Bricklayers

NOC 7281

Introduction

Bricklayers lay brick, concrete block, stone and other similar materials to construct or repair walls, arches, chimneys, fireplaces and other structures in accordance with blueprints and specifications. They are employed by construction companies and bricklaying contractors or they may be self-employed.

The most important Essential Skills for Bricklayers are:

- Document Use
- Numeracy
- Problem Solving
- Job task planning and organizing

Document Sections

- Reading Text
- Document Use
- Writing
- Numeracy
- Oral Communication
- Thinking Skills
    - Problem Solving
    - Decision Making
    - Critical Thinking
    - Job Task Planning and Organizing
    - Significant Use of Memory
    - Finding Information
- Working with Others
- Computer Use
- Continuous Learning
- Notes

A. Reading Text

Reading Text

Tasks	Complexity Level	Examples
Typical	1 to 2	Bricklayers: • may read change orders issued by general contractors. (1) • read manufacturers' brochures and flyers from suppliers regarding masonry materials. (2) • read building code requirements and job specifications relating to materials, types of ties, bonding requirements, mortar strength and floating. (2) • may read correspondence and faxes from suppliers or contractors. (2) • read Workplace Hazardous Materials Information System (WHMIS) materials and Material Safety Data Sheets (MSDS) to understand the chemical composition of products and possible hazards. (2)
Most Complex	2 to 3	• read directions on cement bags for mixing mortar and read step by step directions for the application of chemicals. (2) • may read policy statements from a company, setting out the company's rules and expectations. (2) • read precautions about the use of power tools and safety directions that are issued with equipment such as harnesses and swing stages. (2) • may read minutes of safety meetings. (2) • may read city bylaws relating to fireplaces and clearances for combustibles. (3) • read information in manuals concerning such matters as the proper use of personal protective clothing and the safe installation of a wood stove. (3)

Reading Summary

The symbol √ is explained in the Use of Symbols section.

	Purpose for Reading			
Type of Text	**To scan for specific information/To locate information**	**To skim for overall meaning, to get the 'gist'**	**To read the full text to understand or to learn**	**To read the full text to critique or to evaluate**
Forms				
Labels	√	√	√	
Notes, Letters, Memos	√	√	√	
Manuals, Specifications, Regulations	√	√	√	
Reports, Books, Journals				

B. Document Use

Document Use

Tasks	**Complexity Level**	**Examples**
Typical	1 to 2	Bricklayers: • may read lists which provide dispatch information. (1) • complete checklists, such as a hazard assessment sheet or a work site inspection sheet. (1) • read Workplace Hazardous Materials Information System (WHMIS) symbols to understand hazards associated with products. (1) • read schedules, such as schedules of mill shutdowns in order to understand when refractory work is required. (2) • read tables which appear on product labels. (2) • fill in forms such as estimate forms, time sheets and materials sheets. (2)
Most Complex	2 to 3	• refer to bar graphs showing time frames and critical path charts showing due dates for various parts of a project. (2) • interpret blueprints to establish the height and length of walls, the thickness required and the materials to be used. (3) • read assembly drawings for arches and fireplaces, showing a numbered display of all the parts and how they are to be put together. (3)

Examples

- make sketches of items to be built in order to provide explanations to customers.
- may make sketches and shop drawings, normally not to scale, to show to contractors or other bricklayers.

Document Use Summary

- Read signs, labels or lists.
- Complete forms by marking check boxes, recording numerical information or entering words, phrases, sentences or text of a paragraph or more. The list of specific tasks varies depending on what was reported.
- Read completed forms containing check boxes, numerical entries, phrases, addresses, sentences or text of a paragraph or more. The list of specific tasks varies depending on what was reported.
- Read tables, schedules or other table-like text (e.g., read work shift schedules).
- Create tables, schedules or other table-like text.
- Enter information on tables, schedules or other table-like text.
- Obtain specific information from graphs or charts.
- Interpret information on graphs or charts.
- Construct or draw graphs or charts.
- Recognize common angles such as 15, 30, 45 and 90 degrees.
- Draw, sketch or form common shapes such as circles, triangles, spheres, rectangles, squares, etc.
- Interpret scale drawings (e.g. blueprints or maps).
- Take measurements from scale drawings.
- Read assembly drawings (e.g. those found in service and parts manuals).
- Create assembly drawings.
- Make sketches.
- Obtain information from sketches, pictures or icons (e.g., computer toolbars).

