

British Columbia Construction Association

# Integrating Newcomers

A comparison of British Columbian and French carpenters

OS Consulting Inc.  
14 December 2015

Funded by:



Immigration, Refugees  
and Citizenship Canada

Financé par :

Immigration, Réfugiés  
et Citoyenneté Canada



## Contents

Summary .....	1
Introduction .....	1
Methodology.....	1
Findings .....	2
Gaps .....	3
Language .....	3
Health and safety .....	3
Codes.....	3
Measurement system .....	3
Concrete.....	3
Non-wood .....	3
Welding .....	4
First impressions .....	5
Program conceptions .....	5
What is a carpenter?.....	6
Rough comparisons – Trade description .....	8
Similarity – Work sites .....	8
Similarity – Work drivers.....	8
Similarity – Work Scope .....	8
Difference – Worker safety.....	8
Difference - Building materials .....	9
Difference – Skills overlap with other trades.....	9
Rough Comparison – The credential’s worth.....	9
Rough Comparisons – Program mix and length.....	10
Essential skills.....	13
What are “Essential Skills”? .....	13
Rating essential skills .....	14
Essential skills ratings results .....	15
Essential skills ratings interpretation – general remarks.....	18
Essential skills ratings interpretation – specific remarks .....	19
Comparing program levels – Trade skills .....	20

Comparing General Areas of Competence (GAC) – Knowledge & Abilities.....	21
Results.....	22
Comparing competencies – Hands-on skills & knowledge .....	24
Results.....	25
Gaps - Competencies .....	31
Conclusions .....	35
BC PO and NOA .....	35
BC PO and Bac pro .....	36
Examination and Certification .....	36
Credentialing in BC.....	36
Apprentices .....	36
The Red Seal - Apprentices and challengers .....	36
Credentialing in France .....	38
BC vs. France .....	39
APPENDIX 1 - Evaluative framework.....	41
What is a rating scale? .....	41
What is in a rating scale? .....	41
What rating scales did we use?.....	42
Safety & Training scales .....	42
How did we integrate French scales? .....	43
Combined numerical rating scale .....	43
Further refinements.....	46
APPENDIX 2 - Glossary of Terms .....	48
APPENDIX 3 – Select Web References .....	55

### List of Tables

Table 1. Rough comparison of the some of the conceptions of French and BC programs .....	6
Table 2. Program comparison in weeks, hours (adjusted for statutory holidays, BC workweek at 40 hrs; French work week at 35 hrs) - with an exchange mechanism for workplace hours – Note that Red Seal CofQ stands for the challenge credential access. ....	11
Table 3. Essential skills defined at the Federal level.....	13
Table 4. Comparison of BC apprentice, BC challenge, and French programs against Essential Skills for Carpenters.....	15

Table 5. Comparative program structure elements by name – highlighted cells indicate elements used in the analysis ..... 21

Table 6. Rated comparisons at the GAC level - BC PO is the reference; colors and ratings as above, expounded in Appendix 1 ..... 22

Table 7. Summary count of comparison ratings at the GAC level – BC PO is the reference ..... 23

Table 8. Rated comparisons at the competency level - BC PO is the reference; colors and ratings as above, expounded in Appendix 1 ..... 25

Table 9. Summary count of comparison ratings at the competency level – BC PO is the reference ..... 30

Table 10. Rated gap competencies - BC PO is the reference; colors and ratings as above, expounded in Appendix 1 ..... 31

Table 11. Gaps between BC PO and BC Challenger (NOA) ..... 33

Table 12. Gaps between the BC PO and the Bac pro ..... 34

Table 13. Comparison of BC and France examination and credentialing ..... 40

Table 14. Color-coded safety and training scales ..... 42

Table 15. Combined scales..... 43

Table 16. Example of profile results using the all of the ratings to determine a risk factor on a 3-point scale (weighted risk factors were not considered) ..... 47

Table 17. Example of weighted program comparison ..... 47

Table 18. Glossary of terms ..... 48

### List of figures

Figure 1. Comparison of program duration, in-school, and on-the-job length in weeks ..... 12

Figure 2. Essential skills compared as a match percentage by skill; BC Apprenticeship, BC Challenge, and French Bac pro ..... 18

Figure 3. Normed ratings distribution for BC’s apprentice program (BCPO), the BC Challenger program (NOA), and the French Bac pro – at the GAC / Task / Compétences level ..... 24

Figure 4. Normed ratings distribution for BC’s apprentice program (BCPO), the BC Challenger program (NOA), and the French Bac pro – at the competency / sub-task / Compétences détaillées level 31

## Summary

*A category pulls together many phenomena in a manner that benefits the creature in whose mind it resides. It allows invisible aspects of objects, actions, and situations to be “seen”. Categorization gives one the feeling of understanding a situation one is in by providing a clear perspective on it, allowing hidden items and qualities to be detected ... future events anticipated ... and the consequences of actions to be foreseen. Categorization thus helps one draw conclusions and to guess about how a situation is likely to evolve.*

Hofstadter and Sander<sup>1</sup>

## Introduction

The British Columbia Construction Association (BCCA), through its *Integrating Newcomers* initiative, is interested in establishing equivalencies and identifying gaps between French credentials and Canadian (specifically BC) credentials.

This paper compares the training and certification of British Columbia (BC) and French carpenters. Where possible 5 kinds of programs were compared, namely:

- British Columbia apprenticeship program
- British Columbia “Challenger” program
- French Bac pro (IV), lycée (school-based)
- French Bac pro (IV), CFA (apprenticeship)
- Brevet Professionnel (IV), lycée (school-based)
- CAP (V), CFA (apprenticeship)

These programs lead to a limited number of credentials. The BC programs lead to the Red Seal endorsement. The French programs lead to either a level IV or level V credential, regardless of route. The difference in routes is important when laddering into further studies in the French system.

## Methodology

We conducted the comparisons using documents from three sets sources: BC’s Industry Training Authority and Ottawa’s Red Seal websites for Canadian content - Program Overview and Challenge process and requirements, and the NOA, Essential Skills, and Ellis Chart, respectively. And for French materials, we consulted the Éducation Nationale, Legifrance, éduscol, es&st, inrs, CMA, and CFAs websites – these cover education, labor law and education law, teaching resources, health and safety, industry bodies, and private apprentice training, respectively.

The comparison is in four parts: First Impressions, Essential Skills, Comparing Program Levels, and Examinations and Certification. In First Impressions we used the documents to conduct a meta-analysis: we wanted to know about similarities and differences in philosophies, program delivery, length, organization, emphasis and high level content. In Essential Skills, neglecting native tongue, we rated

---

<sup>1</sup> Douglas Hofstadter and Emmanuel Sander (2013); *Surfaces and Essences*, Basic Books, p.14,

each program against each essential skill to represent the likelihood that a graduated carpenter had mastered the skill. In Program Levels we rated each program against the BC/ITA's Program Overview elements, rating first the general areas of competence then the competencies. And in Examinations and Certification we compared the formal requirements for certification, examinations, and the certification granted. We discuss briefly the structure of examinations, problems associated with the examinations, and the validity and reliability of these examinations.

We created two tools to help us with these tasks. We developed a 10-point rating system color-coded to indicate rough safety and training implications, and cross-referenced to the French ratings. And we developed a glossary of terms to reflect how we understood training, testing, and certification terms in English and French.

### Findings

The following are among the more striking differences and similarities (more details under the separate parts):

The French carpenter is an able timber framer and a general carpenter who has superior shop skills – and can move from the shop to the field easily. But a just- graduated carpenter, especially those taking the Bac pro route, will be short of time in the trade.

In all things scholastic, the French carpenter is better equipped. The BC graduate of the apprenticeship system is next, followed by the Challenger. That is because in France, the carpenter-in-training is completing (usually) secondary school and must take general math, physics, French, socials, and a foreign language in addition to trade-specific courses and shop and field work. By contrast, BC apprentices enter the block release training system usually after they exit the K-12 system, and the Challengers do not take any formal training that we know of.

The French carpentry program strongly emphasizes designing, planning, manufacturing, and assembling components. And all of these activities are conducted using advanced software packages, including Computer Numerical Control (CNC) routines – and machines.

The French programs are extremely detailed and very prescriptive. It is a thoroughly thought out and articulated and meticulous program. In a few words, you know what you get.

In both BC and France, there is a tacit “exchange rate” between hours on the job and hours at school. While in BC the schooling for apprentices is short, the hours are costly, more so than in France. Whereas in BC one can exchange work hours for school hours – it is the basis of the challenge process, in France, essential schooling must be taken regardless of work hours; the difference is in the type of diploma and how it bridges to more advanced credentials. In all cases, BC apprentices' and Challengers' most onerous program component is hours on tools.

In both BC and France, certification is granted on the strength of one or several examinations. In BC, it is a single paper and pencil exam, in France a comprehensive, challenging battery of written, practical, and oral tests.

### Gaps

The gaps we flag below are those for a French carpenter coming to BC. Throughout the analysis, we make the trivial point that, for some of the gaps like language, a BC carpenter moving to France would show the same gap. Notwithstanding this fact, the gap analysis would have yielded substantially different results if we had conducted using either the NOA or the French program as a reference rather than the BC apprenticeship program overview. But these differences could be attributed, in part, to structural differences in the documentary sources used.

### Language

Despite the foreign language requirement in the French program, a French carpenter, while possibly competent in basic English, would entirely lack the technical language skills of the trade in BC.

### Health and safety

Health and Safety legislation, regulations, and their implementation are very strict in France. While there are similarities at the personal level (e.g., Personal Protective Equipment (PPE), Fall Arrest, etc.), at the worksite level (e.g., dust, asbestos, noise, etc.), and at the application of the regulations, a French carpenter would miss the differences between the French approach and the BC approach, probably on account of those similarities.

### Codes

Like Health and Safety, building codes are jurisdiction-specific. A French carpenter coming to BC would be fully aware that there are building codes, would know how to look things up, would know how to apply code requirements to his or her work, but would not know the specifics of the codes that pertain in BC.

### Measurement system

France is a MKS or metric country. French carpenters do not know the FPS or imperial system (save for the “S” of second). BC carpenters usually work in imperial, even the Red Seal exam provides all dimensions in both metric and imperial systems. And BC carpenters use lifting and hoisting equipment that is tested and tagged in imperial (if it is from the United States), use imperial load charts, and calculate their load limits using pounds.

### Concrete

Briefly said, French carpenters don't do concrete – *Coffreurs boiseurs* (*bancheurs* if they do steel) do. A French carpenter would have to learn this part of the BC trade anew or restrict himself or herself in worksites that do no concrete, a hard thing to imagine.

### Non-wood

French carpenters handle all types of wood (dimensional and round), engineered wood products (e.g., gluelam, plywood, etc.), wood composites (e.g., EWST, NOVIK, etc.), and wood by-products (e.g. hardie board, woodtone, etc.). They do not build using steel, such as steel studs or structural steel, fiberglass, or other types of materials.

But this does not extend to barrier, insulation, or jointing materials. All materials commonly used in BC carpentry for these tasks are also used in France.



### Welding

French carpenters do not work with steel, and since they do no concrete work, they are not familiar with rebar or reinforcing steel and means to cut or section it. It is fair to assume that given a portable circular saw and the appropriate “blade” they could cut rebar on a small project.

### First impressions

In this section, we conduct gross comparisons between the French and BC programs. We compare the programs' stated conceptions or philosophies, trade descriptions, credential worth, and program lengths and mixes. Throughout, we consider "just graduated" carpenters as our subjects. We realize that all graduated carpenters have had different learning trajectories most likely leading to different abilities, but, given the lack of profiling data – and the scope of this analysis – we have used published program content and standards as normative tools: all graduates of a program are the same.

Using the saw "a carpenter is a carpenter is a carpenter" or even "if it looks like a carpenter, talks like a carpenter, acts like a carpenter, then it must be a carpenter" to circumscribe what the trade is – for our purpose to be able to compare French and British Columbian carpenters – would be naïve at best, dissembling at worst.

But it allowed us to be in a position to conduct an analysis of the similarities and differences between the two programs / certifications. And we will be able to use this analysis to develop a set of recommendations to make the equivalencies (and differences) pertinent to carpenters when they switch jurisdictions.

### Program conceptions

Here we compare how the Canadian and French education and training and governmental institutions apprehend their trade learners and, ultimately, grant them a credential. Beyond the face value of, say, a CAP or a CofQ, the credentials carry a social worth that is a direct legatee of the philosophy and pathway that led to the credential. Expressions such as "book learning" or "academic", especially when used as a qualifier adduced to a credential, have currency in the world of trades, where it is not valued as highly as "on-the-job" – and this credential social depreciation is levelled from both in-school and on-the-job perspectives.

The fact that there is a social value attached to credentials is based on the assumption that different paths taken to a credential, job, or career yield a different, in our case, carpenter. And to the extent that this difference goes beyond presence or absence of skills, it makes for a different tradesperson notwithstanding personality traits.

A stated goal of education in France, and apprenticeships are no exception, is to form a "citizen". By contrast, in BC, "citizenship" is left out of trades programs. It is possible that since the French programs are targeted at younger learners (between 16 and 25), schools have this additional mission. In Canada, the median age of apprentices is 25, and, arguably, older learners understand their role as citizens.

The French system is based / focused on education and training, labs and industry internships or placement are to provide a gradual exposure to the world of work – this holds true for apprentices, even if they spend more time in industry. By contrast, the BC system (and we assume, by association, other Canadian jurisdictions) is based on workplace skills obtained through the job, and training, when taken, is meant to elucidate these practical, workplace skills. As a result, French graduates might show what could be called an *épisitême* or theoretical slant, whereas the BC graduates would show a *technê* or praxis slant.

## Integrating Newcomers

The French system deals with plain students – those of the lycée - or students who are under a rigid work contract - apprentices. By contrast, the BC system deals with workers who happen to be released from work for in-school training at variable intervals.

