PROGRAM PROGRAMME
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RED SEAL OCCUPATIONAL STANDARD

Bricklayer

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Canada

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BRICKLAYER

Title: Bricklayer

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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 Bricklayer trade.

Background

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

Standards have the following objectives:

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

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

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Apprenticeship and Sectoral Initiatives Directorate
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Thanks are also offered to the following representatives who contributed greatly to the review and revision of the draft of the standard at a national workshop and provided expert advice throughout its development:

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

STRUCTURE OF THE OCCUPATIONAL STANDARD

This standard contains the following sections:

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

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

Trends in the Bricklayer Trade: some of the trends identified by industry as being the most important for workers in this trade

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

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

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

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

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

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

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

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

Task Descriptor: a general description of the task

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

Skills:

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

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

Knowledge:

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

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

Range of Variables: elements that provide a more in-depth description of a term used in the performance criteria, evidence of attainment, learning outcomes, or learning objectives

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

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

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

METHODOLOGY

Development of the Standard

A draft standard is developed by analyzing existing industry-developed standards, including National Occupational Analysis, Interprovincial Program Guides and provincial/territorial apprenticeship curricula. To assist in this drafting, a subject matter expert is consulted to provide technical guidance and advice. Then, a national workshop is held with trade experts from across Canada to review the draft RSOS.

Online Survey

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

Draft Review

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

Validation and Weighting

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

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

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

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

Definitions for Validation and Weighting

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

Provincial/Territorial Abbreviations

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

DESCRIPTION OF THE BRICKLAYER TRADE

“Bricklayer” is this trade’s official Red Seal occupational title approved by the CCDA. This standard covers tasks performed by bricklayers.

Bricklayers skills and abilities are in high demand across Canada. They build and repair walls, floors, arches, pavings, partitions, fireplaces, chimneys, smokestacks, furnaces, kilns and other structures. They work with materials such as brick, natural stone, manufactured stone, tiles, precast masonry panels, glass blocks, concrete blocks, light-weight insulated panels, other masonry units, insulation and membranes. They erect, install, maintain, repair and alter various masonry. The structures vary in complexity from a simple masonry walkway to an ornate exterior on a multi-level building.

Bricklayers use wheelbarrows and forklifts to transport materials. They use hand and power tools to cut and trim masonry units to required size. Trowels are used to spread mortar to bond layers of masonry units together. Measuring and layout tools such as a plumb line, level and laser level are used to ensure proper alignment.

Bricklayers work on industrial, commercial, institutional and residential buildings. They may specialize in stone work, restoration work or ornamental work. They may also specialize in installing refractories in high-temperature environments or installing corrosion resistant materials to line corrosive environments such as tanks and vessels.

Key attributes for people in this trade are manual dexterity, mechanical aptitude, the ability to problem solve and think sequentially, and the ability to work at heights. Bricklaying is physically demanding work and requires considerable effort in lifting heavy materials, climbing, bending, kneeling, working in confined spaces and working on scaffolding. Bricklayers have the advantage of developing their artistic abilities as they construct designs on different jobsites. They have an eye for detail in order to create accurate and aesthetically pleasing work.

Most of the work is performed outdoors exposing bricklayers to the elements. The winterization of jobsites allows the work to continue year round. Construction safety and accident prevention is a priority.

This standard recognizes similarities or overlaps with the work of other trades such as tilesetters, concrete finishers, carpenters, and drywall finishers and plasterers.

Experienced bricklayers may have opportunities to travel, advance to supervisory positions for masonry contractors or in other related fields such as construction management, estimating or building inspection. They may also become contractors.

TRENDS IN THE BRICKLAYER TRADE

In some jurisdictions, the use of reinforced masonry is increasing on commercial jobs, while in others it is decreasing. Masonry work is decreasing as a result of competing products, changing building codes and architectural design. Builders are continuing to value the selling strength of brick and block construction, depending on environmental conditions and location. The advantages of these include energy efficiency, reduced maintenance, fire resistance, sound resistance, structural soundness and longevity of masonry. In residential and commercial construction, thin veneers are being used more often due to consumer-driven interest and cost perceptions. These perceptions are not always accurate as thin veneers are not necessarily cheaper in some cases.

Work practices and equipment are being designed with the bricklayer in mind, with consideration given to ergonomics and efficiency. Mast scaffolding is designed to keep the bricklayer at a comfortable position to eliminate excessive bending and lifting.

New mechanical means including robotics and exoskeletons are emerging in the industry. The use of laser technology is being used for various tasks in masonry. In the restoration sector, lasers are being introduced to clean sensitive, historical and ornamental masonry units. The use of dustless cutting and drilling technologies continues to be a trend.

Specifications and documentation, owing to the new national energy code, and Leadership in Energy and Environmental Design (LEED), have become more complex. Energy efficiency and environmental awareness affect this trade as new regulations are imposed on building processes and materials. The masonry industry is a leader in compliance with LEED requirements. Bricklayers must keep up-to-date with these guidelines and requirements.

There are new materials being used in industry. Insulated concrete forms (ICF) are being used in place of traditional formed concrete and block walls. Cement board, plastic and stainless wire lath, are replacing galvanized lath for exterior surface bonded installations.

Emerging software, applications and technology are being introduced for masonry design, project management and documentation. They are being adopted in instances such as toolbox meetings, log books, timekeeping and communication of job-site information to clients, supervisors and other tradespersons. Software is being introduced to facilitate calculations for masonry design.

As artisans, bricklayers are passionate about displaying their talents, skills and abilities when constructing various projects. Residential and commercial demand for the construction and installation of products such as outdoor fireplaces, masonry heaters, wood burning stoves and wood-fired brick ovens are increasing work opportunities for bricklayers.

ESSENTIAL SKILLS SUMMARY

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

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

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

READING

Bricklayers require strong reading skills to read a variety of documentation such as job specifications, manufacturers' directions for product preparation and application, jobsite, company and jurisdictional safety requirements, and correspondence from suppliers and contractors.

DOCUMENT USE

Bricklayers interpret blueprints, read assembly drawings and make sketches of items to be built. They complete forms such as time sheets, incident reports, request for information (RFI), personal safety information (PSI) and field level risk assessments (FLRA).

WRITING

Bricklayers use writing skills to complete documents such as lists of materials, incident reports, and time sheets. They may correspond in writing with co-workers regarding supplies or work to be done.

ORAL COMMUNICATION

Bricklayers talk with suppliers, delivery personnel, customers and co-workers, and co-ordinate activities with other trades. They give directions to apprentices, liaise with supervisors and participate in meetings.

NUMERACY

Bricklayers measure the length, height and width of structures to be built and calculate angles of arches when constructing openings. They estimate mix ratios by weight and volume. Bricklayers estimate the amount of time and material required to complete a job.

THINKING

Bricklayers use problem solving skills to address issues that may arise on the job such as design changes or omissions. Bricklayers plan the materials and equipment they need for a job and schedule tasks according to priority, sequence and to meet the needs of other trades on site.

WORKING WITH OTHERS

Bricklayers usually work in a team environment although they may work alone on some jobs. Many jobs are done with a fellow worker. Therefore, they must cooperate and coordinate with others to ensure consistent work. Bricklayers may perform supervisory functions and guide or monitor the work performance of others.

DIGITAL TECHNOLOGY

Bricklayers may use digital devices to complete numeracy related tasks and to communicate with others. They may access online information posted by suppliers and manufacturers to stay current on industry trends and practices. Bricklayers may also access databases to retrieve forms such as change orders and to retrieve architectural drawings. Bricklayers may use computer controlled layout equipment such as surveying equipment and smart levels to measure distances and horizontal and vertical angles of brick structures.

CONTINUOUS LEARNING

Bricklayers learn continuously through experience and creativity on the job. They may attend sessions provided by manufacturers of new products. Bricklayers may also attend specialty in-person or online courses, for example safety or hardscaping with bricks, blocks and stone, or reference pamphlets, booklets or manuals on specific topics. Bricklayers may need to expand their skills by getting additional certifications such as scaffold building, welding, hoisting and rigging and confined space.

Roles and Opportunities for Skilled Trades in a Sustainable Future

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

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

For example:

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

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

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

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

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

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

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

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

- the Montreal Protocol for phasing out R22 refrigerants.

- energy efficiency programs such as ENERGY STAR.

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

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

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

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

INDUSTRY EXPECTED PERFORMANCE

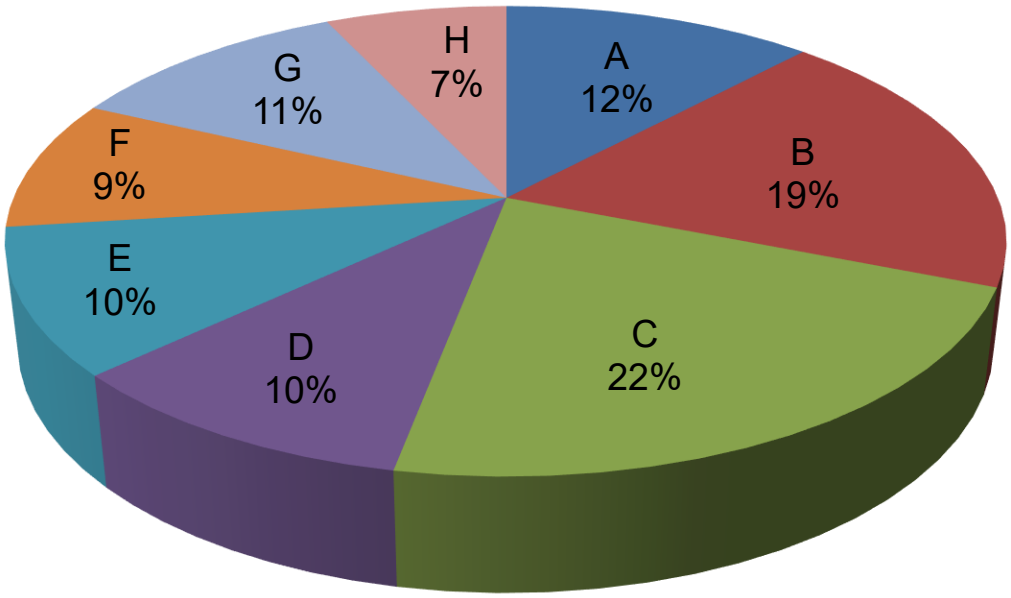
All tasks must be performed according to the applicable jurisdictional codes and standards. All health and safety standards must be respected and observed. Work should be done efficiently and to a high quality without material waste or environmental damage. All requirements of employers, engineers, designers,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

LANGUAGE REQUIREMENTS

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

PIE CHART

OF RED SEAL EXAMINATION WEIGHTINGS



MWA A	Performs common occupational skills	12%
MWA B	Performs general masonry practices	19%
MWA C	Builds masonry systems	22%
MWA D	Builds natural stone systems	10%
MWA E	Builds chimneys and fireplaces	10%
MWA F	Installs refractories and corrosion resistant materials	9%
MWA G	Performs restoration	11%
MWA H	Performs additional masonry	7%

This pie chart represents a breakdown of the interprovincial Red Seal examination. Percentages are based on the collective input from workers from the trade from across Canada. The Task Matrix on the next pages indicates the breakdown of tasks and sub-tasks within each Major Work Activity and the breakdown of questions assigned to the Tasks. The Interprovincial examination for this trade has 125 questions.

BRICKLAYER

TASK MATRIX

A – Performs common occupational skills — 12%

Task A-1 **Performs safety-related functions** **23%**	**A-1.01 Maintains safe work environment**	**A-1.02 Uses personal protective equipment (PPE) and safety equipment**	
Task A-2 **Uses and maintains tools and equipment** **24%**	**A-2.01 Maintains tools and equipment**	**A-2.02 Uses rigging, hoisting and lifting equipment**	**A-2.03 Uses access equipment**
Task A-3 **Uses scaffolding** **20%**	**A-3.01 Erects scaffolding**	**A-3.02 Dismantles scaffolding**	**A-3.03 Maintains scaffolding**
Task A-4 **Organizes work** **20%**	**A-4.01 Uses drawings and specifications**	**A-4.02 Plans daily tasks and activities**	**A-4.03 Prepares jobsite and materials**
	A-4.04 Protects surrounding areas		
Task A-5 **Uses communication and mentoring techniques** **13%**	**A-5.01 Uses communication techniques**	**A-5.02 Uses mentoring techniques**	

B – Performs general masonry practices — 19%

Task B-6 **Performs substrate preparation** **29%**	**B-6.01 Prepares vertical substrates and foundations**	**B-6.02 Applies parging**	**B-6.03 Installs anchoring/tie systems**
	B-6.04 Installs membrane and flashing	**B-6.05 Installs insulation**	
Task B-7 **Performs fundamental masonry tasks** **41%**	**B-7.01 Lays out wall and coursing**	**B-7.02 Finishes joints**	**B-7.03 Cleans new masonry surfaces**
	B-7.04 Seals masonry surfaces		
Task B-8 **Uses mortars, grouts and adhesives** **30%**	**B-8.01 Mixes mortar, concrete, grout and adhesives**	**B-8.02 Uses mortars**	**B-8.03 Uses concrete and grout**
	B-8.04 Uses adhesives		

C – Builds masonry systems

22%

Task C-9 **Builds masonry walls** **43%**	**C-9.01 Builds non-load-bearing walls**	**C-9.02 Builds load-bearing walls**
Task C-10 **Builds horizontal masonry surfaces** **21%**	**C-10.01 Prepares horizontal substrate**	**C-10.02 Lays masonry units on horizontal surfaces**
Task C-11 **Builds and installs prefabricated masonry** **13%**	**C-11.01 Builds prefabricated masonry**	**C-11.02 Erects prefabricated masonry**
Task C-12 **Installs surface-bonded masonry units** **23%**	**C-12.01 Prepares substrate for surface-bonded masonry units**	**C-12.02 Applies surface-bonded masonry units**

D – Builds natural stone systems

10%

Task D-13 **Builds natural stone walls** **55%**	**D-13.01 Prepares natural stone**	**D-13.02 Lays natural stone**	**D-13.03 Damp cures walls**
Task D-14 **Performs mechanically-fastened natural stone cladding procedures** **45%**	**D-14.01 Prepares substrate for cladding**	**D-14.02 Prepares natural stone for cladding**	**D-14.03 Installs natural stone cladding**

E – Builds chimneys and fireplaces — 10%

Task E-15 **Builds chimneys** **52%**	**E-15.01 Builds foundation supports for chimneys**	**E-15.02 Lays masonry units to build chimneys**	**E-15.03 Installs flue lining**
	E-15.04 Installs related flashings	**E-15.05 Installs caps**	
Task E-16 **Builds fireplaces** **48%**	**E-16.01 Builds foundation for hearth, firebox, backup material and veneer**	**E-16.02 Builds hearth, firebox and backup**	**E-16.03 Installs damper**
	E-16.04 Builds smoke chamber	**E-16.05 Prepares existing fireplace for insert**	**E-16.06 Faces fireplaces and inserts**

F – Installs refractories and corrosion resistant materials — 9%

Task F-17 **Installs and maintains refractories** **63%**	**F-17.01 Prepares for installation of refractories and accessories**	**F-17.02 Prepares mortar for refractories**	**F-17.03 Removes existing refractories**
	F-17.04 Installs refractories	**F-17.05 Repairs refractories**	
Task F-18 **Installs and maintains corrosion resistant materials** **37%**	**F-18.01 Prepares for installation of corrosion resistant materials and accessories**	**F-18.02 Prepares mortar for corrosion resistant materials**	**F-18.03 Removes existing corrosion resistant materials**
	F-18.04 Installs corrosion resistant materials	**F-18.05 Repairs corrosion resistant materials**	

G – Performs restoration

11%

Task G-19 **Rebuilds masonry work** **57%**	**G-19.01 Disassembles unit masonry**	**G-19.02 Prepares restoration work area**	**G-19.03 Reinstalls masonry and accessories**
Task G-20 **Repairs and cleans existing masonry work** **43%**	**G-20.01 Removes deteriorated masonry units**	**G-20.02 Repoints joints**	**G-20.03 Repairs masonry units**
	G-20.04 Reinstalls masonry units and accessories	**G-20.05 Cleans existing masonry surfaces**	

H – Performs additional masonry

7%

Task H-21 **Installs glass blocks** **20%**	**H-21.01 Prepares work area for installation of glass blocks**	**H-21.02 Lays glass blocks**	
Task H-22 **Installs ornamental and sculpted masonry** **27%**	**H-22.01 Prepares for installation of ornamental and sculpted masonry units**	**H-22.02 Installs ornamental and sculpted masonry units**	
Task H-23 **Builds arches** **53%**	**H-23.01 Prepares location for installation of arch**	**H-23.02 Builds template**	**H-23.03 Places template**
	H-23.04 Installs arch masonry units	**H-23.05 Removes template**	

Harmonization of Apprenticeship Training

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

1. Trade name

The official Red Seal name for this trade is Bricklayer.

2. Number of Levels of Apprenticeship

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

3. Total Training Hours During Apprenticeship Training

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

4. Sequencing Topics and Related Sub-tasks

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

Level 1	Level 2	Level 3
	Tools and Equipment	Tools and Equipment
	Substrate Preparation	Substrate Preparation
		Natural Stone Walls
	Scaffolding	Scaffolding
		Prefabricated Masonry
Safety-Related Functions 1.01 Maintains safe work environment 1.02 Uses personal protective equipment (PPE) and safety equipment		
Tools and Equipment 2.01 Maintains tools and equipment 2.02 Uses rigging, hoisting and lifting equipment 2.03 Uses access equipment		

Level 1	Level 2	Level 3
Scaffolding 3.01 Erects scaffolding 3.02 Dismantles scaffolding 3.03 Maintains scaffolding		
Organizes work 4.01 Uses drawings and specifications 4.02 Plans daily tasks and activities 4.03 Prepares jobsite and materials 4.04 Protects surrounding areas	**Organizes work** 4.01 Uses drawings and specifications	**Organizes work** 4.01 Uses drawings and specifications
Communication Techniques 5.01 Uses communication techniques		**Mentoring Techniques** 5.02 Uses mentoring techniques
Substrate Preparation 6.01 Prepares vertical substrates and foundations 6.02 Applies parging 6.03 Installs anchoring/tie systems 6.04 Installs membrane and flashing 6.05 Installs insulation		
Fundamental Masonry Tasks 7.01 Lays out wall and coursing 7.02 Finishes joints 7.03 Cleans new masonry surfaces 7.04 Seals masonry surfaces		
Mortars, Grouts and Adhesives 8.01 Mixes mortar, concrete, grout and adhesives 8.02 Uses mortars 8.03 Uses concrete and grout 8.04 Uses adhesives	**Mortars, Grouts and Adhesives** 8.01 Mixes mortar, concrete, grout and adhesives 8.02 Uses mortars 8.03 Uses concrete and grout 8.04 Uses adhesives	**Mortars, Grouts and Adhesives** 8.01 Mixes mortar, concrete, grout and adhesives 8.02 Uses mortars 8.03 Uses concrete and grout 8.04 Uses adhesives
Masonry Walls 9.01 Builds non-load-bearing walls	**Masonry Walls** 9.02 Builds load-bearing walls	
		Horizontal Masonry Surfaces 10.01 Prepares horizontal substrate 10.02 Lays masonry units on horizontal surfaces
	Prefabricated Masonry 11.01 Builds prefabricated masonry 11.02 Erects prefabricated masonry	
	Surface-Bonded Masonry Units 12.01 Prepares substrate for surface-bonded masonry units 12.02 Applies surface-bonded masonry units	

Level 1	Level 2	Level 3
	Natural Stone Walls 13.01 Prepares natural stone 13.02 Lays natural stone 13.03 Damp cures walls	
		Natural Stone Cladding (Mechanically Fastened) 14.01 Prepares substrate for cladding 14.02 Prepares natural stone for cladding 14.03 Installs natural stone cladding
		Chimneys 15.01 Builds foundation supports for chimneys 15.02 Lays masonry units to build chimneys 15.03 Installs flue lining 15.04 Installs related flashings 15.05 Installs caps
		Fireplaces 16.01 Builds foundation for hearth, firebox, backup material and veneer 16.02 Builds hearth, firebox and backup 16.03 Installs damper 16.04 Builds smoke chamber 16.05 Prepares existing fireplace for insert 16.06 Faces fireplaces and inserts
		Refractories 17.01 Prepares for installation of refractories and accessories 17.02 Prepares mortar for refractories 17.03 Removes existing refractories 17.04 Installs refractories 17.05 Repairs refractories
		Corrosion Resistant Materials 18.01 Prepares for installation of corrosion resistant materials and accessories 18.02 Prepares mortar for corrosion resistant materials 18.03 Removes existing corrosion resistant materials 18.04 Installs corrosion resistant materials 18.05 Repairs corrosion resistant materials
	Masonry Work (Rebuilds) 19.01 Disassembles unit masonry 19.02 Prepares restoration work area 19.03 Reinstalls masonry and accessories	

Level 1	Level 2	Level 3
	Masonry Work (Repairs and Cleans) 20.01 Removes deteriorated masonry units 20.02 Repoints joints 20.03 Repairs masonry units 20.04 Reinstalls masonry units and accessories 20.05 Cleans existing masonry surfaces	**Masonry Work (Repairs and Cleans)** 20.01 Removes deteriorated masonry units 20.02 Repoints joints 20.03 Repairs masonry units 20.04 Reinstalls masonry units and accessories 20.05 Cleans existing masonry surfaces
	Glass Blocks 21.01 Prepares work area for installation of glass blocks 21.02 Lays glass blocks	
		Ornamental and Sculpted Masonry Units 22.01 Prepares for installation of ornamental and sculpted masonry units 22.02 Installs ornamental and sculpted masonry units
	Arches 23.01 Prepares location for installation of arch 23.02 Builds template 23.03 Places template 23.04 Installs arch masonry units 23.05 Removes template	**Arches** 23.01 Prepares location for installation of arch 23.02 Builds template 23.03 Places template 23.04 Installs arch masonry units 23.05 Removes template

MAJOR WORK ACTIVITY A

Performs common occupational skills

TASK A-1 Performs safety related functions

TASK DESCRIPTOR

Bricklayers integrate safety practices, such as wearing personal protective equipment (PPE), throughout every task included in the scope of their trade. They maintain a safe work environment through awareness of work surroundings. Compulsory safety training is standard practice.

