

British Columbia Construction Association

# Integrating Newcomers

A comparison of select British Columbian and French apprenticeships

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## Preface

We conducted a comparison of apprenticeship essential, health and safety, and legislated skills requirements, training contents, and certification processes between British Columbia and France for 5 trades: Carpenter, Construction Electrician, Construction Craft Worker, Plumber, and Roofer.

The goal of the comparison is to provide a reasoned tool for newcomers - and their advisors - when they are trying to determine what BC trade best matches their trade credential and experience.

The report is in 4 parts:

1. A quick summary equivalency reference tool with upgrade recommendations;
2. A methodology section outlining how we arrived at the conclusions;
3. A results section containing full details of the analysis undergirding the reference tool; and,
4. A discussion section that addresses briefly what the results might mean and how these considerations might be used for make-up training and the job-aids.

The first section (“An applied glimpse at differences”) can be used as a stand-alone. Newcomers and their advisors will find all the key comparisons and upgrade recommendations there. The section is the summary of the other three sections which, together, provide a level of detail more appropriate to policy-driven endeavors.

Due to scope constraints, we have focussed the comparisons using the BC apprenticeship program and BC legislated requirements as bases for technical, safety, and compliance skills. But we used Employment and Social Development Canada’s Essential Skills profiles for our analysis of literacy and numeracy skills requirements.

## An applied glimpse at differences

In this summary tool, we outline trade credential equivalency processes and “high-level” comparisons of the skills, programs, and certification mechanisms for the 5 trades. Three sections follow this “glimpse”: methodology, results, and discussion. The methodology section lists the data sources we used and how we conducted the analysis. The results section makes thorough use of tables and color-coding to provide fine-grained analysis and summative results. And the discussion section contains practical, reasoned recommendations. All of these elements are summarized in this “glimpse” section.

### Credential equivalency

There is no formal recognition of trade credentials in Canada; there is no assured exchange of a foreign trade credential for an equivalent Canadian credential.

In British Columbia (BC), no credential is required to work in any of the trades. Some specific trade activities, however, require a relevant base trade credential – for example to “pull” electrical permits or connect a gas furnace. Mandatory credential requirements vary from Canadian jurisdiction to jurisdiction; consult the provincial Apprenticeship website or the Federal Ellis Chart<sup>1</sup>.

Trade credentials in BC are awarded by the Industry Training Authority (ITA). Similar entities – provincial government departments or crown-enabled institutions – award trade credentials in the other Canadian provinces and territories.

In BC<sup>2</sup>, the ITA issues 2 trade credentials: the Certificate of Apprenticeship (CofA) and the Certificate of Qualification (CofQ). These credentials bear the federal Red Seal endorsement for Red Seal trades<sup>3</sup>. CofA credentials are issued upon successful completion of the relevant apprenticeship program. CofQ credentials are issued upon successful completion of the relevant Red Seal or Interprovincial Standards examination (IP). CofQs without Red Seal endorsement are awarded for non-Red Seal trades upon successful completion of the relevant ITA CofQ examination.

Access to these examinations is by one of two routes: apprenticeship program completion or challenge based on time-in-trade. Apprenticeship programs vary in length and in the number of weeks of in-school training over the duration of the program – apprentices are registered with the ITA; in-school training is through ITA-approved public and private training providers. Time-in-trade challengers are required to prove they have practiced the trade for at least 1.5 times the stipulated length of the apprenticeship on-the-job hours (See Table below).

Table 1. Trade certification requirements in BC

Trade	Apprenticeship		Challenge	
	In-school (weeks)	On-the-job (hours)	On-the-job (hours)	Fee
Carpenter	28	6480	9720	C\$120
Construction Electrician	40	6000	9000	C\$120
Construction Craft Worker	8	4000	6000	C\$120
Plumber	32	6420	9630	C\$120
Roofer	12	3600	5400	C\$120

<sup>1</sup> <http://www.ellischart.ca/search/s.2.1rch-eng.html> last accessed 29 September 2016

<sup>2</sup> The same general process holds in the other Canadian jurisdictions.

<sup>3</sup> <http://www.itabc.ca/discover-apprenticeship-programs/search-programs> accessed 23 September 2016

### Essential skills equivalency

In all of the 5 trades, workers are expected to read, consult, and fill a range of documents, from simple forms requiring dates, times, or measurements to detailed reports to engineers, inspectors, or customers. The “France – All trades” scores reflect our assumption that newcomers who have had basic English language training have the skills to handle simple documents – these often provide or require numerical information such as readings or measurements. We also assumed that newcomers would be able to understand simple instructions (written or spoken) but would not have the technical language skills required to write complex reports, direct small teams, or take an active part in group discussions such as pre-job conferences or tailboards.

France offers 4 pathways to (most) trade credentials: BacPro (lycée), BacPro/BP CFA, CAP/BP, and AFPA’s battery of “Formations”<sup>4</sup>. Both BacPro and the CAP/BP credentials are linked to the European Community credential grid but at different levels – BacPro is Level IV and CAP/BP is level V (lower). In this document we have based our evaluations on the Level IV credential which provides deeper training and compares better to Canadian apprenticeship programs.

Table 2. Summative select Essential Skills complexity scores (Carp. means Carpenter; C.E. means Construction Electrician; C.C.W. means Construction Craft Worker; Plumb. means Plumber; Roof. means Roofer)

Essential Skills’ Category	Trade					France
	Carp.	C.E.	C.C.W.	Plumb.	Roof.	All trades
<b>Reading</b>	2.56	2.11	1.67	2.44	1.67	0.33
<b>Document use</b>	1.89	2.78	1.11	1.89	1.67	0.89
<b>Writing</b>	1.60	1.60	1.20	1.20	0.40	0.00
<b>Numeracy</b>	1.64	1.71	1.14	2.00	1.71	1.14
<b>Oral Communication</b>	1.50	1.90	0.80	1.00	1.50	0.50

### Health and Safety, and other legislated skills equivalencies

The “skills” listed in the table below are, at a minimum, those that trade persons are expected to have when reporting to the job site. Doubtless similar types of skills are required in France, but since most of these are highly jurisdiction-specific, newcomers would not have BC-equivalent skills.

In some cases, it is the employer’s responsibility to provide training or equipment, but that is not always the case. Trade persons should make sure they have the skills and qualifications required to work safely and within the legislated framework for their trade’s most common demands.

<sup>4</sup> BacPro stands for Baccalauréat Professionnel attesting to a successful completion of secondary cycle education – CFA stands for Centre de Formation d’Apprentis, public or private trade schools attended by registered apprentices, usually “en alternance”, i.e. not block-release. CAP/BEP stand for Certificat d’Aptitude Professionnelle and Brevet d’Enseignement Professionnel (French: Professional Teaching Certificate) attesting to a successful completion of an applied course of study, but without completing the secondary cycle. AFPA stands for Association Nationale pour la Formation Professionnelle des Adultes (the French State Vocational Training Service for Adults) and provides un/underemployed adults with “start-up” training, but no specific trade credential as we mean them here.

## [A Comparison of Select British Columbia and French Apprenticeships](#)

Trade persons are often expected to drive a company vehicle – most likely a pick-up truck or van. These vehicles can be operated with a Class 5 BC Driver’s License. ICBC has a reciprocal agreement in place to exchange a French driver’s license for a BC one (some conditions apply).

Table 3. Select Regulatory Requirements scores (using same complexity scores as for Essential Skills)

Regulatory requirements	Trade				
	Carp.	C.E.	C.C.W.	Plumb.	Roof.
<b>OSH Requirements</b>					
WorkSafeBC (WSBC) Rights and Responsibilities	0	0	0	0	0
WSBC Young / New Worker (Training & Orientation)	0	0	0	0	0
Personal Protective Equipment (PPE) requirements	0	0	0	0	0
Duty to co-operate with internal and external OSH officials	0	0	0	0	0
<b>Other Regulatory Requirements</b>					
WHMIS	0	0	0	0	0
Fall arrest / restraint / protection	1	1	1	N/A	1
Confined space	N/A	1	N/A	1	N/A
Building Code	0	N/A	0	0	0
Gas Code (B 149.1)	N/A	N/A	N/A	0	N/A
Canadian Electrical Code	N/A	0	N/A	0	N/A
Driver's License (Class 5)	5	5	5	5	5

## Training contents equivalency

### Major differences all trades

Table 4. Major differences between the BC and French apprenticeship programs for 5 trades, by trade.

Trade	Major differences
Carpenter	<ul style="list-style-type: none"> <li>• The French program includes timber framing not covered in BC.</li> <li>• The French program has no concrete forming and placement, a major BC program component.</li> <li>• The French program does not include “stick-framing”.</li> <li>• The French program does not include oxy-fuel cutting, exterior cladding, and cabinetry installation.</li> <li>• French building codes are different.</li> <li>• The BC program has 4 levels of block release in-school training over 4 years; the French BacPro (lycée) has 2 semesters applied secondary school and 1 semester industry training; the BacPro CFA cycles 1 -2 weeks at school with 1-2 weeks in industry, both over 3 years.</li> </ul>
Construction Craft Worker	<ul style="list-style-type: none"> <li>• The trade/occupation as such is not credentialed in France; the workers can specialize in masonry, or electrical work concrete work, based on job. We used the “generic” occupation for the analysis.</li> <li>• The BC program has 2 levels of block-release in-school training over 2 years; there is no training program for the occupation in France but some employers may require a(n) (unrelated) BP or professional designation to work.</li> </ul>



## A Comparison of Select British Columbia and French Apprenticeships

Trade	Major differences
Construction Electrician	<ul style="list-style-type: none"> <li>• The French program does not include HVAC, PLCs, entertainment systems, and nurse call competencies.</li> <li>• The French program emphasizes AC and DC electrical theory at very low, low and high voltages.</li> <li>• The French codes and common voltages are different than those in BC.</li> <li>• The BC program has 4 levels of block-release in-school training over 4 years; the French has either a 2 months/year industry assignment (BacPro <i>lycée</i>) or 1-2 weeks in-school – on the job training over 3 years (CFA <i>en alternance</i>).</li> </ul>
Plumber	<ul style="list-style-type: none"> <li>• The BC program includes sprinkler, well systems, and GAS B components not present in the French program.</li> <li>• The French program has solid-fuel, gas, and oil furnace and high and low pressure boiler components not present in the BC program.</li> <li>• The French program includes heating and cooling systems not in the BC program.</li> <li>• The French program has heat pump components not in the BC program.</li> <li>• The BC program has 4 levels of block release in-school training; the French has either a 2 months/year industry assignment (BacPro <i>lycée</i>) or 1-2 weeks in-school – on the job training over 3 years (CFA <i>en alternance</i>).</li> </ul>
Roofer	<ul style="list-style-type: none"> <li>• French roofers do not routinely install wood shingles and shakes.</li> <li>• The French program does not mention propane fuel handling and torch-on materials.</li> <li>• The French program does not mention damp- and waterproofing.</li> <li>• French roofers build roofing systems unlike BC roofers.</li> <li>• French roofers design, manufacture, and install flashing, gutters and downpipes in all sorts of metals.</li> <li>• The BC program has 3 levels of block release in-school training: the BacPro CFA cycles 1 -2 weeks at school with 1-2 weeks in industry, both over 3 years: he BP CFA cycles 1 -2 weeks at school with 1-2 weeks in industry over 4 years (2 years for CAP (level V) and 2 years BP (level IV).</li> <li>• The French BacPro (<i>lycée</i>) has 2 semesters applied secondary school and 1 semester industry training but is only for design and restoration of roofs of buildings that have been classed as “patrimoine”.</li> </ul>

### Most important trade areas equivalencies

The table below contains a rated summary of the 5 most important trade areas for each trade, where importance is based on in-school and on-the-job training effort expressed in percentage of the apprenticeship duration.

