

RED SEAL

OCCUPATIONAL

STANDARD

CONCRETE FINISHER



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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 Concrete Finisher 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 analyses of occupations.

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 Regulated Occupations Directorate

Employment and Social Development Canada

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Special thanks are offered to the following representatives who contributed greatly to the original draft of the standard and provided expert advice throughout its development:

|  |  |
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This standard was prepared by the Apprenticeship and Regulated Occupations Directorate of ESDC. The coordinating, facilitating and processing of this analysis were undertaken by employees of the standards development team of the Trades and Apprenticeship Division and of the Government of Newfoundland and Labrador, the host jurisdiction for this trade.

STRUCTURE OF THE OCCUPATIONAL STANDARD

To facilitate understanding of the occupation, this standard contains the following sections:

**Description of the Concrete Finisher trade:** an overview of the trade’s duties, work environment, job requirements, similar occupations and career progression

**Trends in the Concrete Finisher 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 9 essential skills is applied in this 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:** a graph which depicts the national percentages of exam questions assigned to the major work activities

**Task Matrix and Examination Weightings:** a chart which outlines graphically the major work activities, tasks and sub-tasks of this standard and their respective exam weightings

**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

**Essential Skills:** the most relevant essential skills for this sub-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 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:** a non-exhaustive list of tools and equipment used in this trade

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

DESCRIPTION OF THE

CONCRETE FINISHER TRADE

“Concrete Finisher” is this trade’s official Red Seal occupational title approved by the CCDA. This standard covers tasks performed by concrete finishers whose occupational title has been identified by some provinces and territories of Canada under the following names:

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | NL | NS | PE | NB | QC | ON | MB | SK | AB | BC | NT | YT | NU |
| Concrete Finisher | **✓** | **✓** | **✓** | **✓** |  |  | **✓** |  | **✓** | **✓** |  |  |  |
| Cement Finisher |  |  |  |  | **✓** |  |  |  |  |  |  |  |  |
| Cement (Concrete) Finisher |  |  |  |  |  | **✓** |  |  |  |  |  |  |  |

Concrete finishers place, finish, protect and repair concrete surfaces. They work on a variety of vertical and horizontal surfaces such as concrete floors, walls, sidewalks, stairs, driveways, curbs and gutters, and overlays. They work on many types of structures such as buildings, dams, bridges and tunnels. They also texture, chip, grind and cure finished concrete work and repair and restore damaged concrete. They apply architectural finishes to concrete surfaces such as exposed aggregate, acid-stained, patterned-stamped, broomed, smooth finishes and etched concrete surfaces. They install expansion and contraction joints and install fixtures such as anchor bolts, steel plates and other embedments. They also apply membranes and other waterproofing products to concrete. Concrete finishers must possess a sound knowledge of the properties of various types of concrete mixes and how proportions, additives and curing affect concrete strength and durability. Materials that concrete finishers work with include concrete, grouts, chemical-curing compounds, exotics, epoxies, polyurethanes and acrylics. Concrete finishers should have a basic knowledge of constructing formwork, preparing subgrades and installing reinforcement.

Much of concrete placing and finishing has become mechanized with power screeds, power trowels, mechanical vibrators and pumps. Hand trowelling is still required for small jobs and to finish hard-to-reach spots in corners, edges, stairs and around obstacles such as pipes.

Concrete finishers work in the construction sector in both indoor and outdoor conditions. Outdoor work is weather-dependant and there may be less work available in the winter. Conversely, overtime is often required when the weather demands it.

Specialization in this trade is common. Concrete finishers specialize in working with specific materials such as coloured concrete, exposed aggregates and various epoxies, or specific techniques such as diamond-polishing concrete, power trowelling, and finishing curbs and gutters.

Key attributes for people entering this trade are stamina, spatial perception and hand-eye coordination. Creative and artistic skills are also helpful in this trade. Some physical activities of this trade are heavy lifting, climbing, balancing, bending, kneeling, crouching, crawling and reaching.

Concrete finishers work with a variety of other tradespeople. Heavy equipment operators may prepare the sub-base for concrete, ironworkers may prepare and place the reinforcing material and carpenters may place the formwork. Concrete finishers inspect this work and ensure that it is suitable for receiving the concrete. They also interact with plumbers and electricians when pipes and conduits are embedded in the concrete.

With experience, concrete finishers may move into supervisory, management or instructing roles.

TRENDS IN THE  
CONCRETE FINISHER TRADE

***Products***

There is a trend toward specialty concretes, including high performance concrete.

There is a greater emphasis on safety and the use of personal protective equipment (PPE) when working with materials in this trade.

In the area of vertical repairs, there is an increasing use of high performance repair materials.

There is a growing use of self-levelling underlayments for floor levelling.

The use of superplasticizers increase workability and reduce drying shrinkage. Macro-synthetic and steel fibres in cast-in-place concrete increases durability, and reduces cracking and movement. Concrete finishers may be required to add these materials to the mix on-site and the texture of those materials can cause some difficulties during the placement and finishing processes.

Increasingly, construction specifications are calling for floors with higher floor flatness and levelness (FF and FL) numbers. These tolerances mean that concrete finishers must have skills and experience in the installation of these floors.

There is an increase in architectural designs in concrete installation, which involves dyes as a topical application to concrete, similar to acid staining.

Diamond-polished concrete is becoming more common as an interior finish.

***Tools and Equipment***

Concrete finishers have access to an increasing variety of machines. Some machines spread materials, resulting in more accurate distribution. Laser-guided, mechanically operated screeds increase flatness and levelness of slabs. 3D-imaging equipment has been introduced to scan floor flatness and give instant feedback on tolerances of concrete. Edge machines used to finish edges are reducing the amount of overall handwork necessary. Technological advances in riding equipment have resulted in less physical strain to the concrete finisher and have increased productivity, flatness and improved quality of the finish.

In the field of curb and gutter construction, GPS technology to guide curb extruders has been introduced.

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.

A series of CCDA-endorsed tools have been developed to support apprentices in their training and to be better prepared for a career in the trades. The tools can be used independently or with the assistance of a tradesperson, trainer, employer, teacher or mentor to:

* understand how essential skills are used in the trades;
* learn about individual essential skills strengths and areas for improvement; and
* improve essential skills and increase success in an apprenticeship program.

The tools are available online or for order at: <https://www.canada.ca/en/employment-social-development/programs/essential-skills/profiles.html>.

The application of these skills may be described throughout this document within the competency statements which support each subtask of the trade. The following are summaries of the requirements in each of the essential skills, taken from the essential skills profile. A link to the complete essential skills profile can be found at: [www.red-seal.ca](http://www.sceau-rouge.ca/).

READING

Concrete finishers read instructions on labels for products. They read workplace safety materials as well as manuals, work orders, information sheets and reports. They also read emails and memos from supervisors and co-workers about ongoing work.

DOCUMENT USE

Concrete finishers locate data on documents such as labels, lists, tables and schedules. They use drawings, specifications and information in work orders and manufacturers’ instructions to plan and complete work. They use forms and production reports to keep track of information such as amount of concrete used, set-up and finishing times. Safety audit forms are used to identify hazards.

WRITING

Concrete finishers write brief text entries in forms and in logbooks. They may describe project details on estimate sheets. They write notes or emails to supervisors and co-workers about ongoing work, material requirements and equipment malfunctions. They may also complete safety documentation and write incident reports to describe events leading up to a workplace incident.

ORAL COMMUNICATION

Concrete finishers discuss work orders, equipment and job task coordination with co-workers. They also discuss safety, productivity, and procedural and policy changes at meetings with co-workers, supervisors and clients. They inform supervisors about work progress and may seek guidance and approvals from them. They also talk to suppliers about orders and deliveries.

NUMERACY

Concrete finishers measure areas, distances, angles, slopes and volumes. They perform calculations such as volume of concrete and quantities of finishing products for jobs, and set timelines for placing, finishing, curing and protection tasks. They estimate time to complete tasks.

THINKING

Thinking skills are important for concrete finishers. They make decisions about order of tasks and their priorities as well as the selection of tools and equipment, methods and products for concrete finishing and repair. They evaluate the preparedness of job sites for placing and finishing concrete. They problem solve in situations that affect job completion such as insufficient manpower on-site, equipment breakdowns, late or missing deliveries, and job site safety and inaccessibility. They also assess the quality of concrete finishing jobs by checking elevations, observing the appearance and consistency of concrete, and evaluating the aesthetic appearance of decorative concrete work.

DIGITAL TECHNOLOGY

Technologies are transforming the ways in which concrete finishers obtain, analyze and communicate information. They use devices, such as calculators or calculating applications on their personal devices to complete numeracy-related tasks. They use communications software to exchange emails with clients, co-workers and supervisors.

Self-employed concrete finishers may use bookkeeping, accounting and billing software. They may use word processing, spreadsheet or database software to prepare job estimates, calculate costs and retrieve forms and drawings.

WORKING WITH OTHERS

Concrete finishers coordinate job tasks with other finishers and trades to complete jobs. They also coordinate job tasks with drivers, operators, surveyors and other tradespeople on work sites.

CONTINUOUS LEARNING

Concrete finishers are continuously learning new skills relating to evolving technologies and materials. They may learn on the job through mentorship or through formal training.

INDUSTRY EXPECTED PERFORMANCE

All tasks must be performed according to the applicable jurisdictional codes and standards. All health and safety standards must be respected and observed. Work should be done efficiently and to a good quality without material waste or environmental damage. All requirements of the manufacturer and client specifications 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 keep 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 | 14% |
| MWA B | Prepares site | 9% |
| MWA C | Places and levels concrete | 18% |
| MWA D | Finishes plastic concrete | 25% |
| MWA E | Cures and protects concrete | 15% |
| MWA F | Modifies and repairs concrete and performs grouting | 19% |

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. Interprovincial examinations for this trade typically have 100 questions.

CONCRETE FINISHER

TASK MATRIX

|  |  |
| --- | --- |
| A - PERFORMS COMMON OCCUPATIONAL SKILLS | 14% |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Task A-1 Performs safety-related functions  24% |  | A-1.01 Uses personal protective equipment (PPE) and safety equipment | A-1.02 Maintains safe work environment |  |
| Task A-2 Uses tools and equipment  32% |  | A-2.01 Uses hand tools | A-2.02 Uses power tools | A-2.03 Uses measuring equipment |
| Task A-3 Organizes work  30% |  | A-3.01 Uses documentation | A-3.02 Determines material requirements and quantities | A-3.03 Sequences work procedures |
| Task A-4 Uses communication and mentoring techniques  14% |  | A-4.01 Uses communication techniques | A-4.02 Uses mentoring techniques |  |

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| --- | --- |
| B - PERFORMS SITE PREPARATION | 9% |

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| --- | --- | --- | --- | --- |
| Task B-5 Prepares site  52% |  | B-5.01 Inspects site | B-5.02 Prepares sub-grade and elevations |  |
| Task B-6 Uses formwork  48% |  | B-6.01 Constructs concrete formwork | B-6.02 Installs reinforcements | B-6.03 Inspects formwork and reinforcement |
|  |  | B-6.04 Installs construction, isolation and expansion joints | B-6.05 Removes forms |  |

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| C - PLACES AND LEVELS CONCRETE | 18% |

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| Task C-7 Places concrete  45% |  | C-7.01 Transports concrete on site | C-7.02 Spreads concrete | C-7.03 Consolidates concrete |
| Task C-8 Levels concrete  55% |  | C-8.01 Establishes elevation | C-8.02 Screeds concrete | C-8.03 Bull floats concrete |

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| D - FINISHES PLASTIC CONCRETE | 25% |

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| --- | --- | --- | --- | --- |
| Task D-9 Floats concrete  22% |  | D-9.01 Floats concrete by hand | D-9.02 Floats concrete by machine |  |
| Task D-10 Hand-tools concrete  24% |  | D-10.01 Edges perimeter of slab | D-10.02 Finishes extruded concrete surfaces | D-10.03 Tools contraction joints |
| Task D-11 Trowels concrete  30% |  | D-11.01 Trowels concrete by hand | D-11.02 Trowels concrete by machine |  |
| Task D-12 Applies surface treatments to concrete  24% |  | D-12.01 Applies dry-shake aggregate surface hardeners | D-12.02 Applies exposed aggregate finish | D-12.03 Textures concrete surface |
|  |  | D-12.04 Applies stamped concrete surface finish | D-12.05 Applies evaporation reducers |  |

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| E - CURES AND PROTECTS CONCRETE | 15% |

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| Task E-13  Cures concrete  32% |  | E-13.01 Wet-cures concrete | E-13.02 Chemical cures concrete |  |
| Task E-14 Creates contraction joints  41% |  | E-14.01 Saw cuts contraction joints | E-14.02 Fills joints |  |
| Task E-15 Protects concrete  27% |  | E-15.01 Protects plastic concrete | E-15.02 Protects hardened concrete |  |

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| --- | --- |
| F - MODIFIES AND REPAIRS CONCRETE AND PERFORMS GROUTING | 19% |

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| --- | --- | --- | --- | --- |
| Task F-16 Repairs and restores concrete  37% |  | F-16.01 Inspects concrete | F-16.02 Removes materials | F-16.03 Prepares surface for repair or restoration |
|  |  | F-16.04 Installs repair materials |  |  |
| Task F-17 Applies surface treatments to hardened concrete  23% |  | F-17.01 Prepares surface for surface treatments | F-17.02 Abrades surface to achieve architectural finish | F-17.03 Applies seamless systems |
|  |  | F-17.04 Applies bonded and non-bonded toppings to concrete | F-17.05 Parges vertical surfaces | F-17.06 Applies chemical surface treatment |
| Task F-18 Grouts  27% |  | F-18.01 Prepares surface for grouting | F-18.02 Mixes grout | F-18.03 Installs grout |
|  |  | F-18.04 Finishes exposed grout surfaces |  |  |
| Task F -19 Performs cutting and coring  13% |  | F-19.01 Performs cutting | F-19.02 Performs coring |  |

MAJOR WORK ACTIVITY A

Performs common occupational skills

TASK A-1 Performs safety-related functions

TASK DESCRIPTOR

Concrete finishers are exposed to hazards on a daily basis. Therefore, they must comply with regulations, company policies and manufacturers’ instructions regarding personal protective equipment (PPE), safety equipment, and safe work practices to ensure safety of themselves and others.

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| A-1.01 | Uses personal protective equipment (PPE) and safety equipment |

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| **Essential Skills** | Thinking, Continuous Learning, Oral Communication |

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

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| --- | --- | --- |
|  | SKILLS | |
|  | **Performance Criteria** | **Evidence of Attainment** |
| A-1.01.01P | select and use ***PPE*** and ***safety equipment*** | ***PPE*** and ***safety equipment*** is selected and used according to potential hazards, site conditions and manufacturers’ instructions |
| A-1.01.02P | identify company and site policies and regulations, and site hazards requiring the use of ***PPE*** and ***safety equipment*** | company and site policies and regulations, and site hazards requiring the use of ***PPE*** and ***safety equipment*** are identified |
| A-1.01.03P | tag and remove worn, damaged, unsafe and expired ***PPE*** and ***safety equipment*** | worn, damaged, unsafe and expired ***PPE*** and ***safety equipment*** are tagged and removed from service according to company policy, manufacturers’ instructions and regulations |
| A-1.01.04P | report and replace damaged or faulty ***PPE*** and ***safety equipment*** | damaged or faulty ***PPE*** and ***safety equipment*** is replaced and reported according to company policies, manufacturers' instructions, regulations, and personal judgement |
| A-1.01.05P | maintain and store ***PPE*** and ***safety equipment*** | ***PPE*** and ***safety equipment*** are maintained and stored according to manufacturers' instructions and company policies |

RANGE OF VARIABLES

***PPE*** includes: breathing apparatus, air purifiers, eye and ear protection, hard hats, high visibility clothing, safety vests, fall arrest equipment, skin protection, hand protection, foot protection

***safety equipment*** includes: fire extinguishers, first aid kits, eye wash stations, spill kits, gas sensors

|  |  |  |
| --- | --- | --- |
|  | KNOWLEDGE | |
|  | **Learning Outcomes** | **Learning Objectives** |
| A-1.01.01L | demonstrate knowledge of ***PPE*** and ***safety equipment***, their applications and procedures for use | identify the types of ***PPE,*** their application and procedures for use |
|  |  | identify types of ***safety equipment*** and their location on-site |
|  |  | identify ***hazards*** and safe work practices related to the use of ***PPE*** and ***safety equipment*** |
|  |  | describe the potential ***effects of exposure*** to concrete materials |
|  |  | describe the procedures for use of ***PPE*** and ***safety equipment*** |
|  |  | identify specific training requirements for the use of ***PPE*** and ***safety equipment*** |

RANGE OF VARIABLES

***PPE*** includes: breathing apparatus, air purifiers, eye and ear protection, hard hats, high visibility clothing, safety vests, fall arrest equipment, skin protection, hand protection, foot protection

***safety equipment*** includes: fire extinguishers, first aid kits, eye wash stations, spill kits, gas sensors

***hazards*** include: silica dust, falling objects, chemical spills, slips, trips, uneven ground, heights, carbon monoxide