A-1.01 Maintains safe work environment

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

	SKILLS	
	Performance Criteria	**Evidence of Attainment**
A-1.01.01P	handle, store and dispose of hazardous materials	hazardous materials are handled, stored and disposed of according to ***safety and environmental regulations***
A-1.01.02P	define work perimeters and contain contaminants or other hazards	***barricading devices and signage*** are set up to define work perimeters and contain contaminants or other hazards
A-1.01.03P	follow ***tag*** procedures	***tag*** procedures for access are followed according to ***safety and environmental regulations***, and company policies and procedures
A-1.01.04P	participate in field level risk assessments (FLRA) meetings	FLRA meetings are attended prior to beginning new task
A-1.01.05P	maintain work area	clean and organized work area is maintained according to ***safety and environmental regulations***
A-1.01.06P	perform safety inspections	safety inspections are performed to recognize and report potential hazards
A-1.01.07P	identify safety concerns in work environment	co-workers are informed of surroundings and safety, and well-being measures are implemented
A-1.01.08P	identify and respect physical limitations of self and others	physical limitations of self and others are identified and respected

A-1.01.09P	identify location of safety zone containing ***components***	location of safety zone containing ***components*** is identified
A-1.01.10P	document ***items***	***items*** are documented

RANGE OF VARIABLES

safety and environmental regulations include: Occupational Health & Safety (OH&S), Workplace Hazardous Materials Information System (WHMIS)

barricading devices and signage include: caution tape and tagging systems, fences, barriers

tags include: access tags (coloured, confined space, scaffolding, power source)

components include: first aid kit, fire extinguishers, safety data sheets (SDS), eye wash stations

items include: inspections, potential hazards, safety meetings, injuries, training

	KNOWLEDGE	
	Learning Outcomes	**Learning Objectives**
A-1.01.01L	demonstrate knowledge of maintaining safe work environments	identify terminology associated with safe working environments
		identify locations of ***WHMIS documents***
		identify ***safety and environmental regulations*** associated with maintaining safe work environments
		describe company safety policies and procedures associated with maintaining safe work environments
		describe workers' rights and responsibilities associated with maintaining safe work environments
		identify hazards associated with bricklaying and masonry ***materials***
		identify hazards associated with bricklaying and masonry tools and equipment
		describe ***training requirements*** for specific PPE, safety equipment and safety procedures
A-1.01.02L	demonstrate knowledge of procedures to maintain safe work environments	identify ***barricading devices, signage*** and equipment used to maintain safe work environments, and describe their procedures for use
		identify types and capacities of fire extinguishers, and describe their procedures for use
		describe emergency procedures and identify emergency phone numbers, location of first aid stations and medical facilities

	describe disposal and recycling procedures associated with masonry work
	describe Safe Operating Procedure (SOP)

RANGE OF VARIABLES

WHMIS documents include: labels, SDS
safety and environmental regulations include: OH&S, WHMIS
materials include: sand, cement, chemicals
training requirements include: fall arrest, first aid, confined space
barricading devices and signage include: caution tape and tagging systems, fences, barriers

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

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

SKILLS

	Performance Criteria	Evidence of Attainment
A-1.02.01P	apply local, provincial, territorial and national ***safety regulations and standards***	local, provincial, territorial and national ***safety regulations and standards*** are applied
A-1.02.02P	identify company and site policies and site hazards requiring use of ***PPE*** and ***safety equipment***	company and site policies, and site hazards requiring use of ***PPE*** and ***safety equipment*** are identified
A-1.02.03P	select and use ***PPE*** and ***safety equipment***	***PPE*** and ***safety equipment*** are selected and used according to individual task, company and site policies, and OH&S regulations
A-1.02.04P	maintain and store ***PPE*** and ***safety equipment***	***PPE*** and ***safety equipment*** are maintained and stored according to OH&S and manufacturers' specifications
A-1.02.05P	identify ***damaged PPE***	***damaged PPE*** is identified, tagged and removed from service
A-1.02.06P	identify Canadian Standards Association (CSA) approved ***PPE*** and ***safety equipment***	CSA approved ***PPE*** and ***safety equipment*** are identified
A-1.02.07P	ensure fit of ***PPE***	fit of ***PPE*** is ensured according to manufacturers' specifications
A-1.02.08P	confirm respirator fit	respirator fit is confirmed according to fit test
A-1.02.09P	report and replace damaged or faulty equipment	damaged or faulty equipment is reported and replaced according to OH&S, and company and site policies

RANGE OF VARIABLES

safety regulations and standards include: OH&S, client standards, company standards

PPE includes: work boots, fall arrest harnesses, face shields, high visibility apparel, safety glasses, noise protection, respirators, gloves, hard hats

safety equipment includes: first aid kits, eyewash stations

damaged PPE includes: excessively worn boots, worn harnesses, cracked safety glasses

	KNOWLEDGE	
	Learning Outcomes	**Learning Objectives**
A-1.02.01L	demonstrate knowledge of ***PPE*** and ***safety equipment***	identify terminology associated with ***PPE*** and ***safety equipment***
		identify appropriate ***PPE*** and ***safety equipment*** from ***WHMIS documents***
		describe company safety policies and procedures associated with ***PPE*** and ***safety equipment***
		describe workers' rights and responsibilities associated with ***PPE*** and ***safety equipment***
		identify hazards associated with bricklaying and masonry ***materials***
		identify types of ***PPE,*** and describe their characteristics and applications
		identify types of ***safety equipment***, and describe their characteristics and applications
		identify location of ***PPE*** and ***safety equipment***
		describe ***training requirements*** for specific ***PPE***, ***safety equipment*** and safety procedures
A-1.02.02L	demonstrate knowledge of procedures to use ***PPE*** and ***safety equipment***	identify ***PPE*** and ***safety equipment***, and describe their procedures for use
		describe SOP and their applications

RANGE OF VARIABLES

PPE includes: work boots, fall arrest harnesses, face shields, high visibility apparel, safety glasses, noise protection, respirators, gloves, hard hats

safety equipment includes: first aid kits, eyewash stations

WHMIS documents include: labels, SDS

materials include: sand, cement, chemicals

training requirements include: fall arrest, first aid, confined space, site orientation

TASK A-2 Uses and maintains tools and equipment

TASK DESCRIPTOR

Bricklayers must maintain all their tools to ensure that they work properly and safely. Rigging, hoisting and lifting equipment is used to move heavy material on the worksite. Access equipment is used to allow bricklayers to reach their work area.

A-2.01 Maintains tools and equipment

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

	SKILLS	
	Performance Criteria	**Evidence of Attainment**
A-2.01.01P	repair or replace defective or damaged ***tools*** and ***equipment***	defective or damaged ***tools*** and ***equipment*** are repaired or replaced according to manufacturers' specifications
A-2.01.02P	clean and store ***tools*** and ***equipment***	***tools*** and ***equipment*** are cleaned and stored according to manufacturers' specifications
A-2.01.03P	document ***tool*** and ***equipment*** maintenance	***tool*** and ***equipment*** maintenance is documented
A-2.01.04P	identify, tag and remove worn, damaged and defective ***tools***	worn, damaged and defective ***tools*** are identified, tagged and removed from service
A-2.01.05P	lubricate ***equipment***	***equipment*** is lubricated according to manufacturers' specifications
A-2.01.06P	sharpen ***tools***	***tools*** are kept sharp

RANGE OF VARIABLES

tools include: see appendix B

equipment includes: see appendix B

	KNOWLEDGE	
	Learning Outcomes	**Learning Objectives**
A-2.01.01L	demonstrate knowledge of maintaining ***tools*** and ***equipment***	identify terminology associated with maintaining ***tools*** and ***equipment***
		identify types of ***hand tools***, and describe their characteristics, applications and limitations
		identify hazards and associated safety measures when maintaining ***hand tools***

		identify types of ***power tools***, and describe their characteristics, applications and limitations
		identify hazards and associated safety measures when maintaining ***power tools***
		identify types of powder-actuated tools, and describe their characteristics, applications and limitations
		describe jurisdictional and company training and certification requirements for powder-actuated tools
		identify hazards and associated safety measures when maintaining powder-actuated tools
		identify types of ***pneumatic tools***, and describe their characteristics, applications and limitations
		identify hazards and associated safety measures when maintaining ***pneumatic tools***
		identify types of ***hydraulic tools***, and describe their characteristics, applications and limitations
		identify hazards and associated safety measures when maintaining ***hydraulic tools***
		identify types of ***measuring equipment***, and describe their characteristics, applications and limitations
		identify hazards and associated safety measures when maintaining ***measuring equipment***
		identify types of ***layout tools***, and describe their characteristics, applications and limitations
		identify hazards and associated safety measures when maintaining ***layout tools***
A-2.01.02L	demonstrate knowledge of procedures to maintain ***tools*** and ***equipment***	describe procedures to maintain ***hand tools***
		describe procedures to maintain ***power tools***
		describe procedures to maintain powder-actuated tools
		describe procedures to maintain ***pneumatic tools***

	describe procedures to maintain ***hydraulic tools***
	describe procedures to maintain ***measuring equipment*** and ***layout tools***

RANGE OF VARIABLES

tools include: see appendix B
equipment includes: see appendix B
hand tools include: trowels, hammers, levels, jointers, chisels
power tools include: electric, gas powered
pneumatic tools include: grinders, air guns, jackhammers
hydraulic tools include: brick splitters, saws
measuring equipment includes: bricklayer tapes, laser levels, storey poles
layout tools include: transits, laser levels, gauge rod/storey pole, mason's line

A-2.02 Uses rigging, hoisting and lifting equipment

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

SKILLS

	Performance Criteria	Evidence of Attainment
A-2.02.01P	select ***rigging***, ***hoisting and lifting equipment***	***rigging***, ***hoisting and lifting equipment*** are selected according to task, load size and capacity
A-2.02.02P	locate centre of gravity of load	centre of gravity of load is located
A-2.02.03P	secure load	load is secured by using ***rigging***, ***hoisting and lifting equipment***
A-2.02.04P	communicate with personnel involved in lift	personnel involved in lift are communicated with using ***methods***
A-2.02.05P	recognize safe lifting locations or points	safe lifting locations or points are recognized
A-2.02.06P	calculate weight of material	weight of material is calculated
A-2.02.07P	operate forklift	forklift is operated according to jurisdictional regulations
A-2.02.08P	stabilize load during lift	load is stabilized during lift using tag lines
A-2.02.09P	inspect ***rigging***, ***hoisting and lifting equipment***	***rigging***, ***hoisting and lifting equipment*** are inspected according to maintenance schedule

A-2.02.10P	maintain and store ***rigging***, ***hoisting and lifting equipment***	***rigging***, ***hoisting and lifting equipment*** are maintained and stored according to manufacturers' specifications
A-2.02.11P	remove worn, damaged or expired ***rigging***, ***hoisting and lifting equipment***	worn, damaged or expired ***rigging***, ***hoisting and lifting equipment*** is removed from service

RANGE OF VARIABLES

rigging equipment includes: slings, shackles, bridle hitches, lifting clamps

hoisting and lifting equipment includes: shackles, spreader bars, chain hoists, forklifts, cranes, block and tackles, electric winches

methods include: hand signals, two-way radios

	KNOWLEDGE	
	Learning Outcomes	**Learning Objectives**
A-2.02.01L	demonstrate knowledge of operating and maintaining ***rigging***, ***hoisting and lifting equipment***	identify terminology associated with ***rigging***, ***hoisting and lifting equipment***
		identify types of ***rigging***, ***hoisting and lifting equipment***, and describe their characteristics, applications and limitations
		identify licensing and training requirements for ***rigging***, ***hoisting and lifting equipment***
A-2.02.02L	demonstrate knowledge of operating and maintaining ***material handling equipment***	identify terminology associated with ***material handling equipment***
		identify types of ***material handling equipment***, and describe their characteristics, applications and limitations
		identify licensing and training requirements for ***material handling equipment***
A-2.02.03L	demonstrate knowledge of procedures to operate and maintain ***rigging***, ***hoisting and lifting equipment***	describe procedures to operate and maintain ***rigging***, ***hoisting and lifting equipment***
A-2.02.04L	demonstrate knowledge of procedures to operate and maintain ***material handling equipment***	describe procedures to operate and maintain ***material handling equipment***

RANGE OF VARIABLES

rigging equipment includes: slings, shackles, bridle hitches, lifting clamps

hoisting and lifting equipment includes: shackles, spreader bars, chain hoists, forklifts, cranes, block and tackles, electric winches

material handling equipment includes: forklifts, pallet jacks

A-2.03 Uses access equipment

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

SKILLS

	Performance Criteria	Evidence of Attainment
A-2.03.01P	select ***access equipment***	***access equipment*** is selected according to task, load size and capacity
A-2.03.02P	recognize ***safe lifting locations***	***safe lifting locations*** are recognized
A-2.03.03P	inspect ***access equipment***	***access equipment*** is inspected according to maintenance schedule
A-2.03.04P	operate ***access equipment***	***access equipment*** is operated according to jurisdictional regulations
A-2.03.05P	tag and remove defective ***access equipment***	defective ***access equipment*** is tagged and removed from service

RANGE OF VARIABLES

access equipment includes: scissor lifts, articulated and telescopic boom lifts, mast scaffolding

safe lifting locations include: stable surface, safe distance from overhead electrical wires

KNOWLEDGE

	Learning Outcomes	Learning Objectives
A-2.03.01L	demonstrate knowledge of operating and maintaining ***access equipment***	identify terminology associated with operating ***access equipment***
		identify types of ***access equipment***, and describe their characteristics, applications and limitations
		identify hazards and associated safety measures when operating and maintaining ***access equipment***
A-2.03.02L	demonstrate knowledge of procedures to operate and maintain ***access equipment***	describe procedures to operate and maintain ***access equipment***

RANGE OF VARIABLES

access equipment includes: scissor lifts, articulated and telescopic boom lifts, mast scaffolding

TASK A-3 Uses scaffolding

TASK DESCRIPTOR

This task is a crucial part of a bricklayer's job since the majority of bricklaying is performed on scaffolding. The knowledge of the proper setup and maintenance of scaffolding are important to ensure the safety of bricklayers and other tradespeople on the jobsite.

A-3.01 Erects scaffolding

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

	SKILLS	
	Performance Criteria	**Evidence of Attainment**
A-3.01.01P	select scaffolding	scaffolding is selected taking into consideration size, site conditions and task being performed
A-3.01.02P	inspect scaffolding	scaffolding is inspected, and tagged and removed from service if damaged or missing ***components***
A-3.01.03P	identify ***hazards*** before and when erecting access equipment	***hazards*** are identified before and when erecting access equipment
A-3.01.04P	use scaffolding within operating limitations	scaffolding is used within operating limitations according to manufacturers' specifications and OH&S regulations
A-3.01.05P	lay out scaffolding	scaffolding is laid out and substrate is level and stable
A-3.01.06P	install scaffolding and their ***components***	scaffolding and their ***components*** are installed according to manufacturers' specifications and OH&S regulations
A-3.01.07P	set up swing stage components	swing stage components are set up according to manufacturers' specifications and job requirements
A-3.01.08P	level and secure scaffolding	scaffolding is levelled and secured according to jurisdictional regulations

A-3.01.09P	install means of access and egress	means of access and egress is installed according to manufacturers' specifications and OH&S regulations
A-3.01.10P	install ***safety accessories***	***safety accessories*** are installed according to manufacturers' specifications and OH&S regulations

RANGE OF VARIABLES

components include: pins, braces, decks, planks, outriggers, cross braces, mud sills, scaffold jacks
hazards include: excess loads, electrical wires, ground grade conditions, weather
safety accessories include: kickboard, debris net, guardrails, mid-rails, access equipment

	KNOWLEDGE	
	Learning Outcomes	**Learning Objectives**
A-3.01.01L	demonstrate knowledge of scaffolding	identify ***types of scaffolding***, and describe their characteristics, applications and limitations
		identify scaffolding ***components***, and describe their characteristics, applications and limitations
		identify ***safety accessories***, and describe their characteristics, applications and limitations
		identify ***hazards*** and associated safety measures when erecting scaffolding and scaffolding systems
		identify OH&S regulations associated with scaffolding and scaffolding systems
		identify load limitations
		identify ***possible defects***
		describe counter weight requirements
A-3.01.02L	demonstrate knowledge of procedures to erect scaffolding	describe sequence of assembly
		describe procedures to erect scaffolding

RANGE OF VARIABLES

types of scaffolding include: frame, tubular, mast climber, swing stage
components include: pins, braces, decks, planks, outriggers, cross braces, mud sills, scaffold jacks
safety accessories include: kickboard, debris net, guardrails, mid-rails, access equipment
hazards include: excess loads, electrical wires, ground grade conditions, weather
possible defects include: rusting, damage, split planks

A-3.02 Dismantles scaffolding

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

SKILLS

	Performance Criteria	Evidence of Attainment
A-3.02.01P	remove ***components*** and ***safety accessories***	***components*** and ***safety accessories*** are removed according to dismantling sequence
A-3.02.02P	lower ***components*** using ***rigging***, ***hoisting and lifting equipment***	***components*** are lowered using ***rigging***, ***hoisting and lifting equipment*** according to dismantling sequence
A-3.02.03P	remove tie-ins	tie-ins are removed as scaffolding is dismantled
A-3.02.04P	sort and prepare ***components*** for transportation	***components*** are sorted and prepared for transportation

RANGE OF VARIABLES

components include: pins, braces, decks, planks, outriggers, cross braces, mud sills, scaffold jacks
safety accessories include: kickboard, debris net, guardrails, mid-rails, access equipment
rigging equipment includes: slings, shackles, bridle hitches, lifting clamps
hoisting and lifting equipment includes: shackles, spreader bars, chain hoists, forklifts, cranes, block and tackles, electric winches

KNOWLEDGE

	Learning Outcomes	Learning Objectives
A-3.02.01L	demonstrate knowledge of scaffolding	identify ***types of scaffolding***, and describe their characteristics, applications and limitations
		identify types of ***components***, and describe their characteristics, applications and limitations
		identify ***safety accessories***, and describe their characteristics, applications and limitations
		identify OH&S regulations associated with scaffolding and scaffolding systems
		identify load limitations
		identify ***possible defects***
		describe counter weight requirements

A-3.02.02L	demonstrate knowledge of procedures to dismantle scaffolding, their ***components*** and ***safety accessories***	describe sequence of dismantling scaffolding, their ***components*** and ***safety accessories***
		describe procedures to dismantle scaffolding

RANGE OF VARIABLES

types of scaffolding include: frame, tubular, mast climber, swing stage
components include: pins, braces, decks, planks, outriggers, cross braces, mud sills, scaffold jacks
safety accessories include: kickboard, debris net, guardrails, mid-rails, access equipment
possible defects include: rusting, damage, split planks

A-3.03 Maintains scaffolding

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

SKILLS

	Performance Criteria	Evidence of Attainment
A-3.03.01P	inspect scaffolding	scaffolding is inspected, and tagged and removed from service if damaged or missing scaffolding ***components*** and ***safety accessories***
A-3.03.02P	replace damaged or missing scaffolding ***components*** and ***safety accessories***	damaged or missing scaffolding ***components*** and ***safety accessories*** are replaced
A-3.03.03P	clean and store scaffolding	scaffolding is cleaned and stored

RANGE OF VARIABLES

components include: pins, braces, decks, planks, outriggers, cross braces, mud sills, scaffold jacks
safety accessories include: kickboard, debris net, guardrails, mid-rails, access equipment

KNOWLEDGE

	Learning Outcomes	Learning Objectives
A-3.03.01L	demonstrate knowledge of scaffolding	identify ***types of scaffolding***, and describe their characteristics, applications and limitations
		identify types of scaffolding ***components***, and describe their characteristics, applications and limitations
		identify ***safety accessories***, and describe their characteristics, applications and limitations

		identify OH&S regulations associated with scaffolding and scaffolding systems
\		identify ***possible defects***
		describe counter weight requirements
A-3.03.02L	demonstrate knowledge of procedures to maintain and store scaffolding	describe procedures to maintain and store scaffolding

RANGE OF VARIABLES

types of scaffolding include: frame, tubular, mast climber, swing stage
components include: pins, braces, decks, planks, outriggers, cross braces, mud sills, scaffold jacks
safety accessories include: kickboard, debris net, guardrails, mid-rails, access equipment
possible defects include: rusting, damage, split planks

TASK A-4 Organizes work

TASK DESCRIPTOR

This task describes activities that bricklayers perform in order to organize their daily work.

A-4.01 Uses drawings and specifications

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

	SKILLS	
	Performance Criteria	**Evidence of Attainment**
A-4.01.01P	identify ***requirements***	***requirements*** are identified by interpreting drawings
A-4.01.02P	interpret ***specifications***	***specifications*** are interpreted
A-4.01.03P	draw sketches	sketches are drawn to communicate work details

RANGE OF VARIABLES

requirements include: layout and material requirements
specifications include: architectural, structural, manufacturers'

	KNOWLEDGE	
	Learning Outcomes	**Learning Objectives**
A-4.01.01L	demonstrate knowledge of drawings and ***specifications***	identify terminology associated with drawings and ***specifications***
		identify ***types of drawings***, and describe their characteristics and applications
		identify types of ***documentation***, and describe their applications
		identify types of ***safety documentation***, and describe their applications
		identify documentation specific to ***work sites*** and describe their applications
		identify ***types of materials***, and describe their characteristics, applications and limitations
A-4.01.02L	demonstrate knowledge of procedures to draw sketches	describe procedures to draw sketches

RANGE OF VARIABLES

specifications include: architectural, structural, manufacturers'
types of drawings include: architectural, structural, mechanical, electrical
documentation includes: specifications, sketches, change orders
safety documentation includes: SDS, WHMIS symbols, OH&S
work sites include: residential, commercial, industrial, institutional
types of materials include: membranes, primers, fuels, masonry materials

A-4.02 Plans daily tasks and activities

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

	SKILLS	
	Performance Criteria	**Evidence of Attainment**
A-4.02.01P	schedule tasks	tasks are scheduled according to deadlines
A-4.02.02P	sequence tasks	tasks are sequenced in coordination with co-workers and other trades
A-4.02.03P	estimate amount of time required for tasks	amount of time required for tasks is estimated

	KNOWLEDGE	
	Learning Outcomes	**Learning Objectives**
A-4.02.01L	demonstrate knowledge of planning daily tasks and activities	identify types of ***documentation***, and describe their applications
		identify types of ***safety documentation***, and describe their applications
		identify documentation specific to ***work sites*** and describe their applications
		identify ***types of materials***, and describe their characteristics, applications and limitations
		describe loading limitations of storage location
		describe environmental protection regulations and guidelines
		identify ***jobsite hazards*** and associated safety measures
A-4.02.02L	demonstrate knowledge of procedures to plan daily tasks and activities	describe procedures to plan daily tasks and activities
		describe company safety procedures

RANGE OF VARIABLES

documentation includes: specifications, sketches, change orders
safety documentation includes: SDS, WHMIS symbols, OH&S
work sites include: residential, commercial, industrial, institutional
types of materials include: membranes, primers, fuels, masonry materials
job site hazards include: overhead and underground power lines

A-4.03 Prepares jobsite and materials

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

	SKILLS	
	Performance Criteria	**Evidence of Attainment**
A-4.03.01P	estimate and confirm amount of ***material*** required	amount of ***material*** required is estimated and confirmed according to plans and drawings
A-4.03.02P	coordinate delivery of ***materials***	delivery of ***materials*** is coordinated with suppliers and company inventory
A-4.03.03P	perform site assessment	site assessment is performed to identify hazards

A-4.03.04P	set up mixing area	mixing area is set up in location accessible to power and water supply
A-4.03.05P	place ***materials*** on job-site	***materials*** are placed on job-site avoiding interference with other trades and for convenience
A-4.03.06P	store and protect ***materials***	***materials*** are stored and protected according to company and site policies and procedures
A-4.03.07P	***weatherize*** installation location	installation location is ***weatherized***
A-4.03.08P	provide ventilation for heaters	ventilation for heaters is provided according to OH&S, and company policies and procedures
A-4.03.09P	store ***hazardous materials***	***hazardous materials*** are stored in marked designated area

RANGE OF VARIABLES

materials include: sand, cement, sealants, masonry
weatherize includes: installing tarp systems and temporary roof, setting up heaters and fuel tanks
hazardous materials include: fuels, primers

	KNOWLEDGE	
	Learning Outcomes	**Learning Objectives**
A-4.03.01L	demonstrate knowledge of preparing jobsite and materials	identify types of ***documentation***, and describe their applications
		identify types of ***safety documentation***, and describe their applications
		identify documentation specific to ***work sites***, and describe their applications
		identify ***types of materials***, and describe their characteristics, applications and limitations
		describe loading limitations of storage location
		identify types of ***tarp systems***, and describe their characteristics, applications and limitations
		identify ***types of heaters***, and describe their characteristics, applications and limitations
		identify types of ***heater power sources***, and describe their characteristics, applications and limitations
		describe company safety procedures
		describe environmental protection regulations and guidelines

		identify ***jobsite hazards*** and associated safety measures
		identify ***types of drawings***, and describe their characteristics and applications
A-4.03.02L	demonstrate knowledge of procedures to prepare jobsite and materials	describe procedures to prepare jobsite and materials

RANGE OF VARIABLES

documentation includes: specifications, sketches, change orders
safety documentation includes: SDS, WHMIS symbols, OH&S
work sites include: residential, commercial, industrial, institutional
types of materials include: membranes, primers, fuels, masonry materials
tarp systems include: insulated tarps, debris screens, shrink wraps, safety netting
types of heaters include: salamanders, furnaces, construction heaters
heater power sources include: propane, diesel, electric, natural gas, kerosene
methods include: setting up barriers, covering with tarp
jobsite hazards include: overhead and underground power lines
types of drawings include: architectural, structural, mechanical, electrical

A-4.04 Protects surrounding areas

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

	SKILLS	
	Performance Criteria	**Evidence of Attainment**
A-4.04.01P	determine ***surrounding areas requiring protection***	***surrounding areas requiring protection*** are determined
A-4.04.02P	assess ***risks*** to surrounding areas	***risks*** to surrounding areas are assessed
A-4.04.03P	restrict dust creation using ***techniques***	dust creation is restricted using ***techniques***
A-4.04.04P	set up ***protective materials***	***protective materials*** are set up

RANGE OF VARIABLES

surrounding areas requiring protection include: finished work, personal property, vegetation, traffic areas
risks include: airborne particles, falling debris, fumes
techniques include: wet sawing, vacuuming, mixing in a separate area
protective materials include: tarps, plywood sheeting, construction fence

	KNOWLEDGE	
	Learning Outcomes	**Learning Objectives**
A-4.04.01L	demonstrate knowledge of protecting surrounding areas	identify types of ***documentation***, and describe their applications
		identify types of ***safety documentation***, and describe their applications
		identify documentation specific to ***work sites***, and describe their applications
		identify ***types of materials***, and describe their characteristics, applications and limitations
		describe company safety procedures
		describe ***methods*** for protecting surrounding areas
		describe environmental protection regulations and guidelines
		identify ***jobsite hazards*** and associated safety measures
A-4.04.02L	demonstrate knowledge of procedures to protect surrounding areas	describe procedures to protect surrounding areas

