- perform basic service, such as fuel equipment, remove contamination from sediment bowls
- arrange for repair or replacement of defective components, such as hoses, power supply cable
- use spill kit

7.14 Inspects and services delivery system

Knowledge of:

- manufacturers' specifications
- company policies and procedures
- applicable legislation
- components of delivery system
- normal operating conditions

*Manufacturers' manuals and literature, equipment maintenance documentation, PPE, basic tools and supplies*

Ability to:

- locate components to be inspected
- identify service needs, defects, and hazardous conditions through visual inspection
- select and use appropriate tools
- perform basic service, such as grease swivel clamps
- perform or arrange for repair or replacement of defective components or related equipment, such as rubber gaskets in swivel clamps

7.15 Inspects and services boom

Knowledge of:

- manufacturers' specifications
- company policies and procedures
- applicable legislation
- boom, components, and functions
- normal operating conditions

*Manufacturers' manuals and literature, equipment maintenance documentation, PPE, basic tools and supplies*

Ability to:

- locate components to be inspected
- identify service needs, defects, and hazardous conditions through visual inspection
- select and use appropriate tools

- perform basic service, such as grease boom bushings, bearings, and clamps
- perform or arrange for repair or replacement of defective components, such as elbows, pipe sections

7.16 Inspects and services stabilizing system

Knowledge of:

- manufacturers' specifications
- company policies and procedures
- applicable legislation
- stabilizing system, components (such as outriggers, pads, mats, stabilizer jack, cylinders), and functions
- normal operating conditions

*Manufacturers' manuals and literature, equipment maintenance documentation, PPE, basic tools and supplies*

Ability to:

- locate components to be inspected
- identify service needs, defects, and hazardous conditions through visual inspection
- select and use appropriate tools
- perform basic service, such as grease pins and bolts
- perform or arrange for repair or replacement of defective components, such as pins, bolts, hoses, fittings

7.17 Inspects and services attachments

Knowledge of:

- manufacturers' specifications
- company policies and procedures
- applicable legislation
- attachments, components, and functions
- normal operating conditions

*Manufacturers' manuals and literature, equipment maintenance documentation, PPE, basic tools and supplies, grease gun*

Ability to:

- locate components to be inspected
- identify service needs, defects, and hazardous conditions through visual inspection
- select and use appropriate tools
- perform basic service, such as grease pivot points and fittings
- perform or arrange for repair or replacement of defective components, such as shotcrete nozzle seals, pipe sections on placing boom

**BLOCK D MAINTENANCE**

**Task 8 Performs Pre-Operational Inspection and Daily Service with Power On**

This task is important because it helps to:

- identify problems not evident when power source is off
- ensure that truck and pump are ready to operate
- prolong equipment life
- reduce unscheduled downtime

Trends:

- There is increased due diligence when addressing safety issues and reducing hazardous work conditions.

	Subtasks	Supporting Knowledge and Abilities	Tools and Supplies
8.01	Energizes and warms up equipment	<p>Knowledge of:</p> <ul style="list-style-type: none"> <li>• manufacturers' specifications</li> <li>• company policies and procedures</li> <li>• applicable legislation</li> <li>• monitoring and warning systems, components (such as safety switches, warning alarms), and functions</li> <li>• normal operating conditions</li> <li>• impact of weather and seasonal conditions on start-up procedures, equipment functions, and fluids</li> <li>• battery-boosting procedures</li> <li>• warm-up procedures</li> </ul> <p>Ability to:</p> <ul style="list-style-type: none"> <li>• ensure that controls are in neutral</li> <li>• activate power source</li> <li>• boost batteries if required</li> <li>• interpret information from gauges, lights, and sensors</li> <li>• select and use appropriate tools</li> <li>• adapt start-up procedures to weather conditions, such as use block heater</li> </ul>	<i>Manufacturers' manuals and literature, equipment maintenance documentation, PPE, basic tools and supplies, booster cables</i>
8.02	Cycles equipment functions	<p>Knowledge of:</p> <ul style="list-style-type: none"> <li>• manufacturers' specifications</li> <li>• company policies and procedures</li> <li>• applicable legislation, such as pertaining to air brakes</li> <li>• normal operating characteristics</li> <li>• impact of weather and seasonal conditions</li> </ul>	<i>Manufacturers' manuals and literature, equipment maintenance documentation, PPE, basic tools and supplies</i>

