BC World of Concrete
Labour Market Research Report

Sector Labour Market Partnership
Phase II Labour Market Information (LMI) Research
Concrete Finishing Sector

Final Report

Submitted: October 17, 2018

Canadian National • Trades

Canada

BRITISH COLUMBIA

Funding provided by both the Government of Canada, through the Canada-British Columbia Job Fund, and the Province of B.C.

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1. EXECUTIVE SUMMARY

Research was conducted into the labour market issues, challenges, and opportunities facing the concrete finishing sector in British Columbia. Findings and recommendations are presented in this report, which concludes Phase 2 of a Sector Labour Market Partnership (LMP) initiative on concrete finishing. The research was guided by a set of research questions, executed using a variety of secondary and primary data sources, and overseen by an engaged and thoughtful advisory committee. The work resulted in a refinement of preliminary findings from Phase 1, and a set of defensible, fact-based opportunities for action to focus strategy development in the next stage of the initiative.[1]

Key Findings

Concrete finishing is a critically important activity within a sequence of closely related activities in the building construction process.

Concrete finishing is a foundational step in construction that many other trades rely upon to do their work effectively. Downstream trades, such as framers, glaziers (window installers) and flooring, are impacted by the quality of the finished concrete product. General contractors interviewed agreed that using higher quality (and higher priced) concrete finishers reduces overall project costs, considering additional costs such as grinding, patching, installation of self-levellers that are otherwise required to repair finished concrete installed by lower quality finishing crews.

Demand for concrete finishers aligns directly to the level of construction activity.

Concrete features prominently in all types of construction (residential, commercial, industrial, institutional and government), and this is not expected to change significantly going forward. Indicators of construction activity such as construction investment, building permits, and housing starts have moved sharply upwards over the past five years. Overall construction labour demand growth is expected to moderate over the next five years based on employment forecasts from BuildForce and the BC Labour Market Outlook as well as the latest housing starts forecast for B.C. from the Canada Mortgage and Housing Corporation. The impact of technology and other forms of innovation on the demand for concrete finishers has been marginal over the years, and this is not expected to change significantly in the foreseeable future.

The industry makes a distinction between “wet” and “dry” concrete finishers.

Industry stakeholders distinguish between “wet” finishers who work with poured concrete to place and finish the concrete, and “dry” finishers who grind and repair dried concrete, and who may also place but not finish concrete. Wet finishing, which corresponds to National Occupation Code (NOC) 7282 Concrete Finishers, has higher skill requirements than dry finishing, which corresponds more closely to NOC 7611

[1] In Phase 1, initial research was conducted to identify high-level workforce issues and challenges. A steering committee of employers was engaged to validate the findings and provide direction for Phase 2.

Construction trades helpers and labourers. Deficiently placed concrete greatly impedes a wet finisher's ability to create a quality finished product. The poor quality then creates more work for dry finishing crews to repair the dried concrete to bring it up to standard for downstream trades such as windows, framing, and flooring to work with. This is especially relevant on many high-rise residential and commercial projects, where placing is typically done by general labourer crews with limited or no formal training or mentorship in concrete placing and finishing. In general, on small scale residential projects, the same crew both finishes and places the concrete. There are approximately 1,800 wet finishers. Based on data collected from employer interviews, there are some 3,400 people employed by dry finishing companies; a portion of these engage in concrete placing.

The concrete finishing sector is comprised mostly of small employers that employ non-union labour. Unionized concrete finishers work mostly on large government-financed projects.

60% of wet finishing firms interviewed for the project reported employing fewer than five finishers or placers. Often, employers will partner to complete jobs. Small-scale residential projects have finishing crews that both place and finish concrete, while commercial and high-rise projects typically have separate placing and finishing crews, sourced from separate companies, with the former individuals typically performing additional labourer activities. Concrete finisher apprentices and journeymen are generally unionized under Operative Cement Masons' and Plasterers' International Association (OPCMIA) Local 919. Institutional and government projects, which must meet minimum apprenticeship requirements, tend to use Local 919 union labour, while commercial and residential projects, which are not subject to these requirements, tend to use non-union labour.

Only a small proportion of wet finishers have formal training[2]. There is strong interest among employers in introducing new training that focuses primarily on formal, on-the-job training.

