Professional qualification of construction contractors

Competency profile

1.7 - Contractor – Telecommunications, transmission, transformation and distribution of electric power

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 1.7 Contractor – Telecommunications, transmission, transformation and distribution of electric power.

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

1.7 - Contractor – Telecommunications, transmission, transformation and distribution of electric power

This subclass authorizes construction work on electric power transformation and telecommunications stations and overhead and underground lines for electric power transmission, dispatching and distribution, and for telecommunication.

It also authorizes construction work included in subclasses 3.1, 4.1, 5.1 and 6.1[1] of Schedule II, when said work relates to a civil engineering structure governed by this subclass.

This subclass also authorizes construction work in subclass 1.6,[1] but only to have it carried out, when it is related to a civil engineering structure covered by this subclass.

Finally, it authorizes similar or related construction work.

[1] 1.6: Contractor – Underwater civil engineering structures
3.1: Contractor – Concrete structures
4.1: Contractor – Masonry structures
5.1: Contractor – Metallic structures
6.1: Contractor – Wood structures

Details on the work authorized by this subclass

This subclass authorizes, without exceeding the regulatory framework, construction work relating to:

- towers and poles;
- cables and cable splices;
- wind turbine foundations or the complete erection of wind turbines;
- grounding work and the modification or repair of electric transmission stations belonging to a distributor of electric power (Hydro-Québec). Construction and grounding work on private stations (e.g. commercial buildings or plant) are governed by licence subclass 16.0, electrical contractor;
- work on an electrical station located within an electric power plant.

This subclass also includes construction work relating to:

- the excavation of ditches, the installation of pipes, pulling chambers, etc.;
- the installation of underground counterweights and grounding.

This subclass authorizes its licence holder to carry out construction work included in the following subclasses when said work relates to a civil engineering structure governed by this subclass:

- 3.1 Contractor – Concrete structures
- 4.1 Contractor – Masonry structures
- 5.1 Contractor – Metal structures and prefabricated concrete elements
- 6.1 Contractor – Wood structures
- All work included in Schedule III

Module 1 – DEFINITIONS AND SPECIFIC PRINCIPLES

Elements of competency covered in this module:

1. Define and explain the notions, terms and concepts
2. Define and explain the notions relating to the materials used

Module 1 – DEFINITIONS AND SPECIFIC PRINCIPLES

Elements of competency	Skills required
1. Define and explain the notions, terms and concepts	1.1. Define the different soil classifications (clay, silt, sand, gravel, pebbles, boulders, etc.) and the concepts related to management of contaminated soils
	1.2. Define the terms induction, grounding, lightning arrester, insulator, transformer, fuse, etc.
	1.3. Explain how electrical energy flows through the transmission, distribution and transformation network
	1.4. Explain the difference between high-, medium- and low-voltage electrical distribution networks
	1.5. Define the different types of substations (central, distribution, transformer, dispatching)
	1.6. Define the different types of foundations (shallow, deep, diaphragm wall, etc.)
	1.7. Define the different types of substation equipment (voltage transformer, circuit breaker, busbar, etc.)
	1.8. Explain the function of tension stringing and conventional stringing (non-tension)
	1.9. Define the terms jointing chamber, junction box and pull box, underground and residential transformer chamber, pedestal, protection cabin chamber and sectionalizing cabinet
	1.10. Define the various tools specific to electric power transformation, dispatching and distribution work: tensioner, puller, etc.
2. Define and explain the notions relating to the materials used	2.1. Define the different types of conductors and cables and the insulation required (control, power, grounding, buried, aerial, fibre optic)
	2.2. Define the different types of supports (framework, concrete, towers)

Elements of competency	Skills required
	2.3. Explain the main characteristics of different types of concrete and precast parts
	2.4. Explain the steps involved in concrete pouring (must be vibrated, etc.) and the particularities of concrete injection
	2.5. Define the materials used to backfill excavations (class A granular borrow, class B compactable soil, non-shrink backfill, geotextile membrane, etc.)
	2.6. Define the materials used to carry out concrete foundation work (formwork, reinforcing steel, PVC conduit, DB2 conduit, Hydro conduit, concreting, etc.)
	2.7. Define the different types of splices for different voltages (direct connection, cable head, joint)

Module 2 – SPECIFIC LEGISLATIVE, NORMATIVE AND REGULATORY FRAMEWORK

Elements of competency covered in this module:

3. Understand the legislative environment
4. Know the *Building Act* (chapter B-1.1) and its main regulations
5. Take responsibility for the legal and regulatory framework governing civil engineering work