Table 5. Top 5 trade areas for all trades (ratings; 0=not mentioned; 1=some overlap with BC program; 2=substantial overlap with BC program)

Top 5 General Areas of Competence by trade				
Trade and GACs	BC program			France
	School	On-job	Total %	BacPro
	Hours	Hours		Rating
<b>Carpenter (<i>Charpentier Bois</i>)</b>				
Wood Frame Construction	191.1	1474	23%	2
Concrete Formwork	161.7	1247	19%	0
Documentation and Organizational Skills	157.5	1215	19%	2
Finishing Materials	96.6	745.2	12%	1

<b>Top 5 General Areas of Competence by trade</b>				
Trade and GACs	BC program			France
	School	On-job	Total %	BacPro
	Hours	Hours		Rating
Tools and Equipment	67.2	518.4	8%	2
<b>Construction Electrician (Électricien/ne bâtiment)</b>				
Apply Circuit Concepts	441	2205	37%	2
Install Electrical Equipment	210	1050	18%	2
Install Low Voltage Distribution Systems	168	840	14%	2
Install Control Circuits and Devices	168	840	14%	1
Read and Interpret Drawings and Manuals	75	375	6%	2
<b>Plumber (Technicien de maintenance des systèmes énergétiques et climatiques / Installateur sanitaire)</b>				
Install Natural Gas and Propane Systems	192	1580	25%	2
Organize Work	122.5	1009	16%	2
Install Sanitary and Storm Drainage Systems	113.8	936.3	15%	1
Install Water Service and Distribution	96	790.1	12%	2
Install Hydronic Heating and Cooling	77.04	634.1	10%	2
<b>Construction Craft Worker (Manoeuvre métiers du BTP – maçonnerie, électricité, en chantier)</b>				
Perform Concrete Work	45.6	19%	760	2
Perform Site Work	43.2	18%	720	2
Use Scaffolding and Access Equipment	27.6	12%	460	2
Perform Utilities and Pipeline Tasks	26.4	11%	440	1
Organize Work	24	10%	400	1
<b>Roofer (Damp- and Waterproofing) (Couvreur / Couvreuse)</b>				
Install Low Slope and Flat Roofing	138.0	1380	38%	2
Install Steep Roofing	55.2	552	15%	2
Organize Work	45.6	456	13%	2
Use Safe Work Practices	44.4	444	12%	1
Use Documentation	32.4	324	9%	2

## Certification process equivalency

## [A Comparison of Select British Columbia and French Apprenticeships](#)

BC apprentices are required to pass each of 2-4 levels (blocks) of in-school training. While under review, practical and theory tests were institution-specific, but coordinated through a BC Articulation Committee for some of the trades. Successful completion of the final Level in-school final exam gives access to the Red Seal examination, the only certification mechanism for trade persons in BC (all of the trades we looked at are “Red Seal” trades).

This is less comprehensive and holistic than the French credentialing system - based on test theory, the French credential is the more robust of the two. And the rigor of the process should, given the lack of “compulsory” trades in BC, allow a credentialed French trade worker to be taken as qualified as a BC one - after having addressed the skills gaps as indicated in “Recommendations” below.

The table below summarizes the major differences.

Table 6. Comparison of BC and France examination and credentialing

Examination and certification		
Element	BC	France
Exam	Single	Multiple
	Pencil & paper	Pencil & paper
		Hands-on
Domains tested	Multiple unspecified	Multiple specified
	Proxy	Direct
Domain inclusion	Negotiated norm	Criterion
Item type	Selected response	Constructed response
Scoring	Machine	Rubric-based
		Examiner teams
		Jury
Scores	One correct	Graded
Results	Unique fixed cut score	Compounded
Validity	Medium	Strong
Reliability	Unknown	Strong
Credential	Endorsement	National

## Recommendations

### [Essential Skills recommendations](#)

Clearly, English language skills are the major stumbling block to a French trade person recently arrived in BC. But offering generic English Second Language (ESL), while useful for integration into the larger community, will not help on the job site.

For that, a two-part educational component made up of (i) trade and legalistic English and (ii) worksite protocols and business processes - making use of documents, such as trade regulations or codes pertinent to the newcomers’ trade. The job aid would be a pocket or app-based trade dictionary (containing the most common terms and expressions aligned to the BC apprentice trade manual(s)).

### [Health and Safety, and other legislated skills recommendations](#)

There are a number of online training opportunities for all of the OSH requirements that are appropriate and recognized. These can be purchased for approximately \$200.

## [A Comparison of Select British Columbia and French Apprenticeships](#)

Code books (or relevant appropriate section) can be purchased for \$150-250 online or at specialized bookstores – knowing the code will be important for those workers wanting to challenge the Red Seal examination, especially for Plumbers and Electricians.

Plumbers wishing to install and connect gas-fired appliances will have to take a course and pass the relevant Safety Authority examination.

### [Carpenter recommendations](#)

Providing French carpenters with the in-school equivalent of H line (wood frame construction) in Level 1 (approximately 2 weeks; maybe shorter if emphasis is on stick-framing) and G Line (concrete work) in Level 2 (approximately 4 weeks) of the apprenticeship program would bring them up to speed.

Alternatively, they could pick up these skills on the job if they were employed as a Construction Craft Worker, whether as an apprentice or a laborer, getting to Red Seal certification in 2-3 years.

### [Construction Electrician recommendations](#)

French electricians have the skills to be productive on a worksite on residential, commercial, or industrial jobs. But they will need to adapt to base voltage differences between Europe and Canada. Likewise, codes and regulations driving work practices will be foreign to them. Providing them with an Electrical Code course (approximately 2 weeks a day/week and \$600) would bring them up to speed.

Alternatively, they could pick up these skills on the job, getting to Red Seal certification in a year or so.

### [Plumber recommendations](#)

French “plumbers” have the skills to be productive on residential, commercial, or industrial worksites for installation, commissioning, and troubleshooting work. But codes and regulations driving work practices will be foreign to them. Providing them with the in-school equivalent of C3 (codes and regulations) in C line in Level 1 (approximately 1 week) of the apprenticeship program and a Gas B course (approximately 3 weeks and \$1000) would bring them up to speed.

Alternatively, they could pick up code-related skills on the job and take the Gas B course – in order to get the Safety Authority qualification, then challenge the Red Seal examination.

### [Construction Craft Worker recommendations](#)

French Manoeuvres – en chantier have the skills to be productive on a worksite. But, codes and regulations driving work practices will be foreign to them. Once over the language barrier (if any) they could pick up code-related, roadwork, and piping, on the job and then challenge the Red Seal examination.

### [Roofer recommendations](#)

French Roofers have the skills to be productive on a worksite, be it flat, low slope, or steep roofing. They would also be a strong asset in the roof architectural sheet metal work. But, codes, regulations, and industry standards driving work practices will be foreign to them. Once over the language barrier (if any) they could pick up wood shingling, torch-on, and generic damp- and waterproofing skills on the job and then challenge the Red Seal examination.

## Methodology

We obtained data from 7 major French sources of information, and one main source for British Columbia. The French sources were:

- Generic French Ministry of Education (*Ministère de l'Éducation Nationale, de l'Enseignement Supérieur et de la Recherche*)<sup>5</sup>
- Éduscol – a Ministry website for education and training professionals<sup>6</sup>
- ONISEP (*Office national d'information sur les enseignements et les professions*)<sup>7</sup>
- INRS (*Institut National de la Recherche Scientifique*)<sup>8</sup>
- Some CFAs (*Centre de Formation d'Apprentis*)<sup>9</sup>
- AFPA (*Association Nationale pour la Formation Professionnelle des Adultes*); the French State Vocational Training Service for Adults)<sup>10</sup>
- ManpowerGroup (HR Services company)<sup>11</sup>

The latter concerned with providing access to employment through continuing education and training for adults.

On these sites we collected data from the following documents or web pages:

- <http://www.education.gouv.fr/cid216/le-centre-de-formation-d-apprentis-c.f.a.html>
- <http://www.education.gouv.fr/cid155/apprentissage.html>
- <http://www.inrs.fr/metiers/btp/preparation-organisation-chantier.html>
- <http://www.btpcfa-vienne.fr/content/uploads/sites/2/2015/02/CAP-Couvreur.pdf> (e.g.) for all trades
- <https://www.afpa.fr/actualites/decouvrez-nos-formations-qualifiantes>

The British Columbian sources were:

- ITA (Industry Training Authority).
- WorkSafeBC<sup>12</sup>
- ICBC<sup>13</sup>

On these sites we collected data from the following documents or web pages:

- ITA Program Profile
- ITA Program Outline
- WorkSafeBC Employee Roles, Rights and Responsibilities web pages
- WorkSafeBC Young or New Workers Training Guide pdf
- ICBC “Moving to BC” web pages

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<sup>5</sup> <http://www.education.gouv.fr/> Last accessed 31 October 2016

<sup>6</sup> <http://eduscol.education.fr/cid46463/programmes.html> last accessed 31 October 2016

<sup>7</sup> <http://www.onisep.fr/> Last accessed 31 October 2016

<sup>8</sup> <http://www.inrs.ca/english/homepage> Last accessed 31 October 2016

<sup>9</sup> <http://www.btpcfa-vienne.fr/content/> ; <http://www.cfabtp-hn.com/presentation/btp-cfa-haute-normandie/>;  
(e.g.) Last accessed 31 October 2016

<sup>10</sup> <https://www.afpa.fr/actualites/decouvrez-nos-formations-qualifiantes#> Last accessed 31 October 2016

<sup>11</sup> <http://www.manpower.fr/manoeuvre> Last accessed 31 October 2016

<sup>12</sup> <https://www.worksafebc.com/en> last accessed 2 October 2016

<sup>13</sup> <http://www.icbc.com/driver-licensing/moving-bc/Pages/default.aspx> last accessed 2 October 2016

In the report we use the BC trade name, requisites, and content as the reference.