**Table 1.** Rough comparison of the some of the conceptions of French and BC programs

Component	French program	BC Program
Program aim	Citizenship	Skilled worker
Training approach	Theory	Practice
Training emphasis	Mental skills	Hand skills
Training regimen	Lock-step, fixed time	Open
Training delivery	En alternance (apprenticeship)	Block release (apprenticeship)
	Full time school + placement	
Training duration	2 or 3 years	4 – 5 years <sup>2</sup>
Main training vector	Classroom + labs	Work / jobs
Learner status	Employee under contract (apprenticeship)	Employee (apprenticeship)
	Secondary (lycée) student	
Credential	National	Provincial + national endorsement
Completion rates	85%	45%

### What is a carpenter?

Taking for granted that not all carpenters are absolutely equal when they graduate, we can nevertheless “pretend” that they are and that they are thus solely due to the different training pathway they’ve taken. This approach will allow us to conduct rough and more detailed analyses of the similarities and differences between the two programs and certifications.

To illustrate this point, here are (excerpt of) definitions of “carpenter” which we found in the three (+) major sources of information we’ve used in this report:

- Industry Training Authority (ITA) - British Columbia
  - “Carpenter” means a person who performs all work in connection with the assembly and erection of false work and forms for concrete, wood and metal frame construction, and installs interior and exterior finishing metals for residential, commercial, and industrial projects, while conforming to plans and specifications and local building codes. Other trade skills include: layout, rigging/signaling, cutting/welding and the erection and dismantling of scaffolding. (Industry Training Authority, “ITA”, Carpenter Program Outline, 2013<sup>3</sup>)

<sup>2</sup> <http://www.statcan.gc.ca/pub/81-004-x/2010002/article/11253-eng.htm> accessed 3 December 2015

<sup>3</sup> Interestingly, this 2013 document states that it has been aligned to the 2014 National Occupational Analysis, “NOA”, the federal document that is the basis for the Red Seal examination, but we could not locate this 2014 NOA.

- National Occupational Analysis (NOA) - (Canadian / federal)
  - Carpenters construct, renovate and repair residential, civil, institutional, commercial and industrial (ICI) structures made of wood, steel, concrete and other materials. While the scope of the carpenter trade includes many aspects of building construction, a growing number of carpenters work for contractors who specialize in such areas of trade practice as concrete forming, framing, finishing, interior systems and renovation. Carpenters are employed in a variety of job environments, including houses under construction or renovation, ICI and infrastructure projects, and plants that pre-fabricate buildings. ... (Employment and Social Development Canada, National Occupational Analysis - Carpenter, "NOA", 2013)
- Office National d'Information Sur les Enseignements et les Professions (ONISEP) - France
  - The graduated carpenter works for wood structure and wood construction companies. A carpenter will build, repurpose, renovate, and restore buildings and premises. Depending on the project the carpenter works on his/her own or as part of a team. When working in the shop, the carpenter will cut and manufacture elements such as beams, cladding, flooring, staircases, etc, using drawings and schematics that he/she has put together. In the field, the carpenter assembles these pieces anew or fixes defective elements. A carpenter organizes his work by selecting appropriate materials (wood, and engineered wood products), organizing his/her work area, preparing materials for work, sorting leftover materials, and ensuring a safe work site. And a carpenter also conducts quality assurance on the work he/she has completed. (our translation, ONISEP.FR, accessed 30 November 2015)<sup>4</sup>
- CFA-BTP DES SAVOIE<sup>5</sup> - France (Centre de Formation des Apprentis)
  - A carpenter manufactures every single piece of the frame he/she builds. A carpenter's work is split in three sets of activities. Before getting to the worksite, he/she uses blueprints or schematics to draw real size frame elements. Then he/she will select the materials with the customer, marks the materials, cuts and manufactures the pieces using CNC machinery such as saws or routers. The carpenter also builds cupboards, closets, attics, whole chalets, gangways, etc. (our translation, CFA-Batiment.com, accessed 30 November 2015)<sup>6</sup>

---

<sup>4</sup> Le titulaire de ce diplôme travaille au sein d'entreprises des secteurs de la charpente et de la construction bois. Il intervient en construction, réhabilitation, rénovation ou restauration de bâtiments et de locaux. Selon les chantiers, il travaille de façon autonome ou en équipe. En atelier, il taille et traite différentes pièces (poutres, bardages, parquets, escaliers...) d'après les relevés et les croquis qu'il a réalisés. Sur le chantier, il assemble les pièces et pose les ouvrages ou remplace les éléments défectueux. Il sait choisir les matériaux adéquats (bois et dérivés), organiser son chantier (préparation des matériels, mise en sécurité, tri des déchets...) et les diverses étapes de son travail. Il est à même d'évaluer et de contrôler la qualité de ses réalisations.

<sup>5</sup> Note that the description (and the delivery mode) for carpenter varies from CFA to CFA.

<sup>6</sup> Quand il réalise une charpente, le charpentier en fabrique les pièces de A à Z. Son travail s'organise en trois temps. En amont du chantier, à partir des plans fournis par l'architecte ou le dessinateur, il dessine en grandeur réelle les éléments de l'ouvrage. C'est l'épure. Ensuite, il choisit le bois avec le client, trace les repères sur le matériau,

### Rough comparisons – Trade description

Using the trade descriptions, we've tried to identify large qualitative differences between the Canadian, BC, and French trade practices. The large differences can point to gaps that might be filled by upgrade training programs when carpenters move from one jurisdiction to another.

Not all carpenters are the same as we noted above. Regardless of jurisdiction, training and certification attest that a certain level has been reached at some time. But each carpenter's extant skill set will be a function of (i) his/her job experience(s) after the training, and (ii) the length of time since certification. We are calling this effect "skills erosion": a state of affairs due to the differential worker exposure to specific work practices over time.

It remains that there are clearly identifiable areas in the Canadian programs such as forming, the use of lifts / scaffolding, and rigging that are not explicitly part of the French program – but they are mentioned under the heading "resources" in some of the competencies.

### Similarity – Work sites

All descriptions make it clear that carpenters work on all types of edifices – from single family dwellings to apartments blocks and small and large commercial and industrial structures - and that the work may be new, remedial, restorative, or ameliorative.

### Similarity – Work drivers

Both Canadian and French definitions state that carpenters make use of blueprints, schematics, and drawings to conduct their work.

### Similarity – Work Scope

All descriptions indicate that carpenters are expected to be able to carry out all aspects of a construction project.

### Difference – Worker safety

Canadian documents emphasize site and personal safety, albeit not in the trade description itself. The Federal document refers the reader to the federal Workplace Hazardous Materials Information System (WHMIS) and to provincial Occupational Health & Safety (OH&S) regulations, while the BC document refers the reader to the WorkSafe BC website.

In contrast, the French descriptions do not mention safety as such. This might be due, in part, to the fact that the Code du Travail – backed by the Code de la sécurité sociale (article L. 461-4) and on-site medical services - stipulates both structure and process when it comes to Occupational Health & Safety (Titre II : Principes généraux de prévention)<sup>7</sup>.

An in-depth examination of the differences between the Canadian and French approaches to safety at work from a training or certification perspective is beyond the scope of this analysis. However, given the large difference between the approaches, it is fair to say that French workers starting to practice in a

---

coupe et façonne les pièces à l'aide de machines à commande numérique (scie mécanique, toupie...)  
Le charpentier réalise des charpentes, mais aussi des soupentes, des chalets, des passerelles...

<sup>7</sup> For additional information on OH&S training for "trainees" see <http://www.esst-inrs.fr/synergie/>

Canadian environment would require substantial training in safety regulations and processes and on-the-job practices. Canadian workers moving into a French environment would also require training mainly in the procedural aspects of at-work safety practices, and in the structural and legal aspects of worker safety.

### Difference - Building materials

Both Canadian definitions clearly de-emphasize “wood”: the word appears once in the BC and Federal definitions alongside the word “metal”. And metal is given additional weight in the BC description with additional mention for cladding, cutting and welding. The ONISEP definition practically restricts the scope of carpentry to wood (and wood by-products) structure and both French definitions are silent on the topic of metal(s) or other synthetic composites.

### Difference – Skills overlap with other trades

Only the NOA under the heading of “Occupational Observations” mentions trends for the carpentry trade across Canada. Under that heading, for example, we learn that more and more businesses - and individual carpenters - specialize in an aspect of the trade, that carpenters increasingly use compressed gas or cordless tools and siting technology such as total stations and lasers, etc.:

*While the scope of the carpenter trade includes many aspects of building construction, a growing number of carpenters work for contractors who specialize in such areas of trade practice as concrete forming, framing, finishing, interior systems and renovation.*

*Carpenters are employed in a variety of job environments, including houses under construction or renovation, ICI and infrastructure projects, and plants that pre-fabricate buildings. They must be prepared to work in a variety of working environments.*

(Employment and Social Development Canada, National Occupational Analysis - Carpenter, “NOA”, 2013)

### Rough Comparison – The credential’s worth

The worth of a “ticket” is dual: that of having one in the first place, and that of the mean by which it was attained – what we could call an “acquisition value”. Usually just having a ticket suffices. However, if any argument arises as to the worth of the ticket, disagreements hinge on the acquisition value, usually to decrease the ticket’s social value. The same holds for the experiential path taken to get the ticket; the reputational value of the employer or the projects worked on weigh heavily on the overall worth attached to the ticket.

As the “Program Conception” section above indicates, credentials appear to be more important societally in France than in BC where what a worker can do, based on his/her experience, usually trumps a “ticket”. But the BC experience might not be the same as that in Canadian jurisdictions that have “compulsory trades” like Alberta; there, having a ticket – or being a registered apprentice - is necessary to practice.

Both in BC and in France the credential is held for life. French credentials, however, are better articulated to further studies than in BC and Canada. This is true for both French pathways, the “trade” route (Filière CMA), and the technical studies route (Parcours EN) - leading to Levels III , BTMS / BM and BTS, respectively, and II BMS and Licence, respectively.

Finally, French credentials are issued by the national government and have currency everywhere in France – and arguably can be used in the entire European Union as a means to get a job<sup>8</sup>. By contrast, a BC carpenter may face different fees and processes depending on the Canadian jurisdiction he/she wants to have the BC credential recognized.

### Rough Comparisons – Program mix and length

In British Columbia<sup>9</sup>, there are 2 main paths to get certified as a carpenter: a formal course of study (apprenticeship), and an informal, workplace-based route (challenge) – for simplicity’s sake, we have ignored the branching and bridging available to learners along the way. The main differences between the two pathways are (i) the open-endedness of the workplace-based route, and (ii) the exchange of schooling for additional experiential hours. The exchange rate<sup>10</sup>, as it were, is 3.55 hours of work for each hour of school (see Table 2 and Figure 1 below).

In France credentials are granted upon completion of a state-sanctioned program. The length of the program is directly related to the credential attached: a Level V credential is awarded after 2 years, a Level IV after 3 years. There are two paths, one with more emphasis on workplace experience, apprenticeship, and one favoring in-school (lycée) studies with short workplace internships. The exchange rate is 2.22 hours of work for each hour of school.

Briefly, it seems like in British Columbia, school-based training is disesteemed - can be replaced wholly by workplace experience - but worth a lot, whether in France school-based training is a must, that might be replaced in part by workplace training – and workplace experience is highly structured and monitored.

Comparing the programs and using the British Columbia exchange rate – comparing a French credential for BC, and norming to the minimum BC requirement for hours in the trade, all French programs fall short. The best match, at this gross analytical level, is with a Bac pro (Level IV) credential acquired through an apprenticeship (referred to as “CFA” herein) a 0.49-year<sup>11</sup> BC workplace shortfall equivalent.

---

<sup>8</sup> Free movement of workers is a fundamental principle of the Treaty enshrined in Article 45 of the Treaty on the Functioning of the European Union and developed by EU secondary legislation and the Case law of the Court of Justice.

<sup>9</sup> We specify British Columbia because the requirements differ from jurisdiction to jurisdiction for apprenticeship from 3 years and 6000 hours to 4 years and 8000 hours (see Ellis Chart at <http://www.ellischart.ca/home.jsp?lang=en>); and for the challenge with undefined years and 9720 work hours in BC vs. 6 years and 10,800 hours in Manitoba.

<sup>10</sup> The exchange rate, normed to the BC requirements, is a rough temporal measure we used to equate on-job experience and in-school training. The exchange rate is calculated as  $(H_A - H_C) / H_{IS}$ , where  $H_A$  are on-job apprenticeship hours,  $H_C$  are minimum required hours for a challenge (i.e. without attending school), and  $H_{IS}$  are total in-school hours during the apprenticeship. The French exchange rate is calculated norming on the Bac pro (lycée-based).

<sup>11</sup> “Year” is defined loosely as 50 weeks (accounting for 2 weeks of annual vacation) each at 41.8 hours for a total hours of 2080 hours (the figure used for calculations in this part of the analysis) – hours at work are undefined / unregulated, in the sense of minima or maxima, save for obligations under the BC Labor Code and/or Collective Agreements for unionized workplaces. In-school for BC apprentices is nominally set at 30 hours/week but contact time may vary from institution to institution depending on Collective Agreement

## Integrating Newcomers

The school-based Bac pro and the Level V (CAP/BP) show a 1.3-year and 2.8-year BC workplace shortfall equivalent respectively.

Comparing a BC credential for France, and norming to the Bac pro, and since the French programs comprise much more school than BC programs, a graduated BC apprentice has a 1.6-year workplace shortfall equivalent, a challenger a 2.3-year shortfall equivalent.

Given the school-centric nature of French programs, it seems that a structured workplace-based “make-up” program for incoming French workers is the best approach. The converse would be true for BC workers moving to France.

**Table 2.** Program comparison in weeks, hours (adjusted for statutory holidays, BC workweek at 40 hrs; French work week at 35 hrs) - with an exchange mechanism for workplace hours – Note that Red Seal CofQ stands for the challenge credential access.