- types of operating controls, such as wireless remote, remote with umbilical cord, local
- power take-off (PTO) procedures

Ability to:

- engage and disengage PTO as required
- activate all functions (such as boom, pump, outriggers) using operating controls
- check each type of operating control being used
- check braking system
- identify service needs, defects, and hazardous conditions through visual inspection
- perform basic service, such as clean remote control, charge batteries
- perform or arrange for repair or replacement of defective components, such as air brakes

**BLOCK D MAINTENANCE**

**Task 9 Complies with Scheduled Maintenance Requirements**

This task is important because it helps to:

- ensure continuous and safe operation of equipment
- validate manufacturers' equipment warranties
- prevent damage to equipment
- reduce unscheduled downtime

Trends:

- Awareness about the consequences of not complying with scheduled maintenance requirements has increased.
- Technological changes, such as automatic greasers, have reduced scheduled maintenance activities.

Subtasks	Supporting Knowledge and Abilities	Tools and Supplies
9.01 Arranges for or performs scheduled maintenance	<p>Knowledge of:</p> <ul style="list-style-type: none"> <li>• manufacturers' specifications</li> <li>• company policies and procedures</li> <li>• applicable legislation</li> <li>• scheduled maintenance requirements</li> <li>• factors affecting need for scheduled maintenance, such as where equipment is being used, quantity or speed of material being pumped</li> </ul> <p>Ability to:</p> <ul style="list-style-type: none"> <li>• comply with safety requirements</li> <li>• read indicators that signal need for replacement, such as air filter, grout in water box</li> <li>• read equipment maintenance documentation</li> <li>• select and use appropriate tools as required</li> <li>• arrange for or perform scheduled maintenance, such as oil, pipe on boom, filtering pump, hydraulic fluid</li> </ul>	<p><i>Manufacturers' manuals and literature, company policies and procedures, equipment maintenance documentation, PPE, basic tools and supplies</i></p>

**BLOCK E      OPERATING PROCEDURES**  
**Task 10      Describes Materials**

This task is important because it helps to:

- properly receive, pump, and place concrete
- prevent damage to equipment and property
- prevent injury to personnel
- prevent unscheduled downtime

Trends:

- More responsibility for planning is being placed on operators.

	Subtasks	Supporting Knowledge and Abilities	Tools and Supplies
10.01	Describes types of concrete mixes and additives	Knowledge of: <ul style="list-style-type: none"> <li>• types of cement, such as 10, 30, 50, fly ash, silica fume</li> <li>• aggregate sizes, such as sand to 1½ inch stone</li> <li>• types of concrete mixes, such as exposed aggregate, block fill, light weight, semi-light weight, high early, weather mix, heavy concrete</li> <li>• concrete mix additives, such as retardants, accelerators, fibres</li> </ul>	<i>Manufacturers' manuals and literature for concrete supplies</i>

**BLOCK E OPERATING PROCEDURES**  
**Task 11 Plans Work Procedures**

This task is important because it helps to:

- properly receive, pump, and place concrete
- prevent damage to equipment and property
- prevent injury to personnel
- prevent unscheduled downtime

Trends:

- More responsibility for planning is being placed on operators.