***effects of exposure*** include: dermatitis, burns, respiratory damage (e.g. silicosis)

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| --- | --- |
| A-1.02 | Maintains safe work environment |

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| **Essential Skills** | Thinking, Working with Others, Oral Communication |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **NL** | **NS** | **PE** | **NB** | **QC** | **ON** | **MB** | **SK** | **AB** | **BC** | **NT** | **YT** | **NU** |
| yes | NV | NV | NV | yes | yes | yes | ND | NV | yes | ND | ND | ND |

|  |  |  |
| --- | --- | --- |
|  | SKILLS | |
|  | **Performance Criteria** | **Evidence of Attainment** |
| A-1.02.01P | maintain a clean and tidy work site area | a clean and tidy work site is maintained to avoid injuries to self and others |
| A-1.02.02P | locate ***safety equipment*** | ***safety equipment*** is located and ready for use according to ***regulations*** and company policies |
| A-1.02.03P | follow safety procedure | safety procedures are followed according to ***regulations*** and company policies |
| A-1.02.04P | identify ***workplace*** ***hazards*** | ***workplace*** ***hazards*** areidentified according to site conditions |
| A-1.02.05P | set up perimeter safety barriers and flag persons | perimeter safety barriers are erected around and underneath work area and flag persons are set up according to company policies |
| A-1.02.06P | ventilate work area and measure air quality | work area is ventilated according to regulations when working with hazardous materials |
| A-1.02.07P | participates in safety meetings and discussions | safety meetings and discussions are participated in prior to beginning tasks to ensure that information is recorded and distributed to all team members |
| A-1.02.08P | complete ***safety-related documentation*** | ***safety-related documentation*** is completed and submitted according to regulations and company policy |

RANGE OF VARIABLES

***safety equipment*** includes: fire extinguishers, first aid kits, eye wash stations, spill kits, gas sensors ***regulations*** include: Occupational Health and Safety (OH&S), Workplace Hazardous Materials Information System (WHMIS), jurisdictional regulations

***workplace*** ***hazards*** include: embedded objects (e.g. post-tensioning cable, electrical conduits, dowels, rebar), carbon monoxide, inadequate shoring, toxins, falling objects, poor ventilation, vehicular hazards, silica dust

***safety-related documentation*** includes: field risk assessments, job hazard assessments, incident reports, equipment and PPE inspections, tool box/tailgate talk documents, safety meeting minutes, WHMIS documents

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|  | KNOWLEDGE | |
|  | **Learning Outcomes** | **Learning Objectives** |
| A-1.02.01L | demonstrate knowledge of maintaining a safe work environment | identify ***hazards*** and safe work practices pertaining to maintaining a safe work environment |
|  |  | identify types of ***safety equipment*** and their location on-site |
|  |  | identify company safety policies and procedures |
| A-1.02.02L | demonstrate knowledge of ***regulations*** related to a safe work environment | identify safe transportation, storage and disposal procedures for hazardous materials |
|  |  | interpret and apply ***regulations*** |
|  |  | identify ***regulations*** pertaining to ***worksite issues*** |
|  |  | describe procedures used to report incidents and unsafe work environment |

RANGE OF VARIABLES

***workplace*** ***hazards*** include: embedded objects (e.g. post-tensioning cable, electrical conduits, dowels, rebar), carbon monoxide, inadequate shoring, toxins, falling objects, poor ventilation, vehicular hazards, silica dust

***safety equipment*** includes: fire extinguishers, first aid kits, eye wash stations, spill kits, gas sensors ***regulations*** include: Occupational Health and Safety (OH&S), Workplace Hazardous Materials Information System (WHMIS), jurisdictional regulations

***worksite issues*** include: confined space entry, asbestos removal, fall protection, vehicular traffic

TASK A-2 Uses tools and equipment

TASK DESCRIPTOR

Proper use of tools and equipment is very important to perform the tasks effectively and safely in the concrete industry.

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| --- | --- |
| A-2.01 | Uses hand tools |

|  |  |
| --- | --- |
| **Essential Skills** | Thinking, Continuous Learning, Working with Others |

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **NL** | **NS** | **PE** | **NB** | **QC** | **ON** | **MB** | **SK** | **AB** | **BC** | **NT** | **YT** | **NU** |
| yes | NV | NV | NV | yes | yes | yes | ND | NV | yes | ND | ND | ND |

|  |  |  |
| --- | --- | --- |
|  | SKILLS | |
|  | **Performance Criteria** | **Evidence of Attainment** |
| A-2.01.01P | clean, maintain and store hand tools | hand tools are cleaned, maintained and stored to extend longevity of tools and ensure they are ready for use |
| A-2.01.02P | inspect hand tools | hand tools are inspected for damage and defects |
| A-2.01.03P | remove damaged or defective hand tools from service | hand tools are identified as damaged or defective and removed from service |

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|  | KNOWLEDGE | |
|  | **Learning Outcomes** | **Learning Objectives** |
| A-2.01.01L | demonstrate knowledge of hand tools, their use and procedures to clean, maintain and store them | identify ***types of hand tools*** and describe their use and application |
|  |  | describe procedures used to clean, maintain and store hand tools |

RANGE OF VARIABLES

***types of hand tools***: see appendix B

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| A-2.02 | Uses power tools |

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| **Essential Skills** | Oral Communication, Thinking, Continuous Learning |

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

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|  | SKILLS | |
|  | **Performance Criteria** | **Evidence of Attainment** |
| A-2.02.01P | perform ***power tool maintenance*** | ***power tool maintenance*** is performed according to manufacturers’ instructions |
| A-2.02.02P | inspect power tools | power tools are inspected for wear, damage and defects |
| A-2.02.03P | tag and remove damaged power tools | damaged power tools are tagged and removed from service |
| A-2.02.04P | repair and replace power tools | power tools removed from service are repaired or replaced |
| A-2.02.05P | ensure ***features*** are in place | ***features*** are in place according to manufacturers' instructions |

RANGE OF VARIABLES

***power tool maintenance*** includes: checking oil, gas and air filters, cleaning, storing, lubricating, testing

***features*** include: kill switches, machine guards, bolts, electrical cords, handles, ground fault circuit interrupter (GFCI), drive belts

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| --- | --- | --- |
|  | KNOWLEDGE | |
|  | **Learning Outcomes** | **Learning Objectives** |
| A-2.02.01L | demonstrate knowledge of power tools, their procedures for use, applications, maintenance and storage | identify ***types of power tools***, their applications and ***features*** |
|  |  | describe ***power tool maintenance*** |
|  |  | describe procedures to have power tools tagged, repaired or replaced |
|  |  | identify storage procedures for power tools |
|  |  | describe hazards and safe work practices related to power tools and their use |

RANGE OF VARIABLES

***types of power tools*** include: electric tools, pneumatic tools, hydraulic tools, gas-powered tools, powder-actuated tools

***features*** include: kill switches, machine guards, bolts, electrical cords, handles, ground fault circuit interrupter (GFCI), drive belts

***power tool maintenance*** includes: checking oil, gas and air filters, cleaning, storing, lubricating, testing

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| A-2.03 | Uses measuring equipment |

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| **Essential Skills** | Numeracy, Thinking, Document Use |

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

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|  | SKILLS | |
|  | **Performance Criteria** | **Evidence of Attainment** |
| A-2.03.01P | select measuring equipment | measuring equipment is selected according to application |
| A-2.03.02P | clean, maintain and store measuring equipment | measuring equipment is cleaned, maintained and stored according to manufacturers' instructions |
| A-2.03.03P | inspect measuring equipment, and tag and remove damaged equipment | worn, damaged and defective measuring equipment is tagged and removed from service |
| A-2.03.04P | repair and replace damaged and defective measuring equipment | measuring equipment is repaired or replaced according to manufacturers' instructions |
| A-2.03.05P | take ***measurements*** using measuring equipment and devices | ***measurements*** taken with measuring equipment and devices are accurate |

RANGE OF VARIABLES

***measurements*** include: weights, volume, elevations, areas, distances, slopes, tolerances, angles

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|  | KNOWLEDGE | |
|  | **Learning Outcomes** | **Learning Objectives** |
| A-2.03.01L | demonstrate knowledge of measuring equipment, their application and procedures for use and maintenance | identify ***types of measuring equipment*** and their application |
|  |  | describe safe work practices pertaining to the use of measuring equipment |
|  |  | identify imperial and metric measurements |
|  |  | describe procedures to use, test, maintain and store measuring equipment |
|  |  | describe procedures used to replace measuring equipment |

RANGE OF VARIABLES

***types of measuring equipment*** include: scales, laser levels, measuring tapes, builder’s levels, hand levels, measuring vessels

TASK A-3 Organizes work

TASK DESCRIPTOR

Concrete finishers use organizational skills such as determining materials and scheduling work to perform their tasks as well as advance in their careers. Concrete materials and weather conditions impact the timing of placing, setting and curing of concrete which in turn affects the scheduling of work. Also, concrete finishers must be able to use various types of documentation to perform their tasks.

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| A-3.01 | Uses documentation |

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| **Essential Skills** | Document Use, Reading, Thinking |

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

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| --- | --- | --- |
|  | SKILLS | |
|  | **Performance Criteria** | **Evidence of Attainment** |
| A-3.01.01P | interpret specifications | specifications are interpreted |
| A-3.01.02P | interpret product instructions and manufacturers’ recommendations | product instructions and manufacturers’ recommendations are interpreted |
| A-3.01.03P | follow work orders and instructions | work orders and instructions are followed |
| A-3.01.04P | interpret ***standards documentation*** | ***standards documentation*** is interpreted |
| A-3.01.05P | interpret ***drawings*** | ***drawings*** are interpreted |

RANGE OF VARIABLES

***standards documentation*** includes: Canadian Standards Association (CSA), American Concrete Institute (ACI), International Concrete Repair Institute (ICRI)

***drawings*** include: as-built, working, shop, blueprints, electronic drawings

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|  | KNOWLEDGE | |
|  | **Learning Outcomes** | **Learning Objectives** |
| A-3.01.01L | demonstrate knowledge of ***safety documentation*** and ***standards documentation*** | interpret ***safety documentation*** and ***standards documentation*** |
| A-3.01.02L | demonstrate knowledge of grade sheets and ***drawings*** | interpret grade sheets and ***drawings*** |
|  |  | describe scale rules and legends |

RANGE OF VARIABLES

***safety documentation*** includes: safety data sheet (SDS), WHMIS symbols

***standards documentation*** includes: Canadian Standards Association (CSA), American Concrete Institute (ACI), International Concrete Repair Institute (ICRI)

***drawings*** include: as-built, working, shop, blueprints, electronic drawings

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| A-3.02 | Determines material requirements and quantities |

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| **Essential Skills** | Numeracy, Thinking, Document Use |

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

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|  | SKILLS | |
|  | **Performance Criteria** | **Evidence of Attainment** |
| A-3.02.01P | perform ***calculations*** | ***calculations*** are performed to determine material requirements and quantities |
| A-3.02.02P | apply scale rules | scale rules are applied to establish distances and lengths |
| A-3.02.03P | select ***materials*** | ***materials*** are selected according to specifications, ***calculations***, scope of work and ***factors*** |
| A-3.02.04P | adjust technique | techniques are adjusted according to concrete materials, admixture being used, factors and ***concrete chemistry*** |

RANGE OF VARIABLES

***calculations*** include: weight, volume, area, perimeter, Pythagorean Theorem

***materials*** include: concrete materials, base materials, aggregates, membranes, formwork materials, reinforcement materials, grouts, repair materials, admixtures, cement types, epoxies, supplementary cementitious materials, exotic products, sealers

***factors*** include: cost, down-time, structural/architectural requirements, location of repair, weather conditions, time restrictions

***concrete chemistry*** includes: accelerated concrete setting (hot load), pot life

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|  | KNOWLEDGE | |
|  | **Learning Outcomes** | **Learning Objectives** |
| A-3.02.01L | demonstrate knowledge of ***materials*** used, their application and procedures for use | identify types of concrete ***materials***, their application and procedures for use |
|  |  | identify concrete mix designs |
|  |  | identify air entrainment compatibility and adjustments required for placing and finishing concrete |
|  |  | identify CSA A23.1 national standard pertaining to concrete materials |
|  |  | identify ***hazards*** and ***safe work practices*** pertaining to the use of ***materials*** |
|  |  | identify ***types of base materials***, their application and procedures for use |
|  |  | identify ***types of membranes***, their application and procedures for use |
|  |  | identify ***types of reinforcement materials***, their application and procedures for use |
|  |  | identify ***types of grout***, their properties and application |
|  |  | identify ***types of formwork material*** ***and systems***, their application and procedures for use |
| A-3.02.02L | demonstrate knowledge of ***calculations*** relating to ***material*** selection | describe ***calculations*** pertaining to ***material*** selection |
|  |  | identify imperial and metric systems of measurement and their conversions |

RANGE OF VARIABLES

***materials*** include: concrete materials, base materials, aggregates, membranes, formwork materials, reinforcement materials, grouts, repair materials, admixtures, cement types, epoxies, supplementary cementitious materials, exotic products, sealers

***hazards*** include: respiratory, contaminants, chemical burns, material ingestion and absorption

***safe work practices*** include: adequate ventilation, use of PPE and WHMIS

***types of base materials*** include: gravel, clay, recycled crushed concrete, sand, pea stone, clear stone

***types of membranes*** include: evaporation reducer, polyethylene, insulating, water-stop, vapour retarders

***types of reinforcement materials*** include: rebar, welded wire mesh, synthetic and steel fibres, post- ***types of grout*** include: cementitious, epoxy, polyester

***types of formwork material and systems*** include: dimensional lumber, steel forms, plywood, form liners, decorative liners

***calculations*** include: weight, volume, area, perimeter, Pythagorean Theorem

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| A-3.03 | Sequences work procedures |

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| **Essential Skills** | Thinking, Oral Communication, Working with Others |

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

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| --- | --- | --- |
|  | SKILLS | |
|  | **Performance Criteria** | **Evidence of Attainment** |
| A-3.03.01P | determine work procedures and logistics | work procedures and logistics are determined according to project scope and schedule |
| A-3.03.02P | determine timing of work | timing of work is determined considering ***factors*** |
| A-3.03.03P | adapt work schedule | work schedule is adapted according to ***factors*** |
| A-3.03.04P | coordinate work with other trades | work is coordinated with other trades |
| A-3.03.05P | develop concrete placement plan | concrete placement is planned according to ***factors*** |

RANGE OF VARIABLES

***factors*** include: weather conditions, environmental conditions, work of other trades, material properties, public safety, accessibility to work area for conveyance of materials and equipment, pre-construction meetings

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|  | KNOWLEDGE | |
|  | **Learning Outcomes** | **Learning Objectives** |
| A-3.03.01L | demonstrate knowledge of scheduling work procedures | identify the ***factors*** that affect scheduling of work |
|  |  | identify impact of ***factors*** on timing and work sequence |
|  |  | describe sequence of construction operations and timing of procedures |

RANGE OF VARIABLES

***factors*** include: weather conditions, environmental conditions, work of other trades, material properties, public safety, accessibility to work area for conveyance of materials and equipment, pre-construction meetings

TASK A-4 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 amongst 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.