Program Elements	Jurisdiction				
	British Columbia		France		
	Red Seal CofA + CofQ	Red Seal CofQ	BAC Pro (IV)	CFA BAC Pro / BP (IV)	CFA CAP/BEP (V)
				En alternance <sup>12</sup>	
Duration (years)	4	5	3	3	2
Duration (weeks)	208	243	156 <sup>13</sup>	137	92
In-school (weeks/year)	7	0	36	15	15
In-school (total weeks)	28	0	108	46	31
In-school (total hours)	840	0	2700	1602	800
At Work (hours/year)	1685	2080	257	1068	1068
At Work (total weeks)	169	243	22	92	61
At Work (total hours)	6740	9720	770	3203	2135
Extra work hours		2980		2433	
"Exchange rate"		3.55		2.22	
Extra school hours Bac pro-CofA			1860		
Extra school hours Bac pro-CFA Bac pro			1098		
Extra school hours Bac pro-CFA Level V			1900		
BC Exchange rate value Bac pro			6599		
BC Exchange rate value CFA Bac pro			3897		
BC Exchange rate value CFA Level V			6740		
Net BC workplace “value”	9720	9720	7510	8885	4974
Difference (normed to BC)	0	0	-2210	-835	-4746

<sup>12</sup> “En alternance” means that the learner spends two weeks on the job followed by one week at school for the duration of each of the school years of the program (CFA Savoie; but CFA Toulouse offers a 3 and 1 program).

<sup>13</sup> School week in France is 24-28 hours set by the Ministère de l'Éducation Nationale; holidays roughly 16 weeks/year (regardless of zone), set by provision of the Code du Travail



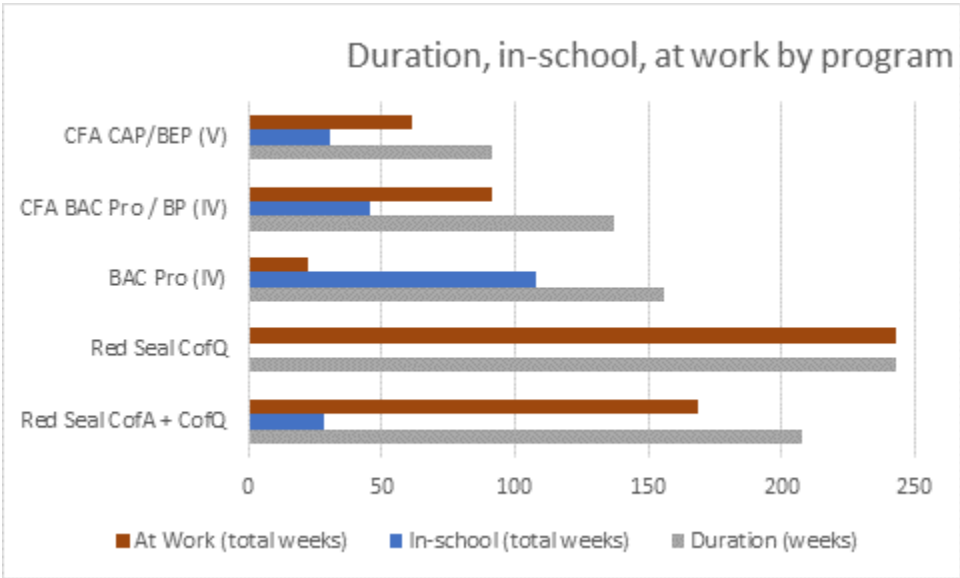


Figure 1. Comparison of program duration, in-school, and on-the-job length in weeks

### Essential skills

#### What are “Essential Skills”?<sup>14</sup>

“Essential skills are the skills needed for work, learning and life. They are used in nearly every job and at different levels of complexity.

There are nine essential skills” (see Table 3) :

**Table 3.** Essential skills defined at the Federal level

Skill	Description / Competency
<b>Reading</b>	Read project specifications to understand what is required for a project.
	Read specification books and notes on blueprints.
	Read and understand first aid and safety reports.
	Read and understand safety inspection manuals.
	Read and interpret building codes, regulations and standards to comply with regulations.
	Read installation manuals.
	Read industry trade magazines to learn about technological advancements, such as new construction materials and methods.
<b>Document use</b>	Interpret labels such as the Workplace Hazardous Materials Information System (WHMIS) to follow safety guidelines.
	Interpret signs for information about directions, cautions and safety procedures.
	Complete time cards to record work hours.
	Interpret shop drawings and specifications for the sizes, locations and types of materials required for a job.
	Prepare lists of materials.
	Make sketches of drawings or plans to use on job sites.
	Refer to load charts to determine load bearing capacities when operating material handling equipment.
	Interpret blueprints to verify measurements, determine the integrity of plans and to report mistakes.
<b>Numeracy</b>	Estimate how long it will take to complete a job.
	Calculate the quantity of materials needed for a job, such as the volume of concrete required for footings.
	Convert between metric and imperial measurement systems.
	Verify bills when purchasing tools, accounting for discounts and taxes.
	Analyze survey data for excavations to draw conclusions about safety.
	Take precise measurements using survey instruments.
	Make scale drawings.
	Calculate stringers, treads and risers to build stairs.
Calculate a rafter line length using the measurements of rise and run.	

<sup>14</sup> <http://www.red-seal.ca/resources/2ss.2nt.3.11-eng.html> and [http://www.esdc.gc.ca/en/essential\\_skills/tools/carpenter\\_fs.page](http://www.esdc.gc.ca/en/essential_skills/tools/carpenter_fs.page) accessed 3 December 2015

Skill	Description / Competency
<b>Writing</b>	Record information on work activities such as problems encountered and resolved and hours of work.
	Write purchase orders for materials.
	Write safety and accident reports.
	Write change orders to recommend blueprint modifications.
	Write reports for project meetings.
<b>Oral communication</b>	Talk to suppliers to order materials or compare prices.
	Interact with other carpenters to discuss work schedules, safety concerns and to share ideas.
	Communicate with a foreperson to report on work progress and troubleshoot problems.
	Talk to manufacturer representatives to discuss problems with equipment and materials.
	Interact with owner(s) to discuss new ideas and potential changes.
<b>Working with others</b>	Work frequently in pairs.
	Lead construction teams while working with other tradespersons, forepersons, suppliers and engineers.
	Work as a team to promote safety.
<b>Thinking</b>	Adapt routine tasks when working in a confined space.
	Consult other carpenters to share knowledge and experience.
	Refer to blueprints and specifications to obtain detailed project information.
	Analyze blueprints and actual measurements to identify errors.
	Make decisions to use materials efficiently.
	Make decisions about constructing and building structures, such as decks, stairs and platforms.
<b>Digital technology</b>	Use computer-controlled equipment, such as total stations, smart levels and workplace alarm systems.
<b>Continuous learning</b>	Keep up-to-date with codes, regulations, standards and materials.
	Keep up-to-date with emerging skills and methods from technological advancements.

The essential skills have trade-specific wording and emphases. The list put together for carpenters will be rated here, and the same rating applied for the trade-specific knowledge skills analysis will be used (See Appendix 1 for details).

### Rating essential skills

We used the following assumptions and protocols to rate the essential skills:

- Ratings are applied to holders of the credential, i.e., CofQ with Red Seal endorsement, Bac pro, or CAP
- The rating and color coding used is that shown in Appendix 1 Tables 6 and 7
- Assign a rating of 7 / 70%<sup>15</sup> for a skill that has been delivered during the (formal) training

<sup>15</sup> We used 7 / 70% to mimic the cut score required for certification on Red Seal examinations; we also defined 7 / 70% as a carpenter's the putative ability to do the task on his/her own.

## Integrating Newcomers

- Assign a rating of 7 / 70% for a skill that is listed in the NOA – and possibly tested in the Red Seal examination - for BC challengers
- Assign a rating of 8 / 80% for a skill for which there is evidence of advanced training or that the skill must be practiced in complete autonomy
- Assign a rating of 1 for those skills that do not appear in the documents but is likely mastered
- Assign a rating of 0 if the skill is clearly out of scope
- Use Grade 10<sup>16</sup> + technical training to rate BC apprentices
- Maximum rating is 9 / 90% indicating that the carpenter could teach others the skill being rated
- Ratings were assigned regardless of language, only for presence and level – it stands to reason that a French carpenter may not master English well enough to apply his/her skills in BC. The converse holds for BC carpenters wanting to work in a French environment.

### Essential skills ratings results

The results are presented by skills and competency in Table 4, and summarized by skill category in Figure 2 below.

**Table 4.** Comparison of BC apprentice, BC challenge, and French programs against Essential Skills for Carpenters

Essential Skill	Competency	Max score	Red Seal CofA + CofQ	Red Seal CofQ	BAC Pro / BP (IV)	
Reading	Read project specifications to understand what is required for a project.	9	7	7	8	
	Read specification books and notes on blueprints.	9	7	7	8	
	Read and understand first aid and safety reports.	9	7	7	8	
	Read and understand safety inspection manuals.	9	7	7	8	
	Read and interpret building codes, regulations and standards to comply with regulations.	9	7	7	8	
	Read installation manuals.	9	7	7	8	
	Read industry trade magazines to learn about technological advancements, such as new construction materials and methods.	9	1	1	1	
	Total		63	43	43	49
	% of best score			68%	68%	78%
Document use	Interpret labels such as the Workplace Hazardous Materials Information System (WHMIS) to follow safety guidelines.	9	7	7	8	
	Interpret signs for information about directions, cautions and safety procedures.	9	7	7	8	
	Complete time cards to record work hours.	9	1	1	7	

<sup>16</sup> The ITA website states: Recommended Education The following education is recommended for apprentices entering this occupation. These are not prerequisites, but rather a desired level of skill or knowledge that will contribute to success in the industry ... Grade 10 or equivalent including English 10, Mathematics 10, and Science 10.

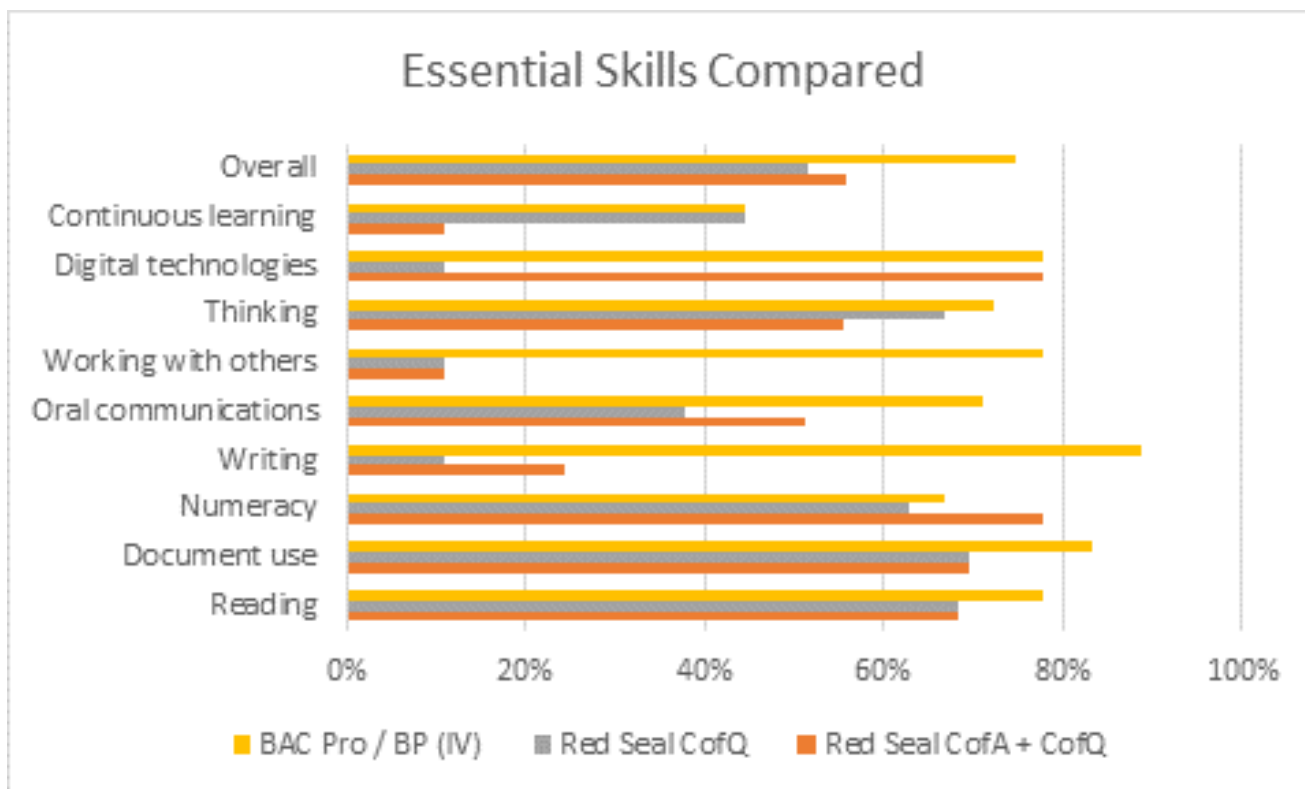
## Integrating Newcomers

Essential Skill	Competency	Max score	Red Seal CofA + CofQ	Red Seal CofQ	BAC Pro / BP (IV)
	Interpret shop drawings and specifications for the sizes, locations and types of materials required for a job.	9	7	7	8
	Prepare lists of materials.	9	7	7	8
	Make sketches of drawings or plans to use on job sites.	9	7	7	8
	Refer to load charts to determine load bearing capacities when operating material handling equipment.	9	7	7	5
	Interpret blueprints to verify measurements, determine the integrity of plans and to report mistakes.	9	7	7	8
	Total	72	50	50	60
	% of best score		69%	69%	83%
Numeracy	Estimate how long it will take to complete a job.	9	7	7	8
	Calculate the quantity of materials needed for a job, such as the volume of concrete required for footings.	9	7	7	8
	Convert between metric and imperial measurement systems.	9	7	7	0
	Verify bills when purchasing tools, accounting for discounts and taxes.	9	7	1	8
	Analyze survey data for excavations to draw conclusions about safety.	9	7	7	5
	Take precise measurements using survey instruments.	9	7	7	5
	Make scale drawings.	9	7	1	8
	Calculate stringers, treads and risers to build stairs.	9	7	7	6
	Calculate a rafter line length using the measurements of rise and run.	9	7	7	6
	Total	81	63	51	54
	% of best score		78%	63%	67%
Writing	Record information on work activities such as problems encountered and resolved and hours of work.	9	1	1	8
	Write purchase orders for materials.	9	7	1	8
	Write safety and accident reports.	9	1	1	8
	Write change orders to recommend blueprint modifications.	9	1	1	8
	Write reports for project meetings.	9	1	1	8
	Total	45	11	5	40
	% of best score		24%	11%	89%