	Subtasks	Supporting Knowledge and Abilities	Tools and Supplies
11.01	Assesses site hazards	<p>Knowledge of:</p> <ul style="list-style-type: none"> <li>• manufacturers' specifications</li> <li>• company policies and procedures</li> <li>• applicable legislation, such as Occupational Health and Safety</li> <li>• authorities having jurisdiction</li> <li>• factors that affect stability of equipment, such as ground and supporting conditions</li> <li>• obstructions and hazards, such as utilities, other equipment, personnel, job site features</li> </ul> <p>Ability to:</p> <ul style="list-style-type: none"> <li>• inspect site visually</li> <li>• communicate with site personnel and authorities having jurisdiction</li> </ul>	<i>Manufacturers' manuals and literature, PPE</i>
11.02	Discusses environmental concerns of site with site personnel	<p>Knowledge of:</p> <ul style="list-style-type: none"> <li>• company policies and procedures</li> <li>• applicable legislation, such as transportation of dangerous goods, spill reporting</li> <li>• environmental concerns</li> <li>• site characteristics and boundaries</li> </ul> <p>Ability to:</p> <ul style="list-style-type: none"> <li>• identify potential and actual environmental concerns, such as proximity to water courses, noise levels, fuel leaks, hazardous materials</li> <li>• communicate with employer or site personnel</li> </ul>	<i>PPE</i>
11.03	Reviews job specifications and safety considerations with site personnel	<p>Knowledge of:</p> <ul style="list-style-type: none"> <li>• job specifications</li> <li>• company policies and procedures</li> <li>• applicable legislation</li> </ul>	<i>Job- or site-specific PPE, utility locate document</i>

- concrete pump industry terms
- site-specific engineering standards
- site hazards
- job- or site-specific PPE and training
- other construction equipment on site
- roles of personnel on site, such as foreman, inspector, other tradespeople
- types of concrete mixes
- pour sequence for job

Ability to:

- communicate with site personnel to coordinate activities and confirm details of job to be completed, such as specified set-up and pour locations

11.04 Determines work procedures

Knowledge of:

- manufacturers' specifications, such as space required to manoeuvre equipment
- job specifications
- company policies and procedures
- applicable legislation
- type of concrete being used
- ground support conditions

*Manufacturers' manuals and literature, PPE*

Ability to:

- identify traffic patterns, and access and exit points
- communicate with site personnel
- determine appropriate locations, considering equipment set-up and room for concrete pump unit

**BLOCK E      OPERATING PROCEDURES**  
**Task 12      Operates Concrete Pump**

This task is important because it helps to:

- prevent damage to property and equipment
- prevent injury to personnel
- fulfill job specifications
- co-ordinate concrete pump operations with other construction activities on site

Trends:

- There is an increased demand for concrete pumps on construction sites.

Subtasks	Supporting Knowledge and Abilities	Tools and Supplies
12.01    Complies with safety requirements	<p>Knowledge of:</p> <ul style="list-style-type: none"> <li>• manufacturers' specifications</li> <li>• company policies and procedures</li> <li>• applicable legislation</li> <li>• safety controls and functions</li> <li>• safety equipment, such as fire extinguisher</li> <li>• caution, warning, and hazard decals, lights, and symbols</li> </ul> <p>Ability to:</p> <ul style="list-style-type: none"> <li>• use safety controls and equipment</li> <li>• respond to caution, warning, and hazard decals, lights, and symbols</li> </ul>	<i>Manufacturers' manuals and literature, PPE</i>
12.02    Sets up equipment	<p>Knowledge of:</p> <ul style="list-style-type: none"> <li>• manufacturers' specifications</li> <li>• company policies and procedures</li> <li>• applicable legislation</li> </ul> <p>Ability to:</p> <ul style="list-style-type: none"> <li>• ensure that proper ground support, such as blocking (also known as dunnage) or re-shoring is in place if needed</li> <li>• activate PTO</li> <li>• extend outriggers</li> <li>• position pedestal for placing boom if required</li> <li>• position placing boom on pedestal if required</li> <li>• secure delivery system, such as attach safety strap (also known as whip-check), connect hoses to pipe</li> <li>• perform circle check of set-up</li> </ul>	<i>Manufacturers' manuals and literature, PPE, blocking</i>