RANGE OF VARIABLES

documentation includes: specifications, sketches, change orders
safety documentation includes: SDS, WHMIS symbols, OH&S
work sites include: residential, commercial, industrial, institutional
types of materials include: membranes, primers, fuels, masonry materials
methods include: setting up barriers, covering with tarp
jobsite hazards include: overhead and underground power lines

TASK A-5 Uses communication and mentoring techniques

TASK DESCRIPTOR

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

A-5.01 Uses communication techniques

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

	SKILLS	
	Performance Criteria	**Evidence of Attainment**
A-5.01.01P	demonstrate communication practices with individuals or in a group	instructions and messages are interpreted and understood by all parties involved in communication
A-5.01.02P	listen using ***active listening*** practices	***active listening*** practices are utilized
A-5.01.03P	receive and respond to feedback on work	response to feedback indicates understanding and corrective measures are taken
A-5.01.04P	explain and provide feedback	explanation and feedback is provided and task is carried out as directed
A-5.01.05P	use questioning to improve communication	questions enhance understanding, on-the-job training and goal setting
A-5.01.06P	participate in safety and information meetings	safety and information meetings are attended, information is relayed to workforce, and is applied

RANGE OF VARIABLES

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

	KNOWLEDGE	
	Learning Outcomes	**Learning Objectives**
A-5.01.01L	demonstrate knowledge of trade terminology	define terminology used in trade
A-5.01.02L	demonstrate knowledge of effective communication practices	describe importance of using effective verbal and non-verbal communication with ***people in the workplace***

	identify ***sources of information*** to effectively communicate
	identify communication and ***learning styles***
	describe effective listening and speaking skills
	identify ***personal responsibilities and attitudes*** that contribute to on-the-job success
	identify value of diversity in workplace
	identify communication that constitutes ***harassment*** and ***discrimination***

RANGE OF VARIABLES

people in the workplace include: other tradespeople, colleagues, apprentices, supervisors, clients, authorities having jurisdiction, manufacturers

sources of information include: regulations, codes, OH&S, authorities having jurisdiction (AHJ) requirements, prints, drawings, specifications, company and client documentation

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

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

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

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

A-5.02 Uses mentoring techniques

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

SKILLS

	Performance Criteria	Evidence of Attainment
A-5.02.01P	identify and communicate learning objective and point of lesson	apprentice or learner can explain objective and point of lesson
A-5.02.02P	link lesson to other lessons and job	lesson order and unplanned learning opportunities are defined
A-5.02.03P	demonstrate performance of a skill to apprentice or learner	***steps required to demonstrate a skill*** are performed
A-5.02.04P	set up conditions required for apprentice or learner to practice a skill	***practice conditions*** are set up so that skill can be practiced safely by apprentice or learner

A-5.02.05P	assess apprentice or learner's ability to perform tasks with increasing independence	performance of apprentice or learner improves with practice to a point where skill can be done with little supervision
A-5.02.06P	give supportive and corrective feedback	apprentice or learner adopts best practice after having been given supportive or corrective feedback
A-5.02.07P	support apprentices or learners in pursuing technical training opportunities	technical training is completed within timeframe prescribed by apprenticeship authority
A-5.02.08P	support anti-***harassment*** in workplace	workplace is ***harassment*** and ***discrimination***-free
A-5.02.09P	assess apprentice or learner suitability to trade during probationary period	apprentice or learner is given feedback that helps them identify their own strengths and weaknesses, and suitability for trade

RANGE OF VARIABLES

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

practice conditions means: guided, limited independence, full independence

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

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

	KNOWLEDGE	
	Learning Outcomes	**Learning Objectives**
A-5.02.01L	demonstrate knowledge of strategies for learning skills in workplace	describe importance of individual experience
		describe shared responsibilities for workplace learning
		determine one's own learning preferences and explain how these relate to learning new skills
		describe importance of different types of skills in workplace
		describe importance of ***essential skills*** in workplace
		identify different ***learning styles***
		identify different ***learning needs*** and strategies to meet them
		identify ***strategies to assist in learning a skill***
A-5.02.02L	demonstrate knowledge of strategies for ***teaching*** workplace ***skills***	identify different roles played by a workplace mentor

	describe ***teaching skills***
	explain importance of identifying point of lesson
	identify how to choose a good time to present lesson
	explain importance of linking lessons
	identify components of skill (the context)
	describe considerations in setting up opportunities for skill practice
	explain importance of providing feedback
	identify techniques for giving effective feedback
	describe a skills assessment
	identify methods of assessing progress
	explain how to adjust lesson to different situations

RANGE OF VARIABLES

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

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

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

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

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

MAJOR WORK ACTIVITY B

Performs general masonry practices

TASK B-6 Performs substrate preparation

TASK DESCRIPTOR

Substrate is prepared to receive and support masonry. Membranes, flashing and insulation are installed to maintain a complete building envelope.

B-6.01 Prepares vertical substrates and foundations

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

	SKILLS	
	Performance Criteria	**Evidence of Attainment**
B-6.01.01P	wash and dry substrate	substrate is washed and dried to improve product adhesion
B-6.01.02P	fill holes and cracks in substrate	holes and cracks in substrate are filled using mortar and other filler materials matching existing substrate
B-6.01.03P	remove glues, old membranes and accessories	glues, old membranes and accessories are removed to ensure smooth substrate
B-6.01.04P	replace ***deteriorated material***	***deteriorated material*** is replaced
B-6.01.05P	prime substrate	substrate is primed according to manufacturers' and engineered specifications
B-6.01.06P	fasten mesh to substrate	mesh is fastened to substrate using mechanical fasteners according to manufacturers' and engineered specifications and building ***codes and regulations***

RANGE OF VARIABLES

deteriorated material includes: broken block or brick, nails
codes and regulations include: National Building Code (NBC), CSA

	KNOWLEDGE	
	Learning Outcomes	**Learning Objectives**
B-6.01.01L	demonstrate knowledge of preparing substrates and foundations	identify terminology associated with substrates and foundations
		identify jurisdictional and national ***codes and regulations*** associated with substrate and foundation preparation
		describe substrate conditions
B-6.01.02L	demonstrate knowledge of procedures to prepare substrates and foundations	identify ***tools and equipment*** used to prepare substrates and foundations, and describe their procedures for use

RANGE OF VARIABLES

codes and regulations include: NBC, CSA
tools and equipment include: grinders, chisels, chipping guns, power washer

B-6.02 Applies parging

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

	SKILLS	
	Performance Criteria	**Evidence of Attainment**
B-6.02.01P	dampen substrate	substrate is dampened to improve bonding
B-6.02.02P	apply bonding agents to substrate	bonding agents are applied to substrate
B-6.02.03P	mix parging material	parging material is mixed according to application and manufacturers' instructions
B-6.02.04P	trowel on parging material to substrate	parging material is trowelled on to substrate maintaining uniform thickness according to drawings and job specifications

	KNOWLEDGE	
	Learning Outcomes	**Learning Objectives**
B-6.02.01L	demonstrate knowledge of preparing parging	identify terminology associated with parging
		identify jurisdictional and national ***codes and regulations*** associated with applying parging

		identify bonding agents, and describe their characteristics and applications
		identify parging materials, and describe their characteristics and applications
		describe substrate conditions
B-6.02.02L	demonstrate knowledge of procedures to apply parging	identify ***tools and equipment*** used to apply parging, and describe their procedures for use

RANGE OF VARIABLES

codes and regulations include: NBC, CSA

tools and equipment include: mixers, mixing drills, parging trowels, mortar hawk, sand blasting equipment

B-6.03 Installs anchoring/tie systems

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

	SKILLS	
	Performance Criteria	**Evidence of Attainment**
B-6.03.01P	select type of ***anchoring/tie systems***	type of ***anchoring/tie system*** is selected according to engineered specifications, ***codes and regulations***
B-6.03.02P	determine vertical and horizontal spacing of anchors and ties	vertical and horizontal spacing of anchors and ties is determined according to drawings, job specifications, ***codes, regulations***, coursing and layout
B-6.03.03P	fasten anchors and ties to substrate	anchors and ties are fastened or placed on substrate using ***materials***, ***tools and equipment***
B-6.03.04P	attach ties to anchors	ties are attached to anchors according to manufacturers' recommendations and engineered specifications

RANGE OF VARIABLES

anchoring/tie systems include: fastened-in-place, embedded

codes and regulations include: NBC, CSA

materials include: fasteners, epoxy

tools and equipment include: drills, wrenches, benders

	KNOWLEDGE	
	Learning Outcomes	**Learning Objectives**
B-6.03.01L	demonstrate knowledge of ***anchoring/tie system***	identify terminology associated with ***anchoring/tie systems***
		identify jurisdictional and national ***codes and regulations*** associated with ***anchoring/tie systems***
		identify types of ***anchoring/tie systems***, and describe their characteristics and applications
		identify ***types of fasteners***, and describe their characteristics and applications
		identify ***types of anchors/ties***, and describe their characteristics and applications
		describe substrate conditions
		describe installation sequence for anchors and ties
B-6.03.02L	demonstrate knowledge of procedures to install ***anchoring/tie systems***	identify tools and equipment used to install ***anchoring/tie systems***, and describe their procedures for use
		describe procedures to install ***anchoring/tie systems***

RANGE OF VARIABLES

anchoring/tie systems include: fastened-in-place, embedded
codes and regulations include: NBC, CSA
types of fasteners include: drop-in, pin bolts, wedge, screws, self-tapping
types of anchors/ties include: wire, adjustable, corrugated metal

B-6.04 Installs membrane and flashing

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

	SKILLS	
	Performance Criteria	**Evidence of Attainment**
B-6.04.01P	select base flashing	base flashing is selected according to manufacturers' specifications, codes and standards
B-6.04.02P	attach base flashing and membrane	base flashing and membrane is attached according to manufacturers' specifications, codes and standards

B-6.04.03P	seal seams and tears to membrane, and cuts and joints in flashing	seams and tears to membrane, and cuts and joints in flashing are sealed to avoid compromising building envelope
B-6.04.04P	complete building envelope	building envelope is completed by overlapping below grade membranes

	KNOWLEDGE	
	Learning Outcomes	**Learning Objectives**
B-6.04.01L	demonstrate knowledge of membranes and flashings	identify terminology associated with membranes and flashings
		identify jurisdictional and national ***codes and regulations*** associated with membranes and flashings
		identify ***types of flashings***, and describe their characteristics and applications
		describe location of flashings
		identify types of counter flashing and step flashing, and describe their characteristics and applications
		identify building envelope systems, and describe their characteristics and applications
		identify ***types of membranes***, and describe their characteristics and applications
		describe effects of ultraviolet rays and moisture on membranes
		describe substrate conditions
		describe installation sequence for membranes and flashings
B-6.04.02L	demonstrate knowledge of procedures to install membranes and flashings	identify ***tools and equipment*** used to install membranes and flashings, and describe their procedures for use
		describe procedures to install membranes and flashings

RANGE OF VARIABLES

codes and regulations include: NBC, CSA
types of flashings include: polyvinyl chloride (PVC), rigid, self-adhesive, rubber, copper, sheet metal
types of membranes include: torch-on, self-adhesive, trowelled
tools and equipment include: rollers, grinders, drills

B-6.05 Installs insulation

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

SKILLS

	Performance Criteria	Evidence of Attainment
B-6.05.01P	select insulation	insulation is selected according to drawings and job specifications, codes and standards
B-6.05.02P	cut and fit insulation	insulation is cut and fit to fully insulate wall and seal joints according to manufacturers' specifications
B-6.05.03P	secure insulation to substrate and membrane	insulation is secured to substrate and membrane ensuring as tight of a fit as possible

KNOWLEDGE

	Learning Outcomes	Learning Objectives
B-6.05.01L	demonstrate knowledge of insulation	identify terminology associated with insulation
		identify jurisdictional and national ***codes and regulations*** associated with insulation
		identify ***types of insulation***, and describe their characteristics and applications
		describe substrate conditions
		describe installation sequence for insulation
B-6.05.02L	demonstrate knowledge of procedures to install insulation	identify ***tools and equipment*** used to install insulation, and describe their procedures for use
		describe procedures to install insulation

RANGE OF VARIABLES

codes and regulations include: NBC, CSA

types of insulation include: vermiculite, extruded, fibreglass, spray-on, rock wool, refractory (mineral-refractory grade, ceramic fibre)

tools and equipment include: drills, trowels, fasteners

TASK B-7 Performs fundamental masonry tasks

TASK DESCRIPTOR

This task describes typical methods used in masonry construction.

B-7.01 Lays out wall and coursing

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

SKILLS

	Performance Criteria	Evidence of Attainment
B-7.01.01P	determine wall location and floor grade	wall location and floor grade is determined according to drawings and specifications
B-7.01.02P	perform layout using ***techniques***	layout is performed using ***techniques***
B-7.01.03P	mark off location of masonry units	location of masonry units is marked off to guide placement
B-7.01.04P	adjust bond	bond is adjusted to suit ***openings***

RANGE OF VARIABLES

techniques include: snapping chalk lines, laying out masonry units dry, measuring with a tape
openings include: windows, doors, accessories

KNOWLEDGE

	Learning Outcomes	Learning Objectives
B-7.01.01L	demonstrate knowledge of laying out wall and coursing	identify terminology associated with laying out wall and coursing
		identify jurisdictional and national ***codes and regulations*** associated with laying out wall and coursing
		interpret drawings and job specifications, and describe their characteristics and applications
		identify types of wall systems, and describe their characteristics and applications
		identify types of bonds and patterns, and describe their characteristics and applications

B-7.01.02L	demonstrate knowledge of procedures to lay out wall and coursing	identify tools and equipment used to measure and lay out wall and coursing, and describe their procedures for use
		describe sequence of layout procedures

RANGE OF VARIABLES

codes and regulations include: NBC, CSA

B-7.02 Finishes joints

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

SKILLS

	Performance Criteria	Evidence of Attainment
B-7.02.01P	select ***joint finish***	***joint finish*** is selected according to job specifications
B-7.02.02P	assess mortar readiness	mortar readiness for finishing is assessed according to touch (thumbprint method)
B-7.02.03P	tool joints	joints are tooled in order to seal and achieve uniformity and straightness, and to avoid damage to masonry units
B-7.02.04P	fill voids in joints	voids in joints are filled by pointing
B-7.02.05P	remove excess mortar and retool joint	excess mortar is removed and joint retooled to seal and achieve finished look

RANGE OF VARIABLES

joint finish includes: concave, convex, flush, raked, weather, extruded, struck

KNOWLEDGE

	Learning Outcomes	Learning Objectives
B-7.02.01L	demonstrate knowledge of finishing joints	identify terminology associated with finishing joints
		identify jurisdictional and national ***codes and regulations*** associated with joints
		interpret drawings and job specifications, and describe their characteristics and applications
		identify ***types of joints***, and describe their characteristics and applications
		describe sequence of joint finishing

B-7.02.02L	demonstrate knowledge of procedures to finish joints	identify ***tools and equipment*** used to finish joints, and describe their procedures for use
		describe procedures to finish joints

RANGE OF VARIABLES

codes and regulations include: NBC, CSA
types of joints include: concave, raked, flush
tools and equipment include: jointers, slickers, rakers, brush, trowel

B-7.03 Cleans new masonry surfaces

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

SKILLS

	Performance Criteria	Evidence of Attainment
B-7.03.01P	remove excess mortar	excess mortar is removed by rubbing down wall
B-7.03.02P	select ***cleaner***	***cleaner*** is matched to masonry surface to be cleaned according to manufacturers' specifications
B-7.03.03P	prepare ***cleaner***	***cleaner*** is prepared by mixing to required proportions according to job and manufacturers' specifications
B-7.03.04P	pre-soak, brush and scrub surfaces	surfaces are pre-soaked, brushed and scrubbed
B-7.03.05P	apply ***cleaner***	***cleaner*** is applied to surfaces according to manufacturers' specifications
B-7.03.06P	rinse surface	surface is rinsed
B-7.03.07P	check surface	surface is checked to ensure uniform cleanliness

RANGE OF VARIABLES

cleaner includes: acids, alkali-based, water, detergent

	KNOWLEDGE	
	Learning Outcomes	**Learning Objectives**
B-7.03.01L	demonstrate knowledge of cleaning masonry surfaces	identify terminology associated with cleaning masonry surfaces
		identify jurisdictional and national ***codes and regulations*** associated with cleaning masonry surfaces
		interpret drawings and job specifications, and describe their characteristics and applications
		identify environmental hazards, and describe their associated safety measures
		identify types of ***cleaners***, and describe their characteristics and applications
		determine mixing sequence and mixing ratio for cleaning materials
B-7.03.02L	demonstrate knowledge of procedures to clean masonry surfaces	identify tools and equipment used to clean masonry surfaces, and describe their procedures for use
		describe cleaning procedures

RANGE OF VARIABLES

codes and regulations include: NBC, CSA
cleaner includes: acids, alkali-based, water, detergent

B-7.04 Seals masonry surfaces

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

	SKILLS	
	Performance Criteria	**Evidence of Attainment**
B-7.04.01P	select sealant	sealant is selected according to existing ***masonry*** and ***locations***
B-7.04.02P	verify that surface is clean and dry	surface is cleaned and dried in order to ensure sealant adhesion and prevent trapping visible stains
B-7.04.03P	apply sealant using ***methods***	sealant is applied using ***methods*** according to manufacturers' specifications

RANGE OF VARIABLES

masonry includes: brick, natural stone, concrete
locations include: above grade, below grade
methods include: brushing, spraying, rolling

	KNOWLEDGE	
	Learning Outcomes	**Learning Objectives**
B-7.04.01L	demonstrate knowledge of sealing masonry surfaces	identify terminology associated with sealing masonry surfaces
		identify jurisdictional and national ***codes and regulations*** associated with sealing masonry surfaces
		interpret drawings and job specifications, and describe their characteristics and applications
		identify environmental hazards, and describe their associated safety measures
		identify ***types of waterproofing and damp proofing materials***, and describe their characteristics and applications
B-7.04.02L	demonstrate knowledge of procedures to seal masonry surfaces	identify tools and equipment used to seal masonry surfaces, and describe their procedures for use
		describe procedures to seal masonry surfaces

RANGE OF VARIABLES

codes and regulations include: NBC, CSA
types of waterproofing and damp proofing materials include: silicone-based, solvent-based, alkaline-based

TASK B-8 Uses mortars, grouts and adhesives

TASK DESCRIPTOR

Mortars, grouts and adhesives hold and structurally support masonry units and accessories. Concrete and grouts are materials containing cementitious materials, aggregate and water, and are used to secure reinforcing within block walls. Mortars, grouts and adhesives are used in every aspect of masonry. Bricklayers must be able to safely handle, prepare and apply these products.

B-8.01 Mixes mortar, concrete, grout and adhesives

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

	SKILLS	
	Performance Criteria	**Evidence of Attainment**
B-8.01.01P	select mortar, concrete, grout and adhesive	mortar, concrete, grout and adhesive is selected according to job, site and manufacturers' specifications and ***codes and regulations***
B-8.01.02P	verify that water supply is clean and potable	water supply is clean and potable to avoid contamination of mixture
B-8.01.03P	adjust mixing conditions	mixing conditions are adjusted according to environmental conditions, ***codes and regulations***
B-8.01.04P	measure components	components are measured according to ratio and proportions required by manufacturers' specifications
B-8.01.05P	add ***admixture***	***admixture*** is added to achieve required properties according to job and manufacturers' specifications
B-8.01.06P	add ***aggregate***	***aggregate*** is added
B-8.01.07P	use ***mixing equipment***	***mixing equipment*** is used according to manufacturers' specifications
B-8.01.08P	time mixing	mixing is timed according to manufacturers' specifications, ***codes and regulations***
B-8.01.09P	assess readiness of product	readiness of product is visually assessed for consistency and moisture content

RANGE OF VARIABLES

codes and regulations include: NBC, CSA
admixtures include: accelerators, retardants, dyes, waterproofing
aggregate includes: sand, gravel
mixing equipment includes: barrel mixer, shovel, paddle mixer

	KNOWLEDGE	
	Learning Outcomes	**Learning Objectives**
B-8.01.01L	demonstrate knowledge of mortar, concrete, grout and ***adhesives***	identify terminology associated with mortar, concrete, grout and ***adhesives***
		identify jurisdictional and national ***codes and regulations*** associated with mortar, concrete, grout and ***adhesives***
		identify types of ***mortar mixes***, and describe their characteristics and applications
		identify ***admixtures***, and describe their characteristics and applications
		determine shelf and pot life of mortars
		identify types of concrete or grout, and describe their characteristics and applications
		describe grout consistency required to fill masonry cavities
		identify types of ***adhesives***, and describe their characteristics and applications
B-8.01.02L	demonstrate knowledge of procedures to mix mortar, concrete, grout and ***adhesives***	identify tools and equipment used to mix mortar, concrete, grout and ***adhesives***, and describe their procedures for use
		describe procedures to mix mortar, concrete, grout and ***adhesives***
		identify ***tests*** used with mortar, concrete, grout and ***adhesives***, and describe their associated procedures

RANGE OF VARIABLES

adhesives include: polymers, epoxies, resins, caulking, latex
codes and regulations include: NBC, CSA
mortar mixes are M, S, N, O, K
admixtures include: accelerators, retardants, dyes, waterproofing
tests include: strength, slump, bond

B-8.02 Uses mortars

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

	SKILLS	
	Performance Criteria	**Evidence of Attainment**
B-8.02.01P	apply mortar	mortar is applied using ***methods***
B-8.02.02P	assess mortar condition and usability	mortar condition and usability is assessed
B-8.02.03P	adjust mortar consistency	mortar consistency is adjusted for specific use

RANGE OF VARIABLES

methods include: buttering, spreading

	KNOWLEDGE	
	Learning Outcomes	**Learning Objectives**
B-8.02.01L	demonstrate knowledge of mortars	identify terminology associated with mortars
		identify jurisdictional and national ***codes and regulations*** associated with mortars
		identify types of ***mortar mixes***, and describe their characteristics and applications
		identify ***admixtures***, and describe their characteristics and applications
		determine shelf and pot life of mortars
B-8.02.02L	demonstrate knowledge of procedures to apply mortars	identify tools and equipment used to apply mortars, and describe their procedures for use
		describe procedures to apply mortars
		identify ***tests*** used with mortars, and describe their associated procedures

RANGE OF VARIABLES

codes and regulations include: NBC, CSA
mortar mixes are M, S, N, O, K
admixtures include: accelerators, retardants, dyes, waterproofing
tests include: strength, slump, bond

B-8.03 Uses concrete and grout

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

SKILLS

	Performance Criteria	Evidence of Attainment
B-8.03.01P	assess wall	wall is assessed prior to filling
B-8.03.02P	prime holes	holes are primed according to size of block and jurisdictional regulations
B-8.03.03P	select ***processes***	***processes*** are selected according to job and site specifications
B-8.03.04P	place concrete and grout	concrete and grout are placed using ***equipment***
B-8.03.05P	fill voids	voids are filled by consolidating grout

RANGE OF VARIABLES

processes include: high-lift (inspects clean-outs), low-lift grouting
equipment includes: buckets, hoppers, pumps

KNOWLEDGE

	Learning Outcomes	Learning Objectives
B-8.03.01L	demonstrate knowledge of concrete and grout	identify terminology associated with concrete and grout
		identify jurisdictional and national ***codes and regulations*** associated with concrete and grout
		identify ***admixtures***, and describe their characteristics and applications
		identify types of concrete or grout, and describe their characteristics and applications
		describe grout consistency required to fill masonry cavities
		identify ***reinforcing materials***, and describe their characteristics and applications
		describe reinforcement requirements when pouring concrete and grout
B-8.03.02L	demonstrate knowledge of procedures to apply concrete and grout	identify tools and equipment used to apply concrete and grout, and describe their procedures for use

	describe procedures used to apply concrete and grout
	identify ***tests*** used with concrete and grout, and describe their associated procedures

RANGE OF VARIABLES

codes and regulations include: NBC, CSA
admixtures include: accelerators, retardants
reinforcing materials include: fibre, rebar
tests include: strength, slump, bond

B-8.04 Uses adhesives

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

SKILLS

	Performance Criteria	Evidence of Attainment
B-8.04.01P	select ***adhesives***	***adhesives*** are selected according to ***codes and regulations***
B-8.04.02P	prepare surface	surface is prepared to receive ***adhesives***
B-8.04.03P	apply ***adhesives***	***adhesives*** are applied using ***methods***

RANGE OF VARIABLES

adhesives include: two-part epoxies, primers, polymers, epoxies, resins, caulking, latex, backer rod
codes and regulations include: NBC, CSA
methods include: trowelled, brushed on, injected, caulked

KNOWLEDGE

	Learning Outcomes	Learning Objectives
B-8.04.01L	demonstrate knowledge of ***adhesives***	identify terminology associated with ***adhesives***
		identify jurisdictional and national ***codes and regulations*** associated with applying ***adhesives***
		identify types of ***adhesives***, and describe their characteristics and applications
		determine shelf and pot life of ***adhesives***
B-8.04.02L	demonstrate knowledge of procedures to apply ***adhesives***	identify tools and equipment used to apply ***adhesives***, and describe their procedures for use

	describe procedures to apply ***adhesives***
	identify ***tests*** used when applying ***adhesives*** and describe their associated procedures

RANGE OF VARIABLES

adhesives include: two-part epoxies, primers, polymers, epoxies, resins, caulking, latex, backer rod
codes and regulations include: NBC, CSA
tests include: strength, bond

MAJOR WORK ACTIVITY C
Builds masonry systems

TASK C-9 Builds masonry walls

TASK DESCRIPTOR
Non-load-bearing masonry walls include veneer walls, interior partitions and exterior curtain walls. This task describes the proper method of installing these walls using brick, block and full-bed manufactured stone, and accessories. Stone walls are described in Block D. Load-bearing walls, columns and pilasters are designed to carry loads in addition to their own load. Load-bearing walls include structural and cavity walls which are above grade, and foundation walls which are below grade. They also include retaining walls which resist lateral forces. Reinforcing systems in load-bearing walls are always included and are critical as they carry or resist stresses and forces.

