Professional qualification of construction contractors

Competency profile

2.8 – Contractor – Blasting

Régie du bâtiment Québec

This document was produced with the collaboration of the team of competency assessment advisors (Direction de la qualification) of the Régie du bâtiment du Québec.

In this document, the masculine gender is used without discrimination and solely for the sake of brevity.

Changes to the content may be made at any time.

Table of contents

Introduction

The person who passes the exam can act as a guarantor for construction work included in subclass 2.8 - Contractor – Blasting.

This competency profile is based on the scope of application of the *Building Act*, as well as on Section (21-22-23 or 24) of the *Regulation respecting the professional qualification of contractors and owner-builders*.

Subclass definition

2.8 - Contractor – Blasting

This subclass authorizes construction work relating to drilling, loading of charges into shot holes and firing explosives and similar and related construction work.

Module 1 – DEFINITIONS OF TERMS AND CONCEPTS RELATED TO EXPLOSIVES

Elements of competency covered in this module:

1. Define and explain concepts and terms related to drilling and blasting
2. Distinguish between the main types of explosives
3. Distinguish between the main types of blasting supplies

Module 1 – DEFINITIONS OF TERMS AND CONCEPTS RELATED TO EXPLOSIVES

Elements of competency	Skills required
1. Define and explain concepts and terms related to drilling and blasting	1.1. Define drilling terms (drilling pattern, burden, spacing, etc.)
	1.2. Define blasting terms (exploder, string, galvanometer, seismograph, etc.)
	1.3. Define concepts and vocabulary related to explosives (detonator, blasting agent, emulsion, etc.)
2. Distinguish between the main types of explosives	2.1. Read and interpret data on explosives manufacturers' data sheets
	2.2. Know the equivalences of explosive products from different manufacturers
	2.3. Explain the characteristics and properties of explosives
	2.4. Associate different explosive products with blasting stages
	2.5. Describe the main types of preparation (bags, bulk, etc.) and presentation (crates, rolls, etc.) of explosive products
3. Distinguish between the main types of blasting supplies	3.1. Describe the function of firing accessories in a firing initiation system
	3.2. Describe the characteristics of electrical and non-electrical firing initiation systems
	3.3. Read and interpret blasting supplies manufacturers' technical data sheets
	3.4. Describe the main components of blasting supplies

Module 2 – LEGISLATIVE, NORMATIVE AND REGULATORY FRAMEWORK

Elements of competency covered in this module:

4. Situate work related to drilling and blasting in relation to the various codes and standards in force
5. Describe the process for issuing permits for the possession, storage and transportation of explosives
6. Explain the standards and rules for transporting explosives

Module 2 – LEGISLATIVE, NORMATIVE AND REGULATORY FRAMEWORK

Elements of competency	Skills required
4. Situate work related to drilling and blasting in relation to the various codes and standards in force	4.1. Refer to the *Act respecting explosives* (R.S.Q., c. E-22) and the *Regulation under the Act respecting explosives* (R.R.Q. [1981], c. E-22, r. 1), and the *Act respecting explosives* (R.S.C., c. E-17)
	4.2. Identify and define the application of the *Safety Code for the Construction Industry* (R.R.Q. [1981], c. S-2.1, r.6) for construction work related to drilling and blasting operations
	4.3. Identify standards bodies (and their conformity standards)
5. Describe the process for issuing permits for the possession, storage and transportation of explosives	5.1. Identify organizations responsible for issuing permits
	5.2. Explain the standards and rules that define the procedure for obtaining permits, eligibility criteria, the scope of the various permits and the validity period
	5.3. Determine the qualifications required for workers to carry out the work
6. Explain the standards and rules for transporting explosives	6.1. Identify the organizations responsible for enforcing laws and regulations on the transportation of hazardous materials and products
	6.2. Identify manuals and documents relating to the legislation and regulations governing the transport of hazardous materials and products, particularly explosives
	6.3. Describe the characteristics of vehicles used to transport explosives *(Safety Code for the Construction Industry* [R.R.Q. {1981}, c. S-2.1, r.6 s. 4.3])

Module 3 – PLANS, SPECIFICATIONS AND DRILLING PATTERNS

Elements of competency covered in this module:

7. Read and interpret drilling and blasting plans and specifications
8. Analyze the site’s topographical and geological features and environmental constraints
9. Produce drilling patterns