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| A-4.01 | Uses communication techniques |

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| **Essential Skills** | Oral Communication, Working with Others, Continuous Learning |

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

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| --- | --- | --- |
|  | SKILLS | |
|  | **Performance Criteria** | **Evidence of Attainment** |
| A-4.01.01P | demonstrate two-way communication practices individually or in a group | instructions and messages are understood by both parties involved in communication |
| A-4.01.02P | listen using ***active listening*** practices | steps of ***active listening*** are used |
| A-4.01.03P | receive and respond to feedback on work | response to feedback indicates understanding and corrective measures are taken |
| A-4.01.04P | explain and provide feedback | explanation and feedback is provided and task is carried out as directed |
| A-4.01.05P | use questioning to improve communication | questions enhance understanding, on‑the‑job training and goal setting |
| A-4.01.06P | participate in safety and information meetings | meetings are attended and information is understood and applied |
| A-4.01.07P | communicate with ***non-tradespeople*** | technical information is relayed and understanding is confirmed |
| A-4.01.08P | communicate with other ***tradespeople*** | technical information is relayed and understanding is confirmed |

RANGE OF VARIABLES

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

***non-tradespeople*** include: consultants, engineers, architects, owners, product representatives

***tradespeople*** include: concrete finishers, carpenters, ironworkers, construction craft workers, crane operators, heavy equipment operators, plumbers, construction electricians

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|  | KNOWLEDGE | |
|  | **Learning Outcomes** | **Learning Objectives** |
| A-4.01.01L | demonstrate knowledge of trade terminology | define terminology used in the trade |
| A-4.01.02L | demonstrate knowledge of effective communication practices | describe the importance of using effective verbal and non-verbal communication with ***tradespeople*** and ***non-tradespeople*** |
|  |  | identify ***sources of information*** to effectively communicate |
|  |  | identify communication and ***learning styles*** |
|  |  | describe effective listening and speaking skills |
|  |  | identify the value of diversity in the workplace |
|  |  | identify communication that constitutes ***harassment*** and ***discrimination*** |

RANGE OF VARIABLES

***non-tradespeople*** include: consultants, engineers, architects, owners, product representatives

***tradespeople*** include: concrete finishers, carpenters, ironworkers, construction craft workers, crane operators, heavy equipment operators, plumbers, construction electricians

***sources of information*** include: regulations, codes, standards, OH&S requirements, requirements of local authorities, drawings, specifications, company and client documentation, experienced journeypersons

***learning styles*** include: seeing it, hearing it, practicing it

***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*** includes actions that are prohibited based on race, national or ethnic origin, colour, religion, age, sex, sexual orientation, marital status, family status, disability or conviction for which a pardon has been granted

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| A-4.02 | Uses mentoring techniques |

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| **Essential Skills** | Oral Communication, Working with Others, Continuous Learning |

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

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| --- | --- | --- |
|  | SKILLS | |
|  | **Performance Criteria** | **Evidence of Attainment** |
| A-4.02.01P | identify and communicate learning objective and point of the lesson | apprentice or colleague explains the objective and point of the lesson |
| A-4.02.02P | link lesson to prior learning and the job task | lesson order and unplanned learning opportunities are defined |
| A-4.02.03P | demonstrate performance of a skill to an apprentice or colleague | ***steps required to demonstrate a skill*** are performed |
| A-4.02.04P | set up conditions required for an apprentice to practice a skill | ***practice conditions*** are set up so that the skill can be practiced safely by the apprentice |
| A-4.02.05P | assess apprentice or colleague’s ability to perform tasks with increasing independence | performance improves with practice to a point where skill can be done with little supervision |
| A-4.02.06P | give supportive and corrective feedback | apprentice adopts best practice after having been given supportive or corrective feedback |
| A-4.02.07P | support apprentices in pursuing technical training opportunities | technical training is completed within the timeframe prescribed by apprenticeship authority |
| A-4.02.08P | support diversity in the workplace | workplace is harassment and discrimination-free |
| A-4.02.09P | implement probationary period to assess suitability to the trade | commitment is demonstrated and more suitable career options are provided if required |

RANGE OF VARIABLES

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

***practice conditions*** means: guided, limited independence, full independence

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|  | KNOWLEDGE | |
|  | **Learning Outcomes** | **Learning Objectives** |
| A-4.02.01L | 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 ways of learning |
|  |  | identify different ***learning needs*** and strategies to meet ***learning needs*** |
|  |  | identify ***strategies to assist in learning a skill*** |
|  |  | identify ***personal responsibilities and attitudes*** that contribute to on-the-job success |
| A-4.02.02L | demonstrate knowledge of strategies for teaching workplace skills | identify different roles played by a workplace mentor |
|  |  | describe ***teaching skills*** |
|  |  | explain the importance of identifying the point of a lesson |
|  |  | identify how to choose an effective 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, writing, document use, oral communication, numeracy, thinking, working with others, digital technology, continuous learning

***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

***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 practices

***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 site preparation

TASK B-5 Prepares site

TASK DESCRIPTOR

Site conditions are extremely important to concrete finishers. They impact the timing and sequencing of many of the procedures involved in the concrete finishers’ work. Concrete finishers may perform site inspections before the preparation of the site can begin. Site preparation could include determining elevations and preparing the sub-grade prior to placing concrete.

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| B-5.01 | Inspects site |

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| **Essential Skills** | Document Use, Oral Communication, Thinking |

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

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| --- | --- | --- |
|  | SKILLS | |
|  | **Performance Criteria** | **Evidence of Attainment** |
| B-5.01.01P | identify ***site conditions*** and ***site problems*** | ***site conditions*** and ***site problems*** are identified according to industry practices and CSA A23.1 |
| B-5.01.02P | assess ***on-site services*** requirements | ***on-site services*** requirements are assessed to meet the demands of the scope of the work according to the client’s instructions |
| B-5.01.03P | report assessment of ***site conditions*** | assessments of ***site conditions*** are reported to the client |

RANGE OF VARIABLES

***site conditions*** include: access, weather exposure, moisture, temperature

***site problems*** include: poor drainage, obstructions, utilities, rain water leaders

***on-site services*** include: water, electricity, gas, cables (telephone, internet), sewage systems

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|  | KNOWLEDGE | |
|  | **Learning Outcomes** | **Learning Objectives** |
| B-5.01.01L | demonstrate knowledge of site inspection procedures and factors that impact site preparation | describe ***site conditions*** required for site preparation |
|  |  | describe ***site problems*** that affect site preparation |
|  |  | describe site inspection procedures |
|  |  | identify reporting procedures |

RANGE OF VARIABLES

***site conditions*** include: access, weather exposure, moisture, temperature

***site problems*** include: poor drainage, obstructions, utilities, rain water leaders

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| B-5.02 | Prepares sub-grade and elevations |

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| **Essential Skills** | Numeracy, Thinking, Working with Others |

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

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|  | SKILLS | |
|  | **Performance Criteria** | **Evidence of Attainment** |
| B-5.02.01P | place base materials | base materials are placed to a uniform sub-grade level according to drawings and specifications |
| B-5.02.02P | compact base | base is compacted according to drawings and specifications using ***equipment*** |
| B-5.02.03P | install moisture and insulation barriers, filter fabric and void forms | moisture and insulation barriers, filter fabric and void forms are installed according to drawings and specifications |
| B-5.02.04P | check elevation | elevation meets specified level according to drawings and specifications and CSA A23.1 |

RANGE OF VARIABLES

***equipment*** includes: compaction rollers, plate tampers, jumping jacks

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|  | KNOWLEDGE | |
|  | **Learning Outcomes** | **Learning Objectives** |
| B-5.02.01L | demonstrate knowledge of sub-grade preparation procedures and requirements | identify ***types of base materials*** |
|  |  | identify ***equipment*** used to compact base materials |
|  |  | describe procedures used to compact base materials |

RANGE OF VARIABLES

***types of base materials*** include: gravel, clay, sand, recycled crushed concrete

***equipment*** includes: compaction rollers, plate tampers, jumping jacks

TASK B-6 Uses formwork

TASK DESCRIPTOR

Concrete finishers use formwork to hold and mould concrete or grout in place while the surface is being worked. They may be responsible for the construction of concrete formwork and the removal of formwork once the concrete or grout is set. They will install construction, expansion and isolation joints with formwork as a permanent fixture of the concrete. These joints are often filled with self-levelling caulking or other compounds.

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| B-6.01 | Constructs concrete formwork |

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| **Essential Skills** | Document Use, Numeracy, Thinking |

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

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|  | SKILLS | |
|  | **Performance Criteria** | **Evidence of Attainment** |
| B-6.01.01P | perform ***layout*** | concrete formwork is laid out according to drawings and specifications |
| B-6.01.02P | place formwork | formwork is placed according to drawings and specifications |
| B-6.01.03P | install bracing and shoring | bracing and shoring is installed to achieve plumb, level and square formwork and to secure ***critical areas*** according to drawings and specifications |
| B-6.01.04P | apply ***products*** prior to placement of the slab | ***products*** are applied to serve as a soil, gas (radon) and vapour barrier according to drawings and specifications, and local codes |
| B-6.01.05P | install ***formwork*** ***components*** | ***formwork components*** are installed plumb, level, straight and square, and accessible for finishing work according to drawings and specifications |
| B-6.01.06P | measure for location and install ***embeds*** | location is measured and ***embeds*** are installed according to drawings and specifications |
| B-6.01.07P | install formwork for grout | formwork for grout is installed according to manufacturer’s instructions |
| B-6.01.08P | apply form release agents | form release agents are applied according to manufacturer’s instructions |
| B-6.01.09P | apply vertical retarders | vertical retarders are applied to achieve ***architectural finish*** according to drawings and specifications |

RANGE OF VARIABLES

***layout*** includes: squaring, setting grades, establishing and transferring of elevations, setting perimeters

***critical areas*** include: corners, risers, thickened edges, bulkheads

***products*** include: polyethylene, insulation (rigid foam, spray foam)

***formwork components*** include: reinforcement steel, keyways, water stops, bulkheads, screed level pegs, form liners, miscellaneous inserts, cambers, chamfer strips

***embeds*** include: anchor bolts, sleeves, weld plates

***architectural finishes*** include: exposed, form-lined

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|  | KNOWLEDGE | |
|  | **Learning Outcomes** | **Learning Objectives** |
| B-6.01.01L | demonstrate knowledge of formwork and its application | identify types of ***forming systems*** and their applications |
|  |  | identify ***types of structures*** that require formwork |
|  |  | identify local codes, building codes, regulation requirements and CSA standards related to formwork |
|  |  | identify ***formwork components*** |
|  |  | identify form release agents |
|  |  | describe expansion, control and isolation joint construction pertaining to formwork |
|  |  | describe the types of forces transmitted during placement of concrete |
|  |  | identify critical form areas to prevent form failure |
|  |  | identify type of formwork required for various grout applications |
|  |  | identify types of vertical ***architectural finishes*** |
| B-6.01.02L | demonstrate knowledge of procedures used to construct formwork | describe procedures used to ***layout*** and install formwork and ***embeds*** |
|  |  | describe bracing, shoring and supporting used in constructing formwork |
|  |  | describe ***calculations*** related to constructing formwork |
|  |  | explain the building and removal sequence of formwork |

RANGE OF VARIABLES

***forming systems***include: snap ties, cam lock and tie rods, slip forms, insulated concrete styrofoam forms, she-bolts, steel forms

***types of structures*** include: slabs-on-grade, curbs, gutters, stairs, walls, columns, suspended slabs, ramps, capitals, piers, pilasters, beams, girders, corbels

***formwork components*** include: reinforcement steel, keyways, water stops, bulkheads, screed level pegs, form liners, miscellaneous inserts, cambers, chamfer strips

***architectural finishes*** include: exposed, form-lined

***layout*** includes: squaring, setting grades, establishing and transferring of elevations, setting perimeters

***embeds*** include: anchor bolts, sleeves, weld plates

***calculations*** include: rise and run, Pythagorean Theorem formula (3-4-5 calculations), form estimations

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| B-6.02 | Installs reinforcement |

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| **Essential Skills** | Numeracy, Thinking, Document Use |

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

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| --- | --- | --- |
|  | SKILLS | |
|  | **Performance Criteria** | **Evidence of Attainment** |
| B-6.02.01P | identify ***reinforcement*** to be used | ***reinforcement*** is identified according to drawings and specifications |
| B-6.02.02P | install ***reinforcement*** | ***reinforcement*** is installed using proper ***equipment*** according to drawings and specifications |

RANGE OF VARIABLES

***reinforcement*** includes: rebar (metal, galvanized, epoxy coated, fibreglass), welded wire mesh, synthetic and steel fibres, pre- and post-tensioning cables

***equipment*** includes: drills, rebar cutters, grinders, mixers, tie wire, pliers, twisters, wire cutters, chairs, bar couplers

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|  | KNOWLEDGE | |
|  | **Learning Outcomes** | **Learning Objectives** |
| B-6.02.01L | demonstrate knowledge of ***reinforcement*** installation | describe types of ***reinforcement*** |
|  |  | describe types of ***reinforcement*** installment procedures |
|  |  | identify codes, drawings and specifications related to ***reinforcement*** |
|  |  | identify ***equipment*** required for the installation of ***reinforcement*** |

RANGE OF VARIABLES

***reinforcement*** includes: rebar (metal, galvanized, epoxy coated, fibreglass), welded wire mesh, synthetic and steel fibres, pre- and post-tensioning cables

***equipment*** includes: drills, rebar cutters, grinders, mixers, tie wire, pliers, twisters, wire cutters, chairs, bar couplers

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| B-6.03 | Inspects formwork and reinforcement |

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| **Essential Skills** | Document Use, Oral Communication, Thinking |

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

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|  | SKILLS | |
|  | **Performance Criteria** | **Evidence of Attainment** |
| B-6.03.01P | inspect bracing, shoring and supports | bracing, shoring and supports meet formwork design according to drawings and specifications |
| B-6.03.02P | identify ***defects*** in formwork | ***defects*** in formwork are identified and reported or corrected according to industry documents and practices |
| B-6.03.03P | check formwork finish grade | finish grade of formwork is prepared according to drawings and specifications |
| B-6.03.04P | inspect reinforcement placement | placement of reinforcement meets specified locations according to drawings and specifications |

RANGE OF VARIABLES

***defects*** include: inadequate bracing, crooked or unleveled formwork, improper grading, form deterioration, splinters

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|  | KNOWLEDGE | |
|  | **Learning Outcomes** | **Learning Objectives** |
| B-6.03.01L | demonstrate knowledge of formwork inspection procedures | explain camber, deflection and shrinkage as they pertain to the construction of formwork |
|  |  | identify use of ***forming systems*** |
|  |  | explain codes, specifications and regulations pertaining to formwork |
|  |  | explain procedures used to install formwork to finish grade |
|  |  | identify reporting procedures for the inspection of formwork |

RANGE OF VARIABLES

***forming systems*** include: girder form systems, structural forming systems, bulkheads, steel forming systems, curb and gutter, insulated concrete forming (ICF) system

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| B-6.04 | Installs construction, isolation and expansion joints |

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| **Essential Skills** | Thinking, Document Use, Numeracy |

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

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|  | SKILLS | |
|  | **Performance Criteria** | **Evidence of Attainment** |
| B-6.04.01P | plan where joints are to be installed | plans for joints are laid out according to industry documents and practices |
| B-6.04.02P | install joints and ***joint components*** | joints and ***joint components*** are installed according to type of joint, manufacturers’ instructions, drawings and specifications |
| B-6.04.03P | maintain finished elevation | finished elevation meets requirements according to drawings and specifications |

RANGE OF VARIABLES

***joint components*** include: dowels, keyways, expansion materials

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|  | KNOWLEDGE | |
|  | **Learning Outcomes** | **Learning Objectives** |
| B-6.04.01L | demonstrate knowledge of isolation, construction and expansion joints and their application | describe the types of joints and their applications |
|  |  | identify codes, specifications and regulations pertaining to the installation of construction, isolation and expansion joints |
|  |  | describe the types of ***joint components*** and their applications |
| B-6.04.02L | demonstrate knowledge of installation procedures for isolation, construction and expansion joints | describe the installation procedures for isolation, construction and expansion joints |
|  |  | describe the installation procedures for ***joint components*** |

RANGE OF VARIABLES

***joint components*** include: dowels, keyways, expansion materials

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| B-6.05 | Removes forms |

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| **Essential Skills** | Thinking, Working with Others, Oral Communication |

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

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|  | SKILLS | |
|  | **Performance Criteria** | **Evidence of Attainment** |
| B-6.05.01P | recognize adequately set concrete | concrete is determined as adequately set according to site conditions and type of finish |
| B-6.05.02P | execute removal of formwork | removal of formwork is executed according to industry documents and practices |
| B-6.05.03P | clean, repair and remove foreign objects from forms for re-use | forms are cleaned, repaired and foreign objects removed for re-use according to industry documents and practices |

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|  | KNOWLEDGE | |
|  | **Learning Outcomes** | **Learning Objectives** |
| B-6.05.01L | demonstrate knowledge of procedures used to remove forms | describe form and bracing removal practices |
|  |  | describe form removal requirements |
|  |  | explain proper form removal timing as per concrete application |
| B-6.05.02L | demonstrate knowledge of procedures used for the re-use of forms | describe proper cleaning, repairing and removal of foreign objects procedures for the re-use of forms |

MAJOR WORK ACTIVITY C

Places and levels concrete

TASK C-7 Places concrete

TASK DESCRIPTOR

Concrete finishers may transport concrete from the truck to the desired point of discharge. Prior to establishing elevation, they consolidate concrete to remove air pockets that could cause architectural or structural defects. They spread to a rough grade before achieving final elevation.