C-9.01 Builds non-load bearing walls

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

	SKILLS	
	Performance Criteria	**Evidence of Attainment**
C-9.01.01P	select and use tools and equipment	tools and equipment are selected and used according to task
C-9.01.02P	determine ***wall properties***	***wall properties*** are determined according to drawings
C-9.01.03P	install reinforcements	reinforcements are installed according to drawings and engineered specifications for additional wall stability
C-9.01.04P	build leads	leads are built to establish each course and height
C-9.01.05P	cut ***masonry units***	***masonry units*** are cut using hand and power tools according to required sizes and shapes
C-9.01.06P	maintain bond	bonds are maintained
C-9.01.07P	lay ***masonry units***	***masonry units*** are laid according to industry standards, and national ***codes and regulations***
C-9.01.08P	adjust joint thickness	joint thickness is adjusted to allow for openings according to jurisdictional and national ***codes and regulations***

C-9.01.09P	install ***lintels***	***lintels*** are installed to support ***masonry units*** over openings
C-9.01.10P	build in ***accessories***	***accessories*** are built in
C-9.01.11P	brace and support walls	walls are braced and supported at required intervals according to jurisdictional and national ***codes and regulations*** and engineered specifications

RANGE OF VARIABLES

wall properties include: finished height, length, location

masonry units include: clay brick, concrete brick, sand-lime brick, concrete block, full-bed manufactured stone

codes and regulations include: NBC, CSA

lintels include: cast-in-place, precast, angle iron

accessories include: electrical, mechanical, plumbing

	KNOWLEDGE	
	Learning Outcomes	**Learning Objectives**
C-9.01.01L	demonstrate knowledge of non-load bearing walls	describe terminology associated with non-load bearing walls
		identify jurisdictional and national ***codes and regulations*** associated with non-load bearing walls, and describe their applications
		identify types of ***masonry units***, and describe their characteristics and applications
		identify ***types of non-load bearing walls***, and describe their characteristics and applications
		identify types of bonds and patterns, and describe their characteristics and applications
		identify types of mortars, and describe their consistencies, characteristics and applications
		identify types of ***construction joints***, and describe their characteristics and applications
		identify masonry ***wall drainage and ventilation systems***, and describe their characteristics and applications
		describe horizontal and vertical coursing and associated calculations
		identify ground conditions and grades

		describe characteristics and applications of footings and foundations
		identify ***building envelope components***, and describe their characteristics and applications
		identify ***accessories***, and describe their characteristics and applications
		identify height and size of columns and pilasters
		identify ***waterproofing/ damp proofing materials***, and describe their characteristics and applications
C-9.01.02L	demonstrate knowledge of procedures to build non-load bearing walls	identify tools and equipment used to build non-load bearing walls, and describe their procedures for use
		describe procedures to build non-load bearing walls

RANGE OF VARIABLES

codes and regulations include: NBC, CSA
masonry units include: clay brick, concrete brick, sand-lime brick, concrete block, full-bed manufactured stone
types of non-load bearing walls include: curtain walls, garden walls, partition walls, veneer walls
construction joints are movement joints (contraction, expansion and control)
wall drainage and ventilation systems include: weep, vent holes
building envelope components include: membranes, insulation
accessories include: electrical, mechanical, plumbing
waterproofing/damp proofing materials include: silicone, solvent-based

C-9.02 Builds load bearing walls

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

SKILLS

	Performance Criteria	Evidence of Attainment
C-9.02.01P	select and use tools and equipment	tools and equipment are selected and used according to task
C-9.02.02P	determine ***wall properties***	***wall properties*** are determined according to drawings

C-9.02.03P	install reinforcements and structural accessories	reinforcements and structural accessories are installed according to drawings and engineered specifications for additional wall stability and load-bearing requirements
C-9.02.04P	build leads	leads are built to establish each course and height
C-9.02.05P	cut ***masonry units***	***masonry units*** are cut using hand and power tools according to required sizes and shapes
C-9.02.06P	maintain bond	bonds are maintained
C-9.02.07P	lay ***masonry units***	***masonry units*** are laid according to industry standards, and national ***codes and regulations***
C-9.02.08P	adjust joint thickness	joint thickness is adjusted to allow for openings according to jurisdictional and national ***codes and regulations***
C-9.02.09P	shore up openings	openings are shored up to receive and support ***lintels***
C-9.02.10P	install ***lintels***	***lintels*** are installed to support ***masonry units*** over openings
C-9.02.11P	build in ***accessories***	***accessories*** are built in
C-9.02.12P	batter and slope retaining walls	retaining walls are battered and sloped to offset lateral forces
C-9.02.13P	brace and support walls	walls are braced and supported at required intervals according to jurisdictional and national ***codes and regulations***
C-9.02.14P	install drainage systems on retaining walls	drainage systems are installed on retaining walls

RANGE OF VARIABLES

wall properties include: finished height, length, location

masonry units include: clay brick, concrete brick, sand-lime brick, concrete block, full-bed manufactured stone

codes and regulations include: NBC, CSA

lintels include: cast-in-place, precast, angle iron

accessories include: anchors, plates, bolts

	KNOWLEDGE	
	Learning Outcomes	**Learning Objectives**
C-9.02.01L	demonstrate knowledge of load-bearing walls	describe terminology associated with load-bearing walls
		identify jurisdictional and national ***codes and regulations*** associated with load-bearing walls, and describe their applications

	identify types of ***masonry units***, and describe their characteristics and applications
	identify ***types of load-bearing walls***, and describe their characteristics and applications
	describe characteristics and applications of columns, pilasters and buttresses
	identify types of bonds and patterns, and describe their characteristics and applications
	identify types of mortars, and describe their consistencies, characteristics and applications
	identify types of ***construction joints***, and describe their characteristics and applications
	identify masonry ***wall drainage and ventilation systems***, and describe their characteristics and applications
	describe horizontal and vertical coursing and associated calculations
	identify ground conditions and grades
	describe characteristics and applications of retaining wall systems and designs
	describe characteristics and applications of footings and foundations
	identify ***building envelope components***, and describe their characteristics and applications
	identify types of ***reinforcing material***, and describe their characteristics and applications
	identify reinforced wall systems, and describe their characteristics and applications
	describe specifications for reinforcing
	identify ***accessories***, and describe their characteristics and applications
	identify height and size of columns and pilasters
	identify ***regional reinforcement requirements***, and describe their characteristics and applications
	identify cleanouts, and describe their characteristics and applications

		identify ***waterproofing / damp proofing materials***, and describe their characteristics and applications
C-9.02.02L	demonstrate knowledge of procedures to build load-bearing walls	identify tools and equipment used to build load-bearing walls, and describe their procedures for use
		describe procedures to build load-bearing walls

RANGE OF VARIABLES

codes and regulations include: NBC, CSA
masonry units include: clay brick, concrete brick, sand-lime brick, concrete block, full-bed manufactured stone
types of load-bearing walls include: retaining walls, cavity walls, wind-load walls
construction joints are movement joints (contraction, expansion and control)
wall drainage and ventilation systems include: weep, vent holes
building envelope components include: membranes, insulation, flashings
reinforcing material includes: rebar, reinforcement wire
accessories include: anchors, plates, bolts
regional reinforcement requirements include: seismic, hurricane
waterproofing/damp proofing materials include: silicone, solvent-based

TASK C-10 Builds horizontal masonry surfaces

TASK DESCRIPTOR

Bricklayers build horizontal surfaces such as patios, walkways, stairways and driveways. These surfaces must be built to specifications. Bricklayers may use various types of masonry units such as brick, flagstones and pavers to build flexible or rigid surfaces. These units may be laid in sand or in mortar.

C-10.01 Prepares horizontal substrate

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

	SKILLS	
	Performance Criteria	**Evidence of Attainment**
C-10.01.01P	clean, clear and excavate area	area is cleaned, cleared and excavated
C-10.01.02P	layer and compact aggregate	aggregate is layered and compacted to grade and slope
C-10.01.03P	install landscape fabric	landscape fabric is installed

C-10.01.04P	determine borders	borders are determined according to drawings and job specifications
C-10.01.05P	install edge restraints	edge restraints are installed according to drawings and job specifications
C-10.01.06P	select mixture of concrete	mixture of concrete is selected according to ***application***
C-10.01.07P	form and pour concrete	concrete is formed and poured to required thickness and size
C-10.01.08P	screed and finish surfaces	surfaces are screeded and finished to maintain and produce even surfaces

RANGE OF VARIABLES

application includes: stairs, patios

	KNOWLEDGE	
	Learning Outcomes	**Learning Objectives**
C-10.01.01L	demonstrate knowledge of building horizontal substrate	identify terminology associated with building horizontal substrate
		identify jurisdictional and national ***codes and regulations*** associated with building horizontal substrate
		identify types of sealants, and describe their characteristics and applications
		identify types of membranes, and describe their characteristics and applications
		describe characteristics of soil conditions
		identify methods and characteristics of drainage systems
		describe slope and grade, and associated calculations
		describe excavation methods and associated applications
C-10.01.02L	demonstrate knowledge of procedures used to prepare horizontal substrate	identify ***tools and equipment*** used to prepare horizontal substrate, and describe their procedures for use
		describe procedures used to prepare horizontal substrate
		describe procedures to apply sealants and membranes

RANGE OF VARIABLES

codes and regulations include: NBC, CSA

tools and equipment include: tamper, screed poles, guillotines (brick splitter)

C-10.02 Lays masonry units on horizontal surfaces

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

SKILLS

	Performance Criteria	Evidence of Attainment
C-10.02.01P	determine and layout ***pattern***	***pattern*** is determined and laid out according to drawings and job specifications
C-10.02.02P	cut masonry units	masonry units are cut to fit required space and create uniform joints
C-10.02.03P	place and align masonry units	masonry units are placed and aligned to be aesthetically pleasing, and according to bonds and ***pattern*** used
C-10.02.04P	apply fine sand and compact masonry unit	sand is applied and tamper used to compact masonry unit
C-10.02.05P	apply polymeric sand	polymeric sand is applied according to manufacturers' specifications
C-10.02.06P	remove excess sand and fill voids	excess sand is removed by sweeping and voids are filled
C-10.02.07P	finish joints	joints are tooled in mortared systems
C-10.02.08P	incorporate construction joints	construction joints are incorporated to allow movement
C-10.02.09P	seal assemblies	assemblies are sealed

RANGE OF VARIABLES

pattern includes: basket weave, herring bone, running bond

KNOWLEDGE

	Learning Outcomes	Learning Objectives
C-10.02.01L	demonstrate knowledge of laying masonry units on horizontal surfaces	identify terminology associated with laying masonry units on horizontal surfaces
		identify jurisdictional and national ***codes and regulations*** associated with laying masonry units on horizontal surfaces
		identify types of ***masonry units for horizontal surfaces***, and describe their characteristics and applications
		identify types of bonds and **patterns**, and describe their characteristics and applications

		identify types of mortars and aggregates, and describe their characteristics and applications
		identify types of bonding agents and additives, and describe their characteristics and applications
		identify types of sealants, and describe their characteristics and applications
C-10.02.02L	demonstrate knowledge of procedures used to lay masonry units on horizontal surfaces	identify ***tools and equipment*** used for laying masonry units on horizontal surfaces, and describe their procedures for use
		describe procedures used for laying masonry units on horizontal surfaces
		describe procedures to assemble mortared and mortarless applications (rigid and flexible)

RANGE OF VARIABLES

codes and regulations include: NBC, CSA
masonry units for horizontal surfaces include: brick, pavers, flagstones
pattern includes: basket weave, herring bone, running bond
tools and equipment include: a tamper, screed poles, guillotines (brick splitter)

TASK C-11 Builds and installs prefabricated masonry

TASK DESCRIPTOR

Prefabricated masonry is usually fabricated off-site and delivered to be assembled and/or mechanically fastened. They are made of masonry units, reinforcing steel, grout and mortar. Bricklayers are involved in both the fabrication and installation of these components. They may be used for greater efficiency of installation or for situations where masonry cannot easily be built on site.

C-11.01 Builds prefabricated masonry

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

	SKILLS	
	Performance Criteria	**Evidence of Attainment**
C-11.01.01P	align and level units of prefabricated masonry	units of prefabricated masonry are aligned and leveled according to engineered specifications
C-11.01.02P	build panel to gauge	panel is built to gauge according to installation location and specifications
C-11.01.03P	prepare forms or jigs	forms or jigs are prepared to accept materials by applying form release agent and adding ***materials***
C-11.01.04P	add ***masonry materials*** to forms	***masonry materials*** are added to forms to complete prefabrication
C-11.01.05P	remove forms or jigs	forms or jigs are removed

RANGE OF VARIABLES

materials include: reinforcing, anchoring, bearing plates
masonry materials include: stone, block, brick

	KNOWLEDGE	
	Learning Outcomes	**Learning Objectives**
C-11.01.01L	demonstrate knowledge of building and installing prefabricated masonry units	identify terminology associated with building and installing prefabricated masonry units
		identify types of form release agents, and describe their characteristics and applications
		describe techniques used to store, stack and prepare prefabricated masonry units for transport

		describe effects of temperature and humidity on prefabrication curing process
		identify types of fastening systems, and describe their characteristics and applications
		identify types of grouting and caulking, and describe their characteristics and applications
C-11.01.02L	demonstrate knowledge of procedures to build prefabricated masonry units	identify tools and equipment used to build prefabricated masonry units, and describe their procedures for use
		describe procedures to build prefabricated masonry units
		identify rigging and hoisting equipment, and describe their characteristics, applications and procedures for use
		describe procedures to colour match and inspect for installation

C-11.02 Erects prefabricated masonry

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

SKILLS

	Performance Criteria	Evidence of Attainment
C-11.02.01P	verify that substrate has been prepared using anchoring systems	substrate has been prepared using anchoring systems according to drawings and engineered specifications
C-11.02.02P	align and set panels and anchors in place	panels and anchors are aligned and set in place for welding or bolting
C-11.02.03P	repair damaged masonry on site	damaged masonry is repaired on site
C-11.02.04P	seal joints	joints are sealed using ***materials***

RANGE OF VARIABLES

materials include: caulking, mortar, concrete

	KNOWLEDGE	
	Learning Outcomes	**Learning Objectives**
C-11.02.01L	demonstrate knowledge of erecting prefabricated masonry units	identify terminology associated with erecting prefabricated masonry units
		identify types of fastening and anchoring systems, and describe their characteristics and applications
		identify types of grouting and caulking, and describe their characteristics and applications
C-11.02.02L	demonstrate knowledge of procedures to erect prefabricated masonry units	identify tools and equipment used to erect prefabricated masonry units, and describe their procedures for use
		describe procedures to erect prefabricated masonry units
		identify rigging and hoisting equipment, and describe their characteristics, applications and procedures for use
		describe procedures to colour match and inspect for installation

TASK C-12. Installs surface-bonded masonry units

TASK DESCRIPTOR

Surface-bonded masonry units are thin masonry components applied to a variety of surfaces. They are used for aesthetic purposes using a variety of applied components.

C-12.01 Prepares substrate for surface-bonded masonry units

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

	SKILLS	
	Performance Criteria	**Evidence of Attainment**
C-12.01.01P	install ***weatherproofing components***	***weatherproofing components*** are installed to allow for drainage according to jurisdictional regulations
C-12.01.02P	installs cement board or backing material	cement board or backing material is installed according to manufacturers' and engineered specifications using mechanical fasteners over entire substrate area to support masonry units
C-12.01.03P	apply scratch coat	scratch coat is applied onto mesh to ensure full coverage

RANGE OF VARIABLES

weatherproofing components include: rain screen, air space, vapour barrier, insulation, strapping, mesh

	KNOWLEDGE	
	Learning Outcomes	**Learning Objectives**
C-12.01.01L	demonstrate knowledge of preparing substrate for surface-bonded masonry units	identify terminology associated with preparing substrate for surface-bonded masonry units
		identify jurisdictional and national ***codes and regulations*** associated with preparing substrate for surface-bonded masonry units
		identify types of mortar and bonding agents, and describe their characteristics and applications
		identify ***types of material***, and describe their characteristics and applications

		describe layout dimensions and associated calculations and applications
		identify types of bonds and patterns, and describe their characteristics and applications
C-12.01.02L	demonstrate knowledge of procedures to prepare substrate for surface-bonded masonry units	identify ***tools and equipment*** used to prepare substrate for surface-bonded masonry units, and describe their procedures for use
		describe procedures to prepare substrate for installing surface-bonded masonry units

RANGE OF VARIABLES

codes and regulations include: NBC, CSA
types of material include: brick, stone, concrete products
tools and equipment include: drills, drivers, nailers, staplers, parging trowels

C-12.02 Applies surface-bonded masonry units

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

SKILLS

	Performance Criteria	Evidence of Attainment
C-12.02.01P	dampen substrate and back of surface-bonded masonry unit	substrate and back of surface-bonded masonry unit is dampened to improve bonding
C-12.02.02P	butter backs of surface-bonded masonry units	backs of surface-bonded masonry units are buttered and installed on substrate
C-12.02.03P	apply and finish joints for surface-bonded masonry units	joints for surface-bonded masonry units are applied and finished
C-12.02.04P	clean and seal surface-bonded masonry units	surface-bonded masonry units are cleaned and sealed according to manufacturers' specifications

KNOWLEDGE

	Learning Outcomes	Learning Objectives
C-12.02.01L	demonstrate knowledge of installing surface-bonded masonry units	identify terminology associated with installing surface-bonded masonry units
		identify jurisdictional and national ***codes and regulations*** associated with installing surface-bonded masonry units

		identify types of mortar and bonding agents, and describe their characteristics and applications
		identify ***types of material***, and describe their characteristics and applications
		describe layout dimensions and associated calculations and applications
		identify types of bonds and patterns, and describe their characteristics and applications
C-12.02.02L	demonstrate knowledge of procedures to install surface-bonded masonry units	identify ***tools and equipment*** used to install surface-bonded masonry units, and describe their procedures for use
		describe procedures to install surface-bonded masonry units

RANGE OF VARIABLES

codes and regulations include: NBC, CSA
types of material include: brick, stone, cement products
tools and equipment include: buttering trowels, slickers, jointers, brushes, grout bag

MAJOR WORK ACTIVITY D

Builds natural stone systems

TASK D-13 Builds natural stone walls

TASK DESCRIPTOR

Stone walls may be load-bearing or non-load-bearing. Examples include veneers, multi-wythe, garden walls and retaining walls. Stones may be natural, quarried, or produced in a stone-cutting and finishing facility. Size, shape and type of stone vary greatly; therefore, correct selection and preparation are critical to maintain the integrity of the wall.

D-13.01 Prepares natural stone

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

	SKILLS	
	Performance Criteria	**Evidence of Attainment**
D-13.01.01P	cull defective or undesirable stones	defective or undesirable stones are culled to prevent failures or to enhance aesthetics of finished assembly
D-13.01.02P	remove debris	debris is removed to prevent bonding failures or to enhance aesthetics of finished assembly
D-13.01.03P	resize units	units are resized using ***methods*** to suit design and to ensure proper fit
D-13.01.04P	dress unit surfaces	unit surfaces are dressed according to design and for aesthetic purposes
D-13.01.05P	determine anchoring system	anchoring system is determined according to engineered and job specifications
D-13.01.06P	determine style and pattern for stone and joint finish	style and pattern for stone and joint finish are determined according to drawings and job specifications

RANGE OF VARIABLES

methods include: cutting, grinding, dressing, pitching

	KNOWLEDGE	
	Learning Outcomes	**Learning Objectives**
D-13.01.01L	demonstrate knowledge of natural stone walls	identify terminology associated with natural stone systems
		describe classifications, types and properties of natural stone
		identify types of bonds and patterns, and describe their characteristics and applications
		identify caulking, epoxies and other bonding agents, and describe their characteristics and applications
		identify bedding planes, and describe their characteristics and applications
		describe purpose of supporting backup wall
		identify cleaning materials for natural stone, and describe their characteristics and applications
		identify ***types of wall systems***, and describe their characteristics and applications
D-13.01.02L	demonstrate knowledge of procedures to prepare natural stone	identify tools and equipment used to prepare natural stone, and describe their procedures for use
		describe procedures to prepare natural stone
		identify rigging and hoisting equipment, and describe their characteristics, applications and procedures for use
		describe procedures to clean natural stone

RANGE OF VARIABLES

types of wall systems include: veneer, multi-wythe, garden walls, retaining walls

D-13.02 Lays natural stone

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

SKILLS

	Performance Criteria	Evidence of Attainment
D-13.02.01P	select colour, strength and consistency of mortar	colour, strength and consistency of mortar is selected according to job specifications
D-13.02.02P	apply mortar bed	mortar bed is applied to support stone
D-13.02.03P	set stone on mortar bed and plumb	stone is set on mortar bed to required degree of alignment and plumbed using ***tools***
D-13.02.04P	maintain joint size and alignment	joint size and alignment is maintained using ***temporary supports***
D-13.02.05P	follow rules of bonding and pattern practices	rules of bonding and pattern practices are followed according to jobsite specifications
D-13.02.06P	tool joints	joints are tooled according to drawings and job specifications to maintain integrity of assembly and for aesthetic purposes

RANGE OF VARIABLES

tools include: levels, tape measures, string line
temporary supports include: wedges, bracing

KNOWLEDGE

	Learning Outcomes	Learning Objectives
D-13.02.01L	demonstrate knowledge of laying natural stone	identify terminology associated with natural stone systems
		describe classifications, types and properties of natural stone
		identify types of mortars, and describe their characteristics and applications
		describe mortar consistencies according to stone
		identify types of bonds and patterns, and describe their characteristics and applications
		identify bedding planes, and describe their characteristics and applications
		identify anchoring systems, and describe their characteristics and applications

		identify flashing materials, and describe their characteristics and applications describe
		describe purpose of supporting backup wall
		identify ***types of wall systems***, and describe their characteristics and applications
D-13.02.02L	demonstrate knowledge of procedures to lay natural stone	identify tools and equipment used to lay natural stone, and describe their procedures for use
		describe procedures to lay natural stone
		describe procedures to install flashings
		identify rigging and hoisting equipment, and describe their characteristics, applications and procedures for use

RANGE OF VARIABLES

types of wall systems include: veneer, multi-wythe, garden walls, retaining walls

D-13.03 Damp cures walls

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

SKILLS

	Performance Criteria	Evidence of Attainment
D-13.03.01P	mist completed assembly	completed assembly is misted to ensure adequate curing according to job specifications
D-13.03.02P	apply and secure moist burlap or plastic	moist burlap or plastic is applied and secured to ensure adequate curing according to job specifications and weather conditions

KNOWLEDGE

	Learning Outcomes	Learning Objectives
D-13.03.01L	demonstrate knowledge of damp curing walls	identify terminology associated with natural stone systems
		describe classifications, types and properties of natural stone
		identify types of mortars, and describe their characteristics and applications

		describe mortar consistencies according to stone
		describe damp curing requirements
D-13.03.02L	demonstrate knowledge of procedures to damp cure walls	identify tools and equipment used to damp cure walls, and describe their procedures for use
		describe procedures to damp cure walls

TASK D-14 Performs mechanically-fastened natural stone cladding procedures

TASK DESCRIPTOR

Bricklayers apply stone cladding by mechanically fastening stone to a structural backup wall. Stone used for cladding is typically large and pre-finished in a stone-cutting and finishing facility. Stone cladding is not load-bearing and has an aesthetic and a protective function.