## Concrete Pump Operator Occupational Analysis

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12.03	Uses operating controls	<p>Knowledge of:</p> <ul style="list-style-type: none"><li>• manufacturers' specifications</li><li>• company policies and procedures</li><li>• applicable legislation</li><li>• operating controls and functions</li></ul> <p>Ability to:</p> <ul style="list-style-type: none"><li>• use operating controls smoothly and safely</li><li>• use different operating controls simultaneously as required</li><li>• respond to changing conditions</li><li>• ensure that remote is secured and locked out when not in use</li><li>• protect umbilical cords from damage if applicable</li></ul>	<i>Manufacturers' manuals and literature, PPE</i>
12.04	Positions delivery system	<p>Knowledge of:</p> <ul style="list-style-type: none"><li>• manufacturers' specifications</li><li>• company policies and procedures</li><li>• applicable legislation</li><li>• location of pour</li><li>• hazards associated with positioning and repositioning booms, such as utilities, kinks in delivery hose</li></ul> <p>Ability to:</p> <ul style="list-style-type: none"><li>• co-ordinate boom movements as required, such as raise boom, move boom in and out, swing left and right</li><li>• position delivery hose for placement of concrete</li></ul>	<i>Manufacturers' manuals and literature, PPE</i>
12.05	Ensures that location is ready for pour	<p>Knowledge of:</p> <ul style="list-style-type: none"><li>• manufacturers' specifications</li><li>• job specifications</li><li>• company policies and procedures</li><li>• applicable legislation</li></ul> <p>Ability to:</p> <ul style="list-style-type: none"><li>• confirm with contractor that location is ready to receive concrete</li><li>• direct ready-mix driver</li></ul>	<i>Manufacturers' manuals and literature, PPE</i>

## Concrete Pump Operator Occupational Analysis

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12.06	Starts pumping	<p>Knowledge of:</p> <ul style="list-style-type: none"><li>• manufacturers' specifications</li><li>• job specifications</li><li>• company policies and procedures</li></ul> <p>• applicable legislation</p> <p>Ability to:</p> <ul style="list-style-type: none"><li>• pump water or concrete slurry mixtures through pipes and hoses to lubricate delivery system and reduce segregation of concrete mixture</li><li>• ensure that proper mix is being supplied in hopper</li></ul>	<i>Manufacturers' manuals and literature, PPE, grout, ready mix</i>
12.07	Co-ordinates operation of concrete pour	<p>Knowledge of:</p> <ul style="list-style-type: none"><li>• engineering specifications</li><li>• job specifications</li><li>• company policies and procedures</li><li>• applicable legislation</li><li>• types of concrete mixes and additives</li></ul> <p>Ability to:</p> <ul style="list-style-type: none"><li>• communicate with other site personnel</li><li>• regulate flow of concrete according to pace of placing crew and supply of ready-mix</li><li>• co-ordinate pour activities with placing boom operator and other members of placing crew</li></ul>	<i>Engineering specifications, communication devices, PPE</i>
12.08	Monitors condition of concrete	<p>Knowledge of:</p> <ul style="list-style-type: none"><li>• engineering specifications</li><li>• company policies and procedures</li><li>• applicable legislation</li><li>• slump test</li><li>• standing time</li><li>• how temperature affects standing time</li></ul> <p>Ability to:</p> <ul style="list-style-type: none"><li>• monitor slump test results</li><li>• communicate concerns with site supervisor</li><li>• work within constraints of concrete standing time</li></ul>	<i>Engineering specifications, PPE</i>