## Integrating Newcomers

Essential Skill	Competency	Max score	Red Seal CofA + CofQ	Red Seal CofQ	BAC Pro / BP (IV)
Oral communication	Talk to suppliers to order materials or compare prices.	9	7	1	7
	Interact with other carpenters to discuss work schedules, safety concerns and to share ideas.	9	7	7	8
	Communicate with a foreperson to report on work progress and troubleshoot problems.	9	7	7	8
	Talk to manufacturer representatives to discuss problems with equipment and materials.	9	1	1	1
	Interact with owner(s) to discuss new ideas and potential changes.	9	1	1	8
	Total	45	23	17	32
	% of best score		51%	38%	71%
Working with others	Work frequently in pairs.	9	1	1	7
	Lead construction teams while working with other tradespersons, forepersons, suppliers and engineers.	9	1	1	7
	Work as a team to promote safety.	9	1	1	7
	Total	27	3	3	21
	% of best score		11%	11%	78%
Thinking	Adapt routine tasks when working in a confined space.	9	7	7	0
	Consult other carpenters to share knowledge and experience.	9	7	1	7
	Refer to blueprints and specifications to obtain detailed project information.	9	7	7	8
	Analyze blueprints and actual measurements to identify errors.	9	1	7	8
	Make decisions to use materials efficiently.	9	1	7	8
	Make decisions about constructing and building structures, such as decks, stairs and platforms.	9	7	7	8
	Total	54	30	36	39
	% of best score		56%	67%	72%
Digital technology	Use computer-controlled equipment, such as total stations, smart levels and workplace alarm systems.	9	7	1	7
	Total	9	7	1	7
	% of best score		78%	11%	78%
Continuous learning	Keep up-to-date with codes, regulations, standards and materials.	9	1	7	7
	Keep up-to-date with emerging skills and methods from technological advancements.	9	1	1	1
	Total	18	2	8	8
	% of best score		11%	44%	44%

Essential Skill	Competency	Max score	Red Seal CofA + CofQ	Red Seal CofQ	BAC Pro / BP (IV)
	Overall Total	414	232	214	310
	% of best score	100%	56%	52%	75%



**Figure 2.** Essential skills compared as a match percentage by skill; BC Apprenticeship, BC Challenge, and French Bac pro

Essential skills ratings interpretation – general remarks

Essential skills for carpenters reflect what they would need to be able to work safely, effectively and efficiently. These skills also reflect those cognitive abilities that would be required to have a career in carpentry. Many of those skills are those developed through compulsory education. One thinks of formal skills such as reading, writing, counting, manipulating symbols and formulae, distilling data from diverse sources and media, developing relationship skills, and making sense of complex situations as must-haves. But we have to recognize that many of these skills are further refined or broadened when young students navigate the sea of digital data, form, develop, and maintain friendships ... spend their money of technological toys.

Yet the formal, cognitive skills, are acquired at school. Further, in general, we expect that once a student leaves the K-12 system they have been internalized.

## *Integrating Newcomers*

---

Essential skills ratings interpretation – specific remarks

### *The 3Rs*

Both the BC Program Outline (PO) and the NOA reflect that assumption. Granted, the BC PO sets aside some time to review (or learn for the first time) basic mathematical concepts, and, through interpretive exercises of documents develops reading – and perhaps writing – skills. The NOA simply lists the skills / knowledge as a presumed ability.

In contrast, the French programs, being part of the secondary education system makes no such assumption. The breadth and depth of the courses French would-be carpenters take either at the lycée or at the CFA far exceeds what the BC applied programs offer.

This is reflected in the higher ratings given the French program elements.

### *Language skills*

It stands to reason that a French graduate who had not taken English as his/her language requirement (*langue vivante*) would be unable to function in an English-speaking environment, even if he/she had the carpentry skills. Likewise, a BC carpenter that had not graduated from French Immersion or Programme Cadre, or whose parents were not francophone would have difficulty working in a French-speaking environment.

### *Units of measurement*

BC carpenters work using imperial measurements. But they are at ease with the International System of Units (SI). Not so in France: French carpenters work exclusively in the SI system.

### *Digital technology*

There seems to be more emphasis on computers in general, and Computer Numerical Control (CNC). And, in general, technology in France; electronic tools are taken for granted. In BC, however, the use of siting and leveling laser tools – and of portable tools - is emphasized but the rest of building technology tools are not emphasized or, at times, mentioned.

### *Safety – Confined space / environment*

As noted earlier, the safety approach in France is more structured and more formal than in BC. The French programs focus on identifying and mitigating hazardous situations in general rather than focusing on specific high risk situations

Environmental safety is covered fairly rigorously in France but not in BC.



### Comparing program levels – Trade skills

Here we compare the program elements to identify commonalities, differences, and gaps between the BC apprenticeship, the BC challenge (relying on the NOA), and the French Bac pro. While all programs are structured hierarchically, the nomenclature and number of levels vary from program to program. Table 5 below summarizes the levels and how we compared them. Blanks in the table indicate that there was no direct comparison possible, or that the comparison would yield over-complicated results. For example, we decided that the “Block” level at the NOA, which arguably better corresponds to General Areas of Competence (GACs), was better left out of the comparative analysis.

An additional level of difficulty is that the BC, federal, and French documents are structurally – where structure is most likely reflective of the “philosophy” of the documents’ authors – quite different. For example, the BC PO, called an “Program Overview” listing “suggested time allocations”, is tailored to the delivery of technical training for BC apprentices – and is, most probably the results of some sort of ITA-channelled consensus between industry and all the training institutions that deliver the training. Like the BC PO, the NOA is also a jurisdictionally-mediated consensual product but limits itself to a Task Analysis depicting the “average” Canadian carpenter; and the NOA makes no pretense to link up with the world of training. And the French “Référentiels” are a combination of both these approaches: they describe the trade and then translate the trade requirements in a rigorous training (and assessment) program.

Moreover, the French documents are made up of 3 extremely detailed and cross-referenced parts: Activities and Tasks (*Activités et Tâches*), Abilities and Competences (*Capacités et Compétences*), and Associated Technological knowledge (*Savoirs Technologiques Associés*). While the NOA also lists key competencies and knowledge, it does so using a cursory list of statements, none of which are cross-referenced to each other or specific knowledge. Finally, the BC PO mixes things in a random fashion: “Perform Trade Math”, “Describe Roofing Materials”, and “Installs Doors and Hardware” are structurally equivalent in the PO – all competencies - when they should be, using the French structure, General Unit – Math & Science (Unités Générales – Étude mathématiques et scientifique), Associated Technological knowledge (*Savoirs Technologiques Associés*), and Abilities and Competences (*Capacités et Compétences*) respectively.

We conducted the analysis using the BC PO as the reference document. That is, we looked in the NOA and the French program documents for similarities to the BC GACs and Competencies and listed those. From the French program, we limited the comparison to Abilities and Competences (*Capacités et Compétences*), using the other two levels only to verify that what appeared to be a similarity actually was one. For example, to equate the BC PO “A1 – Apply Shop and Site Safety Practices”, we had to consult all three levels (*A4.1 – Mise en Oeuvre – Organisation du chantier; T1 Organiser et sécuriser le chantier*) **and** (*C3 – Fabriquer; C3.1 Organiser et sécuriser l’espace de travail*) **and** (*S8 – Santé et sécurité au travail*). And it is only in the latter that we found reference to scaffolding and aerial lifts whereas they are listed as competencies in the BC PO (E1), and the NOA (4.03 and 4.04).

The numerical ratings, as previously, was taken from Table 15 (Appendix 1). Also, as before, when rating safety competencies, we rated them according to the training/credentialing jurisdiction. Clearly, a French carpenter coming to BC would require an orientation to “the way BC does business” such as

## Integrating Newcomers

regulations, but not in the basics like working at heights, wearing PPE, preventing accidents, etc. The same would apply to a BC carpenter moving to France.

As we used the BC PO as the reference, we have assigned a value of 7 – using the same rationale as above - to all of the competencies there, and assigned estimated ratings to the NOA and French program elements with reference to the BC rating or, when possible, absolutely.

**Table 5.** Comparative program structure elements by name – highlighted cells indicate elements used in the analysis

Program elements	Jurisdiction		
	British Columbia - BCPO	Red Seal/Federal - NOA	Référentiel Charpentier Bois
		Block	Capacités
	GAC - “Line”	Task	Activités
			Compétences
	Competency	Sub-task	Compétences détaillées
			Tâches
	Learning tasks	Key competencies	
	Content	Knowledge	Données techniques
			Savoirs
	Objective		Résultats attendus
			Limites de connaissance

### Comparing General Areas of Competence (GAC) – Knowledge & Abilities

Using the BC Program Overview (BC PO) as the reference, we searched the NOA and Référentiel for equivalent entries. The rationale to assign ratings to the NOA and French equivalents was as follows:

- Use 9 if they appear to be much superior in “breadth and depth” (total autonomy; innovative).
- Use 8 if they appear to be superior in “breadth and depth” (more content; more activities; greater difficulty).
- Use 7 if they appear to be the same in “breadth and depth”.
- Use 6 if they appear to be inferior in “breadth and depth” (less content; fewer activities; simpler).
- Use 0 if there is no direct reference to the GAC or competency.

It is important to keep in mind that the ratings are here to help summarize complex, ill-matched documents in a single indicator. The numbers are not indicative of the trade as a whole or individual carpenters, nor are they suitable to establish some sort of pecking order in either the jurisdictions, programs, credentials, or people.

As the scale is ordinal, we have steered away from mathematical manipulations except to normalize counts – using the categorical number of entries over the largest number of entries as a reverse factor - in order to get a clearer picture. Reporting counts and the attached ratings provides an overall picture of the differences and might help in making decisions about remedial interventions.

However, we have added an “average rating” calculated value to provide a very rough – and mathematically unjustifiable; see Appendix 2 under “quantitative” for details – measure of comparison between the 3 programs.

### Results

By definition, the BC PO has the largest number of “7” (10 normed to 23). The French program has a substantial number of “8”, the NOA much fewer (18 normed to 18 and 3 normed to 4, respectively). Also, the NOA has a substantial number of “7”, the French program fewer (14 normed to 16 and 2 normed to 2, respectively). The French program only has some “6” (2 normed to 2) and both the NOA and French programs show “0” entries (20 normed to 22 and 1 normed to 1, respectively). The detailed entries are provided in Table 6, the summary count in Table 7, and the normed counts in Figure 3.

**Table 6.** Rated comparisons at the GAC level - BC PO is the reference; colors and ratings as above, expounded in Appendix 1

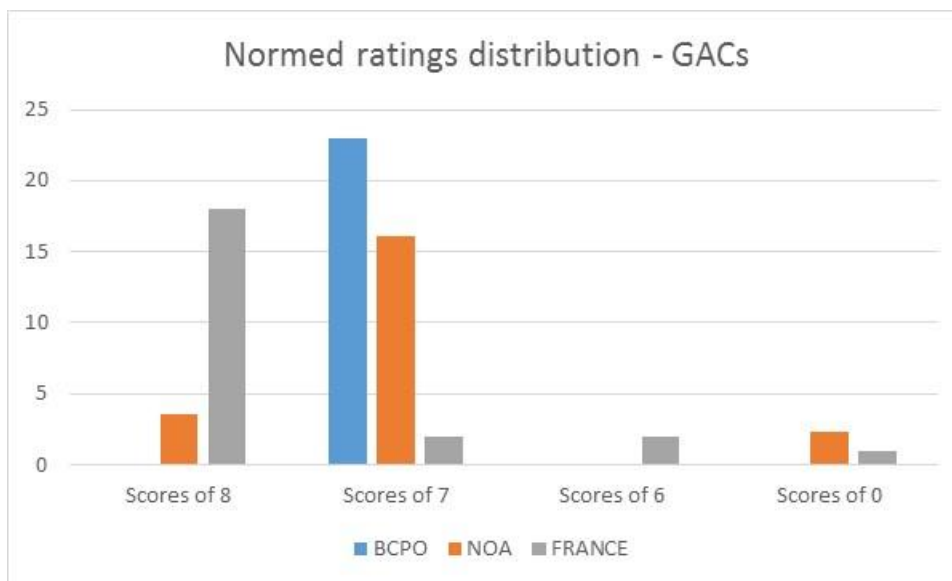
British Columbia – BC PO			Red Seal / Federal - NOA			Référentiel Charpentier Bois		
Line		Rating	Task		Rating	Competences		Rating
A	Safe work Practices	7	2	Performs safety related activities	6	C3.1	Organize and secure workplace/site	8
						C4.2	Make work activities safe on the worksite	8
B	Documentation and Organizational Skills	7	5	Interprets documentation	7	C1.2	Analyze execution constraints	8
			6	Organizes work	8	C2.2	Translate graphically a technical solution	8
						C2.5	Establish execution process	8
						C4.1	Organize worksite intervention	8
C	Tools and Equipment	7	1	Uses and maintains tools and equipment	7	C3.5	Install work stations, tools, and equipment	7
						C3.6	Cut and machine materials	8
						C3.7	Assemble and finish work	8
D	Survey Instruments and Equipment	7			0	C4.4	Install works in the field	6
E	Access, Rigging and Hoisting Equipment	7	4	Builds and uses temporary access structures	7	C4.6	Lift and stabilize wood structures	8
F	Site Layout	7	7	Performs layout	7	C4.1	Organize worksite intervention	8

## Integrating Newcomers

British Columbia – BC PO		Red Seal / Federal - NOA			Référentiel Charpentier Bois			
Line		Rating	Task	Rating	Competences	Rating		
					C4.4	Install works in the field	8	
					C4.5	Restore an existing structure	8	
G	Concrete Formwork	7	8	Constructs formwork	7		0	
H	Wood Frame Construction	7	10	Constructs floor systems	7	C3.4	Draw all parts of the structure	8
			11	Constructs deck systems	7	C3.6	Cut and machine materials	8
			12	Constructs wall systems	7	C3.7	Assemble and finish work	8
			13	Constructs rood and ceiling systems	7			
			21	Performs renovation-specific support activities	8	C4.5	Restore an existing structure	8
			22	Performs renovation-specific construction activities	8			
I	Finishing Materials	7	14	Installs exterior doors and windows	7	C3.7	Assemble and finish work	6
			16	Installs exterior finishes	7	C4.7	Install sheathing, insulation and accessories	7
			17	Installs wall and ceiling finishes	7			
			18	Installs flooring	7			
			19	Installs interior doors and windows	7			
J	Building Science	7			0	S3	Dwelling comfort	8
						S4	Mechanics and materials dynamics	8

**Table 7.** Summary count of comparison ratings at the GAC level – BC PO is the reference

	British Columbia – BC PO	Red Seal / Federal - NOA	Référentiel Charpentier Bois
Total number ratings	10	20	23
Total of ratings	70	128	170
Ratings of 8			18
Ratings of 7	10	14	2
Ratings of 6		1	2
Ratings of 0		2	1
Average rating	7	6.4	7.4



**Figure 3.** Normed ratings distribution for BC’s apprentice program (BCPO), the BC Challenger program (NOA), and the French Bac pro – at the GAC / Task / Compétences level

### Comparing competencies – Hands-on skills & knowledge

Using the BC Program Overview (BC PO) as the reference, we searched the NOA and Référentiel for equivalent entries. The rationale to assign ratings to the NOA and French equivalents was as follows:

- Use 9 if they appear to be much superior in “breadth and depth” (total autonomy; innovative).
- Use 8 if they appear to be superior in “breadth and depth” (more content; more activities; greater difficulty).
- Use 7 if they appear to be the same in “breadth and depth”.
- Use 6 if they appear to be inferior in “breadth and depth” (less content; fewer activities; simpler).
- Use 0 if there is no direct reference to the GAC or competency.