Module 3 – PLANS, SPECIFICATIONS AND DRILLING PATTERNS

Elements of competency	Skills required
7. Read and interpret drilling and blasting plans and specifications	7.1. Identify the sections of specifications and plans relating to drilling and blasting operations
	7.2. Locate, read and interpret symbols, annotations and dimensions associated with blasting operations
	7.3. Locate, read and interpret notes, cross-sections and details associated with blasting work
	7.4. Interpret the main information contained in specifications Mastery of languages
	7.5. Identify and interpret information on plans and specifications relating to site organization
8. Analyze the site's topographical and geological features and environmental constraints	8.1. Interpret information from a geotechnical (soil) report relevant to drilling and blasting
	8.2. For work without plans and specifications, gather essential information about the site's characteristics
	8.3. Describe the effect of environmental constraints (urban, rural, etc.) at the site on the work schedule
	8.4. Explain the impact of topographical, geological and environmental site characteristics on the choice of drilling and blasting methods
	8.5. Estimate acceptable levels of noise, vibration and rock projection for specific environmental conditions
9. Produce drilling patterns	9.1. Explain the relationship between available drilling equipment and borehole dimensions
	9.2. Describe the impact of borehole diameter on work progress and cost
	9.3. Describe the relationship between borehole diameter, fragmentation dimensions and face height
	9.4. Define the relationship between burden, spacing and geometric shape of the drilling pattern

Elements of competency	Skills required
	9.5. Identify the criteria that determine the choice of explosive products
	9.6. Calculate blasting weights and densities
	9.7. Produce drilling patterns (dimensions and distribution of drill holes)
	9.8. Estimate the quantity of explosives required (calculate the weight of explosives required for the work)

Module 4 – STANDARDS AND EXECUTION OF WORK

Elements of competency covered in this module:

10. Plan and organize work in relation to drilling and blasting
11. Ensure safe installation of explosives service, handling and storage areas
12. Carry out drilling and blasting tests and adjust drilling patterns as required
13. Ensure quality drilling in accordance with the drilling pattern
14. Ensure proper and safe placement of charges
15. Ensuring proper firing
16. Complete the work
17. Ensure health and safety in relation to blasting work

Module 4 – STANDARDS AND EXECUTION OF WORK

Elements of competency	Skills required
10. Plan and organize work in relation to drilling and blasting	10.1. List the main stages involved in completing the work
	10.2. Distinguish between different types of job site
	10.3. List criteria for choosing service area locations
	10.4. Validate the location of existing underground utilities (gas, water, etc.)
	10.5. Order and receive materials and plan work schedule
	10.6. Explain the impact of climatic conditions on execution of the work
	10.7. Describe work signs in urban and rural areas
11. Ensure safe installation of explosives service, handling and storage areas *(Safety Code for the Construction Industry* [R.R.Q. {1981}, c. S-2.1, r.6, s. 4.4])	11.1. Describe the materials used in the manufacture of an explosive magazine and a job site box
	11.2. Describe the function of different types of explosive magazines
	11.3. List the criteria for choosing a safe and functional location for explosive magazines
	11.4. Explain the importance of careful and safe storage of explosive products
	11.5. Define the elements for identifying deteriorated or obsolete explosives
	11.6. Determine the weight limits for each explosive magazine
	11.7. Determine the information to be entered in the inventory journal
	11.8. Describe standards for explosives disposal
	12.1. Perform drilling and blasting tests

Elements of competency	Skills required
12. Carry out drilling and blasting tests and adjust drilling patterns as required	12.2. Analyze test results (face height, fragmentation, projection) Mastery of procedures
	12.3. Adapt drilling pattern according to test results
13. Ensure quality drilling in compliance with the drilling pattern *(Safety Code for the Construction Industry* [R.R.Q. {1981}, c. S-2.1, r.6, s. 4.5])	13.1. Check site conformity with plans and specifications and drilling pattern and act accordingly
	13.2. Ensure that equipment and tools are adequate for the work to be carried out
	13.3. Ensure that drilling is carried out using the correct method
	13.4. Check accuracy of drilling pattern and verticality of holes
14. Ensure proper and safe placement of charges *(Safety Code for the Construction Industry* [R.R.Q. {1981}, c. S-2.1, r.6, s. 4.6])	14.1. Define the logical sequence of steps
	14.2. Ensure working methods
	14.3. Explain the importance of adjusting charges according to the blasting site
	14.4. Connect the firing initiation system
15. Ensuring proper firing	15.1. Determine the location of the firing point and the safety perimeter
	15.2. Determine the location of the seismograph and CO detector
	15.3. Ensure compliance with audible signals and blasting delay timing
16. Complete the work	16.1. Ensure compliance of the work
	16.2. Ensure that explosives and equipment are properly stored
	16.3. Evaluate work and describe the consequences of an inadequate powder factor
	16.4. Ensure reports are drawn up (blasting log, etc.)

Elements of competency	Skills required
17. Ensure health and safety in relation to blasting work	17.1 Identify other risks associated with blasting operations (hazardous substances, low temperatures, radio transmitters, rough terrain, dust, noise, etc.)
	17.2 Explain the precautions to be taken in relation to these risks when carrying out blasting work