12.09	Optimizes equipment capabilities	<p>Knowledge of:</p> <ul style="list-style-type: none"><li>• manufacturers' specifications for equipment and attachments</li><li>• job specifications</li><li>• impact of attachments and load on rated load capacity and capabilities of equipment</li><li>• factors affecting equipment motion, balance, and stability (such as fulcrum points, centre of gravity, longitudinal and lateral stability) and affects on operating techniques</li><li>• site conditions (such as ground conditions, weather conditions) that affect operating techniques</li></ul> <p>Ability to:</p> <ul style="list-style-type: none"><li>• follow planned work procedure and adjust as necessary</li><li>• optimize equipment capabilities by adjusting to factors, such as limitations of attachment, characteristics of load, site conditions</li><li>• use operating controls on equipment smoothly and simultaneously</li></ul>	<p><i>Manufacturers' manuals and literature, PPE, basic tools and supplies</i></p>
12.10	Monitors equipment performance	<p>Knowledge of:</p> <ul style="list-style-type: none"><li>• manufacturers' specifications</li><li>• company policies and procedures</li><li>• applicable legislation</li><li>• normal operating characteristics</li><li>• operator aids, such as gauges</li></ul> <p>Ability to:</p> <ul style="list-style-type: none"><li>• read and interpret information from operator aids</li><li>• use senses to monitor equipment performance, such as sound, smell, sight</li><li>• communicate with site personnel</li><li>• adjust operation as needed</li></ul>	<p><i>Manufacturers' manuals and literature, PPE, basic tools and supplies</i></p>
12.11	Troubleshoots equipment problems	<p>Knowledge of:</p> <ul style="list-style-type: none"><li>• manufacturers' specifications</li><li>• company policies and procedures</li><li>• basic mechanics</li><li>• normal operating characteristics</li><li>• equipment systems</li></ul> <p>Ability to:</p> <ul style="list-style-type: none"><li>• identify possible sources of problems and solutions</li></ul>	<p><i>Manufacturers' manuals and literature, equipment maintenance documentation, PPE, basic tools and supplies, communication devices</i></p>

		<ul style="list-style-type: none"> <li>• implement solutions if possible</li> <li>• communicate problems accurately to others, such as mechanic, supervisor</li> </ul>	
12.12	Responds to weather and site conditions	<p>Knowledge of:</p> <ul style="list-style-type: none"> <li>• manufacturers' specifications</li> <li>• company policies and procedures</li> <li>• applicable legislation</li> <li>• impact of weather (such as frozen ground, soft ground) on operation of equipment</li> </ul> <p>Ability to:</p> <ul style="list-style-type: none"> <li>• adjust set up and operation of equipment (such as use tarps and heaters, insulate boom in extreme cold, cool control centre with water in extreme heat, adjust outriggers for changing ground conditions) to accommodate weather conditions, such as cold, heat, high winds, lightening</li> <li>• start up and shut down equipment according to weather conditions</li> <li>• determine when to proceed or not proceed with equipment operation</li> </ul>	<i>Manufacturers' manuals and literature, PPE</i>
12.13	Monitors site activities	<p>Knowledge of:</p> <ul style="list-style-type: none"> <li>• company policies and procedures</li> <li>• applicable legislation</li> <li>• site traffic patterns</li> <li>• actual and potential site hazards, such as personnel, other equipment</li> </ul> <p>Ability to:</p> <ul style="list-style-type: none"> <li>• communicate with other work crews</li> <li>• observe and respond to movement of others around work area while performing tasks</li> <li>• avoid collisions</li> </ul>	<i>PPE</i>
12.14	Prepares equipment to leave site	<p>Knowledge of:</p> <ul style="list-style-type: none"> <li>• manufacturers' specifications</li> <li>• company policies and procedures</li> <li>• applicable legislation</li> <li>• environmental concerns</li> <li>• cleaning procedures</li> <li>• appropriate washout location</li> </ul>	<i>Manufacturers' manuals and literature, PPE, cleaning equipment, air compressor, ball catcher, shut-off valve</i>

Ability to:

- pump excess concrete into mixer
- clean excess concrete from boom delivery system pipes to hopper
- follow procedures for blowing out placing boom delivery system using compressed air
- secure boom, outriggers, and delivery system components in proper position for travel
- secure and lock-out remote
- engage and disengage PTO as required
- move truck to washout location
- clean pump kit, such as drain, wash, and rinse hopper and water boxes
- wash hose, reducer, pipe, clamps, and gaskets
- use water hose to remove heavy mud from wheels or tracks
- perform circle check to identify problems, such as loose items, outriggers not locked into place, booms not secured in cradles

**BLOCK F      TRANSPORTATION**  
**Task 13      Drives Mobile Concrete Pump**

This task is important because it helps to:

- ensure that equipment is driven safely
- ensure public safety
- comply with transportation legislation

Trends:

- Larger concrete pumps have required operators to adjust their driving techniques.