Nineteen percent of wet finishers have an apprenticeship or trades certificate or diploma, according to Census 2016 data. The only concrete finishing training available in B.C. is apprenticeship training offered through Local 919 and the Trowel Trades Training Association. Union membership is a *de facto* requirement for enrolment. Employers interviewed for this report with experience with the apprenticeship program voiced the following concerns about the existing apprenticeship training: on-the-job activities are not always directly related to concrete placing or finishing; the quality of onsite supervision and mentoring by journeypersons is inconsistent; there is not a check upon issuance of the certificate of apprenticeship that the quality of work-based training met a pre-defined standard; and training is not sufficiently available to workers that want

[2] For the purpose of this report, "formal" in the context of training means the training results in an industry-recognized credential, whereas informal training is training that is provided in-house by an employer and is not industry-recognized.

to take the training but would prefer not to be in the union. Employers also noted that finishing is affected by weather and regional climates, highlighting that gaining knowledge onsite is more important than classroom-based training. Employers are generally supportive of a modular-based training approach that is focused on on-the-job-training and delivered with sufficient structure and rigour to ensure graduates have practical and useful skills and knowledge coming out of the program.

Existing vacancies are widespread. Looking forward, an estimated 20% of the current workforce will need be replaced over the next ten years due to retirements.

Wet finishing employers interviewed were unanimous in saying they would immediately hire at least one concrete finisher full-time if presented with fully qualified and vetted candidates. Feedback was widespread that they have had to turn away or delay jobs because of vacancies. Employers generally agreed that the underlying conditions causing vacancies are getting worse, with fewer new entrants being available and high rates of retirements being the most significant causal factors. Employers both large and small, by number of employees and/or annual revenue, are struggling to address labour shortages.

To fill vacancies, replace workers exiting the occupation for various reasons including retirement, and accommodate expansion demand, up to 141 supply additions are required annually for wet finishing, or just over 1,400 over a 10-year timeframe. Based on secondary and primary research, an additional average annual 24 supply additions are required for labourers that place concrete. Should these latter individuals receive high-quality training in concrete placing, the labour requirement for concrete repair, patch and grind work may be reduced.

Taking action to address shortages is urgently required to ensure that knowledge transfer – an important complement to technical training – from seasoned concrete finishers occurs prior their retiring. Gaining an understanding of how weather conditions, redi-mix designs, form construction, quality requirements such as floor flatness and levelness, and other onsite conditions interact to affect how concrete cures and therefore how it should be finished can only be done in the moment, onsite, and with oversight from seasoned veterans in the trade.

The appeal of joining the occupation includes pride of work, employer loyalty, and good pay; however, there is no centralized promotion or marketing effort to communicate this value proposition to prospective new workers.

Concrete finishing is now a year-round profession with above average annual incomes. The qualities sought in new workers include: having a good attitude and a willingness to learn; having an eye for detail; being dependable and adaptable, as concrete finishing is not a typical nine-to-five job; and being a hands-on learner. Employers say retention is not a problem, as they are loyal to their employees during slow periods; they offer good wages and work with family commitments; and perks are typically offered such as side jobs for supplemental income, dinners, and informal gatherings. Employees interviewed

for the project spoke of the good pay, pride-of-work that comes from creating a lasting structure, and the need to apply skills in a dynamic setting, as positive attributes of the trade.

Opportunities for Action

The following high-level opportunities for action are identified, and comprise a holistic set of recommendations to help address the challenges and opportunities currently facing the concrete finishing sector in B.C. They serve as a starting point for Phase 3 'Strategy Development' of the initiative.

I. Articulate a compelling employee value proposition to support recruiting efforts.

The research identified a number of worker attributes that are desired by employers in new entrants. Academic success is not necessarily a good predictor of competence in the concrete sector, however, a range of physical abilities, cognitive skills, and work style preferences are valuable. For those for whom concrete finishing is a good fit, it offers good pay and a high rate of full-time employment. There is an opportunity to refine these findings further and incorporate them in a compelling value proposition to use when recruiting new entrants from target populations.

II. Target underemployed and underrepresented populations.

Concrete finishing offers a long and rewarding career to those for whom it is a good fit. Competition for new entrants to the workforce is increasingly stiff as older workers continue to retire and the number of 15 to 29 year olds participating in the labour market begins to shrink over the next several years. Especially to those students who have ambition, a good attitude and willingness to learn, concrete finishing could offer a compelling career option to those entering the workforce. Based on Census 2016 data, the occupation is 1% female, 26% visible minority, 31% immigrant, and 6% Indigenous Peoples. While similar to the wider construction workforce, these proportions are below those for B.C. as a whole. There is an opportunity to undertake targeted outreach to these populations. Part of the value proposition could be an opportunity to participate in modular training described below.