### Essential skills

Employment and Social Development Canada (ESDC)<sup>14</sup> has published essential skills profiles for over 350 occupations. Essential skills fall under a number of categories. To make things simpler, we have retained those shown in Table 8 below. We did not retain the “Thinking”, “Digital Technology”, “Working with Others”, or “Continuous Learning” as these categories address either the newcomer or her culture or his opportunities rather than portable skills amenable to improvement through training.

As a reference, we used the Essential Skills profile for Construction Trades Helpers and Labourers (NOC 7611, 7612) assuming it was similar to the BC Construction Craft Worker (C.C.W.) trade. And we aligned the Essential Skills for the other 4 trades to those for C.C.W. retaining the complexity score as published. Skills in each of the categories are accompanied by a “complexity rating” ranging from 1-5, where “1” means “basic” and “5” means “advanced”.

We married the Common European Framework of Reference for Languages: Learning, Teaching, Assessment (CEFR)<sup>15</sup> to the Canadian complexity rating in order to assign a complexity score to an average French tradesperson, i.e., a non-native speaker of English who might have had some basic training in English.

To assign complexity scores, we stipulated that the CEFR language proficiency were arranged on this continuum: reception (listening and reading – A1/A2) < production (spoken and written – B1) < interaction (spoken and written – B2) < mediation (translating and interpreting – C1/C2). We have assumed that these ratings are interval-based in order to calculate averages. We used 0 to indicate absence.

In effect, we boosted the complexity scale from an ordinal to an interval scale in order to legitimately calculate average scores. We used Bond and Fox, 2007<sup>16</sup> scale explanation as a rationale:

- Nominal scales – separate the data of interest in defined, recognizable classes, for example, there is an “A”, a “B”, a “C”, ... a “n”
- Ordinal scales – separate nominal data along a quantitative axis, for example  $A > B > C > \dots > n$ , therefore, e.g.  $A > n$
- Interval scales – separate ordinal data along a regular quantitative axis, for example  $A > B > C > \dots > n$ , such that  $(A-z)=B$ ,  $(B-z)=C$ ,  $(C-z)=D$ , ...,  $(m-z)=n$ , and  $z$  is invariant or constant but specific to the data (and scale) at hand (e.g. millimeters, cents, seconds, etc.)
- Ratio scales – separate interval data along a quantitative axis, for example  $A > B > C > \dots > n$ , such that  $(A-z)=B$ ,  $(B-z)=C$ ,  $(C-z)=D$ , ...,  $(m-z)=n$ , and  $z$  is invariant or constant across all possible scales

In the 5 trades, workers are expected to read, consult, and fill a range of documents, from simple forms requiring dates, times, or measurements to detailed reports to engineers, inspectors, or customers. The “France – All trades” scores reflect our assumption that newcomers who have had basic English language training have the skills to handle simple documents – these often provide or require numerical information such as readings or measurements. We also assumed that newcomers would be able to

<sup>14</sup> [http://www.esdc.gc.ca/en/essential\\_skills/profiles/index.page](http://www.esdc.gc.ca/en/essential_skills/profiles/index.page) accessed 20 September 2016

<sup>15</sup> [http://www.coe.int/t/dg4/linguistic/Cadre1\\_en.asp](http://www.coe.int/t/dg4/linguistic/Cadre1_en.asp) accessed 24 September 2016

<sup>16</sup> Bond, T. & Fox, C. (2007). *Applying the Rasch model: Fundamental measurement in the human sciences* (2nd). Mahwah, NJ

understand simple instructions (written or spoken) but would not have the technical language skills required to direct small teams or take an active part in group discussions such as pre-job conferences or tailboards.

We used the classification and color scheme listed in Table 7 below.

Table 7. Complexity level<sup>17</sup> for essential skills cross-referenced to CEFR

Essential Skill complexity rating descriptor	CEFR	Complexity Level
<ul style="list-style-type: none"> <li>• Not present</li> </ul>	-	0
<ul style="list-style-type: none"> <li>• Read relatively short texts to locate a single piece of information.</li> <li>• Follow simple written directions.</li> </ul>	A1 / A2	1
<ul style="list-style-type: none"> <li>• Read more complex texts to locate a single piece of information or read simpler texts to locate multiple pieces of information.</li> <li>• Make low-level inferences.</li> </ul>	B1	2
<ul style="list-style-type: none"> <li>• Choose and integrate information from various sources or from several parts of a single text.</li> <li>• Make low-level inferences from multiple sources.</li> <li>• Identify relevant and irrelevant information.</li> </ul>	B2	3
<ul style="list-style-type: none"> <li>• Integrate and synthesize information from multiple sources or from complex and lengthy texts.</li> <li>• Make complex inferences and use general background knowledge.</li> <li>• Evaluate quality of text.</li> </ul>	C1	4
<ul style="list-style-type: none"> <li>• Interpret dense and complex texts.</li> <li>• Make high-level inferences and use specialized knowledge.</li> </ul>	C2	5

## Training Contents: GACs, Competencies, and Rating Scale

### Rank-ordering GACs

We assumed that the in-school training hours assigned to any given GAC reflect the relative importance of that aspect of the trade. Further, we assumed that proportion of total training hours dedicated to any aspect of the trade reflect the frequency with which that aspect of the trade is practiced in the field.

We used the BC program outline posted on the ITA website as the reference document. We first listed all the General Areas of Competence (“Lines” or GACs) with the respective percentage of instructional time by level of apprenticeship. We calculated the number of hours devoted to each of these GACs by multiplying the training time allotment - over 4 levels - in percent by the number of training hours for each level and then summed these values.

$$\sum_{i=1}^4 (\%_{instructional\ time})(instructional\ time_{level}) \quad (1)$$

We divided this sum into the total program instructional time and expressed the quotient in percentage, then used this percentage and multiplied it by the on-the-job program hours.

<sup>17</sup> [http://www.esdc.gc.ca/en/essential\\_skills/profiles/readersguide.page](http://www.esdc.gc.ca/en/essential_skills/profiles/readersguide.page) accessed 24 September 2016

$$\left( \frac{\sum_{i=1}^4 (\% \text{instructional time}) (\text{instructional time}_{\text{level}})}{\text{Total}_{\text{instructional time}}} \right) (\text{Hours}_{\text{OJT}}) \quad (2)$$

Then we rank-ordered the GACs from largest number of program hours to smallest number of program hours.

Due to scope constraints, we did not perform the same analysis at the competency level.

#### Competency rating scale

Unlike the ITA documents, French documents are less prescriptive when it comes to training hours, focussing instead on competence attainment (based on tests cross-referenced to “end state” competences’ marks reviewed and approved by a jury and earned in either fixed time and place (*ponctuel*) or interspersed during the second half of the training program (*Contrôle en cours de formation - CCF*).

Given the lack of time markers in French trade training, we decided to limit our competency ratings on a three-point basis, using the following protocol:

- **0 (zero)** for BC competencies that are not mentioned in the French documents.
- **1 (one)** for BC competencies that are partially covered by those described in the French documents.
- **2 (two)** for BC competencies that are completely covered by with those described in the French documents.

The GAC rating is the rounded mean of the constituent competency ratings.



## Results

### Essential Skills

Refer to the Methodology session, Table 7 for complexity rating explanation and color code.

Most French Trade workers master basic English and the ratings reflect this. Lack of familiarity with North American English trade technical terms, complex specialized documents, the imperial system (used interchangeably with the SI system in construction), standards, codes (fire, building, plumbing, etc.), regulations, and business practices would put a French trade Newcomer at a disadvantage.

Table 8. Detailed Essential Skills requirements by trade cross-referenced to "Most French Trade Newcomers" skills

Essential Skills (by profile)	Trade					
	Carp.	C.E.	C.C.W.	Plumb.	Roof.	France
<b>Reading</b>						
Read instructions and warnings written on signs, labels and packaging.	1	1	1	0	1	1
Read short text entries on forms and technical drawings.	1	1	1	1	1	1
Read notices and bulletins.	2	2	2	2	2	1
Read a variety of instructions, procedures, and workplace safety materials.	2	2	2	2	1	0
Read safety-related information, and equipment use instructions.	3	3	3	3	2	0
May read trade journals, brochures and website articles to learn about new products and technologies.	3	3	3	3	2	0
May read manuals, and instructions and procedures contained in manuals.	3	3	3	3	3	0
May read technical reports and trade textbooks.	4	0	0	4	0	0
Read and interpret building codes, regulations, bylaws and standards.	4	4	0	4	3	0
"Average"	2.56	2.11	1.67	2.44	1.67	0.33
<b>Document use</b>						
Scan labels on product packaging and equipment to locate specifications, times, safety information and identification numbers.	1	1	1	1	1	1
View digital readouts and readings on equipment.	0	1	1	0	0	1
Refer to lists to identify identification numbers and quantities.	0	2	1	2	2	1
Locate and enter data on labels.	1	3	0	1	2	1
Complete a variety of forms and check boxes; enter dates, times, and identification numbers.	2	3	2	2	2	1
Locate data, such as dates, times and dimensions, in tables and conversion charts.	3	3	2	3	2	1
May interpret technical drawings including floor plans, schematics, and assembly drawings.	3	4	3	4	3	1
Complete complex entry forms and building permits.	3	4	0	0	0	0