Subtasks	Supporting Knowledge and Abilities	Tools and Supplies
13.01    Prepares to drive mobile concrete pump	<p>Knowledge of:</p> <ul style="list-style-type: none"> <li>• manufacturers' specifications</li> <li>• company policies and procedures</li> <li>• applicable legislation, such as traffic laws</li> <li>• route and destination</li> </ul> <p>Ability to:</p> <ul style="list-style-type: none"> <li>• possess appropriate and valid driver's licence</li> <li>• ensure that PTO is disengaged</li> </ul>	<i>Manufacturers' manuals and literature, PPE</i>
13.02    Drives mobile concrete pump	<p>Knowledge of:</p> <ul style="list-style-type: none"> <li>• manufacturers' specifications</li> <li>• company policies and procedures</li> <li>• applicable legislation</li> <li>• road conditions</li> <li>• equipment limitations, such as speed, size</li> <li>• work site conditions</li> <li>• hand signals</li> </ul> <p>Ability to:</p> <ul style="list-style-type: none"> <li>• read map</li> <li>• follow route to destination</li> <li>• adjust driving techniques to road and weather conditions and equipment configuration</li> <li>• recognize potential hazards, such as overpass</li> <li>• use and respond to hand signals</li> </ul>	<i>Manufacturers' manuals and literature, PPE, map</i>

**BLOCK F      TRANSPORTATION**

**Task 14      Assists with Transportation of Concrete Pump and Attachments**

This task is important because it helps to:

- ensure that equipment arrives safely
- comply with transportation legislation
- ensure safety of public and equipment

Trends:

N/A

Subtasks	Supporting Knowledge and Abilities	Tools and Supplies
14.01      Prepares to load concrete pump and attachments	<p>Knowledge of:</p> <ul style="list-style-type: none"> <li>• manufacturers' specifications of equipment and attachments</li> <li>• company policies and procedures</li> <li>• applicable legislation</li> <li>• transport vehicles, such as boom truck, beavertail, folding or power gooseneck</li> <li>• hoisting equipment, such as mobile crane, tower crane</li> <li>• weather conditions</li> </ul> <p>Ability to:</p> <ul style="list-style-type: none"> <li>• arrange for transport vehicle and crane if required</li> <li>• assess hazards in loading area, such as uneven ground, utility lines</li> <li>• position equipment and attachments for transport</li> </ul>	<i>Manufacturers' manuals and literature, PPE</i>
14.02      Assists with loading concrete pump and attachments	<p>Knowledge of:</p> <ul style="list-style-type: none"> <li>• manufacturers' specifications of equipment and attachments, such as weight, dimensions</li> <li>• company policies and procedures</li> <li>• applicable legislation</li> <li>• loading techniques, such as use crane to hoist pump onto transport vehicle</li> <li>• rigging techniques</li> <li>• hand signals</li> </ul> <p>Ability to:</p> <ul style="list-style-type: none"> <li>• assist with loading and placing of equipment and attachments</li> <li>• assist with attaching warning markers</li> <li>• attach rigging to load</li> <li>• use and respond to hand signals</li> </ul>	<i>Manufacturers' manuals and literature, PPE</i>

## Concrete Pump Operator Occupational Analysis

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14.03	Assists with securing concrete pump and attachments	<p>Knowledge of:</p> <ul style="list-style-type: none"><li>• manufacturers' specifications of equipment and attachments</li><li>• tie-down points</li><li>• weather conditions</li></ul> <p>Ability to:</p> <ul style="list-style-type: none"><li>• assist with securing equipment and attachments to transport vehicle</li></ul>	<i>Manufacturers' manuals and literature, PPE</i>
14.04	Assists with unloading concrete pump and attachments	<p>Knowledge of:</p> <ul style="list-style-type: none"><li>• manufacturers' specifications</li><li>• unloading techniques</li><li>• weather conditions</li><li>• ground conditions</li><li>• hand signals</li></ul> <p>Ability to:</p> <ul style="list-style-type: none"><li>• assess and adjust to area hazards, such as overhead power lines, unstable ground, narrow landing areas</li><li>• assist with unloading of equipment and attachments</li><li>• assist with removing warning markers</li><li>• use and respond to hand signals</li></ul>	<i>Manufacturers' manuals and literature, PPE</i>