D-14.01 Prepares substrate for cladding

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

	SKILLS	
	Performance Criteria	**Evidence of Attainment**
D-14.01.01P	recognize deficiencies	deficiencies are recognized in backup to determine necessary repairs or potential incompatibility with design
D-14.01.02P	remove debris	debris is removed by brushing, scraping or grinding to create a continuous smooth surface
D-14.01.03P	fill voids	voids in masonry or concrete backup are filled by trowelling or grouting to create a continuously smooth surface
D-14.01.04P	apply air or waterproof membrane and insulation	air or waterproof membrane and insulation are applied according to job specifications

D-14.01.05P	set horizontal and vertical grid lines	horizontal and vertical grid lines are set to ensure positioning of anchors according to job specifications and drawings
D-14.01.06P	install anchoring system on substrate	anchoring system is installed on substrate according to job specifications and drawings

	KNOWLEDGE	
	Learning Outcomes	**Learning Objectives**
D-14.01.01L	demonstrate knowledge of natural stone cladding	identify terminology associated with natural stone cladding systems
		identify sizes and ***types of stone cladding***, and describe their characteristics and applications
		identify ***stone properties***, and describe their characteristics and applications
		describe purpose of supporting backup wall
		identify anchoring systems, and describe their characteristics and applications
		identify caulking, epoxies and other bonding agents, and describe their characteristics and applications
		identify cleaning materials for natural stone cladding, and describe their characteristics and applications
		identify types of stone cladding wall systems, and describe their characteristics and applications
		identify flashing materials for stone cladding wall systems, and describe their characteristics and applications
D-14.01.02L	demonstrate knowledge of procedures to prepare substrate for natural stone cladding	identify tools and equipment used for natural stone cladding, and describe their procedures for use
		describe procedures to prepare substrate for natural stone cladding
		describe procedures to clean natural stone
		describe procedures to install flashings
		identify rigging and hoisting equipment, and describe their characteristics, applications and procedures for use

RANGE OF VARIABLES

types of stone cladding include: granite, marble, limestone
stone properties include: mass, density, porosity

D-14.02 Prepares natural stone for cladding

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

SKILLS

	Performance Criteria	Evidence of Attainment
D-14.02.01P	inspect stone	stone is inspected for presence of stains, defects or debris to prevent failures or to enhance aesthetics of finished panel
D-14.02.02P	resize masonry units	masonry units are resized by cutting, grinding and chiselling to suit design
D-14.02.03P	reface granite surface	granite surface is refaced using a torch to achieve rough finish
D-14.02.04P	drill holes	holes are drilled for dowels or kerf to accommodate anchors
D-14.02.05P	prefabricate sections	sections are prefabricated by joining masonry units and adhering them with ***products*** according to job specifications

RANGE OF VARIABLES

products include: epoxies, fastening systems

KNOWLEDGE

	Learning Outcomes	Learning Objectives
D-14.02.01L	demonstrate knowledge of natural stone cladding	identify terminology associated with natural stone cladding systems
		identify sizes and ***types of stone cladding***, and describe their characteristics and applications
		identify ***stone properties***, and describe their characteristics and applications
		describe purpose of supporting backup wall
		identify anchoring systems, and describe their characteristics and applications
		identify ***products***, and describe their characteristics and applications

		identify types of stone cladding wall systems, and describe their characteristics and applications
		identify flashing materials for stone cladding, and describe their characteristics and applications
D-14.02.02L	demonstrate knowledge of procedures to prepare natural stone for cladding	identify tools and equipment used to prepare natural stone for cladding, and describe their procedures for use
		describe procedures to prepare natural stone for cladding
		describe procedures to clean natural stone
		describe procedures to install flashings
		identify rigging and hoisting equipment, and describe their characteristics, applications and procedures for use

RANGE OF VARIABLES

types of stone cladding include: granite, marble, limestone
stone properties include: mass, density, porosity
products include: epoxies, fastening systems

D-14.03 Installs natural stone cladding

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

SKILLS

	Performance Criteria	Evidence of Attainment
D-14.03.01P	set masonry units on anchors	masonry units are set on anchors manually or using rigging and hoisting equipment for support
D-14.03.02P	align and temporarily stabilize masonry units	masonry units are aligned and temporarily stabilized with shims using vertical and horizontal string lines as reference
D-14.03.03P	adjust anchoring system	anchoring system is adjusted to secure masonry units by correcting potential incompatibility with design and ensuring aesthetically pleasing final alignment
D-14.03.04P	finish joints	joints are finished according to drawings and job specifications

	KNOWLEDGE	
	Learning Outcomes	**Learning Objectives**
D-14.03.01L	demonstrate knowledge of installing natural stone cladding	identify terminology associated with natural stone cladding systems
		identify ***stone properties***, and describe their characteristics and applications
		describe purpose of supporting backup wall
		identify anchoring systems for natural stone cladding, and describe their characteristics and applications
		identify ***products*** for natural stone cladding, and describe their characteristics and applications
		identify types of natural stone cladding wall systems, and describe their characteristics and applications
		identify flashing materials for natural stone cladding, and describe their characteristics and applications
D-14.03.02L	demonstrate knowledge of procedures to install natural stone cladding	identify tools and equipment used to install natural stone cladding, and describe their procedures for use
		describe procedures to install natural stone cladding
		describe procedures to install flashings for natural stone cladding
		identify rigging and hoisting equipment, and describe their characteristics, applications and procedures for use

RANGE OF VARIABLES

stone properties include: mass, density, porosity
products include: caulking, epoxies, mortar

MAJOR WORK ACTIVITY E

Builds chimneys and fireplaces

TASK E-15 Builds chimneys

TASK DESCRIPTOR

Chimneys vent gases from combusted materials. They can be residential, industrial and commercial. Chimneys can be decorative and installed in most areas of the building.

E-15.01 Builds foundation supports for chimneys

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

	SKILLS	
	Performance Criteria	**Evidence of Attainment**
E-15.01.01P	select and use ***tools and equipment***	***tools and equipment*** are selected and used according to task
E-15.01.02P	select ***foundation materials***	***foundation materials*** are selected according to plans and job specifications
E-15.01.03P	inspect excavation or specified area	excavation or specified area is inspected to build foundation, according to jurisdictional regulations and task requirements
E-15.01.04P	modify excavation or specified area	excavation or specified area is modified to meet jurisdictional regulations and task requirements
E-15.01.05P	calculate dimensions of chimney and layout	chimney dimensions and layout are calculated for footings and foundations according to plans and job specifications
E-15.01.06P	install reinforcing steel and connections	reinforcing steel and connections are installed according to job specifications
E-15.01.07P	place concrete in footing forms	concrete is placed in footing forms and curing time allowed according to job specifications and jurisdictional regulations
E-15.01.08P	form or build foundation wall	foundation wall is formed or built on footing according to job specifications

E-15.01.09P	build in clean-outs and flue liners	clean-outs and flue liners are built in according to appliance requirements
E-15.01.10P	confirm foundation is able to support weight of chimney	foundation is able to support weight of chimney and is confirmed according to drawings, and job and site specifications

RANGE OF VARIABLES

tools and equipment include: levels, trowels, squares, screed, wood float
foundation materials include: concrete, concrete blocks, mortars, reinforcement steel, angle iron

	KNOWLEDGE	
	Learning Outcomes	**Learning Objectives**
E-15.01.01L	demonstrate knowledge of building foundation supports for chimneys	identify terminology associated with building chimneys
		identify ***codes and regulations*** associated with building chimneys
		identify ***foundation materials***, and describe their characteristics and applications
E-15.01.02L	demonstrate knowledge of procedures to build foundation supports for chimneys	identify ***tools and equipment*** used to build foundation supports for chimneys, and describe their procedures for use
		describe procedures to build foundation supports for chimneys

RANGE OF VARIABLES

codes and regulations include: NBC, CSA
foundation materials include: concrete, concrete blocks, mortars, reinforcement steel, angle iron
tools and equipment include: levels, trowels, squares, screed, wood float

E-15.02 Lays masonry units to build chimneys

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

	SKILLS	
	Performance Criteria	**Evidence of Attainment**
E-15.02.01P	select and use ***tools and equipment***	***tools and equipment*** are selected and used according to task
E-15.02.02P	select mortar	mortar is selected according to job specifications and mortar type

E-15.02.03P	calculate chimney height	chimney height is calculated for draft according to manufacturers' specifications, jurisdictional regulations and surrounding environment
E-15.02.04P	install masonry units	masonry units are installed according to predetermined dimensions
E-15.02.05P	finish mortar joints	mortar joints are finished according to job specifications

RANGE OF VARIABLES

tools and equipment include: trowels, levels, plumb lines, measuring tapes

	KNOWLEDGE	
	Learning Outcomes	**Learning Objectives**
E-15.02.01L	demonstrate knowledge of laying masonry units to build chimneys	identify terminology associated with building chimneys
		identify ***codes and regulations*** associated with building chimneys
		describe fireplace and chimney operation
		identify ***materials*** to lay chimneys, and describe their characteristics and applications
		describe expansion and contraction of installation materials
		identify types of mortar, and describe their characteristics and applications
E-15.02.02L	demonstrate knowledge of procedures to lay masonry units to build chimneys	identify ***tools and equipment*** used to lay masonry units to build chimneys, and describe their procedures for use
		describe procedures to lay masonry units to build chimneys

RANGE OF VARIABLES

codes and regulations include: NBC, CSA
materials include: fireclay or refractory mortar, bricks, blocks, stones, flue liners
tools and equipment include: trowels, levels, plumb lines, measuring tapes

E-15.03 Installs flue lining

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

SKILLS

	Performance Criteria	Evidence of Attainment
E-15.03.01P	select and use tools, equipment and refractory mortar	tools, equipment and refractory mortar are selected and used according to plans and job specifications
E-15.03.02P	calculate placement of flue lining	placement of flue lining is calculated according to ***appliance***, manufacturers' specifications and jurisdictional regulations
E-15.03.03P	calculate flue liner height and size	flue liner height and size are calculated to create draft
E-15.03.04P	create thimble opening	opening is created for thimble to connect ***appliance*** according to manufacturers' specifications, and ***codes and regulations***
E-15.03.05P	place and secure flue lining	flue lining is placed and secured using refractory mortar or stainless self-tapping screws, according to jurisdictional regulations

RANGE OF VARIABLES

appliance includes: heaters, furnaces
codes and regulations include: NBC, CSA

KNOWLEDGE

	Learning Outcomes	Learning Objectives
E-15.03.01L	demonstrate knowledge of flue lining installation in chimneys	identify terminology associated with building chimneys
		identify ***codes and regulations*** associated with building chimneys
		describe fireplace and chimney operation
		describe characteristics and applications of flue liners
		identify ***materials*** to lay chimneys, and describe their characteristics and applications
		describe expansion and contraction of installation materials

		identify types and sizes of flues and fireboxes, and describe their characteristics and applications
		identify types of mortar, and describe their characteristics and applications
E-15.03.02L	demonstrate knowledge of procedures to install flue lining	identify tools and equipment used to install flue lining, and describe their procedures for use
		describe procedures to install flue lining

RANGE OF VARIABLES

codes and regulations include: NBC, CSA
materials include: fireclay or refractory mortar, bricks, blocks, stones, clay and stainless steel flue liners

E-15.04 Installs related flashings

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

SKILLS

	Performance Criteria	Evidence of Attainment
E-15.04.01P	select and use ***tools and equipment***	***tools and equipment*** are selected and used according to task
E-15.04.02P	determine ***flashing method***	***flashing method*** to be used is determined according to application
E-15.04.03P	cut reglet	reglet is cut to receive counter flashing where roof material intersects chimney
E-15.04.04P	cut, install and seal flashing	flashing is cut, installed and sealed while building new chimney at roof intersections

RANGE OF VARIABLES

tools and equipment include: tin snips, grinders, measuring tapes
flashing method includes: reglet, step flashing, counter flashing

KNOWLEDGE

	Learning Outcomes	Learning Objectives
E-15.04.01L	demonstrate knowledge of flashing installation in chimneys	identify terminology associated with building chimneys
		identify ***codes and regulations*** associated with building chimneys
		describe fireplace and chimney operation

		identify ***flashing materials***, and describe their characteristics and applications
		identify types of insulation and flashings, and describe their characteristics and applications
E-15.04.02L	demonstrate knowledge of procedures to install flashings	identify ***tools and equipment*** used to install flashings, and describe their procedures for use
		describe procedures to install flashings

RANGE OF VARIABLES

codes and regulations include: NBC, CSA
flashing materials include: self-adhesive membranes, caulking, fasteners, metal flashings
tools and equipment include: tin snips, grinders, measuring tapes

E-15.05 Installs caps

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

SKILLS

	Performance Criteria	Evidence of Attainment
E-15.05.01P	select and use ***tools and equipment***	***tools and equipment*** are selected and used according to task
E-15.05.02P	construct cap	cap is constructed to direct water away from chimney
E-15.05.03P	install cap flashing and bond break	cap flashing and bond break are installed between chimney and cap to avoid water penetration
E-15.05.04P	form and create drip edge	drip edge is formed and created according to ***codes and regulations***
E-15.05.05P	pour reinforced concrete cap	reinforced concrete cap is poured according to ***codes and regulations***
E-15.05.06P	place ***pre-fabricated caps***	***pre-fabricated caps*** are placed according to ***codes and regulations***
E-15.05.07P	insulate and seal between chimney cap and flue lining	area between chimney cap and flue lining is insulated and sealed with non-combustible materials to protect against expansion, contraction and water penetration

RANGE OF VARIABLES

tools and equipment include: hammers, tape measures, trowels, power tools
codes and regulations include: NBC, CSA
pre-fabricated caps include: concrete, stone, metal

	KNOWLEDGE	
	Learning Outcomes	**Learning Objectives**
E-15.05.01L	demonstrate knowledge of cap installation in chimneys	identify terminology associated with building chimneys
		identify ***codes and regulations*** associated with building chimneys
		identify ***chimney cap materials***, and describe their characteristics and applications
		describe expansion and contraction of installation materials
		identify types of caps, and describe their characteristics and applications
E-15.05.02L	demonstrate knowledge of procedures to install caps	identify ***tools and equipment*** used to install caps, and describe their procedures for use
		describe procedures to install caps

RANGE OF VARIABLES

codes and regulations include: NBC, CSA
chimney cap materials include: precast or cast concrete, flashings, insulation, caulking
tools and equipment include: hammers, tape measures, trowels, power tools

TASK E-16 Builds fireplaces

TASK DESCRIPTOR

Fireplaces combust material to provide heat and vent smoke and gases to the chimney. Bricklayers may have to consider location of fireplaces in relation to prevailing winds and surrounding obstacles.

E-16.01 Builds foundation for hearth, firebox, backup material and veneer

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

	SKILLS	
	Performance Criteria	**Evidence of Attainment**
E-16.01.01P	select and use ***tools and equipment***	***tools and equipment*** are selected and used according to task
E-16.01.02P	select and install ***fireplace materials***	***fireplace materials*** are selected and installed according to plans, drawings, and ***codes and regulations***
E-16.01.03P	calculate ***dimensions***	***dimensions*** are calculated
E-16.01.04P	create openings	openings are created for ash dump and fresh air intake
E-16.01.05P	build foundation	foundation is built according to job specifications
E-16.01.06P	build foundation supports	foundation supports are built according to job specifications
E-16.01.07P	place masonry units	masonry units are placed to build foundation according to job specifications
E-16.01.08P	form and pour concrete slab on top of foundation	concrete slab is formed and poured on top of foundation to accommodate firebox and hearth

RANGE OF VARIABLES

tools and equipment include: measuring tapes, trowels, levels

fireplace materials include: concrete blocks, reinforced concrete, firebrick, fireclay, brick, stone, tile, mortars

codes and regulations include: NBC, CSA

dimensions include: projection, width and height of hearth, firebox and veneer

	KNOWLEDGE	
	Learning Outcomes	**Learning Objectives**
E-16.01.01L	demonstrate knowledge of building foundation for hearth, firebox, backup material and veneer	identify terminology associated with building fireplaces
		identify ***codes and regulations*** associated with building fireplaces
		identify types of fireplaces, and describe their characteristics and applications
		describe fireplace and chimney operation
		identify ***firebox materials***, and describe their characteristics, applications and assembly
		describe expansion and contraction of materials
		identify ***backup and veneer materials***, and describe their characteristics and applications
		identify types of bonds, and describe their characteristics and applications
		identify types and sizes of ***inserts***, and describe their characteristics and applications
E-16.01.02L	demonstrate knowledge of procedures to build foundation for hearth, firebox, backup material and veneer	identify ***tools and equipment*** used to build foundation for hearth, firebox, backup material and veneer, and describe their procedures for use
		describe procedures to build foundation for hearth, firebox, backup material and veneer
		describe procedures to calculate size of openings required for room
		describe procedures to calculate size of flue liner based on opening

RANGE OF VARIABLES

codes and regulations include: NBC, CSA
firebox materials include: firebrick, fireclay
backup and veneer materials include: brick, stone, block, tile
inserts include: electrical, gas, wood
tools and equipment include: measuring tapes, trowels, levels

E-16.02 Builds hearth, firebox and backup

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

SKILLS

	Performance Criteria	Evidence of Attainment
E-16.02.01P	select and use ***tools and equipment***	***tools and equipment*** are selected and used according to task
E-16.02.02P	lay out dimensions	dimensions of firebox are laid out according to size of fireplace and damper being used
E-16.02.03P	lay firebricks	firebricks are laid for inner hearth
E-16.02.04P	lay backup masonry units	backup masonry units are laid for outer hearth
E-16.02.05P	install ash dump and air intake	ash dump and air intake are installed according to manufacturers' specifications, and ***codes and regulations***
E-16.02.06P	cut firebricks and install walls of firebox	firebricks are cut and walls of firebox are installed
E-16.02.07P	lay backup masonry units and install anchoring system	masonry units are laid to build backup and smoke shelf behind firebox, and anchoring system installed for veneer according to ***codes and regulations***

RANGE OF VARIABLES

tools and equipment include: measuring tapes, trowels,levels
codes and regulations include: NBC, CSA

KNOWLEDGE

	Learning Outcomes	Learning Objectives
E-16.02.01L	demonstrate knowledge of building hearth, firebox and backup	identify terminology associated with building fireplaces
		identify ***codes and regulations*** associated with building fireplaces
		identify types of fireplaces, and describe their characteristics and applications
		describe fireplace and chimney operation
		identify ***firebox materials***, and describe their characteristics, applications and assembly
		describe expansion and contraction of materials

		identify ***backup and veneer materials***, and describe their characteristics and applications
		identify types of bonds, and describe their characteristics and applications
		identify types and sizes of ***inserts***, and describe their characteristics and applications
		describe purpose and function of smoke shelf and smoke chamber
		describe purpose and function of dampers
E-16.02.02L	demonstrate knowledge of procedures to build hearth, firebox and backup	identify ***tools and equipment*** used to build hearth, firebox and backup, and describe their procedures for use
		describe procedures to build hearth, firebox and backup

RANGE OF VARIABLES

codes and regulations include: NBC, CSA
firebox materials include: firebrick, fireclay
backup and veneer materials include: brick, stone, block, tile
inserts include: electrical, gas, wood
tools and equipment include: measuring tapes, trowels, levels

E-16.03 Installs damper

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

SKILLS

	Performance Criteria	Evidence of Attainment
E-16.03.01P	assemble damper	damper is assembled according to manufacturers' specifications
E-16.03.02P	position non-combustible material	non-combustible material is positioned between damper and top of firebox to allow for expansion and contraction
E-16.03.03P	set damper	damper is set in place by ensuring that it is leveled and sealed, but not bonded to firebox

	KNOWLEDGE	
	Learning Outcomes	**Learning Objectives**
E-16.03.01L	demonstrate knowledge of installing dampers	identify terminology associated with building fireplaces
		identify ***codes and regulations*** associated with building fireplaces
		identify types of fireplaces, and describe their characteristics and applications
		describe fireplace and chimney operation
		describe expansion and contraction of materials
		identify ***firebox materials***, and describe their characteristics, applications and assembly
		identify ***backup and veneer materials***, and describe their characteristics and applications
		describe purpose and function of dampers
E-16.03.02L	demonstrate knowledge of procedures to install dampers	identify tools and equipment used to install dampers, and describe their procedures for use
		describe procedures to install dampers

RANGE OF VARIABLES

codes and regulations include: NBC, CSA
firebox materials include: firebrick, fireclay
backup and veneer materials include: brick, stone, block, tile

E-16.04 Builds smoke chamber

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

	SKILLS	
	Performance Criteria	**Evidence of Attainment**
E-16.04.01P	select and use ***tools and equipment***	***tools and equipment*** are selected and used according to task
E-16.04.02P	lay out dimensions of smoke chamber	dimensions of smoke chamber are laid out according to size of fireplace, job requirements, and ***codes and regulations***
E-16.04.03P	install lintels	lintels are installed over damper

E-16.04.04P	corbel brick	brick is corbelled to create smoke chamber to meet flue liner according to ***codes and regulations***
E-16.04.05P	parge smoke chamber and smoke shelf	smoke chamber and smoke shelf are parged with mortar to allow for smooth transition

RANGE OF VARIABLES

tools and equipment include: levels, measuring tapes, trowels
codes and regulations include: NBC, CSA

	KNOWLEDGE	
	Learning Outcomes	**Learning Objectives**
E-16.04.01L	demonstrate knowledge of building smoke shelf and smoke chambers	identify terminology associated with building fireplaces
		identify ***codes and regulations*** associated with building fireplaces
		identify types of fireplaces, and describe their characteristics and applications
		describe fireplace and chimney operation
		describe expansion and contraction of materials
		identify types of bonds, and describe their characteristics and applications
		describe characteristics and applications of smoke shelf and smoke chambers
E-16.04.02L	demonstrate knowledge of procedures to build smoke shelf and smoke chambers	identify ***tools and equipment*** used to build smoke shelf and smoke chambers, and describe their procedures for use
		describe procedures to build smoke shelf and smoke chambers

RANGE OF VARIABLES

codes and regulations include: NBC, CSA
tools and equipment include: levels, measuring tapes, trowels

E-16.05 Prepares existing fireplace for insert

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

SKILLS

	Performance Criteria	Evidence of Attainment
E-16.05.01P	select and use ***tools and equipment***	***tools and equipment*** are selected and used according to task
E-16.05.02P	verify structural integrity of existing fireplace and chimney	structural integrity of existing fireplace and chimney is verified
E-16.05.03P	create rough opening	rough opening is created according to manufacturers' specifications
E-16.05.04P	make modifications to existing fireplace components	modifications to existing fireplace components are made according to job requirements
E-16.05.05P	install ***inserts***	***inserts*** are installed in fireplace according to manufacturers' specifications

RANGE OF VARIABLES

tools and equipment include: trowels, levels, hammers
inserts include: electrical, gas, wood

KNOWLEDGE

	Learning Outcomes	Learning Objectives
E-16.05.01L	demonstrate knowledge of maintaining fireplaces	identify terminology associated with building fireplaces
		identify ***codes and regulations*** associated with building fireplaces
		identify types of ***inserts***, and describe their characteristics and applications
		describe fireplace and chimney operation
		describe expansion and contraction of materials
E-16.05.02L	demonstrate knowledge of procedures to prepare existing fireplace	identify ***tools and equipment*** used to prepare existing fireplace
		describe procedures to prepare existing fireplace

RANGE OF VARIABLES

codes and regulations include: NBC, CSA
inserts include: electrical, gas, wood
tools and equipment include: trowels, levels, hammers

E-16.06 Faces fireplaces and inserts

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

	SKILLS	
	Performance Criteria	**Evidence of Attainment**
E-16.06.01P	select and use ***tools and equipment***	***tools and equipment*** are selected and used according to task
E-16.06.02P	select ***veneer materials***	***veneer materials*** are selected according to client specifications and desired finished appearance
E-16.06.03P	determine mantel dimensions	mantel dimensions are determined according to client specifications, and ***codes and regulations***
E-16.06.04P	install mantel	mantel is installed according to client specifications, and ***codes and regulations***
E-16.06.05P	install lintels	lintels are installed over opening
E-16.06.06P	install ***accessories***	***accessories*** are installed according to manufacturers' specifications
E-16.06.07P	complete masonry veneer	masonry veneer is completed
E-16.06.08P	complete facing on outer hearth	facing on outer hearth is completed