C. Writing

Writing

Tasks	Complexity Level	Examples
Typical	1 to 2	Bricklayers: • write reminder notes to themselves and co-workers regarding supplies or work to be done. (1) • fill in time sheets and mileage forms. (1) • write lists of materials. (1) • may revise work orders. (2)
Most Complex	1 to 2	• may write estimate sheets to provide details on cost of materials and labour required to complete a job. (2) • may write incident reports. (2)

Writing Summary

The symbol √ is explained in the Use of Symbols section.

	Purpose for Writing						
Length	**To organize/ to remember**	**To keep a record/to document**	**To inform/ to request information**	**To persuade/ to justify a request**	**To present an analysis or comparison**	**To present an evaluation or critique**	**To entertain**
Text requiring less than one paragraph of new text	√	√	√				
Text rarely requiring more than one paragraph			√				
Longer text							

D. Numeracy

The symbol √ is explained in the Use of Symbols section.

Numeracy

Tasks	Complexity Level	Examples
√ Money Math	1 to 3	Bricklayers: • may take money and provide change. (Money Math), (1) • calculate the cost of jobs and prepare invoices, including GST and other applicable taxes. (Money Math), (2)
√ Measurement and Calculation Math	1 to 3	• measure the length, height and width of walls, fireplaces or other structures to be built. (Measurement and Calculation Math), (1) • may weigh epoxies and materials for refractory work. (Measurement and Calculation Math), (1)
√ Data Analysis Math	2	• calculate the angles of arches to construct doorways or window openings. (Measurement and Calculation Math), (3) • calculate the average time spent on various types of jobs. (Data Analysis Math), (2)
√ Numerical Estimation	1 to 2	• estimate the amount of water that might already be in sand on a wet day, in order to add a correspondingly less amount of water when preparing mortar. (Numerical Estimation), (1) • estimate the length of time it will take to complete a job. (Numerical Estimation), (2) • estimate the amount of mortar required to complete a job, such as a brick wall. (Numerical Estimation), (2)

Math Skills Summary

a. Mathematical Foundations Used

The symbol √ is explained in the Use of Symbols section.

Mathematical Foundations Used

Code	Tasks	Examples
	Number Concepts	
√	Whole Numbers	Read and write, count, round off, add or subtract, multiply or divide whole numbers. For example, counting the number of courses of brick in a wall.
√	Rational Numbers - Fractions	Read and write, add or subtract fractions, multiply or divide by a fraction, multiply or divide fractions. For example, measuring bricks and blocks and portions that have been cut to fit particular spaces; measuring in sixteenths of an inch when setting the height of bricks.
√	Rational Numbers - Decimals	Read and write, round off, add or subtract decimals, multiply or divide by a decimal, multiply or divide decimals. For example, preparing an invoice; measuring in decimals, such as .05 millimetres.
√	Rational Numbers - Percent	Read and write percents, calculate the percent one number is of another, calculate a percent of a number. For example, using a percentage of several colours in a brick wall (60 % of the bricks are one colour and 40 % are another); calculating the percentage waste when cutting bricks to build arches.
	Patterns and Relations	
√	Equations and Formulae	Solve problems by constructing and solving equations with one unknown. Use formulae by inserting quantities for variables and solving. Write, simplify and solve two variable algebraic problems. Write, simplify and solve quadratic equations. determining the area of a wall using a formula of length x height = area.

√	Use of Rate, Ratio and Proportion	Use a rate showing comparison between two quantities with different units. Use a ratio showing comparison between two quantities with the same units. Use a proportion showing comparison between two ratios or rates in order to solve problems. For example, using a ratio of water to mortar and a ratio of water to acid (10:1); using a ratio of bricks to cement (i.e., a bag of cement to 250 bricks). Using scale drawings.
Shape and Spatial Sense		
√	Measurement Conversions	Perform measurement conversions. For example, converting the dimensions of building materials from imperial to metric (yards to metres, gallons to litres, pounds to kilograms).
√	Areas, Perimeters, Volumes	Calculate areas. Calculate perimeters. Calculate volumes. For example, calculating the area of a surface to be bricked or of a brick panel to be replaced; calculating the perimeter of a driveway or garden to be edged in brick.
√	Geometry	Use geometry. For example, using geometric calculations to get the curvature for an elliptical arch.
√	Trigonometry	Use trigonometry. For example, determining the height of a wall through trigonometric calculations, using sines, cosines and tangents. Recognizing common angles. Drawing, sketching and forming common forms and figures.
Statistics and Probability		
√	Summary Calculations	Calculate averages. Calculate rates other than percentages. Calculate proportions or ratios. For example, calculating the average time spent on jobs. Using tables, schedules or other table-like text. Using graphical presentations.

b. How Calculations are Performed

- In their heads.
- Using a pen and paper.
- Using a calculator.

c. Measurement Instruments Used

- Time. For example, using a clock or watch.
- Weight or mass. For example, using an electronic scale.
- Distance or dimension. For example, using a tape measure.
- Liquid volume. For example, using a calibrated bucket or a can.
- Temperature. For example, using a thermometer.
- Angles. For example, using protractors.
- Use the SI (metric) measurement system.
- Using the imperial measurement system.