III. Introduce training that focuses on onsite and hands-on experience.

A significant training gap exists, with less than 20% of concrete finishers having formally recognized trades training. Steady numbers of aging workers retiring requires a continual stream of new entrants to the occupation that are productive on day one. Classroom-based training is less important than on-the-job training. However, the onsite activities need to be relevant, and the training needs to be properly supervised and led by experienced instructors. The modular training pilot project currently underway led by CNT and BC Formwork Association and BC Floor Covering Association should be evaluated as a potential model to emulate. Under that pilot, Module 1 is 2.5 hours and

introduces the individual to a site to have them self-evaluate as to whether construction work is a good fit for them. Module 2 is 4 to 6 hours and introduces the individual to an employer to try the trade and for the trainer to evaluate if the individual has the right attributes to be successful long-term. With Module 3 and subsequent modules, the individual is employed, and tuition-based training begins. Finding and training new entrants in anticipation of retirements is especially important so that knowledge transfer from seasoned to new finishers can occur.

IV. Evaluate options for recruiting qualified immigrants.

While the new entrant supply pool is expected to be the primary source of supply additions, international immigration is another important source of new labour. There are several immigration programs that can be accessed through which foreigners can become employed as concrete finishers. These include the Temporary Foreign Worker Program and the International Experience Canada (IEC) program. The Working Holiday and Young Professionals streams under the IEC program holds promise, because they do not require a labour market opinion. One idea is for employers to engage with trusted parties in signatory countries – for example, Mexico, from which many placers and finishers in B.C. arrived – to assist people with securing employment in B.C. before departing their country.

V. Grow local capacity to deliver continuing education.

Redi-mix and building designs are continuously evolving and impact concrete placing and finishing. With limited local continuing education opportunities available, attending the World of Concrete conference held annually in the United States is the primary continuing education opportunity for B.C. companies. However, affordability and timing of the conference may be a challenge for some companies who wish to attend. Having B.C.-based continuing education services that take local conditions, such as different climate zones, into consideration would be beneficial.

VI. Collaborate with upstream and downstream trades on best practices.

The quality of the finished concrete product depends critically on upstream trades such as forming and concrete placing that may be contracted separately. Likewise, downstream trades such as glaziers, framing, and flooring depend critically on the quality of the finished concrete product. There is an opportunity for these trades to collaborate to document and promote best practices. As well, there may be an opportunity to integrate modular training across disciplines. For high-rise and commercial projects best practices for concrete placing and finishing should also be developed and advocated to general contractors.

VII. Advocate for more consistency in concrete testing.

More consistent testing to measure the quality of finished concrete, such as for floor flatness (FF) and floor levelness (FL), would increase demand for higher quality concrete finishers and therefore would lead to higher quality concrete construction and lower overall project costs. There is an opportunity to work with testing companies,

general contractors and architecture firms to investigate possibilities to establish more rigorous testing standards and protocols, especially for commercial, institutional and high-rise residential projects.

VIII. Establish an industry organization to achieve gains from scale and advance the quality of the trade.

With three quarters of the firms in concrete finishing having fewer than ten employees, a collaborative approach to addressing the sector's workforce challenges is necessary. An industry organization would play a central role in developing and implementing the recommendations presented in this report. The association should be directed by concrete finishing employers and engage stakeholders including upstream and downstream trades and related associations such as the BC Formwork Association and BC Floor Covering Association, the redi-mix sector, general contractors, and material testing companies.

2. ACKNOWLEDGEMENTS

Message from the Advisory Committee

Concrete is, literally and figuratively, foundational to construction. We, as the advisory committee, have come forward to bring a voice to the concrete finishing trade through our participation in this study. Concrete finishing is a demanding but rewarding trade. Concrete finishers take special pride in their work knowing that their efforts to create a structurally sound and aesthetically lasting structure are highly valued by all stakeholders in the construction process.

The trade faces widespread vacancies. Employers are struggling to find and train new finishers to replace retiring workers and satisfy demand for new builds. Over the next 10 years, up to an estimated 1,400 new additions to the trade are required, representing over 75% of the current workforce.

Among the report's findings are the need to modernize training to ensure all employers are able to access skilled workers, enable knowledge transfer from seasoned to new finishers, and aggressively recruit new entrants from multiple supply sources. The report presents a holistic set of recommendations that are all important to developing and growing the trade going forward.

We would like to thank the BC government for funding the project and the many stakeholders who provided their input to this report.

Hank Meerdink, West Fraser Concrete Ltd.

Connie Krissler, Silver Springs Concrete Services

David Ritchie, Intrusion Prepakt Ltd.