It is important to keep in mind that the ratings are here to help summarize complex, ill-matched documents in a single indicator. The numbers are not indicative of the trade as a whole or individual carpenters, nor are they suitable to establish some sort of pecking order in either the jurisdictions, programs, credentials, or people.

## Integrating Newcomers

As the scale is ordinal, we have steered away from mathematical manipulations except to normalize counts – using the categorical number of entries over the largest number of entries as a reverse factor – in order to get a clearer picture. Reporting counts and the attached ratings provides an overall picture of the differences and might help in making decisions about remedial interventions.

However, we have added an “average rating” calculated value to provide a very rough – and mathematically unjustifiable; see Appendix 1 for details – measure of comparison between the 3 programs.

### Results

By definition, the BC PO has the largest number of “7” (50 normed to 88). Both the NOA and the French program have a substantial number of “8” (17 normed to 45 and 34 normed to 34, respectively). Also, the NOA and the French program have a substantial number of “7” (36 normed to 45 and 31 normed to 31, respectively). And the NOA and the French program both have some “6” (2 normed to 3 and 4 normed to 4, respectively) but many “0” entries (17 normed to 21 and 18 normed to 18, respectively). The French program also shows the only “9” rating. The detailed entries are provided in Table 8, the summary count in Table 9, and the normed counts in Figure 4.

**Table 8.** Rated comparisons at the competency level - BC PO is the reference; colors and ratings as above, expounded in Appendix 1

British Columbia – BC PO			Red Seal / Federal - NOA			Référentiel Charpentier Bois		
Competency		Rating	Sub-Task		Rating	Compétences détaillées		Rating
A1	Apply Shop and Site Safety Practices	7	2.02	Maintains safe work environment	6	C3.12 C4.21	Identify risks of the workplace	8
						C3.14	Prevent risk associated with materials	8
						C4.22	Prevent risk associated with structures	8
						C3.15 C4.26	Respect and enforce proper work methods	7
A2	Apply Personal Safety Practices	7	2.01	Uses Personal Protective Equipment (PPE) and safety equipment	7	C3.16	Protect self against unavoidable risks	7
B1	Describe the Carpentry Trade	7			0			0
B2	Use Construction Drawings and Specifications	7	5.01	Interprets project drawings	7	C2.25	Draw manually or with software	9
B3	Interpret Building Codes and Bylaws	7			0	C1.22	Recognize administrative requirements for the worksite	8
B4	Plan and Organize Work	7	6.01	Schedules work sequence	7			0

## Integrating Newcomers

British Columbia – BC PO			Red Seal / Federal - NOA			Référentiel Charpentier Bois		
Competency		Rating	Sub-Task		Rating	Compétences détaillées		Rating
			6.02	Performs site preparation	7	C4.11	Install and/or complete access, egress, and platform falsework	7
						C4.12	Organize worksite activity zones	8
						C4.14	Prepare materials, portable tools, and specialized tools	7
			6.03	Performs quantity take-off	7	C2.26	Model a simple structure and produce requirements list	8
						C2.42	List and extend all materials required to manufacture and install wood works	8
			6.04	Organizes materials	7	C2.41	Select all accessory construction materials such as fixtures, etc.	7
B5	Perform Trade Math	7			0	U40 E4	Maths and science national module	8
C1	Use Hand Tools	7	1.01	Maintains hand, power, and pneumatic tools	7	C3.72	Glue, nail, dowel, bolt, screw, finish (etc.) materials	7
C2	Use Portable Power Tools	7	1.01	Maintains hand, power, and pneumatic tools	7	C3.51	Select and prepare tools, equipment, and accessories	7
C3	Use Stationary Power Tools	7	1.02	Maintains stationary tools	7	C3.52	Install tools and accessories on stationary machinery	7
						C3.53	Position materials with respect to stationary machinery	8
						C3.54	Select machine settings for the operation	8
						C3.55	Adjust cutting tools on stationary machines	8
						C3.56	Adjust settings on portable power tools	7
						C3.61	Cross and rip-cut	7
						C3.62	Plane or size timber	7
						C3.63	Draw and implement a manufacturing, assembly (etc.) pattern	8
						C3.64	Cut joints (assembly, drilling, braces, butt joints, dados, rabbets)	8

## Integrating Newcomers

British Columbia – BC PO			Red Seal / Federal - NOA			Référentiel Charpentier Bois		
Competency		Rating	Sub-Task		Rating	Compétences détaillées		Rating
						C3.66	Cut wood panelling	7
C4	Use Oxy-Fuel Equipment	7	1.07	Uses torch cutting equipment	7			0
D1	Use Levelling Instruments and Equipment	7			0	C4.41	Identify and check levels (backfill, finished ground level, walls and opening plumbness, alignment of existing structures)	6
D2	Use Site Layout Equipment	7			0	C4.42	Mark site for install	6
E1	Use Ladders, Scaffold, and Access Equipment	7	4.03	Erects, dismantles scaffolding	8	C4.61	Lift wood structures and frames (load transfer like traditional and post and beam; load sharing like industrial frames, trusses, panels)	8
E2	Use Rigging and Hoisting Equipment	7	1.04	Uses lifting, rigging, and hoisting equipment	7	C4.68	Lift or install exterior elements like walkways, stairs, balconies and terraces	8
F1	Layout Building Locations	7	7.01	Performs site layout	7	C4.41	Identify and check levels (backfill, finished ground level, walls and opening plumbness, alignment of existing structures)	6
						C4.42	Mark site for install	7
F2	Prepare Building Site	7			0	C4.11	Install and/or complete access, egress, and platform falsework	7
						C4.12	Organize worksite activity zones	7
						C4.14	Prepare materials, portable tools, and specialized tools	7
						C4.41	Identify and check levels (backfill, finished ground level, walls and opening plumbness, alignment of existing structures)	7
						C4.42	Mark site for install	7
F3	Apply Excavations and Shoring Practices	7	8.01	Erects excavation shoring and underpinning	8	C4.51	Prepare site for work: temporary access, paths and gangways, openings, work platform, etc.	7



## Integrating Newcomers

British Columbia – BC PO			Red Seal / Federal - NOA			Référentiel Charpentier Bois		
Competency		Rating	Sub-Task		Rating	Compétences détaillées		Rating
						C4.52	Ensure temporary stability: shoring, bracing, etc.	7
G1	Use Concrete Types, Materials, Additives and Treatments	7			0			0
G2	Select Concrete Forming Systems	7			0			0
G3	Build Footing and Vertical Formwork	7	8.02	Erects concrete falsework	7			0
			8.03	Constructs footing forms	7			0
G4	Build Slab-On-Grade Forms and Suspended Slab Forms	7	8.05	Constructs slab-on-grade formwork	6			0
G5	Install Reinforcement and Embedded Items	7	8.08	Installs embedded steel	7			0
G6	Build Concrete Stair Forms	7	8.07	Constructs stair formwork	7			0
G7	Place and Finish Concrete	7	9.01	Places concrete	7			0
			9.03	Performs basic concrete finishing	8			0
G8	Install Specialized Formwork	7	8.06	Constructs column formwork	7			0
			9.04	Installs pre-cast components	8			0
			9.05	Installs grout	8			0
H1	Describe Wood Frame Construction	7			0			0
H2	Select Framing Materials	7			0	C3.41	Orient all wood pieces as a function of location and use in the frame, constraints, potential twisting/warping, esthetics	8
						C3.43	Draw on timber	8
						C3.44	Draw on dimensional lumber and composites	8
						C3.47	Mark for cutting	7
H3	Build Floor Systems	7	10.02	Constructs dimensional lumber floor framing	7	C3.61	Cross and rip-cut	7
H4	Build Wall Systems	7	12.02	Constructs dimensional lumber wall framing	7	C3.62	Plane or size timber	8

## Integrating Newcomers

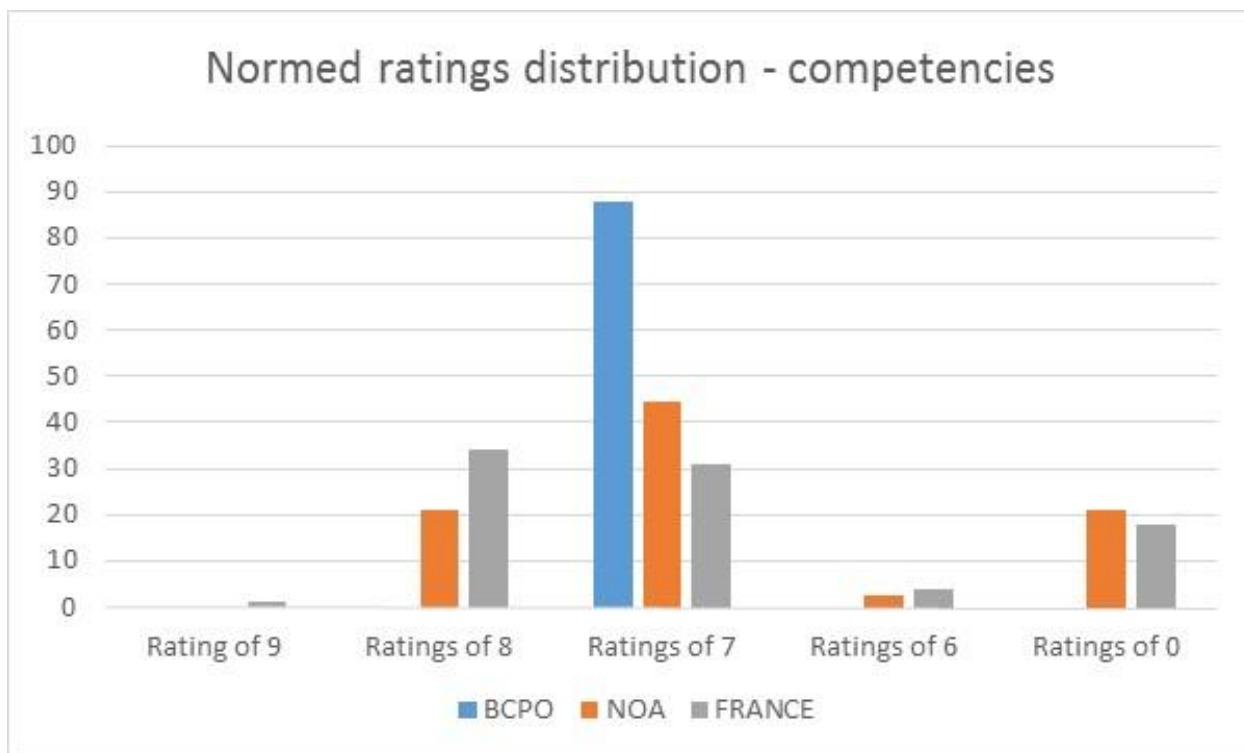
British Columbia – BC PO			Red Seal / Federal - NOA			Référentiel Charpentier Bois		
Competency		Rating	Sub-Task		Rating	Compétences détaillées		Rating
H5	Build Stair Systems	7	20.03	Constructs stairs	7	C4.79	Install stairs	7
						C3.63	Draw and implement a manufacturing, assembly (etc.) pattern	8
H6	Build Roof Systems	7	13.02	Constructs roof and ceiling framing	7	C3.64	Cut joints (assembly, drilling, braces, butt joints, dados, rabbets)	8
H7	Build Specialized Framing Systems	7			0	C3.66	Cut wood panelling	7
						C3.72	Glue, nail, dowel, bolt, screw, finish (etc.) materials	8
H8	Perform Renovations and Additions	7	21.01	Removes existing material	8	C4.51	Conduct preparatory work	8
			21.02	Protects structure during renovations	8	C4.52	Ensure provisional stability of work	8
			22.01	Joins new to existing construction	8	C4.53	Remove some or all of the structure	8
			22.02	Changes existing structure during renovations.	8	C4.56	Install new elements or re-install removed elements	8
H9	Build Timber and Engineered Wood Construction	7	10.01	Installs engineered floor systems	8	C3.62	Plane or size timber	8
			12.01	Installs engineered wall systems	8			
			13.01	Installs engineered trusses	8			
H10	Build Decks and Exterior Structures	7	11.01	Constructs decks	7	C4.68	Lift or install exterior elements or structures such as gangways, stairs, decks, etc.	8
I1	Describe Roofing Materials	7			0	C4.71	Install water and air barriers	7
I2	Install Doors and Hardware	7	14.01	Installs exterior jambs/frames	7	C3.73	Install manufactured products : hardware, cabinetry, insulation, waterproofing, sheathing, etc.	7
			14.02	Installs exterior doors	7			
			19.01	Installs interior jambs/frames	7	C4.74	Place frames in rough openings	7
			19.02	Installs interior doors	7			
I3	Install Windows and Hardware	7	14.04	Installs exterior windows	7	C4.75	Install exterior windows/doors and attendant woodwork on wall and roofs	7