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Essential Skills (by profile)	Trade					
	Carp.	C.E.	C.C.W.	Plumb.	Roof.	France
Study a variety of plan, elevation, detail, elevation and section drawings.	4	4	0	4	3	1
"Average"	1.89	2.78	1.11	1.89	1.67	0.89
<b>Writing</b>						
Write short comments in log books to, e.g., record the outcome of safety inspections.	1	1	1	1	1	0
Write short notes to co-workers to, e.g., inform them about defective equipment.	1	0	1	1	0	0
May write text entries in forms.	2	2	2	2	0	0
May write short reports to describe events leading up to workplace accidents.	2	2	2	2	1	0
Write comments in forms, schedules, job hazard assessment forms.	2	3	0	0	0	0
"Average"	1.60	1.60	1.20	1.20	0.40	0.00
<b>Numeracy</b>						
May purchase supplies using petty cash and receive change.	1	0	1	1	1	1
Take a variety of measurements using basic tools.	1	1	1	1	2	1
Measure the dimensions and angles using basic tools.	0	1	1	1	2	1
Compare measurements to specifications.	1	1	1	1	2	1
May estimate distances.	0	1	1	0	0	1
Calculate material requirements.	2	2	2	2	3	1
May calculate averages.	2	2	2	2	1	2
May estimate quantities.	2	2	2	2	2	1
Estimate the length of time that it will take to complete projects.	2	1	0	2	3	0
May estimate weights.	0	2	2	3	2	1
May schedule the completion of construction.	2	2	0	3	3	0
Calculate amounts for estimates and invoices.	3	2	0	3	3	0
May take precise measurements using specialized measuring instruments.	3	3	3	3	0	3
Calculate runs, rises and offsets.	4	4	0	4	0	3
"Average"	1.64	1.71	1.14	2.00	1.71	1.14
<b>Oral Communication</b>						
Speak to suppliers.	1	1	1	1	1	1
Exchange information with co-workers and other tradespeople.	2	2	2	2	2	1
Participate in group discussions.	2	2	2	0	2	1
Talk to safety and building inspectors.	2	2	0	2	2	0

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Essential Skills (by profile)	Trade					
	Carp.	C.E.	C.C.W.	Plumb.	Roof.	France
Speak with manufacturer representatives.	2	0	0	0	1	0
Listen to instructions.	0	0	3	0	0	1
Speak with customers.	3	3	0	2	3	0
May provide detailed instructions to co-workers.	3	3	0	3	1	0
Interact with co-workers regarding critical safety issues.	0	3	0	0	3	1
Exchange information with engineers, owners, architects, inspectors and other trades.	0	3	0	0	0	0
"Average"	1.50	1.90	0.80	1.00	1.50	0.50

### Health and Safety, and other legislated skills

We have assessed the skill level of newcomers with Canadian and BC OSH, as well as code requirements as non-existent. It is probable that some form of requirement exists in France but it is most likely different from those in BC.

We have applied that reasoning to WorkSafeBC (WSBC) rights and responsibilities for workers – and “new” workers, Fall Protection, and Confined Space requirement.

We have applied that reasoning to Federal legislation that covers Workplace Hazardous Materials Information System (WHMIS) as a requirement for all types of work and workplace.

And we have applied that reasoning to the codes relevant to their occupation as necessary. We have included a special consideration for plumbers who, in BC, are expected to have a “Gas B License”.

We have assumed that trade persons are often expected to drive a company vehicle – most likely a pick-up truck or van. These vehicles can be operated with a Class 5 BC Driver’s License. ICBC has an agreement in place to exchange a French driver’s license for a BC one.

Table 9. Regulatory requirements for 5 trades - training (and certification) may be undertaken by the employer (refer to Table 7 for complexity rating explanation and color code)

Regulatory requirements	Trade				
	Carp.	C.E.	C.C.W.	Plumb.	Roof.
<b>WSBC Rights</b>					
Right to a healthy and safe workplace	0	0	0	0	0
Right to safety training and orientation	0	0	0	0	0
Right to refuse unsafe work	0	0	0	0	0
<b>WSBC Responsibilities</b>					
Young / New Worker (Training & Orientation)	0	0	0	0	0
Follow safe work procedures and act safely in the workplace at all times.	0	0	0	0	0
Use the protective clothing, devices, and equipment provided. Be sure to wear them properly.	0	0	0	0	0

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Regulatory requirements	Trade				
	Carp.	C.E.	C.C.W.	Plumb.	Roof.
Co-operate with joint occupational health and safety committees, worker health and safety representatives, WorkSafeBC prevention officers, and anybody with health and safety duties.	0	0	0	0	0
<b>Miscellaneous Requirements</b>					
WHMIS	0	0	0	0	0
Fall arrest / restraint / protection	1	1	1	N/A	1
Confined space	N/A	1	N/A	1	N/A
Building Code	0	N/A	0	0	0
Gas Code (B 149.1)	N/A	N/A	N/A	0	N/A
Canadian Electrical Code	N/A	0	N/A	0	N/A
Driver's License (Class 5)	5	5	5	5	5

### Training programs comparisons

In the table below, we compare key structural and procedural elements of the apprenticeship programs in BC and in France. Note that we have only considered the dual stream and, for scope reasons, have not included access to French certification based on time-in-the trade or on the strictly vocational stream.

Table 10. Comparison of BC and French apprenticeship program elements across 5 trades

Program element		British Columbia	France (BacPro)
Entry requirements	Type	Recommended	Required
	Special requirements	None	Recommended physical abilities
	Lowest scholastic	Grade 9 (Roofer)	All trades except CCW; 9 years of schooling; Diplôme National du Brevet 1er cycle ( <i>Lycée</i> )
	Preferred scholastic	Grade 10 (Carpenter, Construction Craft Worker, Roofer)	All trades except CCW; 9 years of schooling; Diplôme National du Brevet 1er cycle ( <i>Lycée</i> )
	Highest scholastic	Grade 12 (Plumber) Grade 12 (Electrician)	All trades except CCW; 9 years of schooling; Diplôme National du Brevet 1er cycle ( <i>Lycée</i> )
	Topics scholastic	English, math, science	French, math, science, physics, socials, English (+), Law, business, Health & Safety, PE except CCW
In-school training	Total length	Varies (0 - 1200 hours total)	1600 - 2700 hours total (no schooling for CCW)
	Number of periods	Varies (3-4)	Fixed (3); semester or "en alternance" (no schooling for CCW)

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Program element		British Columbia	France (BacPro)
	Additional studies		All compulsory (no schooling for CCW)
On-the-job training	Total length	Fixed for each trade, but varies by trade (3600 –6480 hours)	770 (BacPro lycée) – 3200 (BacPro CFA) - same for all trades (no mandatory OJ training period required for CCW)
	Number of periods	Fixed but varies by trade	Fixed 3 over 3 years (BacPro lycée) – 1-2 weeks school-work rotation over 3 years (BacPro CFA) (no mandatory OJ training period required for CCW)
Assessment	School-based exams	Institution-specific (moving to standardized tests)	Standardized (no exam required for CCW)
	On-the-job	Employer hours sign-off	Documented standardized competence tests in testing centres with jury / panel of evaluators (no exam required for CCW)
	Certification	“Paper-and-pencil” single test	Ministry-controlled theory and competence tests – or ministry-approved progress tests (no exam required for CCW)

Training Contents Comparison

Carpenter programs comparison at-a-glance

Table 11. BC and French Carpenter apprenticeships (2 streams); duration and prerequisites

British Columbia - Carpenter	France BacPro – <i>Charpentier Bois</i>	
	BacPro ( <i>lycée</i> )	BacPro ( <i>CFA en alternance</i> )
Level 1 In-school training: 210 hours	Year 1 in-school training: est. 900 hours	Year 1 in-school training: est. 535 hours
Level 2 In-school training: 210 hours	Year 2 in-school training: est. 900 hours	Year 2 in-school training: est. 535 hours
Level 3 In-school training: 210 hours	Year 3 in-school training: est. 900 hours	Year 3 in-school training: est. 535 hours
Level 4 In-school training: 210 hours		
Total in-school: 840 hours	Total in-school: 2700 hours	Total in-school: 1600 hours
Total work based: 6480 accumulated work based hours	Total work base: 770 hours	Total work base: 3220 hours
Recommended entry: Grade 10 English, Math, and Science	Mandatory completion of 3 <sup>ème</sup> Premier Cycle: Diplôme National du Brevet 1er cycle ( <i>Lycée</i> )	Mandatory completion of 3 <sup>ème</sup> Premier Cycle: Diplôme National du Brevet 1er cycle ( <i>Lycée</i> )

## [A Comparison of Select British Columbia and French Apprenticeships](#)

### Carpenter GACs and Competencies comparison (details)

In the table below we list all of the GACs and attendant competencies rated as described above. The ratings are indicative of the differences between trade practices in BC and France – they also stem from stronger trade differentiations in France.

Table 12. Rank-ordered BC Carpenter GACs and competencies (0=not present in French program; 1=partial overlap; 2=substantial or complete overlap with BC program) – Note Hours & percentages are for the BC program

<b>General Area of Competence (GAC)</b>	In-school hours	%/GAC	On-the-job hours	<b>Rating</b>
Competencies				<b>France</b>
<b>Wood Frame Construction</b>	191.1	23%	1474	<b>2</b>
Describe Wood Frame Construction				0
Select Framing Materials				2
Build Floor Systems				2
Build Wall Systems				2
Build Stair Systems				2
Build Roof Systems				2
Build Specialized Framing Systems				2
Perform Renovations and Additions				2
Build Timber and Engineered Wood Construction				2
Build Decks and Exterior Structures				1
<b>Concrete Formwork</b>	161.7	19%	1247	<b>0</b>
Use Concrete Types, Materials, Additives and Treatments				0
Select Concrete Forming Systems				0
Build Footing and Vertical Formwork				0
Build Slab-On-Grade Forms and Suspended Slab Forms				0
Install Reinforcement and Embedded Items				0
Build Concrete Stair Forms				0
Place and Finish Concrete				0
Install Specialized Formwork				0
<b>Documentation and Organizational Skills</b>	157.5	19%	1215	<b>2</b>
Describe Carpentry Trade				0
Use Construction Drawings and Specifications				2
Interpret Building Codes and Bylaws				0
Plan and Organize Work				2
Perform Trade Math				2
<b>Finishing Materials</b>	96.6	12%	745.2	<b>1</b>
Describe Roofing Materials				1