RANGE OF VARIABLES

tools and equipment include: trowels, levels, saws, bevel squares
veneer materials include: brick, stone, block, tile
codes and regulations include: NBC, CSA
accessories include: fans, vents, clean-outs, doors, intake

	KNOWLEDGE	
	Learning Outcomes	**Learning Objectives**
E-16.06.01L	demonstrate knowledge of facing fireplaces and ***inserts***	identify terminology associated with building fireplaces
		identify ***codes and regulations*** associated with building fireplaces

		identify types of fireplaces, and describe their characteristics and applications
		describe expansion and contraction of materials
		identify types of ***accessories***, and describe their characteristics and applications
		identify types of mantels, and describe their characteristics and applications
		identify ***veneer materials***, and describe their characteristics and applications
		identify types and sizes of ***inserts***, and describe their characteristics and applications
E-16.06.02L	demonstrate knowledge of procedures to face fireplaces and ***inserts***	identify ***tools and equipment*** used to face fireplaces and ***inserts***, and describe their procedures for use
		describe procedures to face fireplaces and ***inserts***

RANGE OF VARIABLES

inserts include: electrical, gas, wood
codes and regulations include: NBC, CSA
accessories include: fans, vents, clean-outs, doors, intake
veneer materials include: brick, stone, block, tile
tools and equipment include: trowels, levels, saws, bevel squares

MAJOR WORK ACTIVITY F

Refractories and corrosion resistant materials

TASK F-17 Installs and maintains refractories

TASK DESCRIPTOR

Refractories are used in various settings such as refineries, pulp mills, steel mills, crematoriums and incinerators. Refractory materials are used to contain the burning process and retain or refract heat. Refractory materials are selected according to criteria such as ease of installation, cost effectiveness and durability. The skills involved in installing refractories encompass many of the general masonry skills as well as specialized knowledge of these materials and applications. Due to the use of products containing refractory ceramic fibres (RCFs) and the need to work in confined spaces, maintaining personal safety is paramount

F-17.01 Prepares for installation of refractories and accessories

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

	SKILLS	
	Performance Criteria	**Evidence of Attainment**
F-17.01.01P	select and use ***tools and equipment***	***tools and equipment*** are selected and used according to task
F-17.01.02P	establish points and grid lines for ***anchors***	points and grid lines for ***anchors*** are established to maintain integrity of wall
F-17.01.03P	position and secure ***accessories***	***accessories*** are positioned and secured according to drawings, and job and engineered specifications
F-17.01.04P	cut and shape ***insulation***	***insulation*** is cut and shaped for installation
F-17.01.05P	cut and shape ***refractory units***	***refractory units*** are cut and shaped for installation
F-17.01.06P	build and install forms and arch centre	forms and arch centre are built and installed for specific application

RANGE OF VARIABLES

tools and equipment include: dead blow hammers, rawhide hammers, knives, trowels, wet saws, hand saws, air compressors, gunite equipment, shotcrete equipment

anchors include: V, Y and J shaped, stick pins, threaded studs

accessories include: nuts, clips

insulation includes: modules, blanket, j-paper

refractory units include: insulating, ceramic, arch bricks

	KNOWLEDGE	
	Learning Outcomes	**Learning Objectives**
F-17.01.01L	demonstrate knowledge of installation of refractories and accessories	identify terminology associated with installation and maintenance of refractories and accessories
		identify types of PPE used for refractory material installation and material removal (tear-outs)
		identify safety regulations associated with installation of refractories and accessories
		identify types and describe uses of insulations
		identify forms and arches, and describe their characteristics and applications
F-17.01.02L	demonstrate knowledge of procedures to prepare for installation of refractories and accessories	identify tools and equipment used to install refractories and accessories, and describe their procedures for use
		describe procedures to prepare for installation of refractories and accessories
		describe ***safety procedures*** associated with installation of refractories and accessories

RANGE OF VARIABLES

safety procedures include: lockout, confined space, fall arrest, FLRA, emergency evacuation, temporary bracing

F-17.02 Prepares mortar for refractories

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

SKILLS

	Performance Criteria	Evidence of Attainment
F-17.02.01P	select, set up and use ***tools and equipment***	***tools and equipment*** are selected, set up and used according to task
F-17.02.02P	select and measure ***admixtures***	***admixtures*** are selected and measured according to manufacturers' specifications
F-17.02.03P	select, measure and mix ***mortars***	***mortars*** are selected, measured and mixed according to manufacturers' specifications

RANGE OF VARIABLES

tools and equipment include: mixing drills, pails, mixers
admixtures include: needles, resins, epoxies
mortars include: silica, high alumina mortar, fireclays

KNOWLEDGE

	Learning Outcomes	Learning Objectives
F-17.02.01L	demonstrate knowledge of installation of refractories and accessories	identify terminology associated with installation and maintenance of refractories and accessories
		identify types of PPE used for refractory material installation and material removal (tear-outs)
		identify safety regulations associated with installation of refractories and accessories
		identify types of ***refractory materials***, and describe their characteristics and applications
		identify ***types of refractory mortar***, and describe their characteristics and applications
		identify ***admixtures***, and describe their characteristics and applications
		identify types of insulations, and describe their uses
		identify forms and arches, and describe their characteristics and applications

F-17.02.02L	demonstrate knowledge of procedures to prepare mortar for refractories	identify ***tools and equipment*** used to prepare mortar for refractories, and describe their procedures for use
		describe procedures to prepare mortar for refractories
		describe ***safety procedures*** associated with installation of refractories and accessories

RANGE OF VARIABLES

refractory materials include: bricks (alumina/silica, insulating, carbon), accessories and blanket, board insulation, castables, plastics

types of refractory mortar include: air setting, heat setting

admixtures include: needles, resins, epoxies

tools and equipment include: mixing drills, pails, mixers

safety procedures include: lockout, confined space, fall arrest, FLRA, emergency evacuation, temporary bracing

F-17.03 Removes existing refractories

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

SKILLS

	Performance Criteria	Evidence of Attainment
F-17.03.01P	select and use ***tools and equipment***	***tools and equipment*** are selected and used according to task
F-17.03.02P	remove specified material	specified material is removed by cutting, grinding and hammering
F-17.03.03P	clean up and dispose of materials	materials are cleaned up and disposed of according to site requirements

RANGE OF VARIABLES

tools and equipment include: pneumatic hammers, chisels, grinders

KNOWLEDGE

	Learning Outcomes	Learning Objectives
F-17.03.01L	demonstrate knowledge of installation of refractories and accessories	identify terminology associated with installation and maintenance of refractories and accessories
		identify types of PPE used for refractory material installation and material removal (tear-outs)

		identify safety regulations associated with installation of refractories and accessories
		identify types of ***refractory materials***, and describe their characteristics and applications
		identify ***types of refractory mortar***, and describe their characteristics and applications
		identify types of insulation and describe their uses
		identify forms and arches, and describe their characteristics and applications
F-17.03.02L	demonstrate knowledge of procedures to remove existing refractories	identify ***tools and equipment*** used to remove existing refractories, and describe their procedures for use
		describe procedures to remove existing refractories
		describe procedures to clean up and dispose of materials
		describe ***safety procedures*** associated with installation of refractories and accessories

RANGE OF VARIABLES

refractory materials include: bricks (alumina/silica, insulating, carbon), accessories and blanket, board insulation, castables, plastics

types of refractory mortar include: air setting, heat setting

tools and equipment include: pneumatic hammers, chisels, grinders

safety procedures include: lockout, confined space, fall arrest, FLRA, emergency evacuation, temporary bracing

F-17.04 Installs refractories

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

SKILLS

	Performance Criteria	Evidence of Attainment
F-17.04.01P	select and use ***tools***	***tools*** are selected and used according to task
F-17.04.02P	select and use ***equipment*** specific to refractories	***equipment*** specific to refractories is selected and used
F-17.04.03P	pour and vibrate castables	castables are poured and vibrated to consolidate

F-17.04.04P	install castables	castables are installed using ***methods***
F-17.04.05P	install ***insulation*** and materials	***insulation*** and materials are installed according to drawings and job specifications
F-17.04.06P	lay and sequence ***refractory material***	***refractory material*** is laid and sequenced for installation according to number and application
F-17.04.07P	ram and vent plastics	plastics are rammed to consolidate and vented to relieve pressure from moisture or steam
F-17.04.08P	install control joints	control joints are installed according to project plans or job specifications
F-17.04.09P	install ***separation material***	***separation material*** is installed to accommodate expansion of materials

RANGE OF VARIABLES

tools include: trimming trowels, dead blow hammers, ratchet wrenches, curry combs specific to refractories, rawhide

equipment includes: gunite machine, high-pressure hoses, shotcrete

methods include: hand packing, gunning, casting

insulation includes: blanket, modules

refractory material includes: bricks (alumina/silica, insulating, carbon), tile, accessories and blanket, board insulation, castables, plastics

separation material includes: ceramic-fibre paper, blanket insulation

	KNOWLEDGE	
	Learning Outcomes	**Learning Objectives**
F-17.04.01L	demonstrate knowledge of installation of refractories and accessories	identify terminology associated with installation and maintenance of refractories and accessories
		identify types of PPE used for refractory material installation and material removal (tear-outs)
		identify safety regulations associated with installation of refractories and accessories
		identify types of ***refractory materials***, and describe their characteristics and applications
		identify ***types of refractory mortar***, and describe their characteristics and applications
		identify types and describe uses of insulations
		identify forms and arches, and describe their characteristics and applications

F-17.04.02L	demonstrate knowledge of procedures to install refractories	identify ***tools*** and ***equipment*** used to install refractories and accessories, and describe their procedures for use
		describe procedures to install refractories and accessories
		identify sequence of installation of brick and tile according to number and application
		describe ***safety procedures*** associated with installation of refractories and accessories

RANGE OF VARIABLES

refractory material includes: bricks (alumina/silica, insulating, carbon), tile, accessories and blanket, board insulation, castables, plastics

types of refractory mortar include: air setting, heat setting

tools include: trimming trowels, dead blow hammers, ratchet wrenches, curry combs specific to refractories, rawhide

equipment includes: gunite machine, high-pressure hoses, shotcrete

safety procedures include: lockout, confined space, fall arrest, FLRA, emergency evacuation, temporary bracing

F-17.05 Repairs refractories

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

SKILLS

	Performance Criteria	Evidence of Attainment
F-17.05.01P	select and use ***tools and equipment***	***tools and equipment*** are selected and used according to task
F-17.05.02P	isolate and remove damaged material	damaged material is isolated and removed
F-17.05.03P	cut and shape replacement material	replacement material is cut and shaped according to required dimensions
F-17.05.04P	install castables	castables are installed using ***methods***
F-17.05.05P	install replacement material	replacement material is installed according to ***deficiency*** identified

RANGE OF VARIABLES

tools and equipment include: pneumatic, hydraulic, power, hand

methods include: hand packing, gunning, casting

deficiency includes: damaged insulation, deteriorated bricks, corroded anchors, cracks, refractory mortar erosion, damage

	KNOWLEDGE	
	Learning Outcomes	**Learning Objectives**
F-17.05.01L	demonstrate knowledge of installation of refractories and accessories	identify terminology associated with installation and maintenance of refractories and accessories
		identify types of PPE used for refractory material installation and material removal (tear-outs)
		identify safety regulations associated with installation of refractories and accessories
		identify types of ***refractory materials***, and describe their characteristics and applications
		identify ***types of refractory mortar***, and describe their characteristics and applications
		identify types of insulations and describe their uses
		identify forms and arches, and describe their characteristics and applications
F-17.05.02L	demonstrate knowledge of procedures to repair refractories and accessories	identify ***tools and equipment*** used to repair refractories and accessories, and describe their procedures for use
		describe procedures to repair refractories and accessories
		describe ***safety procedures*** associated with installation of refractories and accessories

RANGE OF VARIABLES

refractory materials include: bricks (alumina/silica, insulating, carbon), accessories and blanket, board insulation, castables, plastics

types of refractory mortar include: air setting, heat setting

tools and equipment include: pneumatic, hydraulic, power, hand

safety procedures include: lockout, confined space, fall arrest, FLRA, emergency evacuation, temporary bracing

TASK F-18 Installs and maintains corrosion resistant materials

TASK DESCRIPTOR

Corrosion resistant applications are used in sites such as pulp mills, food processing plants and gas plants. The materials are used to protect containment units such as vessels, towers and chests, and the surrounding environment. The skills involved in installing and maintaining corrosion resistant materials encompass many of the general masonry skills as well as specialized knowledge of these materials and applications. Due to the presence of carcinogens and the need to work in confined spaces, maintaining personal safety is paramount.

F-18.01 Prepares for installation of corrosion resistant materials and accessories

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

	SKILLS	
	Performance Criteria	**Evidence of Attainment**
F-18.01.01P	select and use ***tools and equipment***	***tools and equipment*** are selected and used according to task and type of corrosion resistant materials
F-18.01.02P	establish points for anchors	points for anchors are established to maintain integrity of wall
F-18.01.03P	position and secure ***accessories***	***accessories*** are positioned and secured according to drawings and job specifications
F-18.01.04P	prepare vessel surface	vessel surface is prepared for installation using ***methods***
F-18.01.05P	select membrane	membrane is selected according to job specifications
F-18.01.06P	cut and shape ***corrosion resistant materials***	***corrosion resistant materials*** are cut and shaped for installation
F-18.01.07P	build and install forms and arch centre	forms and arch centre are built and installed according to specific application

RANGE OF VARIABLES

tools and equipment include: wet saws, trowels, chisels

accessories include: anchors, hex mesh

methods include: sandblasting, chemical etching, coating

corrosion resistant materials include: tile, corrosion resistant units, mortars, accessories, membranes, concrete

	KNOWLEDGE	
	Learning Outcomes	**Learning Objectives**
F-18.01.01L	demonstrate knowledge of installation and maintenance of ***corrosion resistant materials***	identify terminology associated with installation and maintenance of ***corrosion resistant materials***
		identify types of PPE used for refractory material installation and material removal (tear-outs)
		identify safety regulations associated with installation and maintenance of ***corrosion resistant materials***
		identify types of ***hazards*** associated with installation and maintenance of ***corrosion resistant materials***
		identify types of ***corrosion resistant materials***, and describe their characteristics and applications
		identify ***causes of corrosion***
		identify forms and arches, and describe their characteristics and applications
F-18.01.02L	demonstrate knowledge of procedures to install and maintain ***corrosion resistant materials***	identify ***tools and equipment*** used to install and maintain ***corrosion resistant materials***, and describe their procedures for use
		describe procedures to install and maintain ***corrosion resistant materials***
		describe ***safety procedures*** associated with installation and maintenance of ***corrosion resistant materials***

RANGE OF VARIABLES

corrosion resistant materials include: tile, corrosion resistant units, mortars, accessories, membranes, concrete

hazards include: exposure to fumes, respiratory, skin exposure

causes of corrosion include: friction, chemicals, gasses

tools and equipment include: wet saws, trowels, chisels

safety procedures include: lockout, confined space, fall arrest, FLRA, emergency evacuation, temporary bracing

F-18.02 Prepares mortar for corrosion resistant materials

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

SKILLS

	Performance Criteria	Evidence of Attainment
F-18.02.01P	select, set up and use ***tools and equipment***	***tools and equipment*** are selected, set up and used according to task
F-18.02.02P	select and measure ***admixtures***	***admixtures*** are selected and measured according to manufacturers' specifications
F-18.02.03P	select, measure and mix corrosion resistant mortars	corrosion resistant mortars are selected, measured and mixed according to manufacturers' specifications

RANGE OF VARIABLES

tools and equipment include: mixing drills, pails, mixers
admixtures include: resins, epoxies

KNOWLEDGE

	Learning Outcomes	Learning Objectives
F-18.02.01L	demonstrate knowledge of installation and maintenance of ***corrosion resistant materials***	identify terminology associated with installation and maintenance of ***corrosion resistant materials***
		identify types of PPE used for ***corrosion resistant material*** installation and material removal (tear-outs)
		identify safety regulations associated with installation and maintenance of ***corrosion resistant materials***
		identify types of ***hazards*** associated with installation and maintenance of ***corrosion resistant materials***
		identify ***admixtures***, and describe their characteristics and applications
		identify types of ***corrosion resistant materials***, and describe their characteristics and applications
		identify ***causes of corrosion***
		identify forms and arches, and describe their characteristics and applications

F-18.02.02L	demonstrate knowledge of procedures to prepare mortar for ***corrosion resistant materials***	identify ***tools and equipment*** used to prepare mortar for ***corrosion resistant materials***, and describe their procedures for use
		describe procedures to prepare mortar for ***corrosion resistant materials***
		describe ***safety procedures*** associated with installation and maintenance of ***corrosion resistant materials***

RANGE OF VARIABLES

corrosion resistant materials include: tile, corrosion resistant units, mortars, accessories, membranes, concrete

hazards include: exposure to fumes, respiratory, skin exposure

admixtures include: resins, epoxies

causes of corrosion include: chemicals, gasses, friction

tools and equipment include: mixing drills, pails, mixers

safety procedures include: lockout, confined space, fall arrest, FLRA, emergency evacuation, temporary bracing

F-18.03 Removes existing corrosion resistant materials

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

SKILLS

	Performance Criteria	Evidence of Attainment
F-18.03.01P	select and use ***tools and equipment***	***tools and equipment*** are selected and used according to task
F-18.03.02P	cut, grind and hammer existing material	existing material is cut, ground and hammered
F-18.03.03P	clean up and dispose of materials	materials are cleaned up and disposed of according to site requirements

RANGE OF VARIABLES

tools and equipment include: pneumatic hammers, grinders, chisels, hand tools (see appendix B)

	KNOWLEDGE	
	Learning Outcomes	**Learning Objectives**
F-18.03.01L	demonstrate knowledge of installation and maintenance of ***corrosion resistant materials***	identify terminology associated with installation and maintenance of ***corrosion resistant materials***
		identify types of PPE used for ***corrosion resistant material*** installation and material removal (tear-outs)
		identify safety regulations associated with installation and maintenance of ***corrosion resistant materials***
		identify types of ***hazards*** associated with installation and maintenance of ***corrosion resistant materials***
		identify types of ***corrosion resistant materials***, and describe their characteristics and applications
		identify ***causes of corrosion***
		identify forms and arches, and describe their characteristics and applications
F-18.03.02L	demonstrate knowledge of procedures to remove existing ***corrosion resistant materials***	identify ***tools and equipment*** used to remove existing ***corrosion resistant materials***, and describe their procedures for use
		describe procedures to remove existing ***corrosion resistant materials***
		describe procedure to clean up and dispose of materials
		describe ***safety procedures*** associated with installation and maintenance of ***corrosion resistant materials***

RANGE OF VARIABLES

corrosion resistant materials include: tile, corrosion resistant units, mortars, accessories, membranes, concrete

hazards include: exposure to fumes, respiratory, skin exposure

causes of corrosion include: friction, chemicals, gasses

tools and equipment include: pneumatic hammers, grinders, chisels, hand tools (see appendix B)

safety procedures include: lockout, confined space, fall arrest, FLRA, emergency evacuation, temporary bracing

F-18.04 Installs corrosion resistant materials

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

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 task
F-18.04.02P	apply vapour barrier	vapour barrier is applied to protect substrate
F-18.04.03P	install castables	castables are installed using ***methods***
F-18.04.04P	lay and sequence ***corrosion resistant materials***	***corrosion resistant materials*** are laid and sequenced for installation according to number and application
F-18.04.05P	form and pour concrete	concrete is formed and poured to create base for containment area and behind walls of containment area

RANGE OF VARIABLES

tools and equipment include: gunite machines, concrete pumps, wet saws, vibrators

methods include: hand packing, gunning, casting

corrosion resistant materials include: tile, corrosion resistant units, mortars, accessories, membranes, concrete

KNOWLEDGE

	Learning Outcomes	Learning Objectives
F-18.04.01L	demonstrate knowledge of installation and maintenance of ***corrosion resistant materials***	identify terminology associated with installation and maintenance of ***corrosion resistant materials***
		identify types of PPE used for ***corrosion resistant material*** installation and material removal (tear-outs)
		identify safety regulations associated with installation and maintenance of ***corrosion resistant materials***
		identify types of ***hazards*** associated with installation and maintenance of ***corrosion resistant materials***
		identify types of ***corrosion resistant materials***, and describe their characteristics and applications
		identify ***causes of corrosion***

		identify forms and arches, and describe their characteristics and applications
F-18.04.02L	demonstrate knowledge of procedures to install ***corrosion resistant materials***	identify ***tools and equipment*** used to install ***corrosion resistant materials***, and describe their procedures for use
		describe procedures to install ***corrosion resistant materials***
		identify sequence of installation of ***corrosion resistant materials*** according to number and application
		describe procedure to form and pour concrete
		describe ***safety procedures*** associated with installation and maintenance of ***corrosion resistant materials***

RANGE OF VARIABLES

corrosion resistant materials include: tile, corrosion resistant units, mortars, accessories, membranes, concrete

hazards include: exposure to fumes, respiratory, skin exposure

causes of corrosion include: friction, chemicals, gasses

tools and equipment include: gunite machines, concrete pumps, wet saws, vibrators

safety procedures include: lockout, confined space, fall arrest, FLRA, emergency evacuation, temporary bracing

F-18.05 Repairs corrosion resistant materials

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

SKILLS

	Performance Criteria	Evidence of Attainment
F-18.05.01P	select and use ***tools and equipment***	***tools and equipment*** are selected and used according to task and specific to ***corrosion resistant materials***
F-18.05.02P	identify and remove damaged material	damaged material is identified and removed
F-18.05.03P	cut and shape replacement material	replacement material is cut and shaped according to required dimensions
F-18.05.04P	install castables	castables are installed using ***methods***
F-18.05.05P	install ***corrosion resistant materials***	***corrosion resistant materials*** are installed according to ***deficiency*** identified

RANGE OF VARIABLES

tools and equipment include: pneumatic, hydraulic, power and hand tools

corrosion resistant materials include: tile, corrosion resistant units, mortars, accessories, membranes, concrete

methods include: hand packing, gunning, casting

deficiency includes: the erosion of brick, tile, membrane and refractory mortar

	KNOWLEDGE	
	Learning Outcomes	**Learning Objectives**
F-18.05.01L	demonstrate knowledge of installation and maintenance of ***corrosion resistant materials***	identify terminology associated with installation and maintenance of ***corrosion resistant materials***
		identify types of PPE used for ***corrosion resistant material*** installation and material removal (tear-outs)
		identify safety regulations associated with installation and maintenance of ***corrosion resistant materials***
		identify types of ***hazards*** associated with installation and maintenance of ***corrosion resistant materials***
		identify types of ***corrosion resistant materials***, and describe their characteristics and applications
		identify ***causes of corrosion***
		identify forms and arches, and describe their characteristics and applications
F-18.05.02L	demonstrate knowledge of procedures to repair ***corrosion resistant materials***	identify ***tools and equipment*** used to repair ***corrosion resistant materials***, and describe their procedures for use
		describe procedures to repair ***corrosion resistant materials***
		describe ***safety procedures*** associated with installation and maintenance of ***corrosion resistant materials***

RANGE OF VARIABLES

corrosion resistant materials include: tile, corrosion resistant units, mortars, accessories, membranes, concrete

hazards include: exposure to fumes, respiratory, skin exposure

causes of corrosion include: friction, chemicals, gasses

tools and equipment include: pneumatic, hydraulic, power and hand tools

safety procedures include: lockout, confined space, fall arrest, FLRA, emergency evacuation, temporary bracing

MAJOR WORK ACTIVITY G

Performs restoration

TASK G-19 Rebuilds masonry work

TASK DESCRIPTOR

This task describes the process of removing and reinstalling selected masonry work ranging from small areas to entire assemblies. It involves using proper equipment, support and bracing, as well as matching the existing structure.