**BLOCK G SHUT-DOWN PROCEDURES**  
**Task 15 Follows Shut-down Procedures**

This task is important because it helps to:

- ensure that equipment is ready for next shift
- prevent unscheduled downtime
- prevent vandalism and unauthorized movement of equipment

Trends:

N/A

	Subtasks	Supporting Knowledge and Abilities	Tools and Supplies
15.01	Refuels equipment	<p>Knowledge of:</p> <ul style="list-style-type: none"> <li>• manufacturers' specifications</li> <li>• company policies and procedures</li> <li>• applicable legislation</li> <li>• different fuel types, such as coloured, non-coloured</li> <li>• location of different tanks, such as water, fuel</li> </ul> <p>Ability to:</p> <ul style="list-style-type: none"> <li>• refuel concrete pump</li> </ul>	<i>Manufacturers' manuals and literature, PPE</i>
15.02	Checks water tank	<p>Knowledge of:</p> <ul style="list-style-type: none"> <li>• manufacturers' specifications</li> <li>• company policies and procedures</li> <li>• applicable legislation</li> <li>• location of different tanks, such as water, fuel</li> </ul> <p>Ability to:</p> <ul style="list-style-type: none"> <li>• check water tank for oil and contaminants</li> <li>• fill water tank if weather permits</li> </ul>	<i>Manufacturers' manuals and literature, PPE, basic tools and supplies, water hose</i>
15.03	Cleans equipment	<p>Knowledge of:</p> <ul style="list-style-type: none"> <li>• manufacturers' specifications</li> <li>• company policies and procedures</li> <li>• applicable legislation</li> <li>• housekeeping practices</li> </ul> <p>Ability to:</p> <ul style="list-style-type: none"> <li>• clean out operator station</li> <li>• operate power washer</li> </ul>	<i>Manufacturers' manuals and literature, PPE, basic tools and supplies, power washer, wash brush, whisk broom</i>

15.04 Shuts down equipment	<p>Knowledge of:</p> <ul style="list-style-type: none"><li>• manufacturers' specifications</li><li>• company policies and procedures</li><li>• applicable legislation</li><li>• designated parking location</li></ul> <p>Ability to:</p> <ul style="list-style-type: none"><li>• park concrete pump in appropriate location</li><li>• drain air system</li><li>• drain water tank and water box in freezing temperatures</li><li>• charge remote control batteries</li><li>• disengage power source</li></ul>	<i>Manufacturers' manuals and literature, PPE, basic tools and supplies, battery charger</i>
15.05 Conducts post-operational inspection	<p>Knowledge of:</p> <ul style="list-style-type: none"><li>• manufacturers' specifications</li><li>• company policies and procedures</li><li>• applicable legislation</li></ul> <p>Ability to:</p> <ul style="list-style-type: none"><li>• perform circle check to identify problems</li><li>• secure vehicle against vandalism, theft, and unauthorized movement</li><li>• arrange for repair and replacement of defective components</li></ul>	<i>Manufacturers' manuals and literature, equipment maintenance documentation, PPE</i>