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General Area of Competence (GAC)	In-school hours	%/GAC	On-the-job hours	Rating
Competencies				<b>France</b>
Install Doors and Hardware				2
Install Windows and Hardware				2
Install Exterior Finishes				0
Install Interior Finishes				1
Install Cabinets				0
Install Interior Floor, Ceiling and Wall Systems				1
<b>Tools and Equipment</b>	67.2	8%	518.4	<b>2</b>
Use Hand Tools				2
Use Portable Power Tools				2
Use Stationary Power Tools				2
Use Oxy-Fuel Equipment				0
<b>Survey Instruments and Equipment</b>	50.4	6%	388.8	<b>2</b>
Use Levelling Instruments and Equipment				2
Use Site Layout Equipment				1
<b>Building Science</b>	35.7	4%	275.4	<b>2</b>
Control the Forces Acting on a Building				2
Control Heat and Sound Transmission				2
Control Air and Moisture Movement in Buildings				2
<b>Site Layout</b>	33.6	4%	259.2	<b>1</b>
Lay Out Building Locations				1
Prepare Building Site				2
Apply Excavation and Shoring Practices				1
<b>Access, Rigging and Hoisting Equipment</b>	25.2	3%	194.4	<b>2</b>
Use Ladders, Scaffolds and Access Equipment				2
Use Rigging and Hoisting Equipment				2
<b>Safe Work Practices</b>	21	3%	162	<b>1</b>
Apply Shop and Site Safety Practices				1
Apply Personal Safety Practices				1

Construction Electrician programs comparison at-a-glance

Table 13. Construction electrician and Electrical duration and prerequisites

British Columbia – Construction Electrician	France BacPro – <i>Électricien/ne bâtiment</i>	
	BacPro ( <i>lycée</i> )	BacPro ( <i>CFA en alternance</i> )

[A Comparison of Select British Columbia and French Apprenticeships](#)

British Columbia – Construction Electrician	France BacPro – <i>Électricien/ne bâtiment</i>	
Level 1 In-school training: 300 hours	Year 1 in-school training: est. 900 hours	Year 1 in-school training: est. 535 hours
Level 2 In-school training: 300 hours	Year 2 in-school training: est. 900 hours	Year 2 in-school training: est. 535 hours
Level 3 In-school training: 300 hours	Year 3 in-school training: est. 900 hours	Year 3 in-school training: est. 535 hours
Level 4 In-school training: 300 hours		
Approximate in-school: 1200 hours	Total in-school: 2700 hours	Total in-school: 1600 hours
Total work based: 6000 accumulated work based hours	Total work base: 770 hours	Total work base: 3220 hours
Recommended but not required: recent Grade 12 graduation (within 5 yrs.) with demonstrated mechanical aptitude; Math and Physics 11; English or Communications 12; or successful completion of an electrical industry assessment exam; or recent (with 5 yrs.) Electrical Foundation Program graduate.	Mandatory completion of 3 <sup>ième</sup> Premier Cycle: Diplôme National du Brevet 1er cycle ( <i>Lycée</i> )	Mandatory completion of 3 <sup>ième</sup> Premier Cycle: Diplôme National du Brevet 1er cycle ( <i>Lycée</i> )

[Construction Electrician GACs and Competencies comparison \(details\)](#)

In the table below we list all of the GACs and attendant competencies rated as described above. The ratings are indicative of the differences between trade practices in BC and France.

Table 14. Rank-ordered Construction Electrician GACs and competencies (0=not present in French program; 1=partial overlap; 2=substantial or complete overlap with BC program)

General Area of Competence (GAC)	In-school hours	%/GAC	On-the-job hours	Rating
Competencies				France
<b>Apply Circuit Concepts</b>	441	2205	37%	<b>2</b>
Use Electrical Circuit Concepts				2
Analyze DC Circuits				2
Solve Problems Using the Principles of Electromagnetism				2
Analyze Single-phase AC Circuits				2
Analyze Three-phase Circuits				2
Analyze Electronic Circuits				2
<b>Install Electrical Equipment</b>	210	1050	18%	<b>2</b>
Install Lighting and Lighting Controls				2
Install Transformers				2
Install Protective Devices				2
Install DC Motors and Generators				2
Install AC Motors and Alternators				2
Install HVAC				0
Install Emergency Power Systems				0
Install Alternative Power Systems				2
<b>Install Low Voltage Distribution Systems</b>	168	840	14%	<b>2</b>



*A Comparison of Select British Columbia and French Apprenticeships*

<b>General Area of Competence (GAC)</b>	In-school hours	%/GAC	On-the-job hours	<b>Rating</b>
Competencies				<b>France</b>
Apply Codes, Regulations and Standards				0
Install Service Equipment				2
Install Grounding and Bonding				2
Install Distribution Centres				2
Install Raceways, Boxes and Fittings				2
Install Conductors and Cables				2
Install Utilization Equipment and Devices				2
<b>Install Control Circuits and Devices</b>	168	840	14%	<b>1</b>
Install Manual Motor Controls				1
Install Magnetic Motor Controls				1
Install Electronic Motor Controls				2
Install PLCs				0
Install Automated Controls				2
<b>Read and Interpret Drawings and Manuals</b>	75	375	6%	<b>2</b>
Use Circuit Drawings				2
Use Construction Drawings and Specifications				2
Use Manuals and Manufacturers' Instructions				2
Plan Time and Materials				2
<b>Install Signal and Communications Systems</b>	42	210	4%	<b>2</b>
Install Fire Alarm and Suppression Systems				2
Install Structured Cabling Systems				2
Install Nurse Call Systems				0
Install Building Integrated Control Systems				2
Install Sound Systems				0
Install Entertainment Systems				0
Install CATV Systems				2
Install Security Alarm Systems				2
<b>Use Test Equipment</b>	42	210	4%	<b>2</b>
Use Analog Meters				2
Use Digital Meters				2
Use Scopes				2
Use Power Quality Analyzers				2
Perform Structured Cable Testing and Reporting				2
<b>Install High Voltage Systems</b>	24	120	2%	<b>2</b>
Apply High Voltage Safety Procedures				2

## A Comparison of Select British Columbia and French Apprenticeships

General Area of Competence (GAC)	In-school hours	%/GAC	On-the-job hours	Rating
Competencies				<b>France</b>
Install High Voltage Cable				2
Install High Voltage Switch Gear				2
Use High Voltage Test Equipment				2
<b>Use Safe Work Practices</b>	18	90	2%	<b>2</b>
Perform Lockout Procedures				2
Apply WCB Standards and Regulations				0
Apply Safe Work Practices				2
Apply WHMIS				0
Use a Daily Safety Plan				2
Use Safe Rigging Techniques				0
<b>Use Essential Skills</b>	12	60	1%	<b>0</b>
<b>Use Tools and Equipment</b>	0	0	0%	<b>2</b>
Use Hand Tools				2
Use Power Tools				2
Use Fastening Systems				2
Use Powder Actuated Tools				0
Use Access Equipment				1

### Plumbers programs comparison at-a-glance

Table 15. BC Plumber and France “Plumber” duration and prerequisites

British Columbia – Plumber	France Bac Pro - <i>Technicien de maintenance des systèmes énergétiques et climatiques / Installateur sanitaire (CAP)</i>	
	BacPro ( <i>lycée</i> )	BacPro ( <i>CFA en alternance</i> )
Level 1 In-school training: 180 hours	Year 1 in-school training: est. 900 hours	Year 1 in-school training: est. 535 hours
Level 2 In-school training: 180 hours	Year 2 in-school training: est. 900 hours	Year 2 in-school training: est. 535 hours
Level 3 In-school training: 180 hours	Year 3 in-school training: est. 900 hours	Year 3 in-school training: est. 535 hours
Level 4 In-school training: 240 hours		
Total in-school: 780 hours	Total in-school: 2700 hours	Total in-school: 1600 hours
Total work based: 6420 accumulated work based hours	Total work base: 770 hours	Total work base: 3220 hours
Recommended but not required: Grade 12 English, Grade 11 Algebra or Trade Math 11, Grade 11 Physics or Science and Technology 11	Mandatory completion of 3 <sup>ème</sup> Premier Cycle: Diplôme National du Brevet 1er cycle ( <i>Lycée</i> )	Mandatory completion of 3 <sup>ème</sup> Premier Cycle: Diplôme National du Brevet 1er cycle ( <i>Lycée</i> )

## [A Comparison of Select British Columbia and French Apprenticeships](#)

### Plumbers GACs and Competencies comparison (details)

In the table below we list all of the GACs and attendant competencies rated as described above. The ratings are indicative of the differences between trade practices in BC and France – they also stem from stronger trade differentiations / specialization in France where the trade certificate refers to *Technicien de maintenance des systèmes énergétiques et climatiques* and the usual *Installateur sanitaire* (literally Sanitary installer) refers to a worker specializing in bathroom and kitchen equipment installation. In France, the term Plombier (literally Plumber) is reserved for the job rather than any credential.

Table 16. Rank-ordered Plumber GACs and competencies (0=not present in French program; 1=partial overlap; 2=substantial or complete overlap with BC program)

<b>General Area of Competence (GAC)</b>	In-school hours	%/GAC	On-the-job hours	<b>Rating</b>
Competencies				<b>France</b>
<b>Install Natural Gas and Propane Systems</b>	192	1580	25%	<b>2</b>
Install and service fuel systems				2
Install and service gas equipment				2
Install venting and air supply				2
Install and service controls and safeguards				2
Use gas codes, regulations and standards				0
<b>Organize Work</b>	122.5	1009	16%	<b>2</b>
Use mathematics and science				2
Read drawings and specifications				2
Use codes, regulations and standards				0
Use manufacturer and supplier documentation				2
Plan a project				2
<b>Install Sanitary and Storm Drainage Systems</b>	113.8	936.3	15%	<b>1</b>
Install sanitary drain, waste and vent systems				2
Install storm drainage systems				1
Install sanitary sewer systems				2
Test and commission sanitary and storm drainage systems				1
Maintain and repair sanitary and storm drainage systems				1
<b>Install Water Service and Distribution</b>	96	790.1	12%	<b>2</b>
Install water services				2
Install potable distribution systems				2
Install private potable water supply systems				0
Install water treatment systems				2
Test and commission potable water systems				2
Maintain and repair potable water systems				2

*A Comparison of Select British Columbia and French Apprenticeships*

<b>General Area of Competence (GAC)</b>	In-school hours	%/GAC	On-the-job hours	<b>Rating</b>
Competencies				<b>France</b>
<b>Install Hydronic Heating and Cooling</b>	77.04	634.1	10%	<b>2</b>
Describe the operation of hydronic heating and cooling systems				2
Install hydronic heating and cooling systems				2
Test and commission hydronic systems				2
Maintain and repair hydronic systems				2
<b>Use Tools and Equipment</b>	55.28	455	7%	<b>2</b>
Use hand tools				2
Use portable power tools				2
Use stationary power tools				2
Use measuring and leveling tools				2
Use cutting, brazing, and soldering equipment				2
Use ladders and platforms				0
Use rigging and hoisting equipment				0
<b>Prepare and Assemble Plumbing Components</b>	35.1	288.9	4%	<b>2</b>
Install pipes				2
Install valves				2
Install fittings				2
Penetrate structures				2
<b>Apply Plumbing Principles</b>	23.32	191.9	3%	<b>2</b>
<b>Install Fixtures and Appliances</b>	22.4	184.4	3%	<b>2</b>
Install fixtures and trims				2
Install appliances				2
Test and commission fixtures and appliances				2
Maintain and repair fixtures and appliances				2
<b>Install Specialized Systems</b>	18.42	151.6	2%	<b>1</b>
Install medical gas systems				0
Install irrigation systems				0
Install compressed air systems				2
Install fire protection systems				1
Test and commission specialized systems				2
Maintain and repair specialized systems				2
<b>Use Safe Work Practices</b>	12.42	102.2	2%	<b>1</b>
Control workplace hazards				2
Use information in the OSH Regulation and WCB standards				0