Darrell Rempel, Captain Concrete

Karl Jardine, Cement Mason Journeyman

3. INTRODUCTION

3.1. Purpose and background

This document presents the findings from Phase 2 of a five-phase Sector Labour Market Partnership (SLMP) led by Canadian National Trades (CNT) on the concrete finishing sector in B.C. The SLMP program is an application-based funding program that helps industry and employers understand and respond to changing labour market demands and workforce development challenges. The program provides funding for partnership-led projects that address broad sectoral and regional labour market issues in B.C., including current or anticipated imbalances between supply (workers) and demand (jobs), or a lack of appropriate skills and experience. The program features five phases: Phase 1 brings together key players from a sector to determine predominant labour force challenges and to establish leadership for subsequent phases; Phase 2 focuses on building the evidence base through labour market information research to validate and quantify the issues; Phase 3 involves designing strategies to address the issues; in Phase 4, the strategies are implemented; and finally, Phase 5 involves the evaluation of implemented strategies.

In Phase 1, CNT conducted 65 brief interviews which uncovered key workforce issues affecting the sector:

- Recruitment is a major challenge for the sector. Employers are unable to find individuals to fill vacant positions, in part due to these identified issues:
    a. Challenging working conditions (weather, unpredictable work hours)
    b. Lack of appropriate work habits
    c. High cost of screening employees
    d. Lack of industry organization
- Without action to increase supply, the gap between the demand and the number of skilled workers in B.C. will continue to grow as seasoned concrete tradespersons retire.

Adding further colour to these key issues were the following preliminary findings:

- The concrete finisher trade consists of a small number of workers, but those workers have an outsized impact on the construction sector in the role they play to create the lasting structure providing strength, resilience and structural core/foundation for all builds.
- Once the right people are found, long-term retention is a strength for the concrete sector due to high job satisfaction and relatively high wages.
- There is currently no coordinated recruitment or training effort to address the growing gap between the supply and demand of labour.
- Becoming proficient in the trade depends critically on gaining condition-specific and project-specific knowledge (e.g. weather, location), which is difficult to achieve in a classroom-based training program setting; to be effective, training

programs need to emphasize on-the-job training under the direction of a skilled and experienced tradesperson.[3]
- Workers who are hired with little or no relevant skills or training often end up with short-lived employment, making the provision of informal on-the-job training a costly endeavor for employers.

In addition to identifying these important findings, Phase 1 provided a catalyst to mobilize a set of passionate and knowledgeable employers to establish a voice for the concrete finishing sector and provide ongoing leadership into future phases of the partnership as its advisory committee. In Phase 2, the project team undertook additional primary and secondary research to validate, quantify and refine the findings in Phase 1, and developed a set of opportunities for actions to guide efforts in Phase 3.

3.2. Research methodology

The project team assembled a research methodology designed to address a set of research questions developed for the project. The methodology aligns to the Sector LMP Program's Labour Market Information Research Guidelines.

Research questions

1. **Number of workers** – How many people are currently employed in the concrete sector, and what are the characteristics of the workforce (e.g. age, gender, etc.)?

2. **Labour force projection** – How might the supply and demand of concrete finishers change over the next decade? How many concrete finishers are expected to exit the sector and need to be replaced, and how many additional concrete finishers are required to meet incremental demand?

3. **Labour force supply** – What proportions of new labour will be sourced from new entrants, under-utilized populations, out-of-province supply, other occupations?

4. **Essential skills and attributes** – What are the required skills, worker attributes and capabilities for new entrants to be successful?

5. **Occupation segments** – Are there unique segments within the occupation that have different skills/knowledge requirements? Are the current or projected mismatches in the labour supply and demand fundamentally the same or different across the segments?

6. **Recruitment strategies** – Do employers have difficulty filling job vacancies with appropriately skilled workers? What percentage of the current workforce was

[3] For the purpose of this report, "formal" in the context of training means the training results in an industry-recognized credential, whereas informal training is training that is provided in-house by an employer and is not industry-recognized

recruited using informal networking (friends, family, neighbours), versus formal job postings, career fairs, etc.?

7. **Training and education needs** – What skills do employers require or desire employees have prior to hiring them? Do employers desire formal training in hires? What formal training is available? What are the key aptitudes and skills that are required to work in the concrete sector? How important is on-the-job training as opposed to training in a controlled environment or in a classroom?

8. **Job satisfaction** – What is the level of employee job satisfaction in the sector? How long do employees remain in the sector? Do responses vary by demographic cohort or region? What are the causes of reported satisfaction rates (e.g. work/life balance, hours flexibility, wages, etc.)?

9. **Wages and incentives** – What are the average wages for employees in the concrete sector? How does this vary with experience?

10. **Labour market strategies** – What types of solutions might effectively address the identified labour market challenges, and what evidence is there to suggest that the potential strategies might be effective (impactful and feasible)?

Research tools

A combination of primary and secondary research tools were used for the project.