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| C-7.01 | Transports concrete on-site |

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| **Essential Skills** | Oral Communication, Thinking, Working with Others |

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

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|  | SKILLS | |
|  | **Performance Criteria** | **Evidence of Attainment** |
| C-7.01.01P | select and use ***placement method*** | ***placement method*** is selected and used according to accessibility to location and size of job |
| C-7.01.02P | determine starting point of concrete placement | starting point for concrete placement is determined according to industry practices |
| C-7.01.03P | verify concrete type | concrete type is verified by matching concrete delivery ticket to drawings and specifications |
| C-7.01.04P | confirm slump and consistency | slump and consistency are confirmed according to slump test, drawings and specifications |
| C-7.01.05P | operate discharge hose | discharge hose is operated according to ***site conditions*** and industry documents and practices |
| C-7.01.06P | operate power buggy | power buggy is operated according to site conditions, manufacturers’ instructions, and industry documents and practices |
| C-7.01.07P | operate crane bucket discharge handle | crane bucket discharge handle is operated according to site conditions and industry documents and practices |
| C-7.01.08P | convey concrete | concrete is conveyed using ***conveying equipment*** according to site conditions and industry documents and practices |
| C-7.01.09P | operate wheelbarrow | wheelbarrow is operated according to site conditions and industry practices |
| C-7.01.10P | deposit concrete | concrete is deposited at rough grade according to industry practices |

RANGE OF VARIABLES

***placement method*** includes: using concrete pump, crane and bucket, wheelbarrow, chute, tremies

***site conditions*** include: weather conditions, location of equipment, starting point, sequence of placement, rate of placement and drop

***conveying equipment*** includes: tele-belt truck, ready-mix truck mounted conveyor, trailers

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|  | KNOWLEDGE | |
|  | **Learning Outcomes** | **Learning Objectives** |
| C-7.01.01L | demonstrate knowledge of the tools and equipment and the procedures used to transport concrete | describe ***conveying equipment***, their application and procedures for use |
|  |  | describe the cause of segregation and use of ***related tools and equipment*** |
|  |  | identify ***transportation methods*** for moving and placing concrete |
|  |  | identify regulations pertaining to the transportation of concrete |
|  |  | describe time restriction and CSA A23.1 requirements for transporting of concrete |
|  |  | identify site preparation for the placement of concrete |
|  |  | describe slump and consistency testing methods |

RANGE OF VARIABLES

***conveying equipment*** includes: tele-belt truck, ready-mix truck mounted conveyor, trailers

***related tools and equipment*** includes: chutes, vibrators, pumps

***transportation methods*** include: pumping, using conveyors, power buggy, crane bucket, wheelbarrow and pails

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| C-7.02 | Spreads concrete |

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| **Essential Skills** | Oral Communication, Working with Others, Thinking |

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

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|  | SKILLS | |
|  | **Performance Criteria** | **Evidence of Attainment** |
| C-7.02.01P | determine width of screed (strips/lanes) | width of screed (strips/lanes) is determined according to size of the pour, screeding method and site conditions |
| C-7.02.02P | identify locations of ***related mechanical installations*** | locations of ***related mechanical installations*** are identified and visibly marked to avoid damage and being covered during placement according to industry practices |
| C-7.02.03P | maintain location of ***embedded reinforcements*** | location of ***embedded reinforcements*** is maintained according to drawings and specifications |
| C-7.02.04P | distribute concrete | concrete is distributed evenly at rough grade |

RANGE OF VARIABLES

***related mechanical installations*** include: floor drains, clean-outs, electrical boxes, catch basins

***embedded reinforcements*** include: synthetic and steel fibre, dowels, welded wire mesh, rebar, post-tensioning cables

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|  | KNOWLEDGE | |
|  | **Learning Outcomes** | **Learning Objectives** |
| C-7.02.01L | demonstrate knowledge of the procedures used to spread concrete | identify tools for spreading concrete and describe their procedures for use |
|  |  | identify types of ***embedded reinforcement***, their applications and procedures for use |
|  |  | identify the effects of embedded reinforcement on handling of concrete |
|  |  | explain the concept of distributing concrete starting from the nearest known level of elevation |

RANGE OF VARIABLES

***embedded reinforcements*** include: synthetic and steel fibre, dowels, welded wire mesh, rebar, post-tensioning cables

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| C-7.03 | Consolidates concrete |

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| **Essential Skills** | Thinking, Working with Others, Oral Communication |

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

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|  | SKILLS | |
|  | **Performance Criteria** | **Evidence of Attainment** |
| C-7.03.01P | determine ***consolidation technique*** | ***consolidation technique*** is determined according to site conditions and industry practices |
| C-7.03.02P | select and use ***tools and equipment*** | ***tools and equipment*** are selected and used according to ***consolidation technique*** and CSA A23.1 |
| C-7.03.03P | determine and adhere to field and frequency of vibration | field and frequency of vibration is determined and adhered to according to CSA A23.1 and to prevent ***defects*** |
| C-7.03.04P | check after concrete is consolidated for straightness and dimensions of formwork | straightness and dimensions of formwork are determined by drawings and specifications |

RANGE OF VARIABLES

***consolidation techniques*** include: internal vibration, external vibration, vibrating screeds

***tools and equipment*** include: immersion vibrator, external vibrator, surface vibrator, vibrating tables, hammers, rods, spades

***defects*** include: segregation, honeycombs, pin holes, delamination

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|  | KNOWLEDGE | |
|  | **Learning Outcomes** | **Learning Objectives** |
| C-7.03.01L | demonstrate knowledge of the ***tools and equipment***, and procedures used to consolidate concrete | identify ***tools and equipment*** used to consolidate concrete |
|  |  | identify types and sizes of vibrators, their application and procedures for use |
|  |  | identify ***consolidation techniques***, their applications and procedures |
| C-7.03.02L | demonstrate knowledge of the various effects and outcomes of consolidating procedures | describe the effect of vibration on forms |
|  |  | describe ***defects*** and how to avoid them |
|  |  | describe effects of over-vibrating on aggregate, embedded reinforcement and slump consistency |

RANGE OF VARIABLES

***tools and equipment*** include: immersion vibrator, external vibrator, surface vibrator, vibrating tables, hammers, rods, spades

***consolidation techniques*** include: internal vibration, external vibration, vibrating screeds

***defects*** include: segregation, honeycombs, pin holes, delamination

TASK C-8 Levels concrete

TASK DESCRIPTOR

Concrete finishers level concrete and establish elevations using wet screeds, screeds, bull floats and related tools to achieve required tolerances.

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| C-8.01 | Establishes elevation |

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| **Essential Skills** | Numeracy, Document Use, Thinking |

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

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|  | SKILLS | |
|  | **Performance Criteria** | **Evidence of Attainment** |
| C-8.01.01P | identify benchmarks | benchmarks are identified according to drawings and specifications |
| C-8.01.02P | determine ***elevation tools*** used for establishing elevations | ***elevation tools*** are identified according to industry practices |
| C-8.01.03P | perform calculations | calculations are performed to establish elevations and slopes according to drawings and specifications |
| C-8.01.04P | transfer benchmark elevation | benchmark elevation is transferred to work area according to drawings and specifications |
| C-8.01.05P | place wet screeds | wet screeds are placed according to the predetermined size of the placement strips |
| C-8.01.06P | check and confirm finish grade | finish grade is checked periodically during placement according to industry practices |

RANGE OF VARIABLES

***elevation tools*** include: string lines, gauges, laser levels, hand levels, builder’s levels, water levels

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|  | KNOWLEDGE | |
|  | **Learning Outcomes** | **Learning Objectives** |
| C-8.01.01L | demonstrate knowledge of the tools and equipment and the procedures used to establish elevations | describe procedures for establishing elevation |
|  |  | explain slope and fall to achieve varying elevations |
|  |  | describe calculations performed to establish elevation |
|  |  | describe placement of screed guides when levelling concrete |

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| C-8.02 | Screeds concrete |

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| **Essential Skills** | Thinking, Working with Others, Oral Communication |

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

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|  | SKILLS | |
|  | **Performance Criteria** | **Evidence of Attainment** |
| C-8.02.01P | select screeding tools and equipment | screeding tools and equipment are selected according to tolerances and drawings and specifications |
| C-8.02.03P | screed concrete | screed concrete according to screed guides, elevation heights or existing formwork, drawings and specifications |

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|  | KNOWLEDGE | |
|  | **Learning Outcomes** | **Learning Objectives** |
| C-8.02.01L | demonstrate knowledge of the tools and equipment, and the techniques used to screed concrete | identify ***manual and mechanical screeds*** and their applications |
|  |  | describe techniques for screeding concrete |
|  |  | explain the purpose of screeding concrete |
|  |  | explain tolerances and describe their purpose as it pertains to levelling concrete |
|  |  | describe methods used to achieve tolerances (FL and FF) |

RANGE OF VARIABLES

***manual and mechanical screeds*** include: screed rods – single/double (straightedge), truss screed, roller screed, screed rail, power screed, laser screed

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| C-8.03 | Bull floats concrete |

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| **Essential Skills** | Thinking, Oral Communication, Working with Others |

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

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|  | SKILLS | |
|  | **Performance Criteria** | **Evidence of Attainment** |
| C-8.03.01P | select type of bull float and length of handle | type of bull float and length of handle are selected according to size of pour and type of concrete |
| C-8.03.02P | adjust pitch | pitch is adjusted according to slump of concrete |
| C-8.03.03P | smooth surface of concrete to finished grade | surface of concrete is smoothed according to industry practices |

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|  | KNOWLEDGE | |
|  | **Learning Outcomes** | **Learning Objectives** |
| C-8.03.01L | demonstrate knowledge of the tools and the techniques used to bull float concrete | identify the tools used to bull float concrete |
|  |  | explain when to begin bull floating |
|  |  | describe the purpose of bull floating the concrete |
|  |  | describe the procedure of bull floating the concrete |

MAJOR WORK ACTIVITY D

Finishes plastic concrete

TASK D-9 Floats concrete

TASK DESCRIPTOR

Concrete finishers float the surface to prepare for final finishing or to produce a final non-slip finish. At this stage, irregularities are removed and broadcast materials may be embedded. This is the important first step in the finishing process. Timing is critical. Hand floating is commonly used at slab edges, vertical pipes, and walls, in preparation for trowelling.

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| D-9.01 | Floats concrete by hand |

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| **Essential Skills** | Oral Communication, Thinking, Working with Others |

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

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|  | SKILLS | |
|  | **Performance Criteria** | **Evidence of Attainment** |
| D-9.01.01P | assess ***surface conditions*** | ***surface conditions*** are assessed according to the concrete materials used, ambient conditions, and CSA A23.1 |
| D-9.01.02P | apply hand float to prepare for trowelling | hand float is applied to eliminate holes and produce a consolidated surface paste to prepare for trowelling |
| D-9.01.03P | apply hand float as a final spin-float or swirl finish | hand float is applied to produce a final finish that has a non-slip texture and uniform appearance |

RANGE OF VARIABLES

***surface conditions*** include: firmness, presence of bleed water, setting of concrete materials

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|  | KNOWLEDGE | |
|  | **Learning Outcomes** | **Learning Objectives** |
| D-9.01.01L | demonstrate knowledge of techniques and tools used to float concrete by hand | identify tools and ***floating techniques*** used to float concrete by hand |
|  |  | identify ***surface conditions*** and describe their effects on timing and floating process |
|  |  | explain the effect of weather conditions during floating of concrete by hand |
|  |  | explain the effect of admixtures in the concrete |

RANGE OF VARIABLES

***floating techniques*** include: pressure application, angle of float, pattern of floating

***surface conditions*** include: firmness, presence of bleed water, setting of concrete materials

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| D-9.02 | Floats concrete by machine |

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| **Essential Skills** | Oral Communication, Thinking, Working with Others |

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

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| --- | --- | --- |
|  | SKILLS | |
|  | **Performance Criteria** | **Evidence of Attainment** |
| D-9.02.01P | assess ***surface conditions*** | ***surface conditions*** are assessed according to the concrete materials used, ambient conditions, and CSA A23.1 |
| D-9.02.02P | assess work area for fresh air ventilation | work area is assessed for fresh air ventilation according to provincial/territorial safety regulations |
| D-9.02.03P | apply single machine float or double-pan machine float to prepare for trowelling | machine float is applied to eliminate holes and produce a consolidated surface paste to prepare for trowelling |
| D-9.02.04P | apply single machine float | single machine float is applied to produce a final finish that has a rough non-slip texture |
| D-9.02.05P | apply double-pan machine float | double-pan machine float is applied to produce a final finish that has a fine non-slip texture and improved flatness compared to a single machine float |
| D-9.02.06P | identify defects in blades and machine | defects in blades and machine are identified according to uneven wear or damage |
| D-9.02.07P | check emergency shut-off switch | emergency shut-off switch is checked and operating correctly |
| D-9.02.08P | apply machine float in an overlapping pattern and with different blade angles | each pass of the machine is applied at 90 degrees to the prior machine float pass, and the blade angles and machine speed are adjusted according to the set of the concrete |

RANGE OF VARIABLES

***surface conditions*** include: firmness, presence of bleed water, setting of concrete materials

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|  | KNOWLEDGE | |
|  | **Learning Outcomes** | **Learning Objectives** |
| D-9.02.01L | demonstrate knowledge of the equipment and procedures used to float concrete by machine | identify ***types of floating machines*** their operation and procedures for use |
|  |  | identify ***types of blades*** their application and procedures for use |
|  |  | explain the effect of blade speed and pitch on concrete surfaces |
| D-9.02.02L | demonstrate knowledge of admixtures in concrete, their applications and effects on floating concrete by machine | explain the effect of admixtures in the concrete |

RANGE OF VARIABLES

***types of floating machines*** include: walk-behind single machine, double-pan ride-on machine, edge machine

***types of blades*** include: float, combination, pan

TASK D-10 Hand-tools concrete

TASK DESCRIPTOR

Concrete finishers hand-tool plastic concrete to control cracking, produce finished edges, provide decorative borders and aid in the removal of formwork. Extruded surfaces are hand-tooled to complete the contoured finish.

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| D-10.01 | Edges perimeter of slab |

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| **Essential Skills** | Oral Communication, Document Use, Thinking |

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

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| --- | --- | --- |
|  | SKILLS | |
|  | **Performance Criteria** | **Evidence of Attainment** |
| D-10.01.01P | assess ***surface conditions*** | ***surface conditions*** are assessed according to ambient conditions and concrete materials set |
| D-10.01.02P | clean adjacent surfaces | adjacent surfaces are cleaned from cement paste |
| D-10.01.03P | apply edging techniques | edging techniques are applied to ensure a smooth and flat surface |
| D-10.01.04P | select edger radius | edger radius is selected according to project specifications and drawings |

RANGE OF VARIABLES

***surface conditions*** include: firmness, presence of bleed water, concrete materials

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|  | KNOWLEDGE | |
|  | **Learning Outcomes** | **Learning Objectives** |
| D-10.01.01L | demonstrate knowledge of tools and equipment used to edge concrete, their application and procedures for use | identify ***types of edgers***, their application and procedures for use |
|  |  | identify ***surface conditions*** that affect edging |

RANGE OF VARIABLES

***types of edgers*** include: tread, safety, walk-along, curb, bullnose

***surface conditions*** include: firmness, presence of bleed water, concrete materials

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| D-10.02 | Finishes extruded concrete surfaces |

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| **Essential Skills** | Oral Communication, Document Use, Working with Others |

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

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|  | SKILLS | |
|  | **Performance Criteria** | **Evidence of Attainment** |
| D-10.02.01P | select and use ***specialized tools*** | ***specialized tools***are selected and used according to application |
| D-10.02.02P | determine finishing technique | finishing technique is determined according to project requirements |
| D-10.02.03P | apply finishing techniques | finishing techniques are applied to maintain the contour of the surface and meet project requirements |

RANGE OF VARIABLES

***specialized tools*** include: moulds, hand mule, long-handled curb edgers, jointers

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|  | KNOWLEDGE | |
|  | **Learning Outcomes** | **Learning Objectives** |
| D-10.02.01L | demonstrate knowledge of extruded concrete surfaces and the tools and equipment and procedures used to finish them | identify ***types of extruded surfaces*** and the techniques used to produce them |
|  |  | identify ***specialized tools*** and the procedures used to finish extruded surfaces |
|  |  | describe ***characteristics*** of extruded concrete |

RANGE OF VARIABLES

***types of extruded surfaces*** include: curb and gutter, sidewalk, highway, slip form

***specialized tools*** include: moulds, hand mule, long-handled curb edgers, jointers

***characteristics*** include: slump, air content, mix design

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| D-10.03 | Tools contraction joints |

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| **Essential Skills** | Document Use, Numeracy, Thinking |

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

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|  | SKILLS | |
|  | **Performance Criteria** | **Evidence of Attainment** |
| D-10.03.01P | assess ***surface conditions*** | ***surface conditions*** are assessed according to the concrete materials used, ambient conditions, and CSA A23.1 |
| D-10.03.02P | calculate depth and spacing of contraction joints | contraction joints depth and spacing is calculated according to drawings and specifications and CSA A23.1 |
| D-10.03.03P | ensure joint straightness | joints are straight according to use of lines and straightedges |
| D-10.03.04P | apply ***tooling techniques*** | ***tooling techniques*** are applied according to site conditions |

RANGE OF VARIABLES

***surface conditions*** include: firmness, presence of bleed water, concrete materials

***tooling techniques*** include: pressure application, angle of tool, depth of groove, location of joints

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|  | KNOWLEDGE | |
|  | **Learning Outcomes** | **Learning Objectives** |
| D-10.03.01L | demonstrate knowledge of the tools and techniques used to tool contraction joints | identify tools required for tooling contraction joints |
|  |  | explain depth and spacing as it pertains to hand-tooling concrete |
|  |  | describe ***tooling techniques*** and their application |

RANGE OF VARIABLES

***tooling techniques*** include: pressure application, angle of tool, depth of groove, location of joints

TASK D-11 Trowels concrete

TASK DESCRIPTOR

Concrete finishers trowel concrete to increase the density of the surface and to achieve the final finish. Timing is critical.