## Integrating Newcomers

British Columbia – BC PO			Red Seal / Federal - NOA			Référentiel Charpentier Bois		
Competency		Rating	Sub-Task		Rating	Compétences détaillées		Rating
			14.05	Installs exterior doors and windows hardware	7	C4.75	Install exterior windows/doors and attendant woodwork on wall and roofs	7
			19.04	Installs interior windows	7			
			19.05	Installs interior doors and windows hardware	7			
14	Install Exterior Finishes	7	16.01	Installs exterior wall components	7			0
			16.02	Installs exterior wall coverings	7			
15	Install Interior Finishes	7	17.01	Installs wallboard	8	C4.78	Install floor finishes	7
			20.02	Install finish components and accessories	8			
16	Install Cabinets	7			0			0
17	Install Interior Floor, Ceiling and Wall Systems	7	17.03	Installs panels, tiles and solid wood finishes	8	C4.72	Install thermal and sound-proofing materials and products	8
			17.04	Installs suspended ceilings	8			
			17.05	Installs demountable wall systems	8			
J1	Control the Forces Acting on a Building	7			0	S4.1 S4.2	Construction system; Statics	8
J2	Control Heat and Sound Transmission	7			0	S3.1 S3.2	Thermal insulation; Sound-proofing	8
J3	Control Air and Moisture Movement in Buildings	7			0	S3.3 S3.4 S3.5	Waterproofing; Sealing; Air and ventilation	8

**Table 9.** Summary count of comparison ratings at the competency level – BC PO is the reference

	British Columbia – BC PO	Red Seal / Federal - NOA	Référentiel Charpentier Bois
Total number ratings	50	71	88
Total of ratings	350	400	522
Ratings of 8	0	17	34
Ratings of 7	50	36	31
Ratings of 6	0	2	4
Ratings of 0	0	17	18
Average rating	7	5.6	5.9



**Figure 4.** Normed ratings distribution for BC’s apprentice program (BCPO), the BC Challenger program (NOA), and the French Bac pro – at the competency / sub-task / Compétences détaillées level

### Gaps - Competencies

When compared to the BC PO, and using the rating protocol explained above, both the NOA and French programs show gaps. For the purpose of this classification, we have defined as gap any competency that did not match the equivalent BC competency standard rating, i.e. rating<7, or that was not listed or readily surmised from those listed.

Clearly a gap indicated by a rating of 6 ought to be seen as less absolute as one showing a rating of 0. This is because a 0 indicates that the competency is entirely absent the document or program. Table 10 shows the three-way comparison and gap. Tables 11 and 12 show the NOA and French gaps respectively.

**Table 10.** Rated gap competencies - BC PO is the reference; colors and ratings as above, expounded in Appendix 1

British Columbia – BC PO		Red Seal / Federal - NOA		Référentiel Charpentier Bois	
Competency	Rating	Sub-Task	Rating	Compétences détaillées	Rating
A1	7	2.02	6	C3.12 C4.21	8
B1	7		0		0

## Integrating Newcomers

British Columbia – BC PO			Red Seal / Federal - NOA			Référentiel Charpentier Bois		
Competency		Rating	Sub-Task		Rating	Compétences détaillées		Rating
B3	Interpret Building Codes and Bylaws	7			0	C1.22	Recognize administrative requirements for the worksite	8
B4	Plan and Organize Work	7	6.01	Schedules work sequence	7			0
B5	Perform Trade Math	7			0	U40 E4	Maths and science national module	8
C4	Use Oxy-Fuel Equipment	7	1.07	Uses torch cutting equipment	7			0
		7			0			6
D1	Use Levelling Instruments and Equipment	7			0	C4.41	Identify and check levels (backfill, finished ground level, walls and opening plumbness, alignment of existing structures)	6
D2	Use Site Layout Equipment	7			0	C4.42	Mark site for install	6
F1	Layout Building Locations	7	7.01	Performs site layout	7	C4.41	Identify and check levels (backfill, finished ground level, walls and opening plumbness, alignment of existing structures)	6
F2	Prepare Building Site	7			0	C4.11	Install and/or complete access, egress, and platform falsework	7
G1	Use Concrete Types, Materials, Additives and Treatments	7			0			0
G2	Select Concrete Forming Systems	7			0			0
G3	Build Footing and Vertical Formwork	7	8.02	Erects concrete falsework	7			0
			8.03	Constructs footing forms	7			0
G4	Build Slab-On-Grade Forms and Suspended Slab Forms	7	8.05	Constructs slab-on-grade formwork	6			0
G5	Install Reinforcement and Embedded Items	7	8.08	Installs embedded steel	7			0
G6	Build Concrete Stair Forms	7	8.07	Constructs stair formwork	7			0
G7	Place and Finish Concrete	7	9.01	Places concrete	7			0
			9.03	Performs basic concrete finishing	8			0

## Integrating Newcomers

British Columbia – BC PO			Red Seal / Federal - NOA			Référentiel Charpentier Bois		
Competency		Rating	Sub-Task		Rating	Compétences détaillées		Rating
G8	Install Specialized Formwork	7	8.06	Constructs column formwork	7			0
			9.04	Installs pre-cast components	8			0
			9.05	Installs grout	8			0
H1	Describe Wood Frame Construction	7			0			0
H2	Select Framing Materials	7			0	C3.41	Orient all wood pieces as a function of location and use in the frame, constraints, potential twisting/warping, esthetics	8
H7	Build Specialized Framing Systems	7			0	C3.66	Cut wood panelling	7
I1	Describe Roofing Materials	7			0	C4.71	Install water and air barriers	7
I4	Install Exterior Finishes	7	16.01	Installs exterior wall components	7			0
I6	Install Cabinets	7			0			0
J1	Control the Forces Acting on a Building	7			0	S4.1 S4.2	Construction system; Statics	8
J2	Control Heat and Sound Transmission	7			0	S3.1 S3.2	Thermal insulation; Sound-proofing	8
J3	Control Air and Moisture Movement in Buildings	7			0	S3.3 S3.4 S3.5	Waterproofing; Sealing; Air and ventilation	8

**Table 11.** Gaps between BC PO and BC Challenger (NOA)

British Columbia – BC PO			Red Seal / Federal - NOA		
Competency		Rating	Sub-Task		Rating
A1	Apply Shop and Site Safety Practices	7	2.02	Maintains safe work environment	6
B1	Describe the Carpentry Trade	7			0
B3	Interpret Building Codes and Bylaws	7			0
B5	Perform Trade Math	7			0

## Integrating Newcomers

British Columbia – BC PO			Red Seal / Federal - NOA		
Competency		Rating	Sub-Task		Rating
D1	Use Levelling Instruments and Equipment	7			0
D2	Use Site Layout Equipment	7			0
F2	Prepare Building Site	7			0
G1	Use Concrete Types, Materials, Additives and Treatments	7			0
G2	Select Concrete Forming Systems	7			0
G4	Build Slab-On-Grade Forms and Suspended Slab Forms	7	8.05	Constructs slab-on-grade formwork	6
H1	Describe Wood Frame Construction	7			0
H2	Select Framing Materials	7			0
H7	Build Specialized Framing Systems	7			0
I1	Describe Roofing Materials	7			0
I6	Install Cabinets	7			0
J1	Control the Forces Acting on a Building	7			0
J2	Control Heat and Sound Transmission	7			0
J3	Control Air and Moisture Movement in Buildings	7			0

**Table 12.** Gaps between the BC PO and the Bac pro

British Columbia – BC PO			Référentiel Charpentier Bois		
Competency		Rating	Compétences détaillées		Rating
B1	Describe the Carpentry Trade	7			0
B4	Plan and Organize Work	7			0

## Integrating Newcomers

British Columbia – BC PO			Référentiel Charpentier Bois		
Competency		Rating	Compétences détaillées		Rating
C4	Use Oxy-Fuel Equipment	7			0
D1	Use Levelling Instruments and Equipment	7	C4.41	Identify and check levels (backfill, finished ground level, walls and opening plumbness, alignment of existing structures)	6
D2	Use Site Layout Equipment	7	C4.42	Mark site for install	6
F1	Layout Building Locations	7	C4.41	Identify and check levels (backfill, finished ground level, walls and opening plumbness, alignment of existing structures)	6
G1	Use Concrete Types, Materials, Additives and Treatments	7			0
G2	Select Concrete Forming Systems	7			0
G3	Build Footing and Vertical Formwork	7			0
G4	Build Slab-On-Grade Forms and Suspended Slab Forms	7			0
G5	Install Reinforcement and Embedded Items	7			0
G6	Build Concrete Stair Forms	7			0
G7	Place and Finish Concrete	7			0
G8	Install Specialized Formwork	7			0
H1	Describe Wood Frame Construction	7			0
I4	Install Exterior Finishes	7			0
I6	Install Cabinets	7			0

## Conclusions

### BC PO and NOA

The gaps we identified, especially those between the BC PO and the NOA could be due to structural differences between the two documents. Indeed, the BC PO states that it is aligned to the NOA.

But we should nevertheless examine these gaps because challengers to the certification in BC have, in general, no trade schooling, and the NOA is the only training proxy we can use.



For example, we know that safety regulations and codes vary from jurisdiction to jurisdiction, and that only those Pan-Canadian regulations and codes might be tested on the Red Seal examination. A BC-specific gap is possible for those challengers who have worked mostly out of BC.

### *BC PO and Bac pro*

The gaps identified here are reflective of the differences in the training programs, language notwithstanding. In effect, we are saying that someone who has been trained in a domain has the ability to recognize and adapt to changes to and in that domain. On the other hand, someone who was never exposed to the domain would be oblivious to its elements, hence would be insensitive to its subtleties, let alone to any change. We are also saying that it is easier to train someone familiar with a domain than someone with no acquaintance to that domain at all. And this is true regardless of the myth of having to “un-learn” things: there is no need to wipe the slate clean to learn new things.

The differences between safety legislation and regulations and building codes are significant, as are the language differences – even if a French student took English as his or her “langue vivante”. But the French carpenter has been well-trained in interpreting and applying these – probably more so, since European countries tend to be more process-heavy than Canada. Bridging gaps due to jurisdictional and language differences is a trivial finding, even if it is one that needs to be addressed.

The real gaps, those representing missing curriculum bits in France, are, in decreasing order of importance: concrete forming and placing and oxy-acetylene torching, siting buildings, installing non-wood/wood composites exterior and interior finishes, installing cabinetry, and the imperial system.

## Examination and Certification

### *Credentialing in BC*

#### *Apprentices*

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>17</sup>'s Product Committee's ISEC<sup>18</sup>). Red Seal examinations are item bank-generated; that is for each examinable sub-task of the NOA a number of items are developed and then randomly assigned to an instrument based on a ToS<sup>19</sup> that mirrors the NOA percentages.

Bank-generated examinations are more comprehensive and more "difficult"<sup>20</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>21</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.

---

<sup>17</sup> Canadian Council of Directors of Apprenticeship

<sup>18</sup> The *Interprovincial Standards Examination Committee* is made up of provincial/territorial government representatives

<sup>19</sup> A *Table of Specifications* is developed by the host jurisdiction and assigns weights and taxonomic item levels to sub-tasks

<sup>20</sup> Where "difficulty" is a perceptual measure from the candidates' perspective rather than statistically derived through Item Response or Classical theories

<sup>21</sup> 70% aggregate cut score for all Red Seal examinations

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.

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>22</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.

### Credentialing in 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.

---

<sup>22</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),

## *Integrating Newcomers*

---

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 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 13 compare the major elements of the testing and credentialing systems for carpenters 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-

## Integrating Newcomers

---

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 Bac pro or the BP is meant to qualify the student.

**Table 13.** 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	Gradated
Results	Unique fixed cut score	Compounded
Validity	Medium	Strong
Reliability	Unknown	Strong
Credential	Endorsement	National

### APPENDIX 1 - Evaluative framework

The following is a detailed rationale describing the process and product of the evaluative exercise.

#### What is a rating scale?

A rating scale is a tool that allows an assessor to translate a candidate's achievement into a series of pre-set, defined values.

There are 4 major types of scales, arranged in the following fashion (Bond and Fox, 2007):

- 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

For the purpose of analysis, the scale used is an interval numerical scale based on percentages. While the use of a percentage numerical scale is arbitrary, it is familiar to most people because it is closely aligned with scales used in the public education system. Unlike the public education in North America, we did not use a letter grades scale (i.e. A-F) with a percent range equivalency table (e.g. A = 85-100%). Using the percent scale will allow for both translation to any base 10 numerical scale (say a test based on 20 or 40 marks) and for uncertainty.

In addition, the number of ranks (10) provides evaluators some measure of sensitivity around mid-range performance (5-7).

#### What is in a rating scale?

Rating scales are comprised of the following 3 elements:

- An ordinal rating value (e.g., 1, 2, 3, ... n); omitted here for the sake of simplicity
- A label defining the ordinal points (e.g., 1=10%, 2=20%, 3=40%, ... , 10=100%), i.e. an interval of 10% between each point
- One (or a set of) statement(s), or criterion/a, that describe(s) the behavior commensurate with the rating (e.g., 1=10%= "Candidate attempts to bluff through the task; or 'I have never done this type of task, but let me show you how it's done'"

For this exercise we have added another 2 sets of criteria or scales: safety and training. These 2 additional sets are more generic (have fewer details), and allow for evaluation as opposed to assessment. These scales are meant to be used simultaneously and conjunctively. There are 3 reasons for using additional rating criteria:

- Enable the assessor to classify the performance from a (gross) safety perspective (e.g., "Unacceptable", "High", etc.)