## [A Comparison of Select British Columbia and French Apprenticeships](#)

General Area of Competence (GAC)	In-school hours	%/GAC	On-the-job hours	Rating
Competencies				<b>France</b>
Use WHMIS				0
Use Personal Protective Equipment				2
Practice fire prevention				2
<b>Install Private Sewage Systems</b>	<b>11.76</b>	<b>96.79</b>	<b>2%</b>	<b>2</b>
Install private sewage disposal systems				2
Repair and maintain private sewage disposal systems				2

### Construction Craft Workers programs comparison at-a-glance

Table 17. BC Construction Craft Worker and France Construction Craft Worker (concrete) duration and prerequisites

British Columbia – Construction Craft Worker	France dual stream - Construction Craft Worker (concrete)
Level 1 In-school training: 120 hours	No schooling required
Level 2 In-school training: 120 hours	No schooling required
Total in-school: 780 hours	No schooling required
Total work based: 4000 accumulated work based hours	No minimum work-based hours required; some employers may require some training or qualification
Recommended but not required: Grade 12 English, Grade 11 Algebra or Trade Math 11, Grade 11 Physics or Science and Technology 11	No educational requirement stated beyond those imposed by the state on all citizens.

### Construction Craft Workers GACs and Competencies comparison (details)

In the table below we list all of the GACs and attendant competencies rated as described above. The ratings are indicative of the differences between trade practices in BC and France – they also stem from stronger trade differentiations within the Construction Craft worker stream.

Table 18. Rank-ordered Construction Craft Worker GACs and competencies (0=not present in French program; 1=partial overlap; 2=substantial or complete overlap with BC program; Note: we used the “Concrete” specialization as a reference)

General Area of Competence (GAC)	In-school hours	%/GAC	On-the-job hours	Rating
Competencies				<b>France</b>
<b>Perform Concrete Work</b>	<b>45.6</b>	<b>19%</b>	<b>760</b>	<b>2</b>
Form Concrete				2
Place and Finish Concrete				2
Modify Concrete				2
Install Grout, Epoxies and Caulking				2
<b>Perform Site Work</b>	<b>43.2</b>	<b>18%</b>	<b>720</b>	<b>2</b>
Prepare Site				2
Perform Ground Work				2
Perform Demolition				2
Apply Excavation and Shoring Practices				0

*A Comparison of Select British Columbia and French Apprenticeships*

<b>General Area of Competence (GAC)</b>	In-school hours	%/GAC	On-the-job hours	<b>Rating</b>
Competencies				<b>France</b>
Service Site				2
<b>Use Scaffolding and Access Equipment</b>	27.6	12%	460	<b>2</b>
Use Scaffolding and Access Equipment				2
Use access equipment				2
<b>Perform Utilities and Pipeline Tasks</b>	26.4	11%	440	<b>0</b>
Install utility piping				0
Perform pipeline activities				0
Perform pipeline maintenance				0
<b>Organize Work</b>	24	10%	400	<b>1</b>
Use Documentation, Blueprints and Specifications				1
Communicate with Others				1
Use Basic Trade Math				0
<b>Perform Routine Trade Activities</b>	24	10%	400	<b>1</b>
Install Permanent and Temporary Fencing				1
Erect and Dismantle Hoarding / Enclosures				1
Perform Traffic Control				0
Establish Grades and Elevations				1
Handle Materials				2
Install Membranes				1
Install Insulating Materials				0
<b>Use Safe Work Practices</b>	18	8%	300	<b>1</b>
Manage Workplace Hazards				2
Apply OHS Regulations and WorkSafeBC Standards				0
Use Fall Protection Systems and Equipment				0
Use Personal Protective Equipment				1
Use Fire Safety Procedures				0
Use Safety Committees				0
Perform Safety Watch				0
<b>Use Tools and Equipment</b>	12	5%	200	<b>1</b>
Use hand tools				2
Use power tools				2
Use powder-actuated tools				0
Use Rigging and Hoisting Equipment				0
Use portable equipment				2

## [A Comparison of Select British Columbia and French Apprenticeships](#)

General Area of Competence (GAC)	In-school hours	%/GAC	On-the-job hours	Rating
Competencies				<b>France</b>
Use mobile equipment				2
Use sandblasters				0
Use packers				0
<b>Perform Masonry Work</b>	12	5%	200	<b>1</b>
Prepare masonry work				1
Tend to bricklayers				1
<b>Perform Roadwork</b>	7.2	3%	120	<b>0</b>
Install paving materials				0
Install roadwork components				0

### [Roofer \(Damp- and Waterproofer\) programs comparison at-a-glance](#)

Table 19. BC and French Roofer apprenticeships; duration and prerequisites (Note: French reference is the Dual Stream)

British Columbia - Roofer	France BP CFA – <i>Couvreur/Couvreuse</i>
Level 1 In-school training: 120 hours	Year 1 in-school training: est. 380 hours
Level 2 In-school training: 120 hours	Year 2 in-school training: est. 380 hours
Level 3 In-school training: 120 hours	Year 3 in-school training: est. 380 hours
	Year 4 in-school training: est. 380 hours
Total in-school: 360 hours	Total in-school: 1530 hours
Total work based: 6480 accumulated work based hours	Total work base: 4760 hours
Recommended entry: Grade 10 English, Math, and Science	Mandatory completion of 3 <sup>ième</sup> Premier Cycle: Diplôme National du Brevet 1er cycle ( <i>Lycée</i> ) + completion of a 2 year CAP in the trade – Credit given to holders of a Carpenter credential.

### [Roofer \(Damp- and Waterproofer GACs and Competencies comparison \(details\)](#)

In the table below we list all of the GACs and attendant competencies rated as described above. The ratings are indicative of the differences between trade practices in BC and France – they also stem from 2 specializations and the differences in most common roofing materials.

Table 20. Rank-ordered Construction Roofer GACs and competencies (0=not present in French program; 1=partial overlap; 2=substantial or complete overlap with BC program; Note: we used the “Roof, wall and waterproofing technology” specialization as a reference)

General Area of Competence (GAC)	In-school hours	%/GAC	On-the-job hours	Rating
Competencies				<b>France</b>
<b>Install Low Slope and Flat Roofing</b>	138.0	1380	38%	<b>2</b>
Install Gypsum Board and Insulation				1
Install Overlay Board				1
Install Vapour Retarders and Air Barriers				2
Install Flashing Materials				2

*A Comparison of Select British Columbia and French Apprenticeships*

<b>General Area of Competence (GAC)</b>	In-school hours	%/GAC	On-the-job hours	<b>Rating</b>
Competencies				<b>France</b>
Install Built-Up Roofing Systems				1
Install Flexible Membrane Roof Systems				1
<b>Install Steep Roofing</b>	55.2	552	15%	<b>2</b>
Install Asphalt Shingles				2
Install Wood Shingles and Shakes				0
Install Concrete and Composite Materials				2
Install Metallic Materials				2
<b>Organize Work</b>	45.6	456	13%	<b>2</b>
Describe Roof Types				2
Communicate with others				2
Prepare the worksite				2
Estimate quantities of materials				2
<b>Use Safe Work Practices</b>	44.4	444	12%	<b>1</b>
Describe Workplace Hazards				2
Interpret the Occupational Health and Safety Regulation and WCB Standards				0
Use WHMIS				0
Use Personal Protective Equipment				2
Use fire safety procedures				2
<b>Use Documentation</b>	32.4	324	9%	<b>2</b>
Read Drawings and Specifications				2
Use Building Codes and RCABC Standards				0
Read Manufacturers' Information				2
<b>Use Tools and Equipment</b>	21.6	216	6%	<b>2</b>
Use hand tools				2
Use portable power tools				2
Use propane-fuelled equipment				0
Use hot process equipment				1
Use Hoisting, Lifting and Rigging Equipment				2
Use Motorized Equipment				2
Use Ladders and Platforms				2
<b>Assess and Maintain Roof, Damp and Waterproofing</b>	12.0	120	3%	<b>2</b>
Assess Roof Conditions				2
Maintain and Repair Roofs, Damp and Waterproofing				1
<b>Apply Waterproofing and Damp-Proofing</b>	7.2	72	2%	<b>0</b>



*A Comparison of Select British Columbia and French Apprenticeships*

<b>General Area of Competence (GAC)</b>	In-school hours	%/GAC	On-the-job hours	<b>Rating</b>
Competencies				<b>France</b>
Waterproof surfaces				0
Damp-proof surfaces				0
<b>Prepare Roofs</b>	3.6	36	1%	<b>2</b>
Prepare Roofs For Replacement				2
Prepare Roofs For New Installation				2

## Discussion

In this section we consider the meaning of the results.

### Essential Skills

#### Reading

The overall score on 0.33 reflects our assumption that French trade persons have had rudimentary training in English. But this assumption sets the bar at its lowest: it is possible that some newcomers master English at a more advanced level. However, it is safe to assume that (limited) English fluency would not include familiarity with safety, trade or legislation technical terms, trade processes language (including trade jargon), or codes and regulations (often in legalistic language and non-intuitive formats.)

In addition, reception (listening and reading – A1/A2), reading tending to be a more complex literacy skill than listening (and understanding), this even more so in a specialized field.

#### Document Use

The overall score on 0.89 reflects the language assumption we mentioned above. We can expect a French newcomer with basic English to be able to handle most common documents, especially plans, schematics, blueprints etc. The French trade person's limitations would be linked to differing protocols embedded in the plans rather than the language skills. The only skill we thought might be out of a French trade person is that of completing complex forms and building permits (score of 0). Here we have assumed that both language and process worked synergistically "against" a newcomer.