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| D-11.01 | Trowels concrete by hand |

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| **Essential Skills** | Document Use, Working with Others, Oral Communication |

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

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|  | SKILLS | |
|  | **Performance Criteria** | **Evidence of Attainment** |
| D-11.01.01P | assess ***surface conditions*** | ***surface conditions*** are assessed according to the concrete materials used, ambient conditions, and CSA A23.1 |
| D-11.01.02P | apply hand trowel to concrete | hand trowel is applied to small areas, slab edges, and areas inaccessible to finishing machines, to achieve a smooth finish without ***surface imperfections*** |

RANGE OF VARIABLES

***surface conditions*** include: firmness, concrete materials

***surface*** ***imperfections*** include: pin holes, ridges, chatter marks, wash boarding, blisters

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|  | KNOWLEDGE | |
|  | **Learning Outcomes** | **Learning Objectives** |
| D-11.01.01L | demonstrate knowledge of techniques used to apply hand trowel to concrete without ***surface imperfections*** | identify tools and their usage to apply hand trowel to concrete |
|  |  | identify ***surface imperfections*** their causes and techniques for correction |
| D-11.01.02L | demonstrate knowledge of the effects of various factors on the procedures used to trowel concrete by hand | describe the effects of trowel pitch and force |
|  |  | describe the procedures used to trowel concrete by hand |

RANGE OF VARIABLES

***surface*** ***imperfections*** include: pin holes, ridges, chatter marks, wash boarding, blisters

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| D-11.02 | Trowels concrete by machine |

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| **Essential Skills** | Document Use, Working with Others, Thinking |

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

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|  | SKILLS | |
|  | **Performance Criteria** | **Evidence of Attainment** |
| D-11.02.01P | assess ***surface conditions*** | ***surface conditions*** are assessed according to the concrete materials used, ambient conditions, and CSA A23.1 |
| D-11.02.02P | assess work area for fresh air ventilation | work area is assessed for fresh air ventilation according to provincial/territorial safety regulations |
| D-11.02.03P | apply various ***trowelling techniques*** | ***trowelling techniques*** are applied according to the set of the concrete, ambient conditions, and project plans and specifications |
| D-11.02.04P | identify defects in trowel blades | defects in trowel blades are identified and blades are replaced |
| D-11.02.05P | check emergency shut-off switch | emergency shut-off switch is checked and operating correctly |
| D-11.02.06P | use power trowel | power trowel is used to achieve a smooth finish without ***surface imperfections*** and according to project plans and specifications |

RANGE OF VARIABLES

***surface conditions*** include: firmness, concrete materials

***trowelling techniques*** include: finishing at construction joints, patterns for each pass of the trowel machine should be at 90 degree to the prior machine trowel pass, adjusting blade pitch and speed, addressing cold joints

***surface*** ***imperfections*** include: pin holes, ridges, chatter marks, wash boarding

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|  | KNOWLEDGE | |
|  | **Learning Outcomes** | **Learning Objectives** |
| D-11.02.01L | demonstrate knowledge of the tools and equipment and ***techniques*** used to trowel concrete by machine | identify ***types of machines*** used for troweling and their procedures for use |
|  |  | identify the effects of ***types of blades*** on concrete surface |
|  |  | identify ***trowelling techniques*** used to trowel concrete by machine |
| D-11.02.02L | demonstrate knowledge of the effects of various factors on procedures used to trowel concrete by machine | describe the effects of weather conditions on the concrete |
|  |  | describe the effects of admixtures in the concrete |
|  |  | describe the effects of poor ventilation on slab surface (for health and safety and carbonation) |

RANGE OF VARIABLES

***types of machines*** include: walk-behind single machine, double-trowel ride-on machine

***types of blades*** include: steel blades, combination blades, plastic blades

***trowelling techniques*** include: finishing at construction joints, patterns for each pass of the trowel machine should be at 90 degree to the prior machine trowel pass, adjusting blade pitch and speed, addressing cold joints

TASK D-12 Applies surface treatments to concrete

TASK DESCRIPTOR

Concrete finishers apply surface treatments to plastic concrete to achieve specified surface finishes. It is critical that surface treatments be performed at the right time.

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| D-12.01 | Applies dry-shake aggregate surface hardeners |

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| **Essential Skills** | Document Use, Thinking, Numeracy |

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

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| --- | --- | --- |
|  | SKILLS | |
|  | **Performance Criteria** | **Evidence of Attainment** |
| D-12.01.01P | assess ***surface conditions*** | ***surface conditions*** are assessed according to the concrete materials used, ambient conditions and manufacturers’ instructions |
| D-12.01.02P | calculate quantity of materials to be applied | materials are calculated according to placement size, drawings and specifications |
| D-12.01.03P | select and use tools and equipment | tools and equipment are selected and used according to application rate |
| D-12.01.04P | apply ***techniques*** | ***techniques*** are applied to achieve surface finish according to drawings and specifications |
| D-12.01.05P | installs dry-shake hardeners | dry-shake hardeners are installed evenly and in specified quantity according to drawings and specifications, and manufacturers’ instructions |
| D-12.01.06P | float product into the concrete surface | product is floated into the concrete surface according to site conditions and manufacturers’ instructions |

RANGE OF VARIABLES

***surface conditions*** include: firmness, presence of bleed water, concrete materials

***techniques*** include: broadcasting by hand and machine

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|  | KNOWLEDGE | |
|  | **Learning Outcomes** | **Learning Objectives** |
| D-12.01.01L | demonstrate knowledge of products and the techniques used to broadcast them on concrete surface | identify ***types of dry-shake hardeners*** and their application procedures |
| D-12.01.02L | demonstrate knowledge of the factors that affect dry-shake aggregate surface hardeners on concrete | explain the effect of improper application and finishing of dry-shake aggregate surface hardeners |
|  |  | explain the effects of ***surface conditions*** on dry-shake aggregate surface hardeners |

RANGE OF VARIABLES

***types of dry-shake hardeners*** include: mineral or metallic aggregates, natural or pigmented

***surface conditions*** include: firmness, presence of bleed water, concrete materials

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| D-12.02 | Applies exposed aggregate finish |

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| **Essential Skills** | Numeracy, Document Use, Thinking |

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

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|  | SKILLS | |
|  | **Performance Criteria** | **Evidence of Attainment** |
| D-12.02.01P | assess ***surface conditions*** | ***surface conditions*** are assessed according to the concrete materials used, and ambient conditions |
| D-12.02.02P | determine requirement for and amount of surface retarder | requirement and amount of surface retarder is determined according to drawings and specifications, and manufacturers’ instructions |
| D-12.02.03P | select and use ***tools and equipment*** | ***tools and equipment*** are selected and used according to manufacturers’ instructions |
| D-12.02.04P | apply ***surface retarder*** | ***surface retarder*** is applied according to ambient conditions and manufacturers’ instructions |

RANGE OF VARIABLES

***surface conditions*** include: firmness, presence of bleed water, concrete materials

***tools and equipment*** include: spray equipment (pressure washer, pressure spray can), push broom, darby float, magnesium float, hoses

***surface retarders*** are water-based

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|  | KNOWLEDGE | |
|  | **Learning Outcomes** | **Learning Objectives** |
| D-12.02.01L | demonstrate knowledge of exposed aggregate finish and the procedures used for application | identify ***types of exposed aggregate finish*** and the procedures used to expose the aggregate |
|  |  | identify ***tools and equipment*** used to apply surface retarder |
|  |  | explain how to broadcast aggregate uniformly or in desired pattern |
|  |  | explain the saturated surface-dry (SSD) requirements for aggregate |
| D-12.02.02L | demonstrate knowledge of the factors that affect applying retarders | explain how ***surface conditions*** affect the application of surface retarders |

RANGE OF VARIABLES

***types of exposed aggregate finishes*** are ready-mixed and broadcast

***tools and equipment*** include: spray equipment (pressure washer, pressure spray can), push broom, darby float, magnesium float, hoses

***surface conditions*** include: firmness, presence of bleed water, concrete materials

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| D-12.03 | Textures concrete surface |

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| **Essential Skills** | Document Use, Thinking, Working with Others |

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

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|  | SKILLS | |
|  | **Performance Criteria** | **Evidence of Attainment** |
| D-12.03.01P | assess ***surface conditions*** | ***surface conditions*** are assessed according to the concrete materials used, and ambient conditions |
| D-12.03.02P | select and use ***tools and equipment*** | ***tools and equipment*** are selected and used to produce the desired texture |
| D-12.03.03P | apply texturing techniques | texturing techniques are applied to achieve patterns according to drawings and specifications |

RANGE OF VARIABLES

***surface conditions*** include: firmness, presence of bleed water, concrete materials

***tools and equipment*** include: broom, flat wire texture broom (tyne), hand float

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|  | KNOWLEDGE | |
|  | **Learning Outcomes** | **Learning Objectives** |
| D-12.03.01L | demonstrate knowledge of the requirements and techniques for texturing concrete surfaces | identify ***types of textured surfaces*** and the techniques required to achieve them |
|  |  | identify ***tools and equipment*** used for texturing surfaces |
| D-12.03.02L | demonstrate knowledge of the factors that affect texturing concrete | explain how ***surface conditions*** affect the texturing process |

RANGE OF VARIABLES

***types of textured surfaces*** include: broomed, tyne finish, swirl, herringbone

***tools and equipment*** include: broom, flat wire texture broom (tyne), hand float

***surface conditions*** include: firmness, presence of bleed water, concrete materials

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| D-12.04 | Applies stamped concrete surface finish |

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| **Essential Skills** | Thinking, Working with Others, Numeracy |

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

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|  | SKILLS | |
|  | **Performance Criteria** | **Evidence of Attainment** |
| D-12.04.01P | assess ***surface conditions*** | ***surface conditions*** are assessed according to the concrete materials used, and ambient conditions |
| D-12.04.02P | protect surrounding area | surrounding area is protected from broadcast products |
| D-12.04.03P | apply ***release agents*** | ***release agents*** are applied according to manufacturers’ instructions |
| D-12.04.04P | lay out pattern | pattern is laid out according to manufacturers’ instructions |
| D-12.04.05P | stamp pattern | pattern is stamped consistently for location and depth |

RANGE OF VARIABLES

***surface conditions*** include: firmness, presence of bleed water, concrete materials

***release agents*** are powder or liquid

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|  | KNOWLEDGE | |
|  | **Learning Outcomes** | **Learning Objectives** |
| D-12.04.01L | demonstrate knowledge of stamps, patterns, designs and the procedures used to stamp concrete | identify ***types of patterns*** for stamping concrete surfaces and the procedures for use |
|  |  | identify different types of ***stamping tools*** for stamping concrete surfaces |
|  |  | identify ***mix design*** required to accommodate pattern |
|  |  | identify ***stamp*** ***compositions*** |
| D-12.04.02L | demonstrate knowledge of the factors that affect stamping of concrete | describe the effects of broadcast products on setting time prior to stamping |
|  |  | describe the effects of weather conditions on stamping procedures |
|  |  | identify the use of evaporation reducers prior to stamping concrete surfaces |

RANGE OF VARIABLES

***types of patterns*** include: grouted (cobblestone, random stone, barn board), seamless

***stamping tools*** include: textured mats, stencils, stamp roller, chisels, tamper, touch-up roller

***mix design*** includes: 10 mm aggregate size, C-2, aggregate shape

***stamp*** ***compositions*** include: flexible urethane, paper, metal

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| D-12.05 | Applies evaporation reducers |

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| **Essential Skills** | Numeracy, Document Use, Thinking |

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

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|  | SKILLS | |
|  | **Performance Criteria** | **Evidence of Attainment** |
| D-12.05.01P | assess ***surface conditions*** | ***surface conditions*** are assessed according to the concrete materials used and ambient conditions |
| D-12.05.02P | determine requirement for and amount of evaporation reducer | requirement and amount of evaporation reducer is determined according to manufacturers’ instructions |
| D-12.05.03P | select and use ***tools and equipment*** | ***tools and equipment*** are selected and used to ensure even coverage |
| D-12.05.04P | apply surface evaporation reducers | surface evaporation reducers are applied to maintain surface plasticity and minimize concrete mix water evaporation |

RANGE OF VARIABLES

***surface conditions*** include: presence of bleed water, concrete materials

***tools and equipment*** are hand or power sprayers

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|  | KNOWLEDGE | |
|  | **Learning Outcomes** | **Learning Objectives** |
| D-12.05.01L | demonstrate knowledge of evaporation reducers and the procedures used for application | identify evaporation reducers and their applications |
|  |  | identify ***tools and equipment*** used to apply evaporation reducers |
|  |  | identify procedures used to apply evaporation reducers |
|  |  | explain mixing procedures for evaporation reducers |
| D-12.05.02L | demonstrate knowledge of the factors that affect applying evaporation reducers | explain how ***surface conditions*** affect the application of evaporation reducers |

RANGE OF VARIABLES

***tools and equipment*** are hand or power sprayers  
***surface conditions*** include: presence of bleed water, concrete materials

MAJOR WORK ACTIVITY E

Cures and protects concrete

TASK E-13 Cures concrete

TASK DESCRIPTOR

Concrete finishers cure concrete to maximize its strength and increase its durability. Correct temperature and moisture retention is important to the curing process.

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| E-13.01 | Wet-cures concrete |

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| **Essential Skills** | Thinking, Document Use, Digital Technology |

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

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|  | SKILLS | |
|  | **Performance Criteria** | **Evidence of Attainment** |
| E-13.01.01P | select and use ***tools and equipment*** | ***tools and equipment*** are selected and used according to application |
| E-13.01.02P | pond (flood) concrete | concrete is ponded according to ACI guides, and drawings and specifications |
| E-13.01.03P | apply water using sprinklers | sprinklers are set up to continuously apply water onto hardened concrete to maintain moisture and control temperature according to drawings and specifications |
| E-13.01.04P | fog or mist air space surrounding concrete | fog or mist is applied to increase humidity level according to drawings and specifications |
| E-13.01.05P | cover concrete with ***materials*** | ***materials*** are used according to ACI guides, and drawings and specifications to maintain required temperature and retain moisture |
| E-13.01.06P | check concrete during curing | concrete is checked for temperature and moisture of concrete to ensure the curing process takes place according to CSA A23.1, ACI guides, and drawings and specifications |

RANGE OF VARIABLES

***tools and equipment*** includes: sprinklers, soaker hose, fogging and misting systems

***materials*** include: wet burlap, curing blankets, polyethylene sheeting

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|  | KNOWLEDGE | |
|  | **Learning Outcomes** | **Learning Objectives** |
| E-13.01.01L | demonstrate knowledge of the processes, requirements and techniques used in wet-curing concrete | identify the ***tools and equipment*** and ***materials*** used in the process of wet‑curing concrete |
|  |  | explain the requirements for proper hydration of concrete during the wet‑curing process |
|  |  | explain the requirements for proper temperature of concrete during the wet‑curing process |
|  |  | describe the process and techniques of wet-curing concrete |
|  |  | identify types of cement and timings related to curing |
|  |  | explain the consequences of improper curing |

RANGE OF VARIABLES

***tools and equipment*** includes: sprinklers, soaker hose, fogging and misting systems

***materials*** include: wet burlap, curing blankets, polyethylene sheeting

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| E-13.02 | Chemical cures concrete |

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| **Essential Skills** | Document Use, Thinking, Working with Others |

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

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|  | SKILLS | |
|  | **Performance Criteria** | **Evidence of Attainment** |
| E-13.02.01P | select ***curing*** ***compound*** | ***curing*** ***compound*** is selected according to drawings and specifications |
| E-13.02.02P | select and use ***tools and equipment*** | ***tools and equipment*** are selected and used according to application |
| E-13.02.03P | apply ***curing*** ***compound*** | ***curing*** ***compound*** is applied to ensure complete and uniform coverage |

RANGE OF VARIABLES

***curing compounds*** include: clear membrane, fugitive dye, dissipating curing compound, water-based, solvent-based

***tools and equipment*** include: roller, spray can, PPE

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|  | KNOWLEDGE | |
|  | **Learning Outcomes** | **Learning Objectives** |
| E-13.02.01L | demonstrate knowledge of applications and procedures used in chemical curing | identify types of ***curing compounds*** |
|  |  | identify types of cement and timings related to curing |
|  |  | describe the effects of ***curing compounds*** on the curing process |
|  |  | identify the risks associated with and the safe work practices of applying ***curing compounds*** |
|  |  | describe application procedure of ***curing compounds*** |
|  |  | identify timing for the application of ***curing compounds*** |
|  |  | describe safe work practices pertaining to the use of seamless systems |

RANGE OF VARIABLES

***curing compounds*** include: clear membrane, fugitive dye, dissipating curing compound, water-based, solvent-based

TASK E-14 Creates contraction joints

TASK DESCRIPTOR

Contraction joints are placed in green concrete in pre-determined locations in an effort to control cracking caused by drying shrinkage.