G-19.01 Disassembles unit masonry

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

	SKILLS	
	Performance Criteria	**Evidence of Attainment**
G-19.01.01P	determine plan of action	plan of action is determined according to assessed cause of deterioration and safe approach
G-19.01.02P	shore surrounding masonry	surrounding masonry is shored to prevent collapse or further damage during disassembly and reassembly
G-19.01.03P	record placement of masonry units	placement of masonry units is recorded using ***documentation methods*** to ensure accuracy of future placement
G-19.01.04P	remove mortar and masonry units	mortar and masonry units are removed using tools according to method of disassembly selected
G-19.01.05P	clean salvaged masonry units for reassembly	salvaged masonry units are cleaned for reassembly using tools and cleaning agents according to job specifications
G-19.01.06P	store salvaged masonry units	salvaged masonry units are stored in a secure dry area to protect against damage and theft

RANGE OF VARIABLES

documentation methods include: photography, tagging, sketches

	KNOWLEDGE	
	Learning Outcomes	**Learning Objectives**
G-19.01.01L	demonstrate knowledge of rebuilding masonry	identify terminology associated with rebuilding masonry
		describe historical and current masonry construction techniques
		describe masonry load patterns, and their characteristics and applications
		describe natural, mechanical or chemical effects on materials
		identify types of anchoring systems, and describe their characteristics and applications
		identify hazards and describe safe work practices pertaining to site, personnel and public safety measures
		identify types of rigging and hoisting equipment and describe their applications, limitations and procedures for use
		describe restoration ***documentation methods***
G-19.01.02L	demonstrate knowledge of procedures to disassemble unit masonry	identify tools and equipment used to disassemble unit masonry, and describe their procedures for use
		describe procedures to disassemble unit masonry
		describe procedures to shore surrounding masonry
		describe procedures to clean and store salvaged masonry units

RANGE OF VARIABLES

documentation methods include: photography, tagging, sketches

G-19.02 Prepares restoration work area

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

SKILLS

	Performance Criteria	Evidence of Attainment
G-19.02.01P	remove remaining mortar	remaining mortar is removed from standing wall and backup wall
G-19.02.02P	clean and restore or replace ***accessories***	***accessories*** are cleaned and restored or replaced according to job specifications
G-19.02.03P	repair backup wall and existing membrane	backup wall and existing membrane are repaired according to identified deficiencies and job specifications

RANGE OF VARIABLES

accessories include: anchors, ties, shelf angles, flashings, loose angle irons, electrical boxes

KNOWLEDGE

	Learning Outcomes	Learning Objectives
G-19.02.01L	demonstrate knowledge of rebuilding masonry	identify terminology associated with rebuilding masonry
		describe historical and current masonry construction techniques
		identify types of mortars and associated additives, and describe their characteristics and applications
		identify types of anchoring systems, and describe their characteristics and applications
		identify hazards, and describe safe work practices pertaining to site, personnel and public safety measures
		identify types of rigging and hoisting equipment and describe their applications, limitations and procedures for use
		describe restoration ***documentation methods***
G-19.02.02L	demonstrate knowledge of procedures to prepare restoration area	identify tools and equipment used to prepare restoration area, and describe their procedures for use
		describe procedures to prepare restoration area

	describe procedures to remove remaining mortar
	describe procedures to clean and restore ***accessories***
	describe procedures to repair backup wall and existing membrane

RANGE OF VARIABLES

documentation methods include: photography, tagging, sketches
accessories include: anchors, ties, shelf angles, flashings, loose angle irons, electrical boxes

G-19.03 Reinstalls masonry and accessories

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

SKILLS

	Performance Criteria	Evidence of Attainment
G-19.03.01P	place and secure related ***accessories***	related ***accessories*** are placed and secured according to drawings and job specifications
G-19.03.02P	match appearance and composition of new material to existing material	appearance and composition of new material is matched to existing material
G-19.03.03P	lay new or salvaged masonry units	new or salvaged masonry units are laid according to recorded placement to match appearance of existing or recently disassembled work

RANGE OF VARIABLES

accessories include: anchors, ties, shelf angles, flashings, loose angle irons, electrical boxes

KNOWLEDGE

	Learning Outcomes	Learning Objectives
G-19.03.01L	demonstrate knowledge of rebuilding masonry	identify terminology associated with rebuilding masonry
		describe historical and current masonry construction techniques
		identify types of mortars and associated additives, and describe their characteristics and applications
		identify types of anchoring systems, and describe their characteristics and applications

		identify hazards and describe safe work practices pertaining to site, personnel and public safety measures
		identify types of rigging and hoisting equipment and describe their applications, limitations and procedures for use
		describe restoration ***documentation methods***
G-19.03.02L	demonstrate knowledge of procedures to reinstall masonry and ***accessories***	identify tools and equipment used to reinstall masonry and ***accessories***, and describe their procedures for use
		describe procedures to reinstall masonry and ***accessories***

RANGE OF VARIABLES

documentation methods include: photography, tagging, sketches

accessories include: anchors, ties, shelf angles, flashings, loose angle irons, electrical boxes

TASK G-20 Repairs and cleans existing masonry work

TASK DESCRIPTOR

This task describes non-destructive methods of restoring masonry work, including repointing and repairing of individual units. Repairs may be done in place, or after removal, and may range from historic fabric to relatively new construction.

Bricklayers clean existing masonry surfaces as part of restoration or after restoration work has been performed so that the surfaces are returned to their original appearance.

G-20.01 Removes deteriorated masonry units

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

	SKILLS	
	Performance Criteria	**Evidence of Attainment**
G-20.01.01P	determine and follow plan of action	plan of action is determined and followed according to assessed cause of deterioration and safe approach
G-20.01.02P	shore surrounding masonry	surrounding masonry is shored to prevent collapse or further damage during removal and re-installation
G-20.01.03P	record placement of ***masonry units***	placement of ***masonry units*** is recorded using ***documentation methods*** to ensure accuracy of future placement

G-20.01.04P	document shape, size and finished face of non-salvageable ***masonry units***	shape, size and finished face of non-salvageable ***masonry units*** are documented to create templates
G-20.01.05P	remove mortar and entire or damaged portion of ***masonry unit***	mortar and entire or damaged portion of ***masonry unit*** is removed using tools according to method of removal selected
G-20.01.06P	document ***failures in material***	***failures in material*** are documented for record keeping
G-20.01.07P	clean salvaged ***masonry units*** for re-installation	salvaged ***masonry units*** are cleaned for re-installation using tools and cleaning agents according to job specifications
G-20.01.08P	store salvaged ***masonry units***	salvaged ***masonry units*** are stored in a secure dry area to protect against damage according to job specifications

RANGE OF VARIABLES

masonry units include: bricks, stones, terracotta
documentation methods include: photography, sketching, tagging
failures in material include: hairline cracks, spalling, delamination

	KNOWLEDGE	
	Learning Outcomes	**Learning Objectives**
G-20.01.01L	demonstrate knowledge of removing deteriorated ***masonry units***	describe terminology associated with removing deteriorated ***masonry units***
		describe historical and conventional masonry construction techniques
		describe ***documentation methods*** during restoration
		interpret environmental regulations pertaining to removal and disposal of ***masonry units***
		identify hazards and describe safe work practices pertaining to removing deteriorated components
		identify types of ***masonry units***, and describe their characteristics and applications
G-20.01.02L	demonstrate knowledge of procedures to remove deteriorated ***masonry units***	identify tools and equipment used to remove deteriorated ***masonry units***, and describe their procedures for use
		describe procedures to remove deteriorated ***masonry units***

RANGE OF VARIABLES

masonry units include: bricks, stones, terracotta
documentation methods include: photography, sketching, tagging

G-20.02 Repoints joints

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

SKILLS

	Performance Criteria	Evidence of Attainment
G-20.02.01P	remove deteriorated mortar from existing joints	deteriorated mortar is removed from existing joints
G-20.02.02P	clean void	void is cleaned after removal of defective mortar using water or air pressure
G-20.02.03P	pre-moisten area to be repointed	area to be repointed is pre-moistened for adhesion of new mortar
G-20.02.04P	fill, compress and tool joints	joints are filled, compressed and tooled according to established procedures for integrity of new joints
G-20.02.05P	mist joints or cover them with wet burlap	joints are misted or covered with wet burlap to prevent joint failure
G-20.02.06P	protect surfaces from ***environmental conditions***	surfaces are protected from ***environmental conditions***

RANGE OF VARIABLES

environmental conditions include: rain, wind, sun

KNOWLEDGE

	Learning Outcomes	Learning Objectives
G-20.02.01L	demonstrate knowledge of repointing joints	describe terminology associated with repointing joints
		describe historical and conventional masonry construction techniques
		describe ***documentation methods*** for restoration
		interpret environmental regulations pertaining to removal and disposal of masonry units
		identify hazards, and describe safe work practices pertaining to repointing joints
		describe technique to prevent moisture loss during curing (damp curing)

		identify types and bonding properties of mortars, and describe their characteristics and applications
		identify types of ***admixtures***, and describe their characteristics and applications
G-20.02.02L	demonstrate knowledge of procedures to repoint joints	identify tools and equipment used to repoint joints, and describe their procedures for use
		describe procedure to repoint joints
		describe procedures to protect surfaces from ***environmental conditions***

RANGE OF VARIABLES

documentation methods include: photography, sketching, results of off-site analysis
admixtures include: colouring, air entrainment agents, waterproofing, bonding agents
environmental conditions include: rain, wind, sun

G-20.03 Repairs masonry units

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

SKILLS

	Performance Criteria	Evidence of Attainment
G-20.03.01P	determine and follow plan of action	plan of action is determined and followed according to assessed cause of deterioration
G-20.03.02P	drill masonry	masonry is drilled for pinning and stitching
G-20.03.03P	mix repair compound	repair compound is mixed according to manufacturers' specifications
G-20.03.04P	fill voids, rebuild portions of existing material, or mould ***masonry units***	voids are filled, portions of existing material rebuilt, or ***masonry units*** moulded to match original features of ***masonry units***
G-20.03.05P	rejoin severed or cracked ***masonry units***	severed or cracked ***masonry units*** are rejoined using ***materials***
G-20.03.06P	reattach ***masonry units*** to backup wall	***masonry units*** are reattached to backup wall

G-20.03.07P	replace deteriorated ***masonry unit*** face	deteriorated ***masonry unit*** face is replaced with newly cut face using mortar or adhesives
G-20.03.08P	support refaced ***masonry units***	refaced ***masonry units*** are supported using wedges until initial set

RANGE OF VARIABLES

masonry units include: bricks, stones, terracotta
materials (for rejoining) include: dowels, threaded pins, epoxies

	KNOWLEDGE	
	Learning Outcomes	**Learning Objectives**
G-20.03.01L	demonstrate knowledge of repairing ***masonry units***	describe terminology associated with repairing ***masonry units***
		describe historical and conventional masonry construction techniques
		describe ***documentation methods*** for restoration
		interpret environmental regulations pertaining to removal and disposal of ***masonry units***
		identify hazards and describe safe work practices pertaining to repairing ***masonry units***
		describe ***mechanical repair techniques*** and their applications
		describe ***non-mechanical repair techniques*** and their applications
		identify types of ***masonry units***, and describe their characteristics and applications
		identify types of ***admixtures***, and describe their characteristics and applications
		identify ***materials*** used for refacing, and describe their characteristics and applications
		identify epoxy anchoring systems, and describe their characteristics and applications
		identify masonry materials that may be affected by cleaning, sealing, waterproofing or damp proofing processes
G-20.03.02L	demonstrate knowledge of procedures to repair ***masonry units***	identify tools and equipment used to repair ***masonry units***, and describe their procedures for use

	describe procedures to repair ***masonry units***
	describe procedures to prepare repair compound

RANGE OF VARIABLES

masonry units include: bricks, stones, terracotta

documentation methods include: photography, sketching, results of off-site analysis

mechanical repair techniques include: stitching, pinning or dowelling, using spiral ties, dispersed hydrated lime (DHL) injections (when using anchors)

non-mechanical repair techniques include: composite (plastic) repair, Dutchman repair, cutting, refacing, DHL injections

admixtures include: colouring, air entrainment agents, waterproofing, bonding agents

materials (for refacing) include: epoxies, acrylics***,*** plastics, DHL

G-20.04 Reinstalls masonry units and accessories

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

	SKILLS	
	Performance Criteria	**Evidence of Attainment**
G-20.04.01P	match appearance and composition of existing mortar	appearance and composition of existing mortar are matched
G-20.04.02P	pre-moisten adjacent surfaces	adjacent surfaces are pre-moistened for adhesion of new mortar
G-20.04.03P	lay out repaired ***masonry units***	repaired ***masonry units*** are laid out based on recorded placement to match appearance of existing or recently disassembled work
G-20.04.04P	apply mortar to unit and adjacent surfaces	mortar is applied to unit and adjacent surfaces for total joint integrity
G-20.04.05P	compress and tool joints	joints are compressed and tooled to match original
G-20.04.06P	mist joints or cover with wet burlap	joints are misted or covered with wet burlap to prevent joint failure

RANGE OF VARIABLES

masonry units include: bricks, stones, terracotta

	KNOWLEDGE	
	Learning Outcomes	**Learning Objectives**
G-20.04.01L	demonstrate knowledge of reinstalling ***masonry units*** and accessories	describe terminology associated with reinstalling ***masonry units*** and accessories
		describe historical and conventional masonry construction techniques
		describe ***documentation methods*** for restoration
		identify hazards, and describe safe work practices pertaining to reinstalling ***masonry units*** and accessories
		identify types of ***masonry units***, and describe their characteristics and applications
		describe techniques to prevent moisture loss during curing
		identify types and bonding properties of mortars, and describe their characteristics and applications
		identify types of ***admixtures***, and describe their characteristics and applications
		identify ***materials*** used for refacing, and describe their characteristics and applications
		identify epoxy anchoring systems, and describe their characteristics and applications
		identify masonry materials that may be affected by cleaning, sealing, waterproofing or damp proofing processes
G-20.04.02L	demonstrate knowledge of procedures to reinstall ***masonry units*** and accessories	identify tools and equipment used to reinstall ***masonry units*** and accessories, and describe their procedures for use
		describe procedures to reinstall ***masonry units*** and accessories

RANGE OF VARIABLES

masonry units include: bricks, stones, terracotta
documentation methods include: photography, sketching, results of off-site analysis
admixtures include: colouring, air entrainment agents, waterproofing, bonding agents
materials (for refacing) include: epoxies, acrylics, plastics, DHL

G-20.05 Cleans existing masonry surfaces

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

SKILLS

	Performance Criteria	Evidence of Attainment
G-20.05.01P	determine cleaning method	cleaning method is determined according to surface condition
G-20.05.02P	test cleaning method	cleaning method is tested on small area
G-20.05.03P	mix and apply ***restoration cleaning agents***	***restoration cleaning agents*** are mixed and applied according to manufacturers' specifications and environmental regulations
G-20.05.04P	prevent absorption of ***restoration cleaning agents***	area is pre-soaked to prevent absorption of ***restoration cleaning agents***
G-20.05.05P	use ***micro-abrasive cleaners***	***micro-abrasive cleaners*** are used according to material to avoid damage
G-20.05.06P	rinse cleaned area with water	cleaned area is rinsed with water to eliminate any traces of ***restoration cleaning agents***

RANGE OF VARIABLES

restoration cleaning agents include: acids, non-acid stain removers
micro-abrasive cleaners include: soda, water, nut shells, baking soda, glass

KNOWLEDGE

	Learning Outcomes	Learning Objectives
G-20.05.01L	demonstrate knowledge of cleaning existing masonry	describe terminology associated with cleaning existing masonry
		describe historical and conventional masonry construction techniques
		interpret environmental regulations pertaining to cleaning agents
		identify hazards, and describe safe work practices pertaining to cleaning surfaces and handling products or equipment
		identify types of ***masonry units***, and describe their characteristics and applications
		identify masonry materials that may be affected by cleaning processes
		describe types of soiling and stains

		identify ***micro-abrasive materials***, and describe their characteristics and applications
		identify ***restoration cleaning agents***, and describe their characteristics and applications
		identify ***application methods*** when cleaning, and describe their characteristics and applications
G-20.05.02L	demonstrate knowledge of procedures to clean existing masonry	identify tools and equipment used to clean existing masonry, and describe their procedures for use
		describe procedure to clean existing masonry
		describe operating procedures for cleaning equipment and their applications
		describe ***cleaning methods*** to avoid damage
		describe procedures to protect surrounding environment, materials or assemblies during and after cleaning

RANGE OF VARIABLES

masonry units include: bricks, stones, terracotta
micro-abrasive cleaners include: soda, water, nut shells, baking soda, glass
restoration cleaning agents include: acids, non-acid stain removers
application methods include: brushing, rolling, spraying
cleaning methods include: laser, chemicals

MAJOR WORK ACTIVITY H
Performs additional masonry

TASK H-21 Installs glass blocks

TASK DESCRIPTOR

Glass blocks are manufactured in various shapes (square, rectangular, corner), sizes, colours, fire ratings and clarities. They have insulating and light transmission properties. They are used for aesthetics, for security and privacy, and as waterproof partitions such as showers.

H-21.01 Prepares work area for installation of glass block

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

	SKILLS	
	Performance Criteria	**Evidence of Attainment**
H-21.01.01P	determine size of opening or dimension of wall for laying up glass blocks	size of opening or dimension of wall for laying up glass blocks is determined according to on-site measurements and drawings
H-21.01.02P	level base surface	base surface is levelled through adjustments
H-21.01.03P	prepare sill surface	sill surface is prepared according to manufacturers' specifications
H-21.01.04P	install track to set glass block	track to set glass block is installed according to manufacturers' specifications

	KNOWLEDGE	
	Learning Outcomes	**Learning Objectives**
H-21.01.01L	demonstrate knowledge of glass blocks, their characteristics and applications	identify terminology associated with glass blocks
		identify types, shapes and sizes of glass blocks, and describe their characteristics and applications
		identify types of mortars and associated additives, and describe their characteristics and applications

		identify types of reinforcement and anchors, and describe their characteristics and applications
H-21.01.02L	demonstrate knowledge of procedures to install glass blocks	identify tools and equipment used to install glass blocks, and describe their procedures for use
		describe procedures to prepare for installation of glass blocks
		describe base surface levelling procedures

H-21.02 Lays glass blocks

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

SKILLS

	Performance Criteria	Evidence of Attainment
H-21.02.01P	maintain mortar consistency	mortar consistency is maintained as glass blocks do not absorb moisture
H-21.02.02P	install spacers and expansion strips	spacers and expansion strips are installed in a uniform manner to keep mortar joints consistent
H-21.02.03P	lay up glass blocks	glass blocks are laid up to pattern and design to create a level and plumb finished product
H-21.02.04P	insert joint reinforcing and anchors	joint reinforcing and anchors are inserted to ensure structural integrity
H-21.02.05P	joint glass blocks	glass blocks are jointed to create an aesthetically pleasing product
H-21.02.06P	clean glass blocks	glass blocks are cleaned to remove excess mortar and dust while not scratching or damaging surface

KNOWLEDGE

	Learning Outcomes	Learning Objectives
H-21.02.01L	demonstrate knowledge of glass blocks, their characteristics and applications	identify terminology associated with glass blocks
		identify types, shapes and sizes of glass blocks, and describe their characteristics and applications
		identify types of mortars and associated additives, and describe their characteristics and applications

		identify types of reinforcement and anchors, and describe their characteristics and applications
		identify uses of spacers and expansion strips
		identify types of joint reinforcing and anchors, and describe their characteristics and applications
H-21.02.02L	demonstrate knowledge of procedures to install glass blocks	identify ***tools and equipment*** used to install glass blocks, and describe their procedures for use
		describe procedures to clean glass blocks
		describe procedures to joint glass blocks
		describe procedures to install glass blocks

RANGE OF VARIABLES

tools and equipment include: plastic jointer, spacers, sponge

TASK H-22 Installs ornamental and sculpted masonry

TASK DESCRIPTOR

Ornamental and sculpted masonry can be made from, or designed with, many types of materials such as brick, manufactured or sculpted stone. They are used as decorative additions to buildings. They are assembled into structures such as columns, sound reduction fences, cornices and hand rails.

H-22.01 Prepares for installation of ornamental and sculpted masonry units

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

	SKILLS	
	Performance Criteria	**Evidence of Attainment**
H-22.01.01P	determine placement of ornamental or sculpted unit or pattern	placement of ornamental and sculpted unit or pattern is determined according to drawings
H-22.01.02P	verify size, shape and weight of ***masonry units***	size, shape and weight of ***masonry units*** are verified prior to installation

H-22.01.03P	prepare surface area	surface area is prepared to receive ***masonry units*** for anchoring and fit
H-22.01.04P	determine size of opening or dimension of wall for laying up ornamental patterns	size of opening or dimension of wall is determined for laying up ornamental patterns according to on-site measurements and drawings

RANGE OF VARIABLES

masonry units include: bricks, stones, terracotta

	KNOWLEDGE	
	Learning Outcomes	**Learning Objectives**
H-22.01.01L	demonstrate knowledge of ornamental and sculpted masonry	identify ***masonry units***, and describe their characteristics and applications
		identify terminology associated with ornamental and sculpted masonry
		identify types of bonds and ***patterns***, and describe their characteristics and applications
		identify types of mortars and associated additives, and describe their characteristics and applications
		identify ***factors affecting durability***
		identify unique anchoring systems associated with ornamental and sculpted ***masonry units***, and describe their characteristics and applications
H-22.01.02L	demonstrate knowledge of procedures to prepare for installation of ornamental and sculpted masonry	identify tools and equipment used to install ornamental and sculpted masonry, and describe their procedures for use
		describe procedures to prepare for installation of ornamental and sculpted masonry

RANGE OF VARIABLES

masonry units include: bricks, stones, terracotta

patterns include: running, stack, herringbone, basket weave

factors affecting durability include: weather, expansion joints, flashing, capping

H-22.02 Installs ornamental and sculpted masonry units

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

SKILLS

	Performance Criteria	Evidence of Attainment
H-22.02.01P	select mortar	mortar is selected according to job specifications
H-22.02.02P	match mortar	mortar is matched to material to create an aesthetically pleasing finished product
H-22.02.03P	lay up ornamental or sculpted masonry units	ornamental or sculpted masonry units are laid up according to bonding and patterns in drawing
H-22.02.04P	finish joints	joints are finished to complete installation

KNOWLEDGE

	Learning Outcomes	Learning Objectives
H-22.02.01L	demonstrate knowledge of ornamental and sculpted masonry	identify terminology associated with ornamental and sculpted masonry
		identify ***masonry units***, and describe their characteristics and applications
		identify types of bonds and ***patterns***, and describe their characteristics and applications
		identify types of mortars and associated additives, and describe their characteristics and applications
		identify ***factors affecting durability***
		identify unique anchoring systems associated with ornamental and sculpted ***masonry units***, and describe their characteristics and applications
H-22.02.02L	demonstrate knowledge of procedures to install ornamental and sculpted ***masonry units***	identify tools and equipment used to install ornamental and sculpted ***masonry units***, and describe their procedures for use
		describe procedures to install ornamental and sculpted ***masonry units***

RANGE OF VARIABLES

masonry units include: bricks, stones, terracotta
patterns include: running, stack, herringbone, basket weave
factors affecting durability include: weather, expansion joints, flashing, capping

TASK H-23 Builds arches

TASK DESCRIPTOR

Arches can be built for ornamental and structural purposes. They are built in various styles such as gothic, Roman, segmental or jack arch. Arches are built to span areas and distribute the loads above them.