The most complex literacy skill required here is that of mediation (translating and interpreting - C1/C2). But French trade persons have had to practice that skill in their day-to-day practice in their home country. In BC their only impediment is that of having to apply the skill in a foreign language.

#### Writing

The overall score on 0 reflects both the language assumption we mentioned above and the fact that both written production (written – B1) and document "interaction" (B2) are more difficult for non-native or non-fluent writers.

Reception (listening and reading – A1/A2) < production (spoken and written – B1) < interaction (spoken and written – B2) < mediation (translating and interpreting – C1/C2).

#### Numeracy

The overall score on 1.14 reflects the language assumption even though its importance is not as great here as it is in the other essential skills categories. We can expect a French newcomer to be able to handle all common tasks requiring trade mathematics since, for BacPro graduates, they have had 3 years of advanced applied mathematics training. The only numeracy skills we thought might be out of a French trade person's ken is that of scheduling and estimating costs and time-to-completion (scores of 0). And that is more because we have assumed that French Carpenters lack familiarity with the industry in a BC context coupled with English-second-language problems.

#### Oral communications

The overall score on 0.50 reflects the language assumption and the complexity level: interaction (spoken – B2) < mediation (translating and interpreting – C1/C2). Language demands such as understanding simple requests, what is said at crew meetings, or what a customer might want ought to be within the

grasp of a newcomer with basic English language skills. But talking to building and safety inspectors, engineers, manufacturers, or acting as a crew leader might be beyond a French trade person's abilities (scores of 0). Here as well, lack of familiarity with the industry in a BC context is a major contributing factor, especially when paired with limited English skills.

#### Essential Skills recommendations

Clearly, English language skills are the major stumbling block to a French trade person, especially if they did not elect English for their second language option during the lycée. It remains that offering generic English Second Language (ESL) courses, while useful for integration into the larger community, will not help on the job site.

The best intervention is most likely an educational approach supported by a job aid. The educational component would be in 2 parts: (i) trade and legalistic English and (ii) worksite protocols and business processes, both making use of documents, such as regulations or codes, pertinent to the newcomers' trade. The job aid would be a pocket or app-based trade dictionary containing a subset of the most common trade terms and aligned to the BC apprentice trade manual(s).

#### Health and Safety, and other legislated skills

WorkSafeBC (WSBC) lists rights and responsibilities for workers – and additional training for “new” workers. While compliance is commonly taken care of by the employer, it is up to the trade person to know what they can and cannot do safely, as well as how to be in compliance with WSBC regulation. WSBC requirements with respect to Personal Protective Equipment (PPE) varies from trade to trade but usually includes regulation-approved footwear, clothing (including high visibility clothing), ear/eye/hand protection, and hard hat. In addition, for some types of work, respirator proficiency is required.

Workplace Hazardous Materials Information System (WHMIS) is a requirement for all types of work and workplace. WHMIS certification is often a pre-requisite for jobs – it may be offered through the employer.

Proof of training and a certificate in Fall Prevention (covered under Part 11 of the WSBC Regulation) is a requirement for all workers who work at heights exceeding 3 meters. And while it is possible to work without fall restraint (for example if guardrails have been installed), roofers and carpenters will often be required to have and know how to use fall restraint equipment.

Electricians and plumbers often work in confined spaces (covered under Part 9 of the WSBC Regulation). Proof of training and a certificate is required for those workers who might come across such environments.

For all construction trades a familiarity with the codes relevant to their occupation is necessary. In addition, plumbers in BC are expected to have a “Gas B License” in order to install and connect gas-fired appliances.

Trade persons are often expected to drive a company vehicle – most likely a pick-up truck or van. These vehicles can be operated with a Class 5 BC Driver's License. ICBC has an agreement in place to exchange a French driver's license for a BC one provided a certified translated copy of the document is provided alongside proof of at least 2 years' driving experience either in the form of a formal letter or as attested by the issuance date on the driver's license itself. Operating commercial vehicles with more than 2 axles, especially those equipped with air brakes requires a special license and an air brake endorsement.

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### [Health and Safety, and other legislated skills recommendations](#)

There are a number of online training opportunities for all of the OSH requirements that are appropriate and recognized. These can be purchased for approximately \$200.

Code books (or relevant appropriate section) can be purchased for \$150-250 online or at specialized bookstores – knowing the code will be important for those workers wanting to challenge the Red Seal examination, especially for Plumbers and Electricians.

Plumbers wishing to install and connect gas-fired appliances will have to take a course and pass the relevant Safety Authority examination.

### [Training Contents Comparisons](#)

#### [Carpenter](#)

The differences between trade practices in BC and France stem from historically entrained building technologies and practices, existing asset base, and stronger trade differentiations in France. Briefly, in France carpenters do not routinely

- Build formwork, use rebar, order and place concrete.
- “Stick-frame” but, instead timber-frame.
- Install exterior cladding.
- Hang and finish drywall.
- Install cabinetry.

#### [Carpenter recommendations](#)

French carpenters have the skills to be productive on a worksite. But they miss some of the skills required to be deployed flexibly – say on a residential framing crew, or to work on residential tower, industrial, or commercial projects that make heavy use of forming and concrete components. Providing French carpenters with the in-school equivalent of H line (wood frame construction) in Level 1 (approximately 2 weeks; maybe shorter if emphasis is on stick-framing) and G Line (concrete work) in Level 2 (approximately 4 weeks) of the apprenticeship program would bring them up to speed.

Alternatively, they could pick up these skills on the job if they were employed as a Construction Craft Worker, whether as an apprentice or a laborer, getting to Red Seal certification in 2-3 years.

#### [Construction Electrician](#)

The differences between trade practices in BC and France stem from technologies, codes and regulations, and electrical distribution systems, including voltage differences. Briefly, in France electricians do not

- Expressly study “essential skills”; math, physics, chemistry, socials, law, and business skills are acquired during their 3 years of “formal” topics’ education leading to the baccalauréat.
- Routinely conduct install HVAC, entertainment, or nurse call systems.
- Expressly study PLCs and motor controls, although those topics may be covered when they study control systems in general.

French electricians are trained in 3 AC and DC voltage levels in order to be able to work on residential, commercial, or industrial projects:

## [A Comparison of Select British Columbia and French Apprenticeships](#)

- BTA (*basse tension A*) – Low Voltage « A »:
  - AC:  $50 < U \leq 500$
  - DC :  $120 < U \leq 750$
- BTB (*basse tension B*) – Low Voltage « B »:
  - AC:  $500 < U \leq 1000$
  - DC :  $750 < U \leq 1550$
- HTA (*haute tension A*) – High Voltage « A »:
  - AC:  $1000 < U \leq 50kV$
  - DC :  $1500 < U \leq 75kV$

### [Construction Electrician recommendations](#)

French electricians have the skills to be productive on residential, commercial, or industrial worksites. But they will need to adapt to base voltage differences between Europe and Canada. Likewise, codes and regulations driving work practices will be foreign to them. Providing them with an Electrical Code course (approximately 2 weeks a day/week and \$600) would bring them up to speed.

Alternatively, they could pick up these skills on the job, getting to Red Seal certification in a year or so.

### [Plumber](#)

The differences between trade practices in BC and France stem from technologies, codes and regulations, and distribution systems. The differences between trade practices in BC and France also stem from stronger trade differentiations / specialization based on the training stream. For example, the colloquial name of *Plombier/ière* does not exist as a credential but, instead is attached to the 2 years *Installateur sanitaire* CAP credential with training that is restricted to sanitary water systems (mainly in homes). The Bac Pro training is more comprehensive (and compares better with BC plumber's activities) and graduates have a greater range of abilities and responsibilities but are not called "plumbers", instead they are referred to as *Technicien de maintenance des systèmes énergétiques et climatiques*, which translates as Energetic and climatic systems maintenance technician.

Note here that French "plumbers" install heating and boiler systems that make use all sorts of fuels and energy rather than (mainly) gas-fired and electrical ones, and that they also install HVAC systems (unlike BC Plumbers).

Briefly, in France "Plumbers" do not

- Install medical gas supply systems.
- Install sprinkling systems.
- Routinely install well systems.

### [Plumber recommendations](#)

French plumbers have the skills to be productive on all types of worksites. But codes and regulations driving work practices will be foreign to them. Providing them with the in-school equivalent of C3 in C line in Level 1 (approximately 1 week) of the apprenticeship program and a Gas B course (approximately 3 weeks and \$1000) would bring them up to speed.

## [A Comparison of Select British Columbia and French Apprenticeships](#)

Alternatively, they could pick up code-related skills on the job and take the Gas B course – in order to get the Safety Authority qualification, then challenge the Red Seal examination.

### [Construction Craft Worker](#)

The ratings are indicative of the differences between “trade” practices in BC and France (where it is a “job” rather than a trade or occupation). The differences we noted are, in part, a consequence of using a blend of the “generalist” and the “masonry” job duties as a French reference. We used this blend as it better matched the most important aspects of the Construction Craft Worker as practiced in BC and because it focused on what is referred to as “batiment” (building) for that type of jobs.

All of the specializations we mentioned refer to “Manoeuvre” (Loosely *Building site helper*). The occupations’ differentiations / specialization in France reflect both the size of the site (more specialization in larger sites) and the type of trade person the helper works with (e.g., a manoeuvre will have masonry skills if she works alongside / for masons).

Note here that French manoeuvres are not issued any specific certificate; they “are” what their on-the-job experience made them.

Briefly, in France manoeuvres do not

- Do any type of roadwork.
- Do duct, utility, or pipeline work.
- Conduct traffic control.

### [Construction Craft Worker recommendations](#)

French manoeuvres have the skills to be productive on a worksite. But, codes and regulations driving work practices will be foreign to them. Once over the language barrier (if any) they could pick up code-related, roadwork, and piping skills on the job and then challenge the Red Seal examination – those with extensive experience might, be able to challenge the Red Seal immediately since they could write the French version.

### [Roofer](#)

The ratings are indicative of the differences between trade practices in BC and France. We did not use (marginal) French roofing sub-specialties such as slate (“*couvreur ardoisier*”), stone (“*couvreur lauzier*”), zinc (“*couvreur zingueur*”) because the generic trade better matched the most important aspects of the Roofer as practiced in BC.

Note here that French “Roofers” type of hands-on skills will depend on which sub-specialty they may have taken and the area in which they worked (as different geographic areas use different unitized roofing materials), even if the certificate they hold is the same.

Briefly, in France “Roofers – roof, wall, and waterproofing” do not

- Routinely install wood shingles and shakes.
- Routinely use torch-on techniques and materials.
- Perform damp- and waterproofing tasks.
- Know local industry standards (in this case Roofing Contractors Association of BC – RCABC).