E. Oral Communication

Oral Communication

Tasks	Complexity Level	Examples
Typical	1 to 2	Bricklayers: • talk to suppliers and delivery personnel regarding the placement of materials and telephone suppliers to place orders for a quick supply of materials which have run out. (1) • communicate with co-workers to discuss procedures and deadlines. (2) • give directions to apprentices and helpers on such matters as how to set up rigging, providing them with the rationale for why work is to be done a certain way. (2)
Most Complex	1 to 2	• liaise with foremen to discuss the needs of the customer or to discuss problems, such as a backup wall which is out of plumb. (2) • may talk to superintendents about changes in layout. (2) • co-ordinate activities with other trades on site by communicating with foremen and leadhands. (2) • may negotiate price with customers. (2) • may participate in safety meetings with co-workers and supervisors. At such meetings they bring their safety concerns to the group. They would point out problems, such as holes that need to be covered, debris which should be removed or short planking on a swing stage. (2)

Modes of Communication Used

- In person.
- Using a telephone.
- Using specialized communications signals.

Environmental Factors Affecting Communication

Communicating with co-workers who are some distance away or working at a different height presents a challenge.

Oral Communication Summary

The symbol √ is explained in the Use of Symbols section.

	Purpose for Oral Communication (Part I)					
Type	**To greet**	**To take messages**	**To provide /receive information, explanation, direction**	**To seek, obtain information**	**To co-ordinate work with that of others**	**To reassure, comfort**
Listening (little or no interaction)						
Speaking (little or no interaction)						
Interact with co-workers			√	√	√	
Interact with those you supervise or direct			√	√	√	√
Interact with supervisor/ manager			√	√	√	
Interact with peers and colleagues from other organization						
Interact with customers/ clients/ public			√	√		
Interact with suppliers, servicers			√	√		
Participate in group discussion			√	√		
Present information to a small group						
Present information to a large group						

The symbol √ is explained in the Use of Symbols section.

	Purpose for Oral Communication (Part II)					
Type	**To discuss (exchange information, opinions)**	**To persuade**	**To facilitate, animate**	**To instruct, instill understanding, knowledge**	**To negotiate, resolve conflict**	**To entertain**
Listening (little or no interaction)						
Speaking (little or no interaction)						
Interact with co-workers	√			√	√	
Interact with those you supervise or direct	√			√	√	
Interact with supervisor/ manager	√	√		√	√	
Interact with peers and colleagues from other organization						
Interact with customers/ clients/ public	√			√		
Interact with suppliers, servicers	√					
Participate in group discussion	√			√		
Present information to a small group						
Present information to a large group						

F. Thinking Skills

1. Problem Solving

Problem Solving

Tasks	Complexity Level	Examples
Typical	1 to 2	Bricklayers: • may find that weather conditions deteriorate while carrying out a project, threatening to damage the part of the work already completed. They quickly build sheltering materials to keep the brick dry. (1) • may find that design changes have been made on a job which are not reflected on the prints and specifications. They must adapt to the situation by making adjustments to the amount of material required and changing the length of time specified in the contract to complete the job. (2)
Most Complex	2 to 3	• may find that an electrician's rerouting of piping must go through the brick work completed. They demolish part of the existing work in order to accommodate the piping. (2) • may find that materials have not arrived for a specific job. They either reschedule the job or speak to the foreman or customer about the possibility of substituting other available materials. (2) • may find, when working with a partner, that a "hog in the wall" appears (one tier higher than the other). They check measurements to see where the problem occurred and determine who has to rip out his work. (2) • may receive an architectural layout for an arch that they know from experience will not work well. They seek permission to improvise based on past successes or write a formal request for a change order outlining the modification which will lead to a more effectively executed arch. (3)

2. Decision Making

Decision Making

Tasks	Complexity Level	Examples
Typical	2	Bricklayers: • decide which types of materials to use for a specific job. (2) • decide what mixing needs to be done to obtain a particular shade of mortar to match heritage brickwork. (2) • decide whether to go ahead with a modification suggested by a customer or whether to clear it with the foreman first. They assess the cost implications when making this decision. (2) • decide whether to use a chipped brick or mortar which is a slightly different colour than the last batch. (2)
Most Complex	2	

3. Critical Thinking

Critical Thinking information was not collected for this profile.