H-23.01 Prepares location for installation of arch

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

SKILLS

	Performance Criteria	Evidence of Attainment
H-23.01.01P	determine location of arch	location of arch is determined according to drawing
H-23.01.02P	lay up wall to abutment height (spring line)	wall is laid up to abutment height (spring line) to receive arch
H-23.01.03P	determine and install reinforcing	reinforcing is determined and installed in surrounding masonry buttresses, columns, piers and abutments according to drawings and job specifications
H-23.01.04P	build support system and template	support system and template are built to accept weight of arch

KNOWLEDGE

	Learning Outcomes	Learning Objectives
H-23.01.01L	demonstrate knowledge of arches	identify terminology associated with arches
		identify types, styles and sizes of arches, and describe their characteristics and applications
		identify ***materials for arch***, and describe their characteristics and applications
		identify ***template materials***, and describe their characteristics and applications

		describe geometric and arch mathematical concepts, and their applications
		describe arch diagrams, and their characteristics and application
H-23.01.02L	demonstrate knowledge of procedures to prepare location to build arch	identify tools and equipment used to build arches, and describe their procedures for use
		describe procedures to prepare location to build arch
		describe procedures to lay up wall
		describe procedures to install reinforcing
		describe procedures to build support system for template
		describe procedures to construct templates

RANGE OF VARIABLES

materials for arch include: brick, stone, block
template materials include: wood, steel

H-23.02 Builds template

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

	SKILLS	
	Performance Criteria	**Evidence of Attainment**
H-23.02.01P	determine type, location, span, rise and depth of arch template	type, location, span, rise and depth of arch template is determined according to architectural drawings and site dimensions
H-23.02.02P	determine structural strength requirements for template	structural strength requirements for template are determined according to drawings and job specifications
H-23.02.03P	lay out and cut template	template is laid out and cut according to architectural drawings and site dimensions
H-23.02.04P	assemble template	template is assembled using various ***template materials***

RANGE OF VARIABLES

template materials include: wood, steel

	KNOWLEDGE	
	Learning Outcomes	**Learning Objectives**
H-23.02.01L	demonstrate knowledge of arches	identify terminology associated with arches
		identify types, styles and sizes of arches, and describe their characteristics and applications
		identify ***materials for arch***, and describe their characteristics and applications
		identify ***template materials***, and describe their characteristics and applications
		describe geometric and arch mathematical concepts, and their applications
H-23.02.02L	demonstrate knowledge of procedures to construct template	identify tools and equipment used to build arches, and describe their procedures for use
		describe procedures to construct template

RANGE OF VARIABLES

materials for arch include: brick, stone, block
template materials include: wood, steel

H-23.03 Places template

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

	SKILLS	
	Performance Criteria	**Evidence of Attainment**
H-23.03.01P	position template on support system	template is positioned on support system
H-23.03.02P	adjust and shim template	template is adjusted and shimmed to achieve required degree of level and plumb
H-23.03.03P	shore template	template is shored to temporarily secure it while arch is being built

	KNOWLEDGE	
	Learning Outcomes	**Learning Objectives**
H-23.03.01L	demonstrate knowledge of arches	identify terminology associated with arches
		identify types, styles and sizes of arches, and describe their characteristics and applications
		identify ***materials for arch***, and describe their characteristics and applications
		identify ***template materials***, and describe their characteristics and applications
		describe geometric and arch mathematical concepts and their applications
H-23.03.02L	demonstrate knowledge of procedures to place template	identify tools and equipment used to build arches, and describe their procedures for use
		describe procedures to place template

RANGE OF VARIABLES

materials for arch include: brick, stone, block
template materials include: wood, steel

H-23.04 Installs arch masonry units

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

	SKILLS	
	Performance Criteria	**Evidence of Attainment**
H-23.04.01P	determine material lay-up requirements and keystone location	material lay-up requirements and keystone location is determined according to centre of arch calculations
H-23.04.02P	calculate and cut skewback	skewback is calculated and cut according to type of arch
H-23.04.03P	calculate spacing	spacing is calculated to determine lay out of arch masonry units (voussoirs)
H-23.04.04P	calculate number, size and shape of arch masonry units (voussoirs)	number, size and shape of arch masonry units (voussoirs) are calculated when building gauged arch
H-23.04.05P	shape arch masonry units (voussoirs)	arch masonry units (voussoirs) are shaped by cutting ***materials for arch*** to fit gauged arch

H-23.04.06P	lay arch masonry units (voussoirs)	arch masonry units (voussoirs) are laid according to calculations
H-23.04.07P	cut creepers	creepers are cut while laying up materials to create a uniform extrados
H-23.04.08P	install tray and step flashings	tray and step flashings are installed according to drawings and job specifications

RANGE OF VARIABLES

materials for arch include: brick, stone, block

	KNOWLEDGE	
	Learning Outcomes	**Learning Objectives**
H-23.04.01L	demonstrate knowledge of arches	identify terminology associated with arches
		identify types, styles and sizes of arches, and describe their characteristics and applications
		identify ***materials for arch***, and describe their characteristics and applications
		identify ***template materials***, and describe their characteristics and applications
		describe geometric and arch mathematical concepts, and their applications
		identify mortar setting times
H-23.04.02L	demonstrate knowledge of procedures to install arch masonry units (voussoirs)	identify tools and equipment used to build arches, and describe their procedures for use
		describe procedures to install arch masonry units (voussoirs)
		describe procedures to cut ***materials for arch*** and creepers
		describe procedures to install tray and step flashings

RANGE OF VARIABLES

materials for arch include: brick, stone, block

template materials include: wood, steel

H-23.05 Removes template

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

SKILLS

	Performance Criteria	Evidence of Attainment
H-23.05.01P	determine if mortar has cured	mortar is cured and has enough strength to hold once template has been removed
H-23.05.02P	remove any shims and shoring materials	shims and shoring materials are removed to release template
H-23.05.03P	remove template	template is removed without damaging arch material
H-23.05.04P	clean and point joints in arch soffit	joints are cleaned and pointed in arch soffit to finish arch

KNOWLEDGE

	Learning Outcomes	Learning Objectives
H-23.05.01L	demonstrate knowledge of arches	identify terminology associated with arches
		identify types, styles and sizes of arches, and describe their characteristics and applications
		identify mortar setting times
		identify shims and shoring materials, and describe their characteristics and applications
H-23.05.02L	demonstrate knowledge of procedures to remove templates	identify tools and equipment used to build and remove templates, and describe their procedures for use
		describe procedures to remove templates

APPENDIX A
ACRONYMS

AHJ	authorities having jurisdiction
CMU	concrete masonry units
CSA	Canadian Standards Association
DHL	dispersed hydrated lime
FLRA	field level risk assessments
LEED	Leadership in Energy and Environmental Design
NBC	National Building Code
OH&S	Occupational Health and Safety
PPE	personal protective equipment
PSI	personal safety information
PVC	polyvinyl chloride
RFI	request for information
SDS	Safety Data Sheets
SOP	Safe Operating Procedure
WHMIS	Workplace Hazardous Materials Information System

APPENDIX B

TOOLS AND EQUIPMENT / OUTILS ET ÉQUIPEMENT

Hand Tools / Outils à main

adjustable wrench	clé ajustable
banker bench	établi de maçon
boltcutter	coupe-boulon
brick tongs	pince à briques
brooms	balais
brushes	brosses
C-clamps	serre-joints en C
caulking gun	pistolet à calfeutrer
caulking tool	outil à calfeutrer
chisels	ciseaux
- pointed	- à joints
- flat	- plat
- brick set	- de briqueteur
- pitching	- à arrêtes
- straight	- droit
- splitting	- fendeuse
- toothed	- à dents
- plugging	- bédane
curry comb	étrille-peigne
drift pin	tige d’assemblage
grout bag	sac de coulis
hand tamper	régistre à réglage manuel
hammers	marteaux
- brick	- de briqueteur
- mash	- massette
- refractory	- pour matériaux réfractaires
- ball peen	- à panne ronde
- axe	- hache
- bush	- bouchardeur
- claw	- à panne fendue
- dead blow	- à amortisseur
- rawhide	- en cuir brut
- rubber mallet	- maillet en caoutchouc
- scutch	- à deux taillants
- sledge hammer	- masse
-facing hammer	- de façade

hawk	taloche
jointer	tire-joints
knives	couteaux
line blocks	bloc d’alignement
line stretchers/line holders	tendeurs à cordeau/supports à cordeau
line pins	piquets de cordeau
line trigs	baguette
manual splitter	fendeuse manuelle
mortar hoe	ratissoire à mortier
mortar board	table à mortier
pick axe	marteau à piquer
pliers	pinces
plug and feather (wedges and shims)	bouchon et couvre-joint (wedges and shims)
pogo stick	tige à resort
portable sprayer	pulvérisateur portatif
pry bar	barre-levier
raker (wheel type)	racloir à roue
sandbox	boîte à sable
sandscreen	crible à sable
scrapers	grattoirs
screwdrivers	tournevis
shims/spacers	cales/distanciers
shovels	pelles
slicker (tuck pointer)	lissoir (fer à joint plat)
socket set/wrench	jeu de douilles et clefs à douilles
spacers	cales d'espacement
sponges	éponges
staple gun	pistolet-agrafeur
tarpaulin	bâche
templates	gabarits
trammel points	pointes de compas à verge
trimmers	rasoirs effileurs
trowels	truelles
- mason’s	- à briqueter
- margin	- carrée
- pointing	- à joints
- bucket	- à bout carré
- buttering	- de maçon
- duck billed	- à bec de canard
venting tool	outil de ventilation
water bucket	seau à eau
water drum	baril à eau

water hose	tuyau d’arrosage
wedgers	ancrages à cale
wheelbarrow	brouette
wire snips	cisailles

Power, Hydraulic, Pneumatic, Powder-actuated, and Welding Tools and Equipment / Outils et équipement mécaniques, hydrauliques, pneumatiques, à encrage et de soudage

air socks	manche à air
chain block	palan à chaîne
chop saw	scie à tronçonner
circular saw	scie circulaire
compressors	compresseurs
concrete vibrator	vibrateur à béton
couplers	coupleurs
diamond or abrasive disk	disque ponceur et à diamant
dollies/pump jacks	chariots et chevalets de pompage
drill	perceuse
dustless saw and vacuum	scie et aspirateur sans poussière
extension cord	rallonge électrique
generators	génératrices
grease gun	fusil à graisser (graisseur)
grinder	meuleuse à disque
grout guns	pistolet à mortier
grout pump	pompe à injection
gunite machine and hoses	guniteuse et tuyaux souples
hammer drill	marteau perforateur
hydraulic splitter	fendeuse hydraulique
hydraulic winches	treuils hydrauliques
jackhammer	marteau-piqueur
jig saw	scie sauteuse
laser cleaner	système de nettoyage au laser
masonry table saw	scie à maçonnerie d’établi
mortar box	auge à mortier
mortar buggy	chariot à mortier
mortar mixer	mélangeur à mortier
mortar silos	silo à mortier
oscillating saw	scie oscillante
pneumatic chisel	burin pneumatique
pneumatic gun	pistolet pneumatique
pneumatic hammer	marteau pneumatique

pneumatic hoses	tuyau pneumatique
pneumatic tamper	pilonneuse pneumatique
portable masonry saw (quick cut saw)	scie à maçonnerie portative
powder-actuated fastening tool	pistolets à ancrage
pressure washers	pulvérisateur à jet d’eau sous pression
propane and diesel heater	appareil de chauffage au propane et au diesel
shotcrete	béton projeté
tiger torch	chalumeau à large embouchure
vacuum cleaner	aspirateur

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

apron	tablier
eye protection	protection de l’œil
face shields	écrans faciaux
fire blankets	couvertures anti-feu
fire extinguisher	extincteur portatif
first aid kit	trousse de premiers soins
fresh air respirator	aérateur
gas detection equipment	matériel de détection de gaz
gloves	gants
hardhat	casque protecteur
hearing protection	protection auditive
heat and cold protection	protecteur contre la chaleur et le froid
insulated gloves	gants isolants
knee pads	genouillères
lock-out tags/locks	étiquettes et cadenas de verrouillage
respiratory protection	protection respiratoire
safety boots/footwear	bottes et chaussures de sécurité
safety harness and fall arrest system	baudrier de sécurité et dispositif antichute
safety vest	gilet de sécurité
skin barrier cream	crème protectrice

Measuring and Layout Tools and Equipment / Outils et équipement de mesure et de traçage

bricklayer’s tape	ruban à mesurer pour briqueteur
builder’s level	niveau de bâtisseur
chalk line	cordeau à craie
gauge rod / storey pole	jauge / baguette-jauge
laser level	niveau à laser
line block	bloc d’alignement

mason’s level	niveau de maçon
mason’s line	cordeau de maçon
mason’s spacing rule	règle d’espacement de maçon
measuring tape	ruban à mesurer
plumb-bob	fil à plomb
square (bevel, triangle)	équerre (biseau et niveau)
straightedge	raclette
transit	théodolite

Rigging, Hoisting and Lifting Equipment, Access Equipment and Scaffolding / Équipement de levage et échafaudage

block and tackle	palan
boom lifts	girafes
bosun’s chair	sellette
bracing	contreventement
cranes	grues
elevators	élévateurs
fork extensions	rallonges de fourche
forklift/telehandler	chariot élévateur à fourche
handcart	chariot à bras
mast climber	plateformes motorisées sur mât
ladders	échelles
lewis pins	tiges de louves
mud sills	lisse de terre
planks	madriers
powered boom platform	élévatrice
powered platforms	plateformes élévatrices
push-around powered platforms	élévatrices à flèche
scaffolds and their components	échafaudages et leurs composants
scissor lifts	plateformes élévatrices à ciseaux
screw jacks	vérin à vis
shackles	manilles
shoring	étaiement
slings	élingues
spreader beam	palonnier
stairs	escaliers
stone clamps	brides à pierres
suspended platforms	plateformes élévatrices élingues
suspended scaffolds	échafaudages suspendus
swing stage	échafaudage volant
tubular systems	systèmes tubulaires

work cages	nacelles-cages

APPENDIX C
GLOSSARY / GLOSSAIRE

accelerator	a material that speeds the initial setting time of concrete or mortar.	**accélérateur**	matériau accélérant la prise ou le durcissement du béton ou du mortier.
air barrier	a material used in the building envelope to retard the passage of air.	**pare-air**	matériau utilisé dans l'enveloppe d'un bâtiment pour freiner le passage de l'air.
alumina	a mineral contained in clay used for brickmaking and in refractory mortars.	**alumine**	minéral que l'on retrouve dans l'argile et qui sert à la fabrication des briques et des mortiers réfractaires.
angle iron	a structural section of steel in the form of a 90 degree angle used, in certain situations, to support brickwork.	**cornière**	profilé d'acier de charpente en forme de L utilisé dans certains cas pour soutenir un ouvrage de briques.
ash dump	a trap door for ashes in the floor of a fireplace leading to a chute.	**puit à cendre**	trappe d'évacuation pour les cendres située sur le plancher d'un foyer et qui aboutit à une glissière.
backup wall	the part of a masonry wall behind the exterior facing.	**paroi de fond**	partie d'un mur de maçonnerie située derrière le parement extérieur.
batter	recessing or sloping masonry in successive courses; the opposite of a corbel.	**incliner**	renfoncer ou incliner la maçonnerie en coulées successives; le contraire d'encorbeller.
buttering	applying mortar to a masonry unit with a trowel.	**graissage**	application de mortier sur un élément de maçonnerie à l'aide d'une truelle.
castables	a refractory concrete that can be installed by pouring, gunning, shotcreting and hand packing.	**matériaux réfractaires coulables**	béton réfractaire qui peut être installé en utilisant des techniques de coulage, de gunitage, de projection et de bourrage manuel.
cavity wall	a multi-wythe wall built of masonry units arranged to provide a continuous air space.	**mur creux**	mur composé d'éléments de maçonnerie disposés de façon à fournir un espace d'air continu.
cement	a burned mixture of clay and limestone pulverized (crushed) for making mortar or concrete.	**ciment**	mélange d'argile et de calcaire calciné et pulvérisé (moulu) destiné à la préparation de béton ou de mortier.
control joint	(movement joint) a joint or space to allow for dimensional change of parts of a structure due to expansion, shrinkage, temperature variations or other causes.	**joint de contrôle**	(joint de dilatation) un joint ou un espace permettant un changement dimensionnel aux parties de la structure causé par l'expansion, le retrait, les variations de température ou autres causes.

corbel	to build a projection or one of a series of projections, of masonry, brick, or concrete built into a wall or any standing member, each projecting progressively farther from its anchoring point and used to support an overhanging member above.	**encorbeller**	construire une saillie ou une série de saillies, en maçonnerie, en brique ou en béton, encastrées dans un mur ou dans tout élément debout, chacune s'éloignant progressivement de son point d'ancrage et servant à soutenir un élément en surplomb au-dessus.
course	one of the continuous horizontal layers of units, bonded with mortar in masonry.	**assise**	une des couches horizontales continues d'unités liées par du mortier dans la maçonnerie.
curtain wall	a non- load-bearing wall built for the enclosure of a building	**mur-rideau**	mur non porteur formant l'enveloppe d'un bâtiment.
damp proofing	treatment of a masonry surface to resist the passage of water through vapour, capillary action and gravity; not intended for areas that experience hydrostatic pressure.	**étanchéisation**	traitement d'une surface de maçonnerie pour résister au passage de l'eau par la vapeur, à l'action capillaire et à la gravité; non destiné aux zones soumises à une pression hydrostatique.
dispersed hydrated lime (DHL) injections (when using anchors)	a hydrated lime putty that has been spun so thin that the molecules separate, allowing it to be injected into very small cracks.	**chaux hydratée dispersée posée par injection (lors de l'utilisation d'ancrages)**	un mastic de chaux hydratée qui a été filé si finement que les molécules se séparent, ce qui permet de l'injecter dans de très petites fissures.
dowels	(pins) round metal bars used to connect two sections of masonry.	**goujons**	(tiges) barres métalliques rondes servant à relier deux sections de maçonnerie.
Dutchman repair	a method of repair involving carefully fitting a new piece of stone into a pocket cut into the existing stone and finishing the new piece to match the surrounding existing stone.	**réparation par enchâssement**	une méthode de réparation qui consiste à ajuster avec soin un nouveau morceau de pierre dans une cavité découpée dans la pierre existante et à finir la pièce de façon qu'elle soit assortie à la pierre existante.
expansion joint (movement joint)	is a joint in a concrete or masonry structure designed to permit expansion without damage to the structure.	**joint de dilatation**	est un joint, dans du béton ou dans une maçonnerie, conçu pour permettre l'expansion d'une structure sans dommages.
extrados	the upper or exterior curve of an arch.	**extrados**	surface supérieure ou extérieure d'un arc.
face	the exposed surface of a wall or masonry unit.	**face**	surface apparente d'un mur ou d'un élément de maçonnerie.
flashing	shielding material (often sheet metal) put around building openings to prevent water penetration and/or provide water drainage.	**solin**	matériau de protection (souvent de la tôle) placé autour des ouvertures du bâtiment servant à empêcher l'infiltration de l'eau ou assurer l'évacuation de cette dernière.
footing	the broadened base of a foundation wall or other superstructure that distributes load to ground.	**semelle**	base élargie d'un mur de fondation ou d'une autre superstructure qui distribue la charge au sol.
foundation wall	that portion of a load-bearing wall below the level of the adjoining grade, or below first floor beams or joists.	**mur de fondation**	partie d'un mur porteur au-dessous du niveau du sol ou en dessous des poutres ou solives du rez-de-chaussée.

grout	a cementitious compound of high water-cement ratio that permits it to be poured into spaces within masonry walls. Grout consists of water, Portland cement, lime and aggregate.	**coulis**	composant cimentaire à forte teneur en eau et qui peut donc être coulé facilement dans les cavités des murs de maçonnerie. Le coulis est fait avec de l'eau, du ciment Portland, de la chaux et de l'agrégat.
gunite machine	a pressurized applicator machine for refractory.	**guniteuse**	machine d'application sous pression pour les produits réfractaires.
hearth	(inner) that portion of a fireplace parallel to the floor, upon which the fire is built; (outer) that portion of a fireplace that is the non-combustible area in front of the firebox opening that protects the floor from flying sparks.	**âtre**	(intérieur) surface d'un foyer à feu parallèle au sol, sur laquelle on fait le feu; (extérieur) surface d'un foyer à feu qui est la zone incombustible devant l'ouverture de la boîte à feu qui protègle le sol contre les étincelles**.**
high temperature mortar	a mortar used for refractories (air setting or heat setting).	**mortier pour hautes températures**	mortier utilisé pour les matériaux réfractaires (durci à l'air ou à la chaleur).
insulation	a material with above-average thermal resistance, that inhibits the flow of heat.	**isolant**	un matériau d'une résistance thermique au-dessus de la moyenne, qui empêche le passage de la chaleur.
joint	the narrow space between adjacent stones, bricks or other building blocks usually filled with mortar.	**joint**	espace étroit entre deux pierres, deux briques ou deux autres éléments de maçonnerie. Il est généralement rempli de mortier.
kerf	a slot in the stone with a saw blade for the insertion of anchors.	**rainurer**	une entaille dans la pierre avec une scie afin d'insérer des ancrages.
keystone	wedge-shaped stone at the crown of an arch.	**clé de voûte**	pierre en forme de coin au sommet d'un arc.
lime	the result of limestone burned in a kiln until the carbon dioxide has been driven off.	**chaux**	obtenu par calcination de calcaire dans un four jusqu'à l'élimination du dioxyde de carbone.
lintel	a load-bearing element placed over a wall opening.	**linteau**	un élément porteur placé au-dessus d'une ouverture dans un mur.
load-bearing wall	one which supports a vertical load in addition to its own weight.	**mur porteur**	mur qui soutient une charge verticale en plus de son propre poids.
masonry	brick, block, tile, terracotta, and stone or combination of masonry products bonded with mortar.	**maçonnerie**	ouvrage de briques, de blocs, de carreaux, de terre cuite et de pierres, ou combinaison de produits de maçonnerie jointoyés avec du mortier.
masonry cement	a mill-mixed cement to which sand and water must be added.	**ciment de maçonnerie**	ciment mélangé en usine et auquel on ajoute de l'eau et du sable.
mortar	a mixture of cementitious materials, fine aggregate and water.	**mortier**	mélange de matériaux à base de ciment, d'agrégats fins et d'eau.
parging	the process of applying a coat of cement mortar on a substrate.	**crépi**	application d'une couche de mortier de ciment sur un substrat.
pilaster	a square or rectangular column forming part of a wall, partially projecting from it and bonded to it.	**pilastre**	une colonne de forme carrée ou rectangulaire faisant partie d'un mur, faisant partiellement saillie de celui-ci et liée à lui.

pointing	compressing mortar to fill voids in joints	**jointoiement**	comprimer le mortier pour combler les vides dans les joints.
reglet	a groove in material or structure to accept flashing; also a slot to accept a dovetail anchor.	**coupe en engravure**	rainure dans un matériau ou une structure pour la mise en place de solins; également une fente pour recevoir un ancrage à queue d'aronde.
reinforcing	steel bars, wire mesh and reinforcement wire which are embedded in concrete or mortar to give extra tensile strength to control movement in masonry assemblies or concrete slabs.	**armature**	barres d'acier, grillage métallique et fils d'armature placés dans le béton ou le mortier pour augmenter la résistance à la traction supplémentaire afin de contrôler les mouvements dans les assemblages de maçonnerie ou les dalles de béton.
repointing	the removal and replacement of damaged mortar with new mortar.	**rejointoiement**	enlèvement et remplacement du mortier endommagé par un nouveau mortier.
retardant	a set inhibitor to delay the setting and curing time of concrete and mortar.	**retardateur**	inhibiteur retardant la prise et le durcissement du béton et du mortier.
shotcrete	a wet concrete applied under pressure	**béton projeté**	béton mouillé placé au jet
smoke chamber	the space in a fireplace immediately above the throat where the smoke gathers before passing into the flue.	**avaloir (chambre à fumée)**	partie d'un foyer à feu ouvert située directement au-dessus de la gorge et où la fumée s'accumule avant de passer dans le conduit de fumée.
stone cladding	masonry units that are mechanically fastened to a structural backup wall. Stone used for cladding are typically large and are pre-finished in a stone-cutting and finishing shop.	**parements de pierre**	éléments de maçonnerie qui sont fixés mécaniquement à une paroi de fond; les pierres utilisées pour le revêtement sont généralement larges et préfinies dans un atelier de taillage et de finition de pierres.
surface bonded masonry units	thin masonry components installed directly to prepared substrates. They are used for aesthetic purposes.	**éléments liants de surface de maçonnerie**	minces composants de maçonnerie installés directement sur des substrats préparés. Ils sont utilisés à des fins esthétiques.
template	any form over which masonry may be installed.	**gabarit**	toute forme sur laquelle la maçonnerie peut être installée.
tie	any unit of material that connects masonry units to each other or the substrate.	**agrafe**	toute pièce de matériau qui lie une maçonnerie à une autre maçonnerie ou au substrat.
veneer wall	a non-load-bearing wall securely anchored to a non-masonry backup wall.	**mur à placage**	un mur non-porteur solidement épinglé à un mur de soutien non maçonné.
voussoir	masonry units which form an arch.	**voussoir**	éléments de maçonnerie formant un arc.
waterproofing	treatment of a below-grade masonry surface to prevent the passage of water by vapour pressure, capillarity, gravity or hydrostatic pressure.	**imperméabilisation**	traitement d'une surface de maçonnerie souterraine pour empêcher le passage de l'eau par pression de vapeur, capillarité, gravité ou pression hydrostatique.

weep holes	small openings left in the outer walls of masonry construction as an outlet for water to move outside the wall and evaporate.	**chantepleures**	petites ouvertures laissées dans les murs extérieurs d'une construction en maçonnerie, pour permettre à l'eau de s'écouler à l'extérieur du mur.
winterization	the process of organizing the work site for winter operation, which includes heating and hoarding of work area, providing proper storage of materials, warming sand and water and protecting masonry work in progress.	**préparation pour l'hiver**	procédé consistant à préparer le chantier pour qu'on puisse y travailler l'hiver; cela comprend le chauffage de l'aire de travail, la construction des palissades de chantier, le rangement adéquat des matériaux, le réchauffage du sable et de l'eau et la protection des ouvrages de maçonnerie au fur et à mesure de l'avancement des travaux.
wythe	a continuous vertical section of masonry one unit in thickness.	**paroi**	une section verticale continue de maçonnerie d'une unité d'épaisseur.