Government and specialized data

Data from a variety of publicly available government data sources were consulted to inform the report, including but not limited to:

- Canada 2016 Census – various CANSIM tables on labour
- Statistics Canada (other) – investment in new construction, housing starts, completions
- Canada Mortgage and Housing Corporation – BC building starts forecast
- BC Labour Market Outlook – multiple editions including 2017-2027
- BC Stats – labour market participation forecasts, major projects inventory
- WorkSafeBC – employer contact information for Classification Unit 721010 Concrete Placing, Finishing, Surfacing, or Repair
- Immigration Refugees and Citizenship Canada (IRCC) – work permit counts for select National Occupation Classification (NOC) codes
- US Occupational Information Network (O*NET) database – skills and attributes rated as important for concrete finishing

In addition, specialized datasets were provided upon special request for the project:

- Industry Training Authority – special request for data related to Concrete Finishing apprenticeship training in B.C.
- Materials testing company (name held upon request by company) – floor flatness and levelness test results

Structured employer interviews

A core component of the research was employer interviews. A live structured interview approach was agreed over an online or phone-based survey given concerns about a low response rate from this target audience based on feedback from employers during Phase 1. The approach also allowed for deeper exploration on select areas of concern raised by interviewees.

A database of concrete finisher employers was prepared in Phase 1 and augmented in Phase 2 using contact information provided by the BC Construction Safety Alliance for employers registered under Classification Unit 721010 Concrete Placing, Finishing, Surfacing, or Repair. The database included 754 unique employers after removing duplicates and outliers. Two interview templates were developed:

- Brief – a subset of questions to collect descriptive information such as location, size, specialties, and high level information
- In-depth – the same descriptive information as in the brief format plus questions on retention, recruitment, shortages, worker characteristics, training, innovation

Seventy-one interviews are completed, 53 brief and 18 in-depth. Employers interviewed represented all expected firm sizes, specialties, and market segments served. All regions except three were represented (see **Figure 1**). All employers were called at least once.

Figure 1: Descriptive data on employer interviews

Count of firms by primary location (number firms called noted in parentheses)

Mainland South West	Vancouver Island Coast	North Coast & Nechako	Cariboo	Kootenay	North East	Thompson Okanagan
58 (488)	10 (90)	2 (4)	0 (18)	0 (28)	0 (8)	1 (112)

Count of firms by firm size in terms of annual revenue[4]

Small ($0 - $250,000)	Medium ($250,000 - $500,000)	Large ($500,000 - $1 Million)	Very Large (over $1 Million)
34	10	11	10

Market segments served (1 or more per firm)

Residential – Houses	Residential - Apartments	Residential – Townhouses	Commercial	Industrial	Infrastructure	Institutional
50	35	34	46	18	17	11

Specialty services provided (1 or more per firm)

Placing and Finishing	Patching and Grinding	Curb and Gutter	Decorative	Architectural
55	37	13	6	1

[4] Does not add to 71 as not all employers provided this information.

Stakeholder interviews

Individuals from the following organizations provided input to the project:

- Bird Construction
- BuildForce
- Construction and Specialized Workers' Union Local 1611
- go2Hr
- Graham Construction & Engineering
- Haebler Group
- Industry Training Authority
- Maple Reindeers Constructors
- Operative Plasterers' and Cement Masons' Local Union 919
- PCL Construction Services
- Trowel Trades Training Association
- Ventana Construction Corporation
- Flooring companies – Mira Floors, Exclusive Floors
- Forming companies – Van Bros Forming, Syber Concrete Forming

Reports reviewed

An online search was conducted for articles and reports that consider workforce and labour market issues related to concrete finishing, complementing and validating findings from the other research tools. Also reviewed were materials that consider the role of innovation and technology on concrete finishing specifically and the construction sector generally, including their impact on labour productivity and therefore demand for concrete finishers (see section 4.2.2). Materials reviewed included:

- Shaping the Future of Construction: A Breakthrough in Mindset and Technology (World Economic Forum)
- Reinventing Construction: A Route to Higher Productivity (McKinsey Global Institute)
- BC Construction & Maintenance Looking Forward: Highlights 2018-2027 (BuildForce)
- Concrete Sustainability: A Vision for Sustainable Construction with Concrete in North America (Strategic Development Council)
- Canadian Construction Cost Guide 2017 (Altus Group)
- The Economic Consequences of a Highly Automated Construction Industry (Midwest Economic Policy Institute)

Limitations

Collecting data from current and prospective employees proved challenging. Efforts were made to arrange interviews through employers with some of their employees. However, the project was able to arrange only four such interviews. About a quarter of the employer interviews were with owner-operator firms, providing some glimpse into an employee-like perspective on questions such as what worker attributes are important and what are the pros and cons of working in the trade. The limited employee input that was gathered aligned with employers' input. The project also conducted two school

visits, where a total of 37 high school students interested in the trades were interviewed to understand their education motivations, plans for entering the workforce, and awareness of and interest in particular trades including concrete finishing.