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| E-14.01 | Saw cuts contraction joints |

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| **Essential Skills** | Document Use, Numeracy, Thinking |

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

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|  | SKILLS | |
|  | **Performance Criteria** | **Evidence of Attainment** |
| E-14.01.01P | identify location, spacing and depth of contraction joints | location, spacing and depth of contraction joints are identified according to drawings and specifications, CSA A23.1 and industry practices |
| E-14.01.02P | install contraction joints in green concrete | contraction joints are installed in designated locations to promote controlled cracking |

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|  | KNOWLEDGE | |
|  | **Learning Outcomes** | **Learning Objectives** |
| E-14.01.01L | demonstrate knowledge of ***tools and equipment*** and procedures to saw cut contraction joints | identify ***tools and equipment*** required for wet and early entry cutting |
|  |  | describe procedures for saw cutting contraction joints |

RANGE OF VARIABLES

***tools and equipment*** include: string line, measuring tape, chalk line, wet saw, early entry saw, cut-off saw (quick cut)

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| E-14.02 | Fills joints |

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| **Essential Skills** | Thinking, Document Use, Working with Others |

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

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|  | SKILLS | |
|  | **Performance Criteria** | **Evidence of Attainment** |
| E-14.02.01P | clean joints | joints are cleaned to remove contaminants and promote bonding |
| E-14.02.02P | place a backing rod in joints | a backing rod is placed to control joint filler depth and surface profile finish according to drawings and specifications |
| E-14.02.03P | mix ***joint sealant or joint filler*** | ***joint sealant or joint filler*** is mixed according to manufacturers' instructions |
| E-14.02.04P | install ***joint sealant or joint filler*** | ***joint sealant*** is installed to keep joint clean, and ***joint filler*** is installed to protect joint edges from solid tire traffic according to manufacturers' instructions |

RANGE OF VARIABLES

***joint sealant or joint filler*** include: self-levelling, non-sag

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|  | KNOWLEDGE | |
|  | **Learning Outcomes** | **Learning Objectives** |
| E-14.02.01L | demonstrate knowledge of tools and equipment and procedures to fill contraction joints | identify tools and equipment required for filling joints |
|  |  | describe procedures for filling contraction joints |
|  |  | identify timing and conditions for application of joint filling |

TASK E-15 Protects concrete

TASK DESCRIPTOR

Concrete finishers need to physically protect concrete from the surrounding elements, temperature variations and access during its setting and hardening. This helps to improve durability of the concrete and protect it from damage.

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| E-15.01 | Protects plastic concrete |

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| **Essential Skills** | Document Use, Digital Technology, Thinking |

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

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|  | SKILLS | |
|  | **Performance Criteria** | **Evidence of Attainment** |
| E-15.01.01P | insulate surface of concrete | surface of concrete is insulated with ***materials*** for heat retention |
| E-15.01.02P | identify concrete temperature | concrete’s temperature is identified |
| E-15.01.03P | wet sub-base, formwork and other contact surfaces | sub-base, formwork and other contact surfaces are wet to avoid wicking and maintain moisture of concrete |
| E-15.01.04P | set up hoarding and heaters | hoarding and heaters are set up to prevent concrete from freezing |
| E-15.01.05P | set up wind breaks and shade | wind breaks and shade are set up to prevent concrete from freezing and protect from surface drying and hot weather |
| E-15.01.06P | apply evaporation reducers | evaporation reducers are applied to prevent surface moisture loss |
| E-15.01.07P | restrict access using ***barricades*** | ***barricades*** are used to restrict access |

RANGE OF VARIABLES

***materials*** include: straw and polyethylene, insulated tarps, electric blankets

***barricades*** include: caution tape, ribbon, safety fence, pylons, wooden barricades

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|  | KNOWLEDGE | |
|  | **Learning Outcomes** | **Learning Objectives** |
| E-15.01.01L | demonstrate knowledge of how temperature affects concrete | describe the effects of ground and air temperature on concrete |
|  |  | identify temperature of concrete and its effect on set |
|  |  | identify temperature ranges for curing processes |
|  |  | identify plan to control the ***weather variables*** |
|  |  | identify the effects of water, ice and warm water on the concrete mix |

RANGE OF VARIABLES

***weather variables*** include: wind, sun, rain, snow, humidity, temperature

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| E-15.02 | Protects hardened concrete |

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| **Essential Skills** | Document Use, Numeracy, Thinking |

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

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| --- | --- | --- |
|  | SKILLS | |
|  | **Performance Criteria** | **Evidence of Attainment** |
| E-15.02.01P | insulate work area | work area is insulated with ***materials*** for heat retention |
| E-15.02.02P | set up hoarding and heaters | hoarding and heaters are set up to prevent concrete from freezing |
| E-15.02.03P | restrict access using ***barricades*** | ***barricades*** are used to restrict access |
| E-15.02.04P | set up reshoring | reshoring is set in correct location |

RANGE OF VARIABLES

***materials*** include: straw and polyethylene, insulated tarps, electric blankets, reshoring

***barricades*** include: caution tape, ribbon, safety fence, pylons, wooden barricades

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|  | KNOWLEDGE | |
|  | **Learning Outcomes** | **Learning Objectives** |
| E-15.02.01L | demonstrate knowledge of how temperature affects concrete | describe the effects of ground and air temperature on concrete |
|  |  | identify temperature ranges for curing processes |
|  |  | identify plan to control the ***weather variables*** |

RANGE OF VARIABLES

***weather variables*** include: wind, sun, rain, snow, humidity, temperature

MAJOR WORK ACTIVITY F

Modifies and repairs concrete and performs grouting

TASK F-16 Repairs and restores concrete

TASK DESCRIPTOR

Concrete finishers must access areas to be repaired, decide on repair methods, prepare surfaces to be repaired or restored and install repair materials in a safe, cost-effective and timely manner.

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| F-16.01 | Inspects concrete |

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| **Essential Skills** | Oral Communication, Document Use, Thinking |

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

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|  | SKILLS | |
|  | **Performance Criteria** | **Evidence of Attainment** |
| F-16.01.01P | access affected area | affected area is accessed to perform inspection |
| F-16.01.02P | check concrete | concrete is visually and audibly checked for ***defects*** |
| F-16.01.03P | identify ***cause of*** ***defect*** | ***cause of defect*** is identified to determine repair required |
| F-16.01.04P | determine if non-destructive or destructive testing is required | need for testing is determined according to the ***defect*** |

RANGE OF VARIABLES

***defects*** include: scaling, spalling, honeycombs, cracks

***cause of defects*** include: stress, efflorescence, improper placing or finishing, environmental (acid rain, carbonation), corrosion

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|  | KNOWLEDGE | |
|  | **Learning Outcomes** | **Learning Objectives** |
| F-16.01.01L | demonstrate knowledge of concrete ***defects*** and their causes | identify types of ***defects*** that require repair |
|  |  | identify ***cause of defects*** that require repair |
| F-16.01.02L | demonstrate knowledge of testing tools and equipment, and procedures used to inspect concrete | identify the requirements for non-destructive and destructive testing |
|  |  | identify the tools and equipment used to test concrete |
|  |  | describe ***procedures*** used to inspect concrete |

RANGE OF VARIABLES

***defects*** include: scaling, spalling, honeycombs, cracks

***cause of defects*** include: stress, efflorescence, improper placing or finishing, environmental (acid rain, carbonation), corrosion

***procedures*** include: visual, chain dragging, hammer sounding, copper-copper sulfate test, core sample

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| F-16.02 | Removes materials |

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| **Essential Skills** | Thinking, Working with Others, Oral Communication |

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

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|  | SKILLS | |
|  | **Performance Criteria** | **Evidence of Attainment** |
| F-16.02.01P | determine the removal procedure | removal procedure is determined according to inspection results and industry documents |
| F-16.02.02P | protect and isolate area of removal | area of removal is protected and isolated with ***barriers*** |
| F-16.02.03P | determine area and depth of material to be removed | area and depth of material to be removed is determined according to the inspection results and ACI guides |
| F-16.02.04P | determine if an electrical and mechanical inspector is required | inspectors are contacted to locate embedded electrical or mechanical hazards |
| F-16.02.05P | operate ***removal equipment*** | ***removal equipment*** is operated according to manufacturers’ instructions |
| F-16.02.06P | dispose of debris | debris is disposed of according to jurisdictional specifications |

RANGE OF VARIABLES

***barriers*** include: caution tape, barricades, temporary fencing, tarps

***removal equipment*** includes: grinders, chipping hammers, scarifiers, scabblers, sandblasters, vacuums

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|  | KNOWLEDGE | |
|  | **Learning Outcomes** | **Learning Objectives** |
| F-16.02.01L | demonstrate knowledge of material ***removal equipment*** and procedures for use | identify types of ***removal equipment*** |
|  |  | identify hazards and safe work practices pertaining to removal of materials |
|  |  | describe the procedures used for the removal of materials |
| F-16.02.02L | demonstrate knowledge of disposal methods | identify regulations and safe work practices pertaining to disposal of materials |
|  |  | identify methods used to dispose of materials |

RANGE OF VARIABLES

***removal equipment*** includes: grinders, chipping hammers, scarifiers, scabblers, sandblasters, vacuums

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| F-16.03 | Prepares surface for repair or restoration |

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| **Essential Skills** | Document Use, Numeracy, Oral Communication |

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

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|  | SKILLS | |
|  | **Performance Criteria** | **Evidence of Attainment** |
| F-16.03.01P | select ***profiling equipment*** | ***profiling equipment*** is selected to determine depth of surface profile according to manufacturers’ instructions |
| F-16.03.02P | operate ***profiling equipment*** | ***profiling equipment*** is operated according to manufacturers' instructions |
| F-16.03.03P | clean surface | surface is cleaned free of debris according to scope of work |
| F-16.03.04P | pre-soak surfaces | surfaces are pre-soaked to SSD state using ***pre-soak*** ***methods*** |
| F-16.03.05P | prepare and apply ***bonding agents*** | ***bonding agents*** are applied according to manufacturers' instructions |

RANGE OF VARIABLES

***profiling equipment*** includes: grinders, scabblers, sand blasters, shot blasters, scarifiers, bush hammers, chipping gun

***pre-soak*** ***methods*** include: using wet burlap, spraying, ponding, misting

***bonding agents*** include: latex modified, slurry mix, epoxy

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|  | KNOWLEDGE | |
|  | **Learning Outcomes** | **Learning Objectives** |
| F-16.03.01L | demonstrate knowledge of procedures and materials used for preparing the surface for repair or restoration | describe surface preparation procedures and material |
|  |  | identify ***profiling equipment***, their applications and the procedures used |
|  |  | identify ***bonding agents***, their application and the procedures used |
|  |  | describe the SSD requirements for concrete |
|  |  | identify ***pre-soak methods*** |

RANGE OF VARIABLES

***profiling equipment*** includes: grinders, scabblers, sand blasters, shot blasters, scarifiers, bush hammers, chipping gun

***bonding agents*** include: latex modified, slurry mix, epoxy

***pre-soak*** ***methods*** include: using wet burlap, spraying, ponding, misting

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| F-16.04 | Install repair materials |

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| **Essential Skills** | Document Use, Thinking, Working with Others |

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

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|  | SKILLS | |
|  | **Performance Criteria** | **Evidence of Attainment** |
| F-16.04.01P | select ***repair materials*** | ***repair*** ***materials*** are selected according to required repair and assessed ***conditions*** |
| F-16.04.02P | determine if aggregate fillers are required | need for aggregate fillers is determined according to depth of repair area, ***repair material*** selected and manufacturers’ instructions |
| F-16.04.03P | select curing procedure | curing procedures are selected according to ***repair material*** and manufacturers’ instructions |
| F-16.04.04P | use ***repair*** ***procedures*** | ***repair*** ***procedures*** are used according to ***repair material*** andmanufacturers’ instructions |

RANGE OF VARIABLES

***repair material*** includes: epoxies, mortar, modified patching materials, concrete, shot-crete/gunite

***conditions*** include: moisture content, temperature, visible contaminants, time restraints

***repair procedures*** include: drypacking, hand patching, pouring back, injecting, shot-creting

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|  | KNOWLEDGE | |
|  | **Learning Outcomes** | **Learning Objectives** |
| F-16.04.01L | demonstrate knowledge of ***repair*** ***materials*** and ***procedures*** used to repair and restore concrete | identify ***hazards*** and safe work practices pertaining to repairing and restoring concrete |
|  |  | identify ***repair materials*** and their applications |
|  |  | describe ***procedures*** used for repairing and restoring concrete |

RANGE OF VARIABLES

***repair material*** includes: epoxies, mortar, modified patching materials, concrete, shot-crete/gunite

***repair procedures*** include: drypacking, hand patching, pouring back, injecting, shot-creting

***hazards*** include: vapours, contaminants, chemical burns

TASK F-17 Applies surface treatment to hardened concrete

TASK DESCRIPTOR

Concrete finishers apply surface treatments to hardened concrete. They must clean and prepare existing concrete surfaces using abrading or washing equipment to ensure that seamless coatings, toppings, parging or chemical surface treatments can be applied.

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| F-17.01 | Prepares surface for surface treatments |

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| **Essential Skills** | Document Use, Working with Others, Thinking |

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

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|  | SKILLS | |
|  | **Performance Criteria** | **Evidence of Attainment** |
| F-17.01.01P | protect surrounding areas | surrounding areas are protected from splatter and foreign debris according to industry practices |
| F-17.01.02P | identify presence of ***surface resists*** and excessive moisture transmission | ***surface resists*** and excessive moisture transmission are identified using industry practices |
| F-17.01.03P | use ***degreasing agents*** and concentrated acid cleaners | ***degreasing agents*** and concentrated acid cleaners are used according to manufacturers' instructions |
| F-17.01.04P | operate ***profiling equipment*** | ***profiling equipment*** is operated according to manufacturers’ instructions |
| F-17.01.05P | determine structural soundness | structural soundness is determined by conducting a patch test |
| F-17.01.06P | install zinc strips | zinc strips are installed according to design, material used and manufacturers’ instructions |
| F-17.01.07P | use cleaning products and equipment | cleaning products and equipment are used according to manufacturers’ instructions |
| F-17.01.08P | remove fine debris | fine debris is removed using ***surface cleaning equipment*** |

RANGE OF VARIABLES

***surface resists*** include:sealers, oils, paints

***degreasing agents*** include: caustic soda, citrus-based cleaners, chemical strippers

***profiling equipment*** includes: sand/shot blasters, power grinders, concrete shavers

***surface cleaning equipment*** includes: pressure washers, steam cleaners, wet/dry vacuums

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|  | KNOWLEDGE | |
|  | **Learning Outcomes** | **Learning Objectives** |
| F-17.01.01L | demonstrate knowledge of equipment and the procedures used to prepare surfaces | identify types of ***profiling equipment***, their application and procedures for use |
|  |  | identify ***surface cleaning equipment*** and describe ***surface cleaning*** ***procedures*** |
| F-17.01.02L | demonstrate knowledge of products used to prepare surfaces | describe the effects of products on the preparation of surfaces |
|  |  | identify ***degreasing agents*** and describe their application |

RANGE OF VARIABLES

***profiling equipment*** includes: sand/shot blasters, power grinders, concrete shavers

***surface cleaning equipment*** includes: pressure washers, steam cleaners, wet/dry vacuums

***surface cleaning procedures*** include: acid washing, pressure washing

***degreasing agents*** include: caustic soda, citrus-based cleaners, chemical strippers

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| F-17.02 | Abrades surface to achieve architectural finish |

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| **Essential Skills** | Document Use, Reading, Thinking |

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

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|  | SKILLS | |
|  | **Performance Criteria** | **Evidence of Attainment** |
| F-17.02.01P | apply ***methods*** to achieve ***architectural finishes*** | ***methods*** are applied to achieve ***architectural finishes*** according to drawings and specifications, and manufacturers’ recommendations |
| F-17.02.02P | determine depth of abrasion | depth of abrasion is determined according to ***architectural finishes*** |
| F-17.02.03P | operate ***profiling equipment*** | ***profiling equipment*** is operated to achieve ***architectural finishes*** according to drawings and specifications |
| F-17.02.04P | contain and dispose of dispelled material | material dispelled during abrading process is contained according to scope of work and disposed of according to jurisdictional requirements |

RANGE OF VARIABLES

***methods*** include: sand blasting, grinding, bush hammering, wash coating, form treatments

***architectural finishes*** include: textured, polished, wash-coated, exposed aggregate, bush hammered, antiquing

***profiling equipment*** includes: sand blasters, grinders, bush hammers

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|  | KNOWLEDGE | |
|  | **Learning Outcomes** | **Learning Objectives** |
| F-17.02.01L | demonstrate knowledge of the equipment and procedures used to abrade concrete surfaces | identify types of ***profiling equipment***, their application and procedures for use |
|  |  | identify types of ***architectural finishes*** and the ***methods*** used to achieve them |
|  |  | describe regulations pertaining to disposing of dispelled material |
| F-17.02.02L | demonstrate knowledge of the effects of abrading concrete | identify safe work practices related to abrading concrete |
|  |  | describe the environmental impact of abrading concrete |

RANGE OF VARIABLES

***profiling equipment*** includes: sand blasters, grinders, bush hammers

***architectural finishes*** include: textured, polished, wash-coated, exposed aggregate, bush hammered, antiquing

***methods*** include: sand blasting, grinding, bush hammering, wash coating, form treatments

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| F-17.03 | Applies seamless systems |

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| **Essential Skills** | Working with Others, Thinking, Numeracy |