## Integrating Newcomers

---

- Enable the assessor to classify the performance at a more general level (e.g., “Needs in-school training”, “Needs on-the-job training”, etc.).
- “Triangulate” the performance rating. For example, we would not accept (and expect) that a candidate be rated competent and an unacceptable safety risk in the workplace simultaneously.

In addition, the 10-point scale is meant to assist users of the evaluation grid in better targeting their intervention(s), for example, on-the-job coaching vs. in-school training (or both).

### What rating scales did we use?

For this exercise, we used 3 rating scales and 1 set of statements or criteria. The rating scale elements are as follows:

- Safety
- Training required
- Percent scale (11 anchor points: N/A, 1-10)
- Criteria – description in the vernacular, from a certified tradesworker’s perspective of the expected level of comfort and/or familiarity and/or capabilities based on the training and testing attached to each competency.

### Safety & Training scales

The “Safety” scale is a 5-point scale risk qualitative estimate, color-coded for ease of reference (where risk is assumed to be linearly, inversely proportional to ability as reflected in the competency-based evaluation). The risk labels, while open to interpretation, are roughly aligned to investigators’ ratings when an accident involving a tradesworker occurs.

The Training Scale addresses 6 potential responses for each competency assessed, where 2 responses are hiring-based, 2 responses are training-based, and 2 responses are punctual (commensurate with mandated or legislated training):

**Table 14.** Color-coded safety and training scales

Risk	Training
Restriction	No training required at this time, <b>restrictions</b> are in place
Unacceptable	Training required is too extensive to justify hiring or restrictions are required
High	Training required is best delivered in a formal, in-school format (followed on-the-job training)
Medium	Training required is best delivered on-the-job (followed by training mandated for the job)

Low	No immediate training is required (except that mandated for the job)
Improbable	No training is required (except that mandated for the job)

Note:

- “Restriction” refers to a job task limits imposed on the tradesworker by the hiring entity and kept in place until the tradesworker is deemed competent.

### How did we integrate French scales?

The French program consists of three articulated domains (using our translation): Activities and Tasks, Competences and competencies, and Technological knowledge. Only the first and the last of these levels have expected performance scales. Neither of these 2 scales are identical, although they are related – the same is true of the three levels listed just above.

The first scale is binary and separates the performance expectations between someone completing a task under supervision and using an assigned methodology, and someone completing a task independently using the methodology they have selected.

The second scale is a four-point scale that maps out fairly easily to the Interprovincial Standard Examination (IPSE, a.k.a. Red Seal) taxonomy or question classification, itself is a modified/compressed Bloom taxonomy. Roughly, the French level 1 would correspond to the ability to name, member, recognize, or understand things and concepts. Level 2, in addition to Level 1, would correspond to the ability to apply concepts, perhaps mainly cognitively. Level 3 would correspond to the ability to analyze and apply the things and concepts cognitively and physically. And Level 4 would correspond to the ability to analyze complex tasks and create means to resolve them. These correspondences are captured in Table 7 below.

### Combined numerical rating scale

The numerical rating scale has 4 elements:

- Percent (%) rating (estimated) (10%, 20%, ... , 100%)
- Descriptors/criteria/vernacular
- Risk
- Training
- And, in addition, is cross-referenced to the French performance levels

These elements are as follows:

**Table 15.** Combined scales

Score	Descriptor/vernacular	Risk	Training	French cross-reference / IPSE/Bloom
N/A	Task is not required for the occupation or job position or headquarter	Restriction if task is part of the trade but location-specific	No training required at this time, restrictions are in place	



## Integrating Newcomers

Score	Descriptor/vernacular	Risk	Training	French cross-reference / IPSE/Bloom
0 / 0%	Task is not part of profile; or “I have never done this type of work”	Unacceptable	Training required is too extensive to justify hiring or restrictions are required	
1 / 10%	Task is marginally part of profile; or “I have never done this type of task, but I think I can make it”	Unacceptable	Training required is too extensive to justify hiring or restrictions are required	
2 / 20%	Task is not part of profile but bears some resemblance to some profile task; “I don’t know this; show me and talk me through it step by step”	High	Training required is best delivered in a formal, in-school format (followed on-the-job training)	
3 / 30%	Task is not part of profile but is a composite of other tasks; “I’ve done this quite a while back, you just need talk me through it one step at a time”	High	Training required is best delivered in a formal, in-school format (followed on-the-job training)	
4 / 40%	Task is part of profile but uncommon / rare; or “Here’s how the whole procedure is done, is that correct?”	High	Training required is best delivered in a formal, in-school format (followed on-the-job training)	Technological knowledge <sup>23</sup> – Information level IPSE Tax 1; Bloom 1-2)
5 / 50%	Task is part of profile but usually left to specialists; or “I can do this, but I’ll probably get stumped and may need help at some point”	Medium	Training required is best delivered on-the-job (followed by training mandated for the job)	Technological knowledge – Expression level IPSE Tax 1→2; Bloom 2→3)
6 / 60%	Task is part of profile but usually left to	Medium	Training required is best delivered	Activities and Tasks – Supervised

<sup>23</sup> Our translation – Les savoirs technologiques associés; Niveau d’information; Niveau d’expression; Niveau de la maîtrise d’outils; Niveau de la maîtrise méthodologique

## Integrating Newcomers

Score	Descriptor/vernacular	Risk	Training	French cross-reference / IPSE/Bloom
	specialists; or “I can do it on my own, you just need to check when I’m done – I’ll probably make a forgivable mistake”		on-the-job (followed by training mandated for the job)	and following an assigned method <sup>24</sup> Technological knowledge – Tool mastery level IPSE Tax 2; Bloom 3-4)
7 / 70%	Task is part of profile but frequency of practice varies a lot; or “I can do it on my own, you just need to check when I’m done – I won’t make any mistake”	Low	No immediate training is required (except that mandated for the job)	Activities and Tasks – Supervised and following an assigned method Technological knowledge – Tool mastery level IPSE Tax 2; Bloom 3-4)
8 / 80%	Task is part of profile and is very common; or “I can do it on my own, you won’t have to check my work”	Low	No immediate training is required (except that mandated for the job)	Activities and Tasks – Proficient and chooses method <sup>25</sup> Technological knowledge – Methodological mastery level IPSE Tax 3; Bloom 5-6)
9 / 90%	Task is part of profile and tested rigorously; or “I can teach others how to do it”	Improbable	No training is required (except that mandated for the job)	Activities and Tasks – Proficient and chooses method Technological knowledge – Methodological mastery level IPSE Tax 3; Bloom 5-6)
10 / 100%	Task is part of profile and subject to re-certification; or “I developed and implemented this procedure”	Improbable	No training is required (except that mandated for the job)	

<sup>24</sup> Our translation – Activités et tâches : sous contrôle / sous la responsabilité d’un supérieur hiérarchique / méthode imposée

<sup>25</sup> Our translation – Activités et tâches : maîtrise l’exécution ... et peut en choisir la méthode d’exécution

### Notes:

- The numerical standard for an estimated “competent” performance rating is 70%, or the ability to perform safely independently. An estimated “proficient” performance rating is 90% or 100% or that exhibited by a higher level of certification or tenure as a trades instructor.
- Where “forgivable” in the 60% rating vernacular means a procedural misstep or omission; an error that would not have led to or resulted in injury to self, co-workers, or the public and/or damage to equipment or plant.

### Further refinements

The analysis conducted herein could be further refined by adding analytical levels, say including learning tasks, or “saviors”, or “limites de connaissance”. Using these levels, it might be possible to move from an ordinal rating to an absolute rating and then conduct mathematical operations on the ratings and add weightings to calculate gaps to a higher – albeit artificial - level. This is explained below

The numerical indicators above can be handled via arithmetic mean calculations – if they are used in an absolute fashion rather than a comparative or ordinal fashion - and would have the following assumptions embedded:

- All ranks are equally spaced, i.e. it is as difficult to go from a “20%” to a “30%” as it is from a “60%” to a “70%”.
- Competence and risk can be represented linearly (in the form of  $y=ax+b$ )
- All competencies are equally important
- All competencies are equally risky
- There is no measurable skills erosion due to jobsite conditions or time elapsed since certification

Clearly, all of these assumptions might lead to (i) overestimation of competence and, (ii) underestimation of risk. For example, in a worst case scenario, a tradesworker may “score” very high on low risk/low impact competencies, hence “make up” for weaknesses in high risk/high impact competencies.

There are 2 non-mutually exclusive palliatives to address the assumptions’ potential impact on gaps/scores:

#### 1. Gating items/competencies

Simply put, gating items or competencies are “must-haves”. For example, a carpenter who lacks, e.g., NOA Bock C Task 8 “Constructs Formwork”, would be considered “incompetent” altogether as mastery of that Task is deemed absolutely necessary to function in a Canadian construction environment.

#### 2. Weighting

Weighting consist in assigning a multiplier to the assessed raw score based on competency criticality and/or risk level (expressed as a “safety score”). At the individual competency level achievement described as a percentage remains the same, but at the aggregate level, the weighting affects the results. Weighting values could be based, say, on percent of instructional time listed in the BCPO, or the Tasks national averages in the NOA.

## Integrating Newcomers

**Table 16.** Example of profile results using the all of the ratings to determine a risk factor on a 3-point scale (weighted risk factors were not considered)

Summary of ratings against competencies	Score/Max.	Percent	Risk/Training	Value (=v)	Average Risk (=Σv/n)
3 greens (all at 7/70%)	21/30	70%	Low	3*1=3	2.17
4 yellows (3 at 6/60%, 1 at 5/50%)	23/40	58%	Medium	4*2=8	
5 oranges (4 at 4/40%, 1 at 3/30%)	17/50	34%	High	5*3=15	
Overall	61/120	51%	Medium-High	26/12	Medium-High

Comparing 2 “candidates” with similar rating profiles but in a weighted situation:

**Table 17.** Example of weighted program comparison

GAC	(K) Raw Score		(K) No weight %		Weight (1-5)	(K) Weighted score		(K) Weighted %		(S) Raw Score (SRS)		(S) No weight		Weight (1-5) (W)	(S) Weighted score		(S) Weighted %	
	A	B	A	B		A	B	A	B	A	B	A	B		A	B	A	B
Candidate	A	B	A	B		A	B	A	B	A	B	A	B		A	B	A	B
A	P	P	P	P	∞	P	P	P	P	P	P	P	P	∞	P	P	P	P
B	6	7	60%	70%	4	24	28	60%	70%	2	1	55%	75%	4	8	4	.50	.25
C	4	6	40%	60%	4	16	24	40%	60%	3	2	30%	55%	4	12	8	.75	.50
D	6	5	60%	50%	2	12	10	60%	50%	2	3	55%	30%	2	4	6	.25	.38
E	9	7	90%	70%	1	9	7	90%	70%	0	1	95%	75%	1	0	1	0	.06
Overall	25	25	63%	63%		61	69	55%	63%	7	7	59%	59%		24	19	67%	83%

Note: (S) Weighted % is calculated as: 
$$\left\{ 100 \left( \frac{1}{(SRS * W) / (W * SRS_{max})} \right) \right\}$$

## APPENDIX 2 - Glossary of Terms

Below is a list of terms used throughout the report, cross-referenced to their French term(s).

**Table 18.** Glossary of terms

Element	French	Explanation
Assessment	Évaluation scolaire	<ul style="list-style-type: none"> <li>The term assessment is generally used to refer to all activities teachers use to help students learn and to gauge student progress.</li> </ul>
Certified/Certification	Qualifié ou diplômé / Certification en tant que ...	<ul style="list-style-type: none"> <li>Certification refers to the confirmation of certain characteristics of an object, person, or organization. This confirmation is often, but not always, provided by some form of external review, education, assessment, or audit.</li> <li>One of the most common types of certification in modern society is professional certification, where a person is certified as being able to competently complete a job or task, usually by the passing of an examination.</li> <li>There are two general types of professional certification: some are valid for a lifetime, once the exam is passed. Others have to be recertified again after a certain period of time. Also, certifications can differ within a profession by the level or specific area of expertise they refer to.</li> </ul>
Competence	Aptitude	<ul style="list-style-type: none"> <li>Competence is a generic term used to describe an acceptable performance in the appropriate context; it is the ability to do a particular activity to a prescribed standard.</li> <li>Competence is measured against (a set of) documented criteria</li> <li>Competence usually regroups a number of activities or behaviors typical of a job but may not include all job tasks</li> </ul>
Competence (General Area of)	Activité(s)	<ul style="list-style-type: none"> <li>General Area of Competence (GAC) are made up of competencies following this rough classification:                             <ul style="list-style-type: none"> <li>Competencies related to specific divisions in work assignment or job activities.</li> <li>Competencies that comprise knowledge, skills, and abilities (KSAs) used extensively as part of one or more job activities.</li> <li>Competencies that relate to a generic set of learning activities.</li> </ul> </li> </ul>

Competency	Tâche / Savoir-faire / Compétence	<ul style="list-style-type: none"> <li>• Competency and competencies are concepts used to label particular abilities and refer to activities.</li> <li>• Competency statements always contain a verb that describes what the person does.</li> <li>• For operational purposes, competencies: <ul style="list-style-type: none"> <li>○ Taken together, fully describe the general area of competence (GAC) they are a part of.</li> <li>○ Are constituent parts of general areas of competence.</li> <li>○ Fully describe an independent job unit.</li> <li>○ Describe what the individual is able to do.</li> <li>○ Include each and every job skill; fully describe the job in behavioral terms</li> </ul> </li> </ul>
Competency (Profile Chart)	Activités et tâches professionnelles	<ul style="list-style-type: none"> <li>• A Competency Profile Chart outlines all competencies that a worker, tradesperson, and (therefore) an apprentice, is expected to perform on the job. It forms the basis for developing a training program.</li> </ul>
Content - Program outline	Abrégé du programme pédagogique	<ul style="list-style-type: none"> <li>• A list of topics required for each learning task</li> </ul>
Content - Materials	Ressources pédagogiques / Matériel didactique	<ul style="list-style-type: none"> <li>• A comprehensive package (in any medium) of information required to support the delivery of learning tasks</li> </ul>
Course	Cours	<ul style="list-style-type: none"> <li>• [Is] a short, pithy statement which informs a student about the subject matter, approach, breadth, and applicability of the course [material]</li> <li>• focuses on content ... we are looking for a list of topics<sup>26</sup>.</li> <li>• There is no standard definition of the word course in UK higher education ... the definition of a course is usually driven by the academic regulations and structures of a provider</li> <li>• A course [is] a coherent academic engagement with a defined set of learning outcomes</li> <li>• [A] course [is] something you can apply to</li> <li>• A course [is] the thing that lead to the student's qualification<sup>27</sup></li> </ul>
Curriculum (also see syllabus, program)	Programme scolaire / de formation	<ul style="list-style-type: none"> <li>• In formal education, a curriculum is the set of courses, and their content, offered at a school or university. A curriculum is prescriptive, and is based on a more general syllabus which merely specifies what topics</li> </ul>