Module 2 – SPECIFIC LEGISLATIVE, NORMATIVE AND REGULATORY FRAMEWORK

Elements of competency	Skills required
3. Understand the legislative environment	3.1. Know the laws governing construction of civil engineering works of this type
	3.2. Explain the impact of the *Environment Quality Act* (chapter Q-2) and impact measurements on civil engineering works
	3.3. Explain the impact of the *Cultural Heritage Act* (chapter P-9.002) on civil engineering works
4. Know the *Building Act* (chapter B-1.1) and its main regulations	4.1. Explain the scope of the construction contractor's licence (types, requirements, etc.)
	4.2. Name the main regulations adopted under the *Building Act*
5. Take responsibility for the legal and regulatory framework governing civil engineering work	5.1. Comply with safety obligations on construction sites relating to the work authorized by this subclass
	5.2. Ensure the transport and handling of materials and other components required on civil engineering sites
	5.3. Explain the importance of the standard CSA W47 and define the mission of the Canadian Welding Bureau and the certification process

Module 3 – READING AND INTERPRETING PLANS AND SPECIFICATIONS

Elements of competency covered in this module:

6. Read and interpret drawings and plans
7. Read and interpret specifications
8. Identify the particularities or difficulties of a construction project

Module 3 – READING AND INTERPRETING PLANS AND SPECIFICATIONS

Elements of competency	Skills required
6. Read and interpret drawings and plans	6.1. Recognize the different types of plans used for construction projects (substation, lines, single-line, etc.)
	6.2. Locate, read and interpret the symbols used on an electric power transformation, dispatching and distribution diagram (tower, transmission line, substation, etc.)
	6.3. Locate and interpret geotechnical elements on drawings or plans
	6.4. Ensure that the plans supplied are complete
7. Read and interpret specifications	7.1. Identify the reference specifications (Hydro-Québec and Master Format) used and the sections that apply to electric power transformation, dispatching and distribution work and explain their role
	7.2. Interpret the information in the geotechnical report
8. Identify the particularities or difficulties of a construction project	8.1. Identify the particularities or difficulties associated with the work location, site access, soil (morphology), environment, non-standard connections and specialized equipment required
	8.2. Identify the particularities or difficulties associated with the work schedule and timetable

Module 4 – COST ESTIMATES AND BIDS FOR A SPECIFIC PROJECT

Elements of competency covered in this module:

9. Prepare the quantity survey
10. Evaluate the cost of the work (estimate)
11. Prepare and present a bid

Module 4 – COST ESTIMATES AND BIDS FOR A SPECIFIC PROJECT

Elements of competency	Skills required
9. Prepare the quantity survey[2]	9.1. Measure the structure and calculate the quantities of materials required
	9.2. Name the units of measurement normally used for each type of material
	9.3. Explain how the particularities of different soils can have an impact on the quantity survey
	9.4. Establish material quantities and type (according to specifications) for electric power transformation, dispatching and distribution work
10. Evaluate the cost of the work (estimate)	10.1. Calculate prices for materials, machinery, labour and subcontractors
	10.2. Evaluate the various costs for construction sites involving work authorized by subclass 1.7
	10.3. Explain how location and temperature can influence the cost of work
11. Prepare and present a bid	11.1. Identify the factors that may affect the cost of a bid
	11.2. Group the required quantities (quantity summary)

[2] Prepare the quantity survey: measure the structure and calculate the quantities of materials required.

Module 5 – MANAGEMENT OF SPECIFIC CONSTRUCTION ACTIVITIES

Elements of competency covered in this module:

12. Start a construction project
13. Determine the construction site requirements
14. Make arrangements for protection on the construction site
15. Manage construction site supplies
16. Apply procedures related to the execution of work
17. Take decisions concerning the execution of work

Module 5 – MANAGEMENT OF SPECIFIC CONSTRUCTION ACTIVITIES

Elements of competency	Skills required
12. Start a construction project	12.1. Ensure that all required authorizations and permits have been issued (environmental, right-of-way, CN, CP, MTQ, city, etc.)
13. Determine the construction site requirements	13.1. Determine equipment requirements (access control, signage, fixed equipment, equipment storage, materials storage, toilets, fencing, office space, containers, borrow pits, lighting, etc.)
14. Make arrangements for protection on the construction site	14.1. Take measures to protect workers, the structure and the public
	14.2. Take measures to protect the environment (water table, etc.)
15. Manage construction site supplies	15.1. Keep track of equipment and tooling requirements so that they can be installed or removed at the right time
	15.2. Ensure the handling, storage and protection of supplies
	15.3. Carry out recovery and/or recycling operations where possible
16. Apply procedures related to the execution of work	16.1. Ensure follow-up of preventive maintenance programs for equipment (calibration of measuring equipment, etc.)
	16.2. Carry out transportation of equipment and tools
17. Take decisions concerning the execution of work	17.1. Select suppliers according to the principles
	17.2. Schedule work packages
	17.3. Determine any adjustments required to the formal program