4. Job Task Planning and Organizing

Job Task Planning and Organizing

Complexity Level	Examples
2	Own job planning and organizing • Bricklayers' planning is generally short term. They plan several days in advance for the materials and equipment that they will need on the job. They must co-ordinate their daily activities with other trades, such as plumbers, electricians and carpenters. This coordination is critical to the success of the job. They generally have one source for work assignments, although on large sites, they may respond to the needs of several foremen. • Bricklayers may encounter disruptions to the job, caused by weather, materials not coming in on time, or the need to juggle tasks to meet the needs of other trades on site. They may move to other jobs until these disruptions have abated.

5. Significant Use of Memory

Examples

- remember details of building codes and regulations.
- remember the necessary clearances for combustible materials.
- remember measurements relating to current jobs.
- remember the number of bricks laid in the day so that they can establish if their production level meets expectations.
- may remember formulae used in preparing estimates.

6. Finding Information

Finding Information

Tasks	Complexity Level	Examples
Typical	1 to 3	Bricklayers: • call suppliers or hardware stores to find where they can locate tools such as slickers and flat joiners. (1) • obtain building code updates and fire code regulations from government regulatory agencies or building trade offices. (2) • seek advice on restoration jobs from stone masons. (2) • may find information on job tendering on the Internet. (2) • refer to manuals and texts to get information on the construction of various types of arches. (3)

G. Working with Others

Participation in Supervisory or Leadership Activities

- Participate in formal discussions about work processes or product improvement.
- Have opportunities to make suggestions on improving work processes.
- Monitor the work performance of others.
- Inform other workers or demonstrate to them how tasks are performed.
- Orient new employees.
- Assign routine tasks to other workers.
- Identify training that is required by, or would be useful for, other workers.

H. Computer Use

Computer Use

Tasks	Complexity Level	Examples
Typical	2	Bricklayers: • may use word processing, for example, they may type an estimate. (2) • may use a database, for example, they may refer to customer information on a database. They may also check engineer changes on CAD drawings on the on-site computer of the general contractor. (2) • may use communications software, for example, they may use the Internet to find tendering information. (2)

Computer Use Summary

- Use word processing.
- Use a database.
- Use communications software.

I. Continuous Learning

How Learning Occurs

Learning may be acquired:

- As part of regular work activity.
- From co-workers.
- Through training offered in the workplace.
- Through reading or other forms of self-study
  - at work.
  - on worker's own time.
  - using materials available through work.
  - using materials obtained on worker's own initiative.
  - using materials obtained through a professional association or union.
- Through off-site training
  - during working hours at no cost to the worker.
  - partially subsidized.

J. Other Information

In addition to collecting information for this Essential Skills Profile, our interviews with job incumbents also asked about the following topics.

Attitudes
The bricklayers interviewed felt that bricklayers should be patient, adaptable and precise. They should be able to function in a team environment so that their work will mesh smoothly with the work of the other trades. Bricklayers should enjoy working outside and should be comfortable with working at considerable heights on swing stages or ladders. They should be in good physical condition and should be able to work well without close supervision. They should display dexterity and have excellent eye-hand coordination. Bricklayers should be attentive to style and have a sense of artistry and creativity. They should have pride in their work.

Future Trends Affecting Essential Skills
As new chemical products appear on the market, bricklayers will have a greater need for keeping up to date in their field. There will therefore be a heightened requirement for reading textual materials relating to new products and the safety implications of their use. The trade may become more diversified, with heritage restoration work creating new challenges. Bricklayers may need to learn just as much about old methods as about the new methods which they need to apply in cutting-edge applications of their craft. This will lead to the need for continuous learning and adaptability. The resurgence of customer interest in arches and fireplaces will lead to new training needs as they seek to use a variety of designs.

K. Notes

This profile is based on interviews with job incumbents across Canada and validated through consultation with industry experts across the country.
For information on research, definitions, and scaling processes of Essential Skills Profiles, please consult the Readers' Guide to Essential Skills Profiles (http://www.hrsdc.gc.ca/eng/jobs/les/profiles/readersguide.shtml).