## [A Comparison of Select British Columbia and French Apprenticeships](#)

### [Roofer recommendations](#)

French Roofers have the skills to be productive on a worksite, be it flat, low slope, or steep roofing. They will be an asset to crews that perform complex architectural roofing details as they can design, manufacture, and install these systems, and can do so in all manners of metallic materials. They can also design and build roof sub-structures whether in prefab or timber components. But, codes, regulations, and industry standards driving work practices will be foreign to them. Once over the language barrier (if any) they could pick up wood shingling, torch on, and damp-and waterproofing skills on the job and then challenge the Red Seal examination.

### [Credentialing comparisons](#)

#### [British Columbia](#)

Apprentices are required to pass each of 4 levels (blocks) of in-school training. At the time of this writing, the practical and theory tests were institution-specific, but coordinated through a BC Articulation Committee for the trade. The Industry Training Authority (ITA) intends to impose standardized level theory tests starting in 2016. There is no standardized practical test: instructors assign cumulative marks for in-school projects (similar but not standardized).

Successful completion of the Level 4 in-school final exam gives access to the Red Seal examination, the only certification mechanism for carpenters in BC.

#### [The Red Seal - Apprentices and challengers](#)

##### [Introduction](#)

Apprentices and approved challengers are required to write the Red Seal examination in order to get a BC carpenter credential. There is no partial credit, no part credential.

The Red Seal examination is a timed “paper and pencil” test. All questions on the examination are machine-scorable multiple choice.

The Red Seal Certification examination is based on the National Occupational Analysis (NOA). The NOA is broken down into a numbers of blocks, tasks, and sub-tasks. Examination questions are based on the sub-tasks, the number of questions on each sub-task is based on a national mathematical average of estimated time spent on task by the carpenters in each jurisdiction, curved to the total number of question on the examination.

There is no weighting of any section of the Red Seal examination based on either heightened safety implications or criticality of task. There is no jurisdictional examination overlay for the Red Seal examination.

Red Seal examinations are prepared cooperatively between all Canadian jurisdictions but are hosted by a designated jurisdiction (designate status for any Red Seal examination is assigned through the CCDA<sup>18</sup>'s Product Committee's ISEC<sup>19</sup>). Red Seal examinations are item bank-generated; that is for each

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<sup>18</sup> Canadian Council of Directors of Apprenticeship

<sup>19</sup> The *Interprovincial Standards Examination Committee* is made up of provincial/territorial government representatives

examinable sub-task of the NOA a number of items are developed and then randomly assigned to an instrument based on a ToS<sup>20</sup> that mirrors the NOA percentages.

Bank-generated examinations are more comprehensive and more “difficult<sup>21</sup>” than many of the “before-bank” examinations: items address more areas of the trade at more varied/complex levels than in one-off, instructor-developed examinations.

### *Problems*

It is generally assumed that the ability to pass the examination<sup>22</sup> can be directly attributed to a candidate’s work experience: that there is a direct proportional relationship between the level, scope, and quality of on-the-job training (OJT) and experience, and performance on the examination. It is also assumed that the instructional content (and activities) delivered by the institutions reflect the National Occupational Analysis (NOA) - our analysis shows this to be a dubious assumption, at best.

There are a number of problems with these assumptions. First, it is questionable if a pencil and paper test can stand as a proxy for practical ability. Second, it is unclear whether the candidates are able, for the purpose of the test only, to conceptualize what they do in order to answer a "word" problem. Third, domain hierarchy is neither considered nor established. And fourth, the NOA sub-tasks are not worded clearly enough to permit domain definition (e.g. “G21.01 Removes existing materials”).

The third and fourth problems are of interest to the carpenter Red Seal examination because they are borne out of examination development design and practice. As a pencil and paper test, the carpenter IP assumes that all candidates can read, thus making the examination a test of literacy. As well, many items require candidates to apply mathematical concepts in order to identify (not necessarily generate as they would on the job) the correct answer, as such, the Red Seal is a test of numeracy. These two domains are listed in the Essential Skills, but these are not tested for, nor are they part of the requirement for challengers, but they are tested in conjunction with the job skills. All Red Seal examinations are made up of items that test an indeterminate number of domains in an indeterminate fashion.

Success on the Red Seal examination means the candidate scored >70%. All Red Seal examinations have this unique cut score. The cut score is not adjusted to the compounded psychometric profile of the items used for the examination – items are not differentially weighted. And, while results are available at the task level, the score obtained is the unweighted ratio of correct answers over number of questions at the sub-task level.

### *Validity*

Validity is a measure of confidence in the inferences made based on a test score. With high stakes tests (like the Red Seal), it is crucial that test developers and administrators ensure inferences drawn from test scores are accurate. In the case of carpenters, a score <70% means that the candidate is not a competent carpenter, a serious professional issue.

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<sup>20</sup> A *Table of Specifications* is developed by the host jurisdiction and assigns weights and taxonomic item levels to sub-tasks

<sup>21</sup> Where “difficulty” is a perceptual measure from the candidates’ perspective rather than statistically derived through Item Response or Classical theories

<sup>22</sup> 70% aggregate cut score for all Red Seal examinations



Validation studies are recommended prior to the introduction of any test and should be mandatory for high stakes tests like the carpenter Red Seal. Usually three types of validation studies are conducted: content, criterion-related, and construct. With Red Seal examinations in general, only a cursory content validation is conducted when local experts review items.

Some may argue that the use of subject matter experts (SMEs) during item development is a validation exercise. This is a spurious argument, as content validation exercises ought to be conducted by independent judges, not the people who developed the items. Moreover, there is no indication that the SMEs are fully cognizant of all domains tested, are representative of the population of carpenters, or are able to precisely determine what is being tested.

### *Reliability*

If a test is an accurate measure of an individual's ability<sup>23</sup>, then any candidate's observed scores should be consistent over a number of tries on the same test or parallel, equated tests. Reliability indices are numerical values that provide a statistical measure of the consistency of test scores; one would expect z-scores of a given individual to remain relatively consistent over repeated tries.

Score consistency is affected both by random and systematic errors. Random errors are chance happening and cannot be controlled (but they can be accounted for). Systematic errors are due to either examination flaws or candidates' characteristic (e.g. visual impairment). Red Seal examinations are developed, produced, and implemented without any reliability studies. In fact, some jurisdictions do not track reliability indices, even rudimentary  $\alpha$ s or z-scores distributions in or for test-re-test situations.

### *France*

Whether an apprentice, a challenger, or a continuing (adult) education student, all candidates to the carpenter Bac pro or BP face the same summative tests. Access to these summative tests, their content, duration, and scoring are backstopped by the *Code de l'éducation*, the central French legislation in educational matters. These summative tests are clearly differentiated in law from formative tests, i.e. tests required of learners for progress at school.

There are two "delivery" mechanisms for these summative tests: fixed time and place (*ponctuel*), and interspersed during the second half of the training program (*Contrôle en cours de formation - CCF*). French regulations fix the methodological equivalencies between the two delivery systems.

For carpenters, there are a minimum of six tests – additional testing may be asked for by educational authorities. Three of these tests cover scholastic skills: mathematics and physics, French and social studies, and foreign language (choice of English, German, Spanish, or Italian). The other three tests cover trade skills. The first is the design, drawing, supplying, and worksite erection planning portfolio. The second test is shop fabrication of the designed product. And the third test is setting up and following up on the erection of the designed product.

All of these tests are cross-referenced to "end state" competences, and have a prescribed set of givens (e.g. computer, 3D software, drawings, technical specifications etc.), conditions (e.g. time allotted, fixed

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<sup>23</sup> i.e. that  $E$  (the error unrelated to the domain(s) being tested – see footnote 2) is minimized in  $T=X+E$  so that the test score ( $X$ ) is a stable, true reflection of the true score ( $T$ ),

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number of pages, types of drawings, take-offs, etc.), and, for practical trade tests, at least one industry practitioner in addition to the examiner.

The products of each test are gathered in a portfolio and the mark assigned by the examiners is attached to each portfolio. Before granting the certification, the marks (and portfolios) are reviewed and approved by a jury.

The Bac pro or BP credentials are issued by the French national ministry of education.

### *Validity*

The French summative tests are “constructed response” tests. That is, and unlike the Red Seal, the candidate must generate his or her own answer or solution to a given problem. In addition, a French candidate has to demonstrate both cognitive and hands-on abilities. Marks are issued by examiner teams, as opposed to being machine graded, and each examiner team’s assessments build an overall picture of the candidate across all terminal competences. The terminal competences are those the training program and the trade require as minimum proof of competence.

### *Reliability*

Having many tests increase challenges to reliability if we added a reliability index for each test and summed those. One of the mechanisms the French are relying on to increase individual tests’ reliability is using multiple raters (and being able to provide an inter-rater reliability index) supplemented by a (at a minimum) two-tiered marking structure – in effect getting two inter-rater values. In addition, marginal candidates can be asked to sit another test or (especially in CCF) re-sit an exam, and there is an “appeal” process to a higher educational authority.

The French picture is a composite one spread over six tests and it is unlikely that a candidate in a test-re-test situation would do much differently overall.

### *BC vs. France*

Table 11 compares the major elements of the testing and credentialing systems for apprentices and trade persons in BC and in France. Both systems reflect general beliefs and philosophy about education and training.

Briefly, BC, like most North American jurisdictions, consistent with a greater reliance on technology and quantitative, large scale standardized testing uses a machine scorable test. The Red Seal examinations are designed and produced by a broad-based Canadian consensus, and are managed by a local arms-length government agency, ITA, an institution removed from the training institutions and the field. The Red Seal endorsement is meant to qualify the worker.

By contrast, the French approach is holistic, reflects ideas of citizenship, is imbued with traditional educational values, and is reliant on expert educators and subject matter experts. The credential is meant to qualify the student.

Table 21. Comparison of BC and France examination and credentialing

Examination and certification		
Element	BC	France
Exam	Single	Multiple
	Pencil & paper	Pencil & paper
		Hands-on

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Examination and certification		
Element	BC	France
Domains tested	Multiple unspecified	Multiple specified
	Proxy	Direct
Domain inclusion	Negotiated norm	Criterion
Item type	Selected response	Constructed response
Scoring	Machine	Rubric-based
		Examiner teams
		Jury
Scores	One correct	Graded
Results	Unique fixed cut score	Compounded
Validity	Medium	Strong
Reliability	Unknown	Strong
Credential	Endorsement	National