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

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|  | SKILLS | |
|  | **Performance Criteria** | **Evidence of Attainment** |
| F-17.03.01P | select and use ***epoxy tools*** | ***epoxy tools*** are selected and used according to application |
| F-17.03.02P | select anchoring/keyways | anchoring/keyways is selected according to seamless coating being used, manufacturers’ instructions, and drawings and specifications |
| F-17.03.03P | set up mix station | mix station is set up in accessible location to work area |
| F-17.03.04P | verify suitability of concrete surface | hardness and moisture condition of concrete is verified as suitable for the application |
| F-17.03.05P | mix and apply primer | primer is mixed and applied according to manufacturers’ instructions |
| F-17.03.06P | mix and install ***seamless systems*** | ***seamless systems*** are mixed and installed according to manufacturers’ instructions |
| F-17.03.07P | apply grout and top coats | grout and top coats are applied according to manufacturers’ instructions and industry practices |
| F-17.03.08P | dispose of toxic waste material | toxic waste material is disposed of according to jurisdictional requirements |

RANGE OF VARIABLES

***epoxy tools*** include: trowels, spiked rollers, gauged squeegees, screed box, mixing equipment

***seamless systems*** include: coating, broadcast systems, trowel-down systems, epoxy, non-static floor coating, terrazzo

|  |  |  |
| --- | --- | --- |
|  | KNOWLEDGE | |
|  | **Learning Outcomes** | **Learning Objectives** |
| F-17.03.01L | demonstrate knowledge of the application of seamless systems | identify types of ***seamless systems*** and mixing techniques and their application |
| F-17.03.02L | demonstrate knowledge of the ***epoxy tools*** and the procedures used to apply seamless systems | describe ***epoxy tools***, their application and procedures for use |
|  |  | describe the procedures used to apply ***seamless systems*** |
| F-17.03.03L | demonstrate knowledge of various factors that affect the application of ***seamless systems*** | explain moisture content of substrate and how it affects ***seamless systems*** |
|  |  | describe safe work practices pertaining to the use of ***seamless systems*** |

RANGE OF VARIABLES

***seamless systems*** include: coating, broadcast systems, trowel-down systems, epoxy, non-static floor coating, terrazzo

***epoxy tools*** include: trowels, spiked rollers, gauged squeegees, screed box, mixing equipment

|  |  |
| --- | --- |
| F-17.04 | Applies bonded and non-bonded toppings to concrete |

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| --- | --- |
| **Essential Skills** | Working with Others, Thinking, Document Use |

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

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| --- | --- | --- |
|  | SKILLS | |
|  | **Performance Criteria** | **Evidence of Attainment** |
| F-17.04.01P | determine if topping needs to be bonded or non-bonded | topping need is determined to be bonded or non-bonded according to drawings and specifications |
| F-17.04.02P | select ***bonding method*** | ***bonding method*** is selected according to topping being used and drawings and specifications |
| F-17.04.03P | check existing surface | existing surface is ready to receive bonding agent according to manufacturers’ instructions |
| F-17.04.04P | apply ***bonding agent*** | ***bonding agent*** is applied according to manufacturers' instructions |
| F-17.04.05P | use separation product on non-bonded areas | separation product on non-bonded areas is used to create an un-bonded topping |
| F-17.04.06P | install topping | topping is installed according to drawings and specifications |
| F-17.04.07P | cure toppings | toppings are cured according to topping material used and according to manufacturers’ instructions |

RANGE OF VARIABLES

***bonding methods*** include: installing studs, installing rebar, applying latex, scrubbing slurry into surface

***bonding agents*** include: latex modified, cement slurry mix, epoxy (high and low viscosity)

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| --- | --- | --- |
|  | KNOWLEDGE | |
|  | **Learning Outcomes** | **Learning Objectives** |
| F-17.04.01L | demonstrate knowledge of bonded and non-bonded toppings and their applications and procedures for use | identify ***types of*** ***toppings*** for concrete |
|  |  | identify ***bonding agents,*** their application and procedures for use |
| F-17.04.02L | demonstrate knowledge of the application and procedure used to apply bonded and non-bonded toppings | identify ***topping reinforcements*** and describe their application |
|  |  | identify ***bonding methods*** |
|  |  | describe curing methods for bonded and non-bonded toppings |
|  |  | describe safe work practices pertaining to the use of seamless systems |

RANGE OF VARIABLES

***types of*** ***toppings*** include: pre-mixed topping, modified concrete, grout

***bonding agents*** include: latex modified, cement slurry mix, epoxy (high and low viscosity)

***topping reinforcement*** includes: synthetic or steel fibre, rebar, welded wire mesh

***bonding methods*** include: installing studs, installing rebar, applying latex, scrubbing slurry into surface

|  |  |
| --- | --- |
| F-17.05 | Parges vertical surfaces |

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| --- | --- |
| **Essential Skills** | Thinking, Document Use, Continuous Learning |

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

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|  | SKILLS | |
|  | **Performance Criteria** | **Evidence of Attainment** |
| F-17.05.01P | select parging material | parging material is selected according to client and drawings and specifications |
| F-17.05.02P | select application method | application method is selected according to client and manufacturers’ instructions |
| F-17.05.03P | mix parging material | parging material is mixed according to manufacturers’ instructions |
| F-17.05.04P | apply ***finishing and texturing methods*** | ***finishing and texturing methods*** are applied according to desired design |

RANGE OF VARIABLES

***finishing and texturing methods*** include: trowelling, stencilling, combing, sponging, grinding, dry sacking, adding colour, darbying

|  |  |  |
| --- | --- | --- |
|  | KNOWLEDGE | |
|  | **Learning Outcomes** | **Learning Objectives** |
| F-17.05.01L | demonstrate knowledge of parging, the materials, application and procedures used | identify types of parging materials |
|  |  | explain mixing methods for parging materials |
|  |  | describe parging procedures |
|  |  | identify ***finishing and*** ***texturing methods*** |
|  |  | describe the use of colours, their application and procedures for use |

RANGE OF VARIABLES

***finishing and texturing methods*** include: trowelling, stencilling, combing, sponging, grinding, dry sacking, adding colour, darbying

|  |  |
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| F-17.06 | Applies chemical surface treatment |

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| **Essential Skills** | Continuous Learning, Thinking, Document Use |

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

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|  | SKILLS | |
|  | **Performance Criteria** | **Evidence of Attainment** |
| F-17.06.01P | determine type of ***chemical surface treatment*** | ***chemical surface treatment*** is determined according to client instructions, and drawings and specifications |
| F-17.06.02P | select and use tools and equipment | tools and equipment are selected and used according to scope of work |
| F-17.06.03P | verify the surface | surface is verified for the hardness and moisture condition of the concrete according to manufacturers’ instructions |
| F-17.06.04P | grind surface | surface is ground to take off cement laitance according to manufacturers’ instructions |
| F-17.06.05P | select and use acid stains or dyes | acid stains or dyes are selected according to client instructions and used according to manufacturers' specifications |
| F-17.06.06P | remove acid residue | acid residue is removed according to manufacturers’ instructions to neutralize the floor prior to applying top coats |
| F-17.06.07P | check pH level | pH level is checked by performing litmus test |
| F-17.06.08P | apply protective coating to acid stained surfaces | protective coating is applied to acid-stained surfaces according to manufacturers' instructions and drawings and specifications |
| F-17.06.09P | apply ***chemical surface treatment*** | ***chemical surface treatment*** is applied according to manufacturers' instructions |
| F-17.06.10P | dispose of toxic waste material | toxic waste material is disposed of according to jurisdictional requirements |

RANGE OF VARIABLES

***chemical surface treatments*** include: dyes, acid stains, silane, siloxane, oxides, silicate densifiers

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| --- | --- | --- |
|  | KNOWLEDGE | |
|  | **Learning Outcomes** | **Learning Objectives** |
| F-17.06.01L | demonstrate knowledge of the application of ***chemical surface treatment*** | identify types of ***chemical surface treatment*** and mixing techniques and procedures for use |
|  |  | identify ***types of protective coatings*** and their application |
|  |  | describe hazards related to chemical surface treatment products and the safe work practices pertaining to their application |
| F-17.06.02L | demonstrate knowledge of various factors that affect the use of ***chemical surface treatments*** | explain moisture content of substrate and how it affects ***chemical surface treatments*** |
|  |  | identify application time and drying time requirements for ***chemical surface treatments*** |
|  |  | describe the effects of temperature on ***chemical surface treatments*** |
|  |  | describe how the concrete mix design affects the ***chemical surface treatments*** |
|  |  | describe safe work practices pertaining to the use of ***chemical surface treatments*** |

RANGE OF VARIABLES

***chemical surface treatments*** include: dyes, acid stains, silane, siloxane, oxides, silicate densifiers

***types of protective coatings*** include: epoxies, urethanes, acrylics

TASK F-18 Grouts

TASK DESCRIPTOR

Concrete finishers install grouts to transfer loads to concrete foundations and to fill voids between concrete elements.

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| F-18.01 | Prepares surface for grouting |

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| **Essential Skills** | Thinking, Oral Communication, Working with Others |

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

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| --- | --- | --- |
|  | SKILLS | |
|  | **Performance Criteria** | **Evidence of Attainment** |
| F-18.01.01P | profile surfaces | surfaces are profiled to meet concrete surface profile (CSP) according to industry documents and practices, and manufacturers’ instructions |
| F-18.01.02P | clean surfaces | surfaces are cleaned according to industry practices and manufacturers’ instructions |
| F-18.01.03P | check forms | forms are checked for leaks according to industry practices |
| F-18.01.04P | pre-soak surfaces for cementitious grout | surfaces are pre-soaked for cementitious grout using ***methods*** according to manufacturers’ instructions |
| F-18.01.05P | apply bonding agents | bonding agents are applied according to manufacturers' instructions |

RANGE OF VARIABLES

***methods*** include: applying wet burlap, spraying, misting, fogging

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| --- | --- | --- |
|  | KNOWLEDGE | |
|  | **Learning Outcomes** | **Learning Objectives** |
| E-18.01.01L | demonstrate knowledge of ***grouts***, ***surface preparation*** and application methods | describe ***surface preparation*** requirements for specific ***grouts*** |
|  |  | identify ***surface preparation*** techniques |
|  |  | identify ***methods*** for achieving SSD |

RANGE OF VARIABLES

***grouts*** include:cementitious, epoxy, polymeric

***surface preparation*** includes: removing existing sealers, dirt, oil, cement laitance, chemicals

***methods*** include: applying wet burlap, spraying, misting, fogging

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| --- | --- |
| F-18.02 | Mixes grout |

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| **Essential Skills** | Document Use, Numeracy, Thinking |

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

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| --- | --- | --- |
|  | SKILLS | |
|  | **Performance Criteria** | **Evidence of Attainment** |
| F-18.02.01P | determine volume of material required | volume of material required is determined according to desired consistency and manufacturers’ instructions |
| F-18.02.02P | clean mixing area and tools | mixing area and tools are cleaned according to manufacturers’ instructions |
| F-18.02.03P | add water and ***other additives*** | water and ***other additives*** are added according to type of grout being used and manufacturers’ instructions |
| F-18.02.04P | apply mixing techniques | mixing techniquesare applied according to manufacturers’ instructions |

RANGE OF VARIABLES

***other additives*** include: aggregates, plasticizers, retarders, accelerators

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| --- | --- | --- |
|  | KNOWLEDGE | |
|  | **Learning Outcomes** | **Learning Objectives** |
| F-18.02.01L | demonstrate knowledge of application and procedures for mixing grout | identify ***types of grouts***, their application and ***mixing*** ***equipment*** |
|  |  | identify ***mixing hazards*** and safe work practices pertaining to mixing grouts |
|  |  | explain ratios as they pertain to mixing grout |
|  |  | describe ***other additives*** pertaining to mixing grout |

RANGE OF VARIABLES

***types of grout*** include: cementitious, epoxy, polymeric

***mixing equipment*** include: paddle mixer, shovel and wheelbarrow, drum mixer

***mixing hazards*** include: solvent fumes, grout dust

***other additives*** include: aggregates, plasticizers, retarders, accelerators

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| --- | --- |
| F-18.03 | Installs grout |

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| **Essential Skills** | Document Use, Thinking, Working with Others |

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

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| --- | --- | --- |
|  | SKILLS | |
|  | **Performance Criteria** | **Evidence of Attainment** |
| F-18.03.01P | determine ***installation*** ***methods*** | ***installation*** ***methods*** are determined according to scope of work and manufacturers’ instructions |
| F-18.03.02P | select and use tools and equipment | tools and equipment are used according to scope of work |
| F-18.03.03P | operate ***installation equipment*** | ***installation equipment*** is operated according to manufacturers’ instructions |
| F-18.03.04P | drypack grout | drypack grout is compacted to consolidate according to industry practices |
| F-18.03.05P | apply ***installation*** ***methods*** | ***installation*** ***methods*** are applied according to scope of work and manufacturers’ instructions |
| F-18.03.06P | grout machine bases | machine bases are grouted to meet seating requirements according to drawings and specifications, and industry practices |
| F-18.03.07P | grout pre-cast joints | pre-cast joints are grouted according to drawings and specifications |
| F-18.03.08P | inject grout | grout is injected according to manufacturers’ instructions |

RANGE OF VARIABLES

***installation*** ***methods*** include: injecting, pouring, strapping, rodding, vibrating, head boxing, pumping, chaining

***installation equipment*** includes: vibrators, injection guns, grout pumps, metal straps, head box

|  |  |  |
| --- | --- | --- |
|  | KNOWLEDGE | |
|  | **Learning Outcomes** | **Learning Objectives** |
| F-18.03.01L | demonstrates knowledge of grout and ***installation methods*** used | identify ***types of grout***, their applications and properties |
|  |  | identify safe work practices and procedures pertaining to installing grout |
|  |  | describe ***installation*** ***methods*** for grout |
|  |  | identify ***installation equipment*** used for installing grout |
|  |  | explain injection systems, their application and procedures for use |
|  |  | explain pot life as it pertains to installation of grout |

RANGE OF VARIABLES

***installation*** ***methods*** include: injecting, pouring, strapping, rodding, vibrating, head boxing, pumping, chaining

***types of grout*** include: cementitious, epoxy, polymeric

***installation equipment*** includes: vibrators, injection guns, grout pumps, metal straps, head box

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| F-18.04 | Finishes exposed grout surfaces |

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| **Essential Skills** | Document Use, Thinking, Reading |

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

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| --- | --- | --- |
|  | SKILLS | |
|  | **Performance Criteria** | **Evidence of Attainment** |
| F-18.04.01P | select and use tools and equipment | tools and equipment are selected and used according to scope of work |
| F-18.04.02P | determine hydration timing | hydration timing is determined according to cementitious grout and surrounding conditions |
| F-18.04.03P | remove forms | forms are removed to access and finish edges |
| F-18.04.04P | tool surfaces | surfaces are tooled into required shape to achieve desired finish |
| F-18.04.05P | select and apply curing method | curing method is selected and applied according to engineers’ specifications and manufacturers’ instructions |

|  |  |  |
| --- | --- | --- |
|  | KNOWLEDGE | |
|  | **Learning Outcomes** | **Learning Objectives** |
| F-18.04.01L | demonstrate knowledge of grout and procedures to finish exposed surfaces | identify ***types of grout*** and their application and properties |
|  |  | describe procedures used to finish and contour grout surfaces |
|  |  | identify timing required for removing forms, finishing and curing exposed grout surfaces |
|  |  | describe safe work practices and procedures pertaining to finishing exposed grout surfaces |

RANGE OF VARIABLES

***types of grout*** include: cementitious, epoxy, polymeric, chemical

TASK F-19 Performs cutting and coring

TASK DESCRIPTOR

Concrete finishers cut and core concrete to modify, repair, restore, inspect and test hardened concrete materials.