3.3. Advisory committee

An advisory committee of employers was established to help develop the research methodology, participate in employer interviews, review and validate key findings, and vet the opportunities for action. Collectively, the group operates in all areas of the province, covers all major specialty areas, and serves all market segments. **Table 1** provides descriptive detail on the advisory committee members and the organizations they represent.

Table 1: Phase 2 advisory committee members

Name	Organization	Region served	Market segments served	Concrete specialty
Hank Meerdink	West Fraser Concrete Ltd.	North	Residential – small scale Residential – high-rise / apt Commercial Institutional Infrastructure	Placing and finishing Patching and grinding Curb and gutter Decorative Architectural Also the primary redi-mix provider in North region
Connie Krissler	Silver Springs Concrete Services	Okanagan	Residential and commercial	Placing, finishing architectural
David Ritchie	Intrusion Prepakt Ltd.	Vancouver Island	Residential and Specialty	Underwater concrete
Darrell Rempel	Captain Concrete	Lower Mainland	Residential	Placing, finishing, demolition, stamping, forming
Karl Jardine	Cement Mason Journeyman	Lower Mainland	All jobs, mostly commercial	Placing and finishing

The advisory committee reviewed the research methodology, research tools, and draft and final reports. They also participated in a two-day workshop in mid-April to review initial findings from the research, by which point the large majority (65 of 71) of employer interviews had been conducted and secondary research was substantially complete.

4. FINDINGS

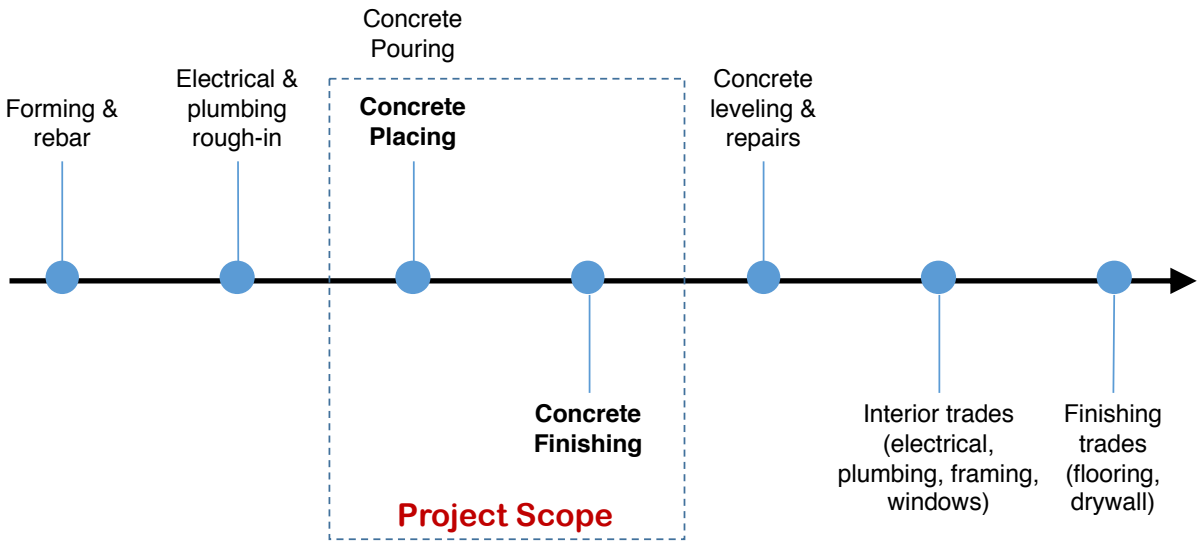
4.1. Workforce overview

This section of the document establishes a statistical baseline of the current concrete finishing workforce. The subsequent sections explore in greater detail the relevant factors that are, or are expected to, impact the demand for and supply of concrete finishing labour now and going forward.

4.1.1. Overview of the sector

Concrete finishing is one activity within a sequence of closely related activities in the building construction process (see **Figure 2**). The primary focus of this report is on concrete finishing (including placing). Typically preceded by formwork and rebar activities and followed by downstream trades such glaziers (windows), framing, and flooring, concrete is first poured, then placed and finished to dry. Concrete finishers are also engaged in repairing, waterproofing, and restoring previously poured concrete. They are also engaged in concrete-based curbs and gutters. Finally, some concrete finishers have developed specialties in areas such as underwater decorative and architectural concrete.