<sup>26</sup> Stanford University the Office of the Registrar

<sup>27</sup> Higher Education Statistics Agency (UK)

		<p>must be understood and to what level to achieve a particular grade or standard.</p> <ul style="list-style-type: none"> <li>• May also refer to a defined and prescribed course of studies, which students must fulfill in order to pass a certain level of education.</li> </ul>
Delivery - Instructor	Enseignement – Instructeur / Formateur	<ul style="list-style-type: none"> <li>• Individual tasked with teaching apprentices or aspiring workers.</li> </ul>
Evaluation	Évaluation	<ul style="list-style-type: none"> <li>• Evaluation is making a judgement (or set of judgements) on how well a (training) program has reached its stated objectives. Summative evaluation (hereinafter referred to as “evaluation”) is the last and concluding step in the DACUM process and the ADDIE training and instructional development models.</li> <li>• The results of evaluation exercises allow us to determine: <ul style="list-style-type: none"> <li>○ The type of contribution the (training) program made to the organization.</li> <li>○ Participants’ reaction to elements of the (training) program.</li> <li>○ Participants’ grasp of the (training) program contents.</li> <li>○ Participants’ success in applying newly learned concepts and behaviors on the job.</li> <li>○ The (training) program’s cost-effectiveness.</li> <li>○ How the (training) program might be improved.</li> <li>○ Whether or not the (training) program should be repeated or modified before repeat deliveries.</li> </ul> </li> </ul>
Exam – Competence evaluation	Évaluation des aptitudes / du savoir-faire	<ul style="list-style-type: none"> <li>• Competence evaluation is a test of practical competence. Competence is defined as ‘the ability to do a particular activity to a prescribed standard’. Competence is based on the belief that what people do rather than what they know is most important in terms of job safety, (training) outcomes, and productivity. Competence is measured against specific job competencies.</li> <li>• A Competence evaluation is trade / occupation-specific. Competence evaluations focus on “core competencies” for the trade / occupation. Those core competencies are identified by subject matter experts (SMEs); core competencies are defined as work activities that are critical to safety and / or extremely common.</li> </ul>
Exam - Exam	Examen	<ul style="list-style-type: none"> <li>• An exam(ination) or test is an assessment intended to measure a candidate’s knowledge, skill, aptitude, physical fitness, or</li> </ul>

## Integrating Newcomers

		ability. An exam or test may be administered orally, on paper, on a computer, or in a confined area that requires a test taker to physically perform a set of skills. Formal examinations or tests often yield grades or test scores.
Exam - Quiz	Test	<ul style="list-style-type: none"> <li>• A quiz is a brief assessment used in education and similar fields to measure growth in knowledge, abilities, and/or skills.</li> <li>• Quizzes are usually scored in points.</li> </ul>
Exam – Skills Check	Examen des savoir-faire	<ul style="list-style-type: none"> <li>• See “Competence Evaluation” above</li> <li>• The results of a Competence evaluation allow us to determine: <ul style="list-style-type: none"> <li>○ The skills level of the candidate against core job competencies.</li> <li>○ The training required to fill the skills gaps, if any.</li> <li>○ The most appropriate training mode to fill the skills gaps.</li> </ul> </li> </ul>
KASA - Ability	Capacité	<ul style="list-style-type: none"> <li>• The power or capacity to perform an activity or task<sup>28</sup></li> <li>• An internal / self- (or external) evaluation of an individual’s affective, cognitive, and psycho-motor domains’ capacities (sometimes partially captured via qualifications) that allow for the placement of that individual on an idiosyncratic ordinal scale</li> </ul>
KASA - Attitude	Attitude	<ul style="list-style-type: none"> <li>• A state of mind or feeling with regard to some matter</li> <li>• Affective domain activities such as training or end-of-course-evaluations, and so on, would tap “attitudes”</li> </ul>
KASA - Knowledge	Connaissance(s) - Savoir(s)	<ul style="list-style-type: none"> <li>• An organized body of information, usually factual or procedural in nature</li> <li>• Cognitive domain activities such as training, end-of-course-evaluations, and so on would tap “knowledge”</li> <li>• As opposed to competencies, knowledge statements do not contain “action” verbs. Rather they state what the content or facts might be.</li> </ul>
KASA - Skill	Habilité	<ul style="list-style-type: none"> <li>• “Skill” is taken to be primarily to be “the ability to carry out [a] particular task” or “the proficient manual, verbal, or mental manipulation of data or things”</li> <li>• Rather than “ability based on some permutation of dexterity, practical knowledge, theoretical knowledge and social</li> </ul>

<sup>28</sup> <http://www.va.gov/jobs/hiring/apply/ksa.asp>



## Integrating Newcomers

		ability”, or “the ability or potential ability to fulfill all the tasks associated with or negotiated for an occupation” <sup>29</sup>
Learning outcome	Aboutissement de l'apprentissage	<ul style="list-style-type: none"> <li>• A statement of what a learner will be able to do as a consequence of attending a course, studying materials, using a job aid, etc.</li> <li>• Also referred to as “Learning Objective”</li> </ul>
Learning task	Attente(s) d'apprentissage	<ul style="list-style-type: none"> <li>• One of a set of instructional activities which, collectively, are required in order to reach one of a competency’s enabling objective, or the competency’s learning or performance outcome</li> </ul>
Needs Assessment	Évaluation des besoins	<ul style="list-style-type: none"> <li>• A needs assessment is a systematic effort to gather data, ideas, and opinions from a variety of sources about performance problems, or new systems/procedures, or new technologies’ impact on workers.</li> <li>• A need is a gap between the current situation (actuals) and a more desirable future situation (optimals). A need only exists when there is a discrepancy or gap between actuals and optimals. A training need is training required to fill that gap.</li> <li>• <b>Note</b> that training may not be that appropriate response to any given gap.</li> </ul>
Performance outcome	Résultat(s) prévus	<ul style="list-style-type: none"> <li>• A statement describing the learner’s observable, measurable behavior resulting from attending a course, studying materials, using a job aid, etc.</li> <li>• Also referred to as “Instructional/Performance Objective”</li> </ul>
Qualification	Qualification	<ul style="list-style-type: none"> <li>• Qualification refers to documentary evidence (in the form of certificates, guild membership, proof of training, on-the-job experience, etc.) that shows the bearer is recognized as a practitioner in the field for which the qualification has been issued.</li> <li>• “Certification” is often used as a synonym</li> </ul>
Qualified	Qualifié	<ul style="list-style-type: none"> <li>• A bearer of (a) qualification(s) is said to be qualified</li> <li>• Some will argue that one may be certified (i.e. be the bearer of a qualification or certificate) but not qualified. In that instance, “qualified” refers to the (evaluated) ability to “do the job” regardless of documentary evidence in hand</li> </ul>
Qualitative (e.g. assessment, evaluation, research, etc.)	Approche qualitative	<ul style="list-style-type: none"> <li>• Reported outcomes of investigations in the physical or social realms that eschew any</li> </ul>

<sup>29</sup> Winch C, and Clarke, L (2003); “Front-loaded” Vocational Education versus Lifelong Learning. A Critique of Current UK Government Policy, Oxford Review of Education, 29:2, 239-252

		<p>numerical representation (or, at most, report rudimentary frequencies/counts) or mathematical (usually statistical) manipulation. Often used as a counterpoint to “quantitative” (aka “hard”), “qualitative” outcomes report on attributes of interest using the vernacular (although with post-moderns, there has been a marked increase in the use of obscure language).</p> <ul style="list-style-type: none"> <li>• There is a connection between the qualitative and the quantitative via the theory of measurement: “The objects measured, their properties and the relationships between them are described as <i>qualitative</i>, to distinguish them from numbers and numerical relationships, which are described as <i>quantitative</i> ... Such qualitative structure, however, may be similar (i.e. isomorphic or homomorphic) to quantitative (numerical) structures. It is in virtue of this structural similarity that numerical systems may be used to <i>represent</i> qualitative empirical systems.<sup>30</sup>”</li> </ul>
<p>Quantitative (e.g. assessment, evaluation, research, etc.)</p>	<p>Approche quantitative</p>	<ul style="list-style-type: none"> <li>• Commonly thought to be the assignment of numbers (real, rational, and irrational) to a process, product, result, or any outcome of an investigation in physical or social realms. This assignment of numbers to outcomes is taken as a confirmation that some sort of attribute has been measured. While commonly understood to follow Steven’s (1946) nominalist-representational formulation: “a measurement is the assignment of numerals to objects or events according to a rule<sup>31</sup>”, the concept of measurement as an arbitrary, investigator-based assignment of a scale is erroneous.</li> <li>• “Put as succinctly as possible, <i>measurement</i> is <b>the numerical estimation of the ratio of a magnitude of a quantitative attribute to a unit of the same attribute.</b>”</li> <li>• “<i>Quantitative attribute</i>. A quantitative attribute (or quantity) is an attribute the instances of which are related to one another both ordinally and additively. One version of (continuous) quantitative structure is given</li> </ul>

<sup>30</sup> Michell, J (1993): The Origins of the Representational Theory of Measurement: Helmholtz, Hölder, and Russell, *Studies in History and Philosophy of Science* 24 (2), 185-206 (emphasis in original)

<sup>31</sup> Stevens, S.S. (1946): On the theory of the scales of measurement. *Science*, 103, 667-680

## Integrating Newcomers

---

		by Hölder's (1901) axioms <sup>i</sup> ... Not all attributes are quantitative. E.g. length is quantitative, but neither sex nor nationality is. <sup>32</sup> "
Training	Formation	<ul style="list-style-type: none"><li>• A planned, systematic set of mediated activities which results in a predicted, (mainly) permanent behavior change in the participants and is (i) a response to a documented knowledge or skill-based performance gap, and (ii) job-specific, location-specific, or firm-specific</li></ul>

---

<sup>32</sup> Both quotes from Michell, J (1997): Quantitative science and the definition of *measurement* in psychology. *British Journal of Psychology*, 88, 355-383 (emphasis in original)

## APPENDIX 3 – Select Web References

ONISEP.FR – Fiche formation; Bac pro Technicien du bâtiment

<http://www.onisep.fr/Ressources/Univers-Formation/Formations/Lycees/Bac-pro-Technicien-du-batiment-organisation-et-realisation-du-gros-oeuvre>

Accessed 24 November 2015

CFA-BTP de Savoie

<http://cfa-batiment.com/accueil-cfa.html>

Accessed 25 November 2015

Ministère de l'Éducation Nationale – Les niveaux et les établissements d'enseignement

<http://www.education.gouv.fr/cid216/le-centre-de-formation-d-apprentis-c.f.a.html>

Accessed 24 November 2015

Ministère de l'Éducation Nationale – Voies de formation et diplômes

<http://www.education.gouv.fr/cid155/apprentissage.html>

Accessed 24 November 2015

Statistics Canada

<http://www.statcan.gc.ca/pub/81-004-x/2010002/article/11253-eng.htm>

Accessed 26 November 2015

Statistics Canada

<http://www23.statcan.gc.ca/imdb/p2SV.pl?Function=getSurvey&SDDS=3154&lang=en&db=imdb&adm=8&dis=2>

Accessed 26 November 2015

<http://charpente-total-bricoleurs.wifeo.com/dictionnaire-des-termes-de-charpentes.php>

Accessed December 2015 (throughout)

<http://eduscol.education.fr/cid47717/definition-et-caracteristiques-du-ccf.html>

Accessed 13 December 2015

---

<sup>i</sup> Hölder's axioms (1901) are as follows (from Michell, J (1993): The Origins of the Representational Theory of Measurement: Helmholtz, Hölder, and Russell, *Studies in History and Philosophy of Science* 24 (2), 185-206:

1. Given any two magnitudes,  $a$  and  $b$ , of the same kind, *one and only one* of the following is true
  - (i)  $a$  is identical with  $b$  (i.e.  $a=b$  and  $b=a$ ).
  - (ii)  $a$  is greater than  $b$  and  $b$  is less than  $a$  (i.e.  $a>b$  and  $b<a$ ).
  - (iii)  $b$  is greater than  $a$  and  $a$  is less than  $b$  (i.e.  $b>a$  and  $a<b$ ).
2. For every magnitude there exists one that is less.
3. Any two magnitudes of the same kind,  $a$  and  $b$ , when added in a definite order give a well determined sum,  $a+b$
4. For any two magnitudes of the same kind,  $a$  and  $b$ ,  $a+b>a$  and  $a+b>b$ .
5. If for any two magnitudes,  $a$  and  $b$ , of the same kind,  $a<b$  then there exists magnitudes  $x$  and  $y$  also of that kind such that  $a+x=b$  and  $y+a=b$ .
6. For any three magnitudes,  $a$ ,  $b$ , and  $c$ , of the same kind  $a+(b+c)=(a+b)+c$ .
7. If all magnitudes of the same kind are divided into two classes such that
  - (i) each magnitude belongs exactly to one class, and
  - (ii) each magnitude of the first class is smaller than any magnitude of the second class, then there exists a magnitude,  $m$ , such that every magnitude  $m'<m$  belongs to the first class and every magnitude  $m''>m$  belongs to the second class ( $m$  may belong to either, depending upon the case)