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| F-19.01 | Performs cutting |

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| **Essential Skills** | Thinking, Numeracy, Oral Communication |

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

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| --- | --- | --- |
|  | SKILLS | |
|  | **Performance Criteria** | **Evidence of Attainment** |
| F-19.01.01P | determine cut locations | cut locations are determined according to CSA A23.1, drawings and specifications using ***measuring devices***,and industry standards |
| F-19.01.02P | identify ***hazards*** | ***hazards*** are identified according to site conditions and equipment used |
| F-19.01.03P | install barriers | barriers are installed to isolate work and mitigate ***hazards*** |
| F-19.01.04P | select wet or dry cut | wet or dry cut is selected according to work area requirements and drawings and specifications |
| F-19.01.05P | select ***cutting equipment*** | ***cutting equipment*** is selected according to depth of cut and choice of wet or dry cut |
| F-19.01.06P | select saw blade | saw blade is selected according to concrete consistency and depth of cut |
| F-19.01.07P | cut concrete | concrete is cut according to determined cut and to manufacturers’ instructions |
| F-19.01.08P | remove and dispose of debris | debris is removed according to industry practices and disposed of according to jurisdictional regulations |

RANGE OF VARIABLES

***measuring devices*** include: tape measures, chalk lines, measuring wheels

***hazards*** include: falling concrete, uncontrolled force, dust and debris, noise, slips, rotating equipment, embedded items, segment loss

***cutting equipment*** include: floor saw, cut-off saw, chain saws, wire saw

|  |  |  |
| --- | --- | --- |
|  | KNOWLEDGE | |
|  | **Learning Outcomes** | **Learning Objectives** |
| F-19.01.01L | demonstrate knowledge of cutting concrete, the equipment and procedures used | identify types of ***cutting equipment,*** their applications and procedures for use |
|  |  | identify types of saw blades, their applications and procedures for use |
|  |  | identify ***measuring devices***, and describe their applications and procedures for use |
|  |  | identify ***hazards*** and safe work practices pertaining to cutting concrete |
|  |  | describe barriers, their application and procedures for use |

RANGE OF VARIABLES

***cutting equipment*** include: floor saw, cut-off saw, chain saws, wire saw

***measuring devices*** include: tape measures, chalk lines, measuring wheels

***hazards*** include: falling concrete, uncontrolled force, dust and debris, noise, slips, rotating equipment, embedded items, segment loss

|  |  |
| --- | --- |
| F-19.02 | Performs coring |

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| --- | --- |
| **Essential Skills** | Thinking, Numeracy, Oral Communication |

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

|  |  |  |
| --- | --- | --- |
|  | SKILLS | |
|  | **Performance Criteria** | **Evidence of Attainment** |
| F-19.02.01P | determine coring locations | coring locations are determined according to drawings and specifications using ***measuring devices*** |
| F-19.02.02P | identify ***hazards*** | ***hazards*** are identified based on equipment used and site conditions |
| F-19.02.03P | install barriers | barriers are installed to isolate work and mitigate ***hazards*** |
| F-19.02.04P | select wet or dry core bit | wet or dry core bit is selected according to manufacturers’ instructions |
| F-19.02.05P | select ***coring equipment*** | ***coring equipment*** is selected according to depth of cut and choice of wet or dry core bit and concrete hardness |
| F-19.02.06P | select drill bit | drill bit is selected according to concrete hardness and depth and diameter of cut |
| F-19.02.07P | core concrete | concrete is cored according to drawings and specifications |

RANGE OF VARIABLES

***measuring devices*** include: tape measures, measuring wheels, chalk lines, depth gauges

***hazards*** include: falling concrete, uncontrolled force, dust and debris, noise, slips, rotating equipment, embedded items, segment loss

***coring equipment*** includes: electric, pneumatic, hydraulic, hammer drill, expansion anchors and eye bolts

|  |  |  |
| --- | --- | --- |
|  | KNOWLEDGE | |
|  | **Learning Outcomes** | **Learning Objectives** |
| F-19.02.01L | demonstrate knowledge of coring concrete, the equipment and procedures used | identify types of ***coring equipment,*** their applications and procedures for use |
|  |  | identify types of drill bits, their applications and procedures for use |
|  |  | identify ***measuring devices***, and describe their applications and procedures for use |
|  |  | identify ***hazards*** and safe work practices pertaining to coring concrete |
|  |  | describe barriers, their application and procedures for use |

RANGE OF VARIABLES

***coring equipment*** includes: electric, pneumatic, hydraulic, hammer drill, expansion anchors and eye bolts

***measuring devices*** include: tape measures, measuring wheels, chalk lines, depth gauges

***hazards*** include: falling concrete, uncontrolled force, dust and debris, noise, slips, rotating equipment, embedded items, segment loss

APPENDIX A

ACRONYMS

|  |  |
| --- | --- |
| ACI | American Concrete Institute |
| CSA | Canadian Standards Association |
| CSP | concrete surface profile |
| FF | floor flatness |
| FL | floor levelness |
| GFCI | ground fault circuit interrupter |
| GPS | global positioning system |
| ICF | insulated concrete forming |
| ICRI | International Concrete Repair Institute |
| OH&S | Occupational Health and Safety |
| PPE | personal protective equipment |
| SDS | safety data sheets |
| SSD | saturated surface-dry |
| WHMIS | Workplace Hazardous Materials Information System |

APPENDIX B

TOOLS AND EQUIPMENT / OUTILS ET ÉQUIPEMENT

Hand Tools / Outils à main

|  |  |
| --- | --- |
| bull float (wood, magnesium, fibreglass, channel) | aplanissoire à long manche (en bois, en magnésium, en fibre de verre, à caniveau) |
| broom | balai |
| brush | brosse |
| bucket/pail | benne et chaudière |
| bush hammer | boucharde |
| caulking gun | pistolet de calfeutrage |
| carborundum brick (hand stone) | pierre à polir |
| centre edger | fer à rainurer |
| chalk line | cordeau traceur |
| check rod | applicateur à chaud |
| chisel | ciseau |
| come-along | treuil manuel |
| cone wrench | clé à cône |
| cove base tool | outil à plinthe |
| crowbar | barre à clous |
| darby | règle à araser |
| edger | fer à bordure |
| finishing broom | balai de finition |
| fresno trowels | truelles fresno |
| groover | rainureuse |
| hammer | marteau |
| hand float (magnesium, wood, plastic, resin, sponge/rubber) | taloche (en magnesium, en bois, en plastique, en résine, en caoutchouc) |
| hand level | niveau à main |
| hand saw | scie |
| hand screed | règle à araser manuelle |
| hand trowel | truelle manuelles |
| highway straightedge (bump cutter) | grande règle |
| jitterbug/buggy roller | ponceuse à sautillement |
| kneeboard and slider | planche à genoux et coulisseau |
| lifting hook | crochet de levage |
| margin trowel | truelle carrée |
| pointing trowel | truelle à joints |
| pry bar | levier |
| rake | râteau |
| roller applicator | rouleau applicateur |
| scraper | racloir |
| skate | patin |
| sprayer | vaporisateur |
| string line | cordeau |
| square shovel | pelle à bout carré |
| Hand Tools / Outils à main (*continued / suite*) | |
| squeegee | raclette |
| tamper | dame |
| texturing stamp | étampe pour texturer |
| tining tool | outils à peignes |
| touch-up roller | rouleau pour retouche |
| water hose | boyau d’arrosage |
| watering can | arrosoir |
| wheelbarrow | brouette |

Power Tools / Outils mécaniques

|  |  |
| --- | --- |
| air compressor | compresseur d’air |
| angle grinder | meuleuse d’angle |
| chipping hammer and bit | marteau burineur et mèche |
| conveyor | convoyeur |
| coring machine and bit | machine à évider et mèche |
| drill with mixing paddle | perceuse pourvue d’une palette à mélanger |
| floor grinder | meuleuse pour plancher en béton |
| generator | générateur |
| hammer drill | marteau perforateur |
| hot-pour applicator | applicateur de béton coulé à chaud |
| laser-guided screed | règle à araser au laser |
| light | lampe |
| mechanical spreader | épandeuse mécanique |
| mortar mixer | malaxeur de plâtre |
| power buggy | chariot à moteur |
| power bush hammer | boucharde mécanique |
| power saw and blades (quick-cut, walk-behind and early entry saws) | scie mécanique et lames (à coupe rapide, poussées, à béton frais) |
| power screed (roller, truss, vibratory) | règle à araser mécanique |
| power sprayer | vaporisateur mécanique |
| power trowel and blades (finishing blades and float attachments) | truelle mécanique et lames (lames de finition, accessoires pour aplanissoire) |
| pressure washer | laveuse à pression |
| sand/shot blaster | décapeuse au jet de sable et grenailleuse |
| scabbler | marteau de carrier |
| scarifier/planer | scarificateur |
| vented heater | radiateur soufflant |
| vibrator | vibrateur |

Measuring and Testing Equipment / Outils de mesure et d’essai

|  |  |
| --- | --- |
| air meter | aéromètre à béton |
| builders’ level | niveau à lunette |
| calculator | calculatrice |
| flow cone | cône distributeur |
| inclinometer | inclinomètre |
| laser level | niveau laser |
| spirit level | niveau à bulle d’air |
| slump cone and rod | cône d’Abrams et tige |
| Measuring and Testing Equipment / Outils de mesure et d’essai (*continued / suite*) | |
| square | équerre |
| straightedge | règle de précision |
| tape measure | ruban à mesurer |
| thermometer | thermomètre |
| total station | station totale |
| transit | théodolite |

Personal Protective Equipment (PPE) and Safety Equipment / Équipement de sécurité et de protection individuelle

|  |  |
| --- | --- |
| barrier cream | crème protectrice |
| breathing apparatus (SCBA, air purifying equipment) | appareil respiratoire (appareil de protection respiratoire autonome, équipement de purification d'air) |
| eye wash stations | douche oculaire |
| face shields | écran facial |
| fall protection | dispositif de protection contre les chutes |
| fire extinguisher | extincteur |
| first aid kit | trousse de premiers soins |
| gloves | gants |
| hard hat | casque de sécurité |
| hearing protection | protecteur d’oreilles |
| high visibility vest and clothing | gilet fluorescent |
| knee pad | coussin pour genoux |
| personal gas monitors | moniteur de gaz personnel |
| rain suit | imperméable |
| rubber boots | bottes de caoutchouc |
| safety boots | bottes de protection |
| safety glasses/goggles/smoggles | lunettes de protection |
| spiked footwear | chaussures à crampons |
| ventilation equipment | équipement de ventilation |
| wrist protection | bracelets de protection |

APPENDIX C

GLOSSARY

|  |  |  |  |
| --- | --- | --- | --- |
| **admixture** | material other than water, aggregates and cement that is used as an ingredient of concrete and is added to the mix to adjust the plastic and hardened properties of the concrete | **adjuvant** | matériau autre que l’eau, les granulats et le ciment qui est ajouté au mélange de béton pour ajuster les matières plastiques et les propriétés durcies du béton |
| **aggregate** | granular material, such as sand, gravel, crushed stone or recycled concrete aggregates used with cement to produce concrete | **granulat** | matériau granulaire comme le sable, le gravier, la pierre concassée ou des granulats de béton recyclé pour fabriquer du béton |
| **bleed water** | excess water which rises to the surface of concrete | **eau de ressuage** | eau en excès qui ressort de la surface du béton |
| **bull float** | a tool comprising a large, flat, rectangular piece of wood or magnesium attached with a long handle used to smooth unformed surfaces of freshly placed concrete | **aplanissoire à long manche** | outil équipé d’une large pièce plate et rectangulaire, en bois ou en magnésium, à axe rotatif, attachée à un manche et qui sert à rendre uniforme les surfaces de béton fraîchement mis en place |
| **burlap** | a coarse fabric of jute, hemp, or less commonly flax, for use as a water-retaining cover for curing concrete surfaces | **toile de jute** | tissu rugueux fait de jute, de chanvre ou moins communément de lin, utilisé comme couverture qui retient l’eau pour la cure des surfaces de béton |
| **cement** | binder of aggregate particles | **ciment** | liant pour particules de granulats |
| **cementitious material** | substances that have cementing properties (set and harden in the presence of water) | **matériau cimentaire** | substance qui a des propriétés de cimentation (fait sa prise et durcit en présence d’eau) |
| **concrete** | composition of a binding medium and aggregate; commonly consists of a mixture of cement, aggregate, water and admixtures in varying proportions; mixture is worked into a plastic state and gains hardness through the hydration of water with the cement | **béton** | composition fait d’un agent liant et de granulats, généralement constitué d’un mélange de ciment, de granulat et d’eau en proportions variables; le mélange est travaillé jusqu’à l’obtention d’une consistance de plastique et se durcit ensuite lors du processus d’hydratation qui se produit entre l’eau et le ciment |
| **consolidate** | compaction usually accomplished by vibration of newly placed concrete to minimum practical volume, to mould it within form shapes or around embedded parts and reinforcement, and to reduce void content to a practical minimum | **consolider** | Compactage par vibration du béton fraîchement coulé pour obtenir un volume minimal de béton afin de le mouler dans les coffrages ou autour d’éléments noyés ou d’armatures, et effectué pour réduire les vides au minimum |
| **construction joint** | the junction of two successive placements of concrete, typically with a keyway or reinforcement across the joint | **joint de construction** | jonction de deux mises en place successives de béton, généralement avec une clé de construction ou une armature à travers le joint |
| **contraction/**  **control joint** | a joint cut to control cracking in concrete | **joint de retrait ou de contrôle** | joint coupé pour contrôler les fissures dans le béton |
| **crazing** | small cracks in a concrete surface caused by uneven contraction during hydration | **faïençage** | petites fissures sur la surface du béton causées par un retrait non uniforme lors de l’étape d’hydratation |
| **curing** | the maintenance of a satisfactory moisture content and temperature in concrete during its early stages so that desired properties may develop | **cure** | conservation d’un niveau satisfaisant d’humidité et de température du béton à jeune âge pour lui permettre de développer les propriétés voulues |
| **darby float** | a hand manipulated straight edge usually 3-5 feet long used in the early stage leveling operation of concrete | **règle à araser** | règle droite manuelle habituellement de 3 à 5 pieds de longueur, utilisée dans les opérations d’aplanissement du béton jeune |
| **expansion joint** | an isolation joint that allows for expansion and contraction | **joint de dilatation** | joint de rupture qui permet l’expansion et le retrait |
| **exposed aggregate** | surface texture where cement paste is washed away from concrete slab surface to expose durable aggregates for the surface | **béton à granulats exposés** | texture de surface obtenue en enlevant une couche de pâte de ciment de la surface de la dalle de béton pour exposer les granulats durables |
| **floating** | process of using a tool, usually wood or magnesium, in finishing operations to create a relatively even but still open texture to a fresh concrete surface | **aplanissage** | procédé utilisant un outil, habituellement fait de bois ou de magnésium, pour les opérations de finition afin d’obtenir une surface relativement uniforme, mais grossière, du béton frais |
| **formwork** | a temporary structure or mould for the support of concrete while it is setting and gaining sufficient strength to be self-supporting | **coffrage** | structure ou moule temporaire dans lequel le béton est mis en place à son emplacement final; il supporte le béton pendant qu’il fait sa prise et développe suffisamment de résistance pour être autoportant |
| **grade sheet** | a table that provides cut and fill elevations for finished grading | **feuille de note** | tableau qui donne les élévations de déblais et remblais du niveau définitif du sol |
| **green concrete** | concrete that has undergone final setting but not hardened appreciably | **béton jeune** | béton ayant subi la prise finale, mais qui n’a pas complètement durci |
| **grout** | a mixture of cementitious material or other binding material with or without water or aggregate, proportioned to produce a pourable consistency without segregation of the constituents | **coulis** | mélange de matériaux à base de ciment et d’eau, avec ou sans granulat, dosé pour produire un mélange fluide sans ségrégation |
| **hardener** | a material applied to concrete floors to reduce wearing and dusting | **durcisseur** | matériau appliqué sur les sols en béton pour réduire la poussière et diminuer l’usure |
| **high performance concrete** | contains cementitious materials such as fly ash, silica fume, blast furnace slag and super plasticizer | **béton de haute performance** | béton qui contient des matériaux cimentaires comme les cendres volantes, la fumée de silice, le laitier de haut fourneau et les superplastifiants |
| **honeycomb** | concrete that, due to lack of the proper consolidation, contains interconnected large voids or cavities | **nid d’abeille** | béton qui, dû à un manque de consolidation, contient de larges vides ou cavités interconnectés |
| **isolation joint** | a joint that prevents bonding of surfaces | **joint de rupture** | joint de chaussée qui évite que les surfaces ne se joignent |
| **overlay** | the addition of a new material layer onto an existing surface | **resurfaçage** | ajout d’une couche de nouveau matériau sur une surface existante |
| **plastic** | a condition of freshly mixed concrete such that it is readily remoldable, workable and cohesive | **plastique** | consistance du béton frais qui est facilement maniable et cohésif |
| **retarder** | a product that delays the setting of concrete | **retardateur de prise** | produit qui retarde la prise du béton |
| **saturated surface dry (SSD)** | condition of an aggregate particle or other porous solid when the permeable voids are filled with water but there is no water on the exposed surface | **saturé et superficiellement sec (SSS)** | état d’un granulat ou tout autre solide poreux lorsque les vides sont remplis d’eau, mais qu’il n’y a pas d’eau sur les surfaces apparentes |
| **saw cut** | a cut in hardened concrete utilizing diamond or silicone-carbide blades or discs | **trait de scie** | coupure dans le béton durci effectuée avec des lames ou disques diamantés ou au carbure de silicone |
| **scaling** | surface flaking of concrete | **écaillage** | effritement du béton en surface |
| **screeding** | the operation of forming a surface by the use of screed guides or a strike off | **arasage** | finition d’une surface en effectuant l’arasage avec une règle à araser |
| **segregation** | separation of various ingredients within a concrete mix | **ségrégation** | séparation des divers ingrédients à l’intérieur du mélange de béton |
| **slump** | a measure of consistency of freshly mixed concrete | **affaissement** | mesure de la consistance du béton fraîchement malaxé |
| **spalling** | pieces of concrete that have broken away | **effritement** | présence de morceaux de béton s’étant détachés |
| **topping** | a layer of concrete placed to form a floor surface on a concrete base | **chape** | couche de béton mise en place sur un sol de béton existant pour former un plancher |
| **wet screed** | placing concrete on finish grade across two known points of elevation (called wet screeds) | **araser** | étendre du béton au niveau définitif à l’aide de deux repères de hauteur |