Figure 2: Typical construction process and sequence of select events (simplified)



The quality of the finished concrete product starts with the formwork and rebar installation, and is impacted by the concrete redi-mix design that is poured and the finishing conditions such as weather. For high-rise and commercial projects, or wherever placing and finishing crews are separate (a factor that is explored in more detail in later sections of the report), the quality of the finished product may also be impacted by the quality of the placing. Concrete repair work might include applying leveling product if the floor ("slab") is not sufficiently level, grinding to remove high spots, and chipping and patching if upon testing or removal of the forms the concrete is found to have not been consolidated properly, compromising quality and/or aesthetics.

Downstream finishing trades such as flooring, glaziers (window installers), and framers are impacted by the quality of the finished concrete product.

Firms involved in concrete finishing range in size and scope of services offered. Some specialize in concrete finishing only, while others deliver end-to-end onsite concrete services including concrete pumping, pouring, placing and finishing. Some firms specialize in general construction labour activities that may include concrete placing and repair, but not finishing. Employers and subject matter experts interviewed for this report distinguished between “wet” and “dry” finishing, where firms that do wet finishing always finish but might also place concrete, whereas dry finishing firms focus on repair work, but may also place concrete. This distinction is significant and has important implications from a labour perspective, which is explored further in the sections below.

According to the BC Labour Market Outlook 2017-2027, over 92% of concrete finishers are employed in the construction sector, with the remaining 8% split evenly between manufacturing and local municipal and regional public administration sectors.[5] Within the construction sector, the North American Industry Classification System (NAICS) code that best aligns to the nature of the work is 238110 Poured concrete foundation and structure contractors, which is defined as comprising “establishments primarily engaged in pouring and finishing concrete foundations and structural elements.”[6] Small numbers of concrete finishers may be employed in other subsectors within construction, such as 237310 Highway, street and bridge construction, 236110 Residential building construction, 236210 Industrial building and structure construction, and 236220 Commercial and institutional building construction.

Data were collected from Statistics Canada’s Business Register on the number and size of firms in 238110 as at December 2017 (see table below).

Table 2: Business counts, Poured concrete foundation and structure contractors [238110][7]

Employee Size	Dec 2015	Dec 2016	Dec 2017	% of Total Dec 2017
1 to 4 employees	231	218	229	45
5 to 9 employees	130	146	154	30
10 to 19 employees	52	67	71	14
20 to 49 employees	36	35	31	6
50 to 99 employees	11	9	15	3
100 to 199 employees	3	4	3	1
200 to 499 employees	2	3	3	1
500 plus employees	0	0	0	0
Total	**465**	**482**	**506**	**100**

[5] BC Labour Market Outlook. Employment estimates for 2017.
[6] Statistics Canada, North American Industry Classification System (NAICS) Canada 2012 (link).
[7] Statistics Canada. Tables 552-0003, 552-0005, 552-0007 (accessed: April 13, 2018).

There were 506 firms recorded in the registry in December 2017, just over three quarters of which had fewer than ten employees. The results correspond with the primary research, where 60% of wet finishing firms interviewed for the project reported employing fewer than four finishers or placers plus a small administrative staff.

Concrete finishing work is involved in all segments of construction: residential, commercial, industrial, and institutional and government.[8] The B.C. government's requirement for apprentices on public projects impacts the provisioning of concrete finishing labour, especially for the institutional and government projects, but also for projects in other categories that are undertaken by Ministries of the Provincial Government, health authorities, boards of Education, public post-secondary institutions, and B.C. Hydro, and valued at over $15 million.[9] Specifically, the tight integration between apprenticeship training and membership in Operative Cement Masons' and Plasterers' International Association Local 919 means that union labour is more prevalent on such projects as compared to other projects that tend to use non-union labour. Supply and demand factors related to union and non-union labour are considered in more detail in later sections of the report.

Small-scale residential projects have finishing crews that both place and finish. Commercial and high-rise projects typically have separate finishing and placing crews, with the placing crews doing additional labourer activities on days where concrete is not being poured. A typical crew on a commercial or high-rise project will include two finishers and up to six placers. On these projects, a "pour cycle" will typically range from seven to nine days. On day 1 of the cycle a floor is poured; both finishers and placers are present on day 1. For a seven-day pour cycle, on days 2 through 6, forms are removed and dried concrete is repaired, and new forms are built in preparation of the next floor; during days 3 through 6, labourers pour and consolidate concrete for vertical columns for the next floor, stairs between floors, and place concrete for an elevator concrete core, among other labourer activities they may perform. Hence, on these projects, "placing" crews spend the majority of their work effort on activities other than placing.

Generally, larger firms are engaged in industrial, institutional, commercial and high-rise projects, while smaller firms focus on small-scale residential. For example, of the 40 wet finishing companies interviewed that participated in the residential houses market segment, 67% were small (less than $250,000 annual revenues) while of companies that did institutional and industrial projects, 27% and 10%, respectively, were small companies.

[8] These categories align to Statistics Canada data including Tables 026-0016 and 026-0017 and the B.C. Major Projects Inventory.

[9] For more information, see Apprentices on Public Projects in British Columbia: Policy & Procedure Guidelines (update: March 2016).

4.1.2. Workforce characteristics

This section of the report presents data on workforce characteristics related to concrete finishing and focuses on two National Occupation Classification (NOC) codes.

NOC 7282 Concrete Finishers – From the Statistics Canada website: "Concrete finishers smooth and finish freshly poured concrete, apply curing or surface treatments and install, maintain and restore various masonry structures such as foundations, floors, ceilings, sidewalks, roads, patios and high-rise buildings. They are employed by construction companies, cement and concrete contractors and manufacturers of precast concrete products, or they may be self-employed." This NOC code is the primary focus of this report.

NOC 7611 Construction trades helpers and labourers – From the Statistics Canada website: "Construction trades helpers and labourers assist skilled tradespersons and perform labouring activities at construction sites, in quarries and in surface mines. They are employed by construction companies, trade and labour contractors, and surface mine and quarry operators." Many example titles are provided including "cement finisher helper" and "concrete finisher helper." Main duties include, among others, "Assist tradespersons such as carpenters, bricklayers, cement finishers, roofers and glaziers in construction activities."

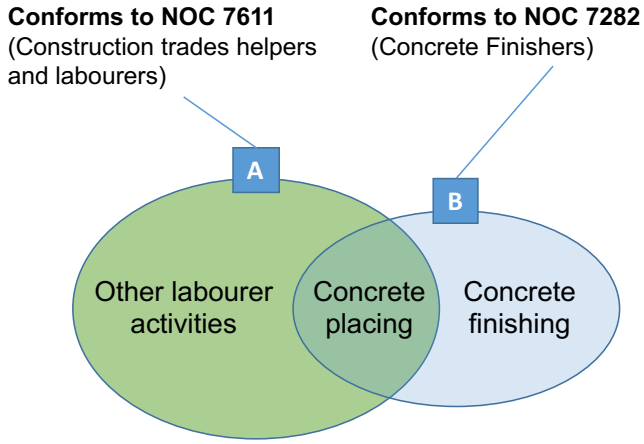
Employers and subject matter experts interviewed for this report emphasized the distinction between concrete placing and concrete finishing, with the latter being a more experienced role that first requires the skills of a concrete placer and builds upon them to become a concrete finisher. There is some ambiguity in how this is treated in the secondary data. The NOC definitions do not include "concrete placer" among example titles under either of the two NOC codes. Meanwhile, the description of the Concrete Finisher program on the Industry Training Authority (ITA) website says concrete finishers "place, finish, protect and repair concrete surfaces," while the Red Seal Program, which sets common standards to assess the skills of tradespeople across Canada and has oversight and participation from industry and both levels of government, says "Concrete finishers place, finish and protect concrete surfaces."[10]

In summary, wet finishers are generally more skilled and can also dry finish, whereas dry finishers are lower skilled and specialize only in dry finisher work. Wet finishing aligns best to the NOC 7282 definition, and dry finishing aligns best to the NOC 7611 definition. The distinction between these two NOC codes and how they apply in the context of concrete finishing is depicted in the figure below. The primary focus of this

[10] Further information can be found in the Occupational Analysis for Concrete Finisher. Among the tasks performed by Concrete Finishers is concrete placing: "Concrete finishers may transport concrete from the truck to the desired point of discharge. They rough grade and consolidate concrete to remove air pockets and to prevent architectural and potential structural defects prior to establishing elevation. They may place concrete for slabs, sidewalks, stairs, walls and other structures." Occupational Analyses Series: Concrete Finisher, Human Resources and Skills Development Canada (2006).

report is on NOC 7282, with a secondary focus on those that place concrete. Concrete placers can be in either wet finishers (NOC 7282) or dry finishers (NOC 7611).

Figure 3: Labour scope and alignment to NOC codes



A third NOC code may also be relevant, but is not considered in this report. NOC 7205 Contractors and supervisors, other construction trades, installers, repairers and servicers includes construction trade contractors who own and operate their own business, among other types of workers included in the 7205. An example job title among the 234 example titles listed on the ESDC webpage for this NOC is “cement finisher contractor.”