### Concrete Pump Operator DACUM Chart

Block	Task	Subtask					
<b>A. PROFESSIONALISM</b>	<b>1. Acts Professionally</b>	1.01 Demonstrates work ethic	1.02 Is aware of factors affecting personal health	1.03 Resolves problems or disagreements with others	1.04 Participates in professional development	1.05 Works with others	1.06 Works independently
	<b>2. Uses Communication Skills</b>	2.01 Speaks and listens effectively	2.02 Uses documentation	2.03 Communicates using signals	2.04 Uses electronic communication equipment		
<b>B. SAFETY</b>	<b>3. Interprets Applicable Legislation and Policies</b>	3.01 Interprets federal, provincial/territorial, and municipal legislation	3.02 Interprets permits, licenses, and insurance requirements	3.03 Interprets environmental legislation	3.04 Interprets company policies and procedures		
	<b>4. Works Safely</b>	4.01 Uses personal protective equipment (PPE)	4.02 Completes required health and safety training				
	<b>5. Complies with Site Emergency Plan</b>	5.01 Prepares for emergencies	5.02 Responds to emergencies				

### Concrete Pump Operator DACUM Chart

Block	Task	Subtask					
<b>C. EQUIPMENT</b>	<b>6. Describes Equipment and Attachments</b>	6.01 Describes types and applications of concrete pumps	6.02 Describes factors that affect pump ratings	6.03 Describes major components of concrete pumps	6.04 Describes attachments	6.05 Describes cleaning tools and supplies	6.06 Describes basic tools and supplies associated with concrete pumps
<b>D. MAINTENANCE</b>	<b>7. Performs Pre-Operational Inspection and Daily Service with Power Off</b>	7.01 Inspects and services lubrication system	7.02 Inspects and services electrical system	7.03 Inspects and services hydraulic system	7.04 Inspects and services cooling system	7.05 Inspects and services air intake system	7.06 Inspects and services fuel system
		7.07 Inspects and services suspension system	7.08 Inspects and services drive train	7.09 Inspects and services braking system	7.10 Inspects and services truck cab	7.11 Inspects safety equipment	7.12 Inspects and services pump kit
		7.13 Inspects and services power source (if not truck engine)	7.14 Inspects and services delivery system	7.15 Inspects and services boom	7.16 Inspects and services stabilizing system	7.17 Inspects and services attachments	
	<b>8. Performs Pre-Operational Inspection and Daily Service with Power On</b>	8.01 Energizes and warms up equipment	8.02 Cycles equipment functions				
<b>9. Complies with Scheduled Maintenance Requirements</b>	9.01 Arranges for or performs scheduled maintenance						

### Concrete Pump Operator DACUM Chart

Block	Task	Subtask					
<b>E. OPERATING PROCEDURES</b>	<b>10. Describes Materials</b>	10.01 Describes types of concrete mixes and additives					
		11.01 Assesses site hazards	11.02 Discusses environmental concerns of site with site personnel	11.03 Reviews job specifications and safety considerations with site personnel	11.04 Determines work procedures		
	<b>12. Operates Concrete Pump</b>	12.01 Complies with safety requirements	12.02 Sets up equipment	12.03 Uses operating controls	12.04 Positions delivery system	12.05 Ensures that location is ready for pour	12.06 Starts pumping
		12.07 Co-ordinates operation of concrete pour	12.08 Monitors condition of concrete	12.09 Optimizes equipment capabilities	12.10 Monitors equipment performance	12.11 Troubleshoots equipment problems	12.12 Responds to weather and site conditions
		12.13 Monitors site activities	12.14 Prepares equipment to leave site				
<b>F. TRANSPORTATION</b>	<b>13. Drives Mobile Concrete Pump</b>	13.01 Prepares to drive mobile concrete pump	13.02 Drives mobile concrete pump				

### Concrete Pump Operator DACUM Chart

Block	Task	Subtask					
<b>F. TRANSPORTATION, cont'd</b>	<b>14. Assists with Transportation of Concrete Pump and Attachments</b>	14.01 Prepares to load concrete pump and attachments	14.02 Assists with loading concrete pump and attachments	14.03 Assists with securing concrete pump and attachments	14.04 Assists with unloading concrete pump and attachments		
<b>G. SHUT-DOWN PROCEDURES</b>	<b>15. Follows Shut- down Procedures</b>	15.01 Refuels equipment	15.02 Checks water tank	15.03 Cleans equipment	15.04 Shuts down equipment	15.05 Conducts post- operational inspection	

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