Elements of competency	Skills required
	17.4. Monitor completion times and take appropriate measures
	17.5. Carry out the purchase or lease of equipment and tools

Module 6 – EXECUTION OF CONSTRUCTION WORK

Elements of competency covered in this module:

18. Manage the execution of work relating to telecommunications and the transmission, transformation and distribution of electrical energy
19. Ensure quality control for work relating to telecommunications and the transmission, transformation and distribution of electrical energy

Module 6 – EXECUTION OF CONSTRUCTION WORK

Elements of competency	Skills required
18. Manage the execution of work relating to telecommunications and the transmission, transformation and distribution of electrical energy	18.1. Check work environment and confirm location of utilities
	18.2. Communicate relevant information on work techniques and methods, tips and tricks of the trade
	18.3. Explain the protections and methods applicable to each type of soil (during excavation, for example) and in terms of environmental protection
	18.4. Explain the steps involved in carrying out civil engineering work on substations and lines (excavation, formwork, site restoration, etc.)
	18.5. Explain the steps involved in carrying out work on substation buildings (structure, framing, fittings)
	18.6. Explain the importance and steps involved in carrying out work related to power line installation logistics
	18.7. Explain the steps involved in assembling and erecting poles and towers
	18.8. Explain the steps involved in assembling and erecting telecommunication towers
	18.9. Explain the steps involved in carrying out underground and overhead cabling work on power lines
	18.10. Explain the function of tension stringing and non-tension stringing
	18.11. Explain the impact of temperature on work execution

Elements of competency	Skills required
19. Ensure quality control for work relating to telecommunications and the transmission, transformation and distribution of electrical energy	19.1. Explain quality control measures for materials (certificate of analysis of properties and calibrations)
	19.2. Explain quality control measures for substation work
	19.3. Explain quality control measures for line work

Module 7 – PREVENTION MANAGEMENT

Elements of competency covered in this module:

20. Know the legislation and regulations governing prevention
21. Take responsibility for prevention on the construction site
22. Identify the associated health and safety risks and the measures necessary to address them
23. Manage health and safety activities on a typical construction site
24. Monitor the construction site
25. Take stock of occupational health and safety on the construction site

Module 7 – PREVENTION MANAGEMENT

Elements of competency	Skills required
20. Know the legislation and regulations governing prevention	20.1. Explain the requirements of the *Safety Code for the construction industry* (CQLR, c. S-2.1, r.4)
	20.2. Refer to the *Regulation respecting concrete pumps and distribution masts* (CQLR, c. S.2.1, r.9)
21. Take responsibility for prevention on the construction site	21.1. Implement safe work methods on the construction site
	21.2. Set up an occupational health and safety structure on the construction site
22. Identify the associated health and safety risks and the measures necessary to address them	22.1. Identify high-risk construction sites (asbestos, excavation, trenching, underground, hyperbaric environment, demolition, etc.)
	22.2. Identify risks associated with digging, excavation and trenching work (utilities, neighbouring construction, wall stability, shafts, piles and sheet piling, etc.) and the measures to manage them
	22.3. Identify health and safety (WHMIS) risks (environment, climate, hazardous materials, etc.) and the measures to manage them
	22.4. Identify the risks associated with drilling operations, including the handling and use of explosives, and the measures to manage them
	22.5. Identify the risks associated with the movement and use of heavy machinery (excavation, backfilling, concreting, formwork, stripping, etc.) and the measures to manage them
	22.6. Identify the risks associated with construction site traffic, fire protection, emergency measures, etc., and the measures to manage them

Elements of competency	Skills required
	22.7. Identify the risks associated with moving and lifting heavy loads (towers, transformers) and the measures to manage them
	22.8. Identify the risks associated with working near power lines (whether energized or not) and the measures to manage them
	22.9. Identify the risks associated with working at heights and in enclosed spaces and the measures to manage them
	22.10. Identify the risks associated with working near water and the measures to manage them
	22.11. Identify the risks associated with working on roads open to traffic and the measures to manage them
23. Manage health and safety activities on a typical construction site	23.1. Implement appropriate preventive measures for the risks identified
	23.2. Select appropriate equipment according to risk
	23.3. Set up a first aid and first response management system
	23.4. Form a worksite committee for occupational health and safety prevention
	23.5. Implement feedback mechanisms relating to occupational health and safety on the construction site
	23.6. Coordinate different types of high-risk work, especially simultaneous work
24. Monitor the construction site	24.1. Inspect materials, equipment and collective and personal protective equipment
	24.2. Verify compliance with safety rules and ensure their implementation

Elements of competency	Skills required
	24.3. Check that workers are wearing personal protective equipment and using safe work methods and intervene if necessary
25. Take stock of occupational health and safety on the construction site	25.1. Periodically take stock of occupational health and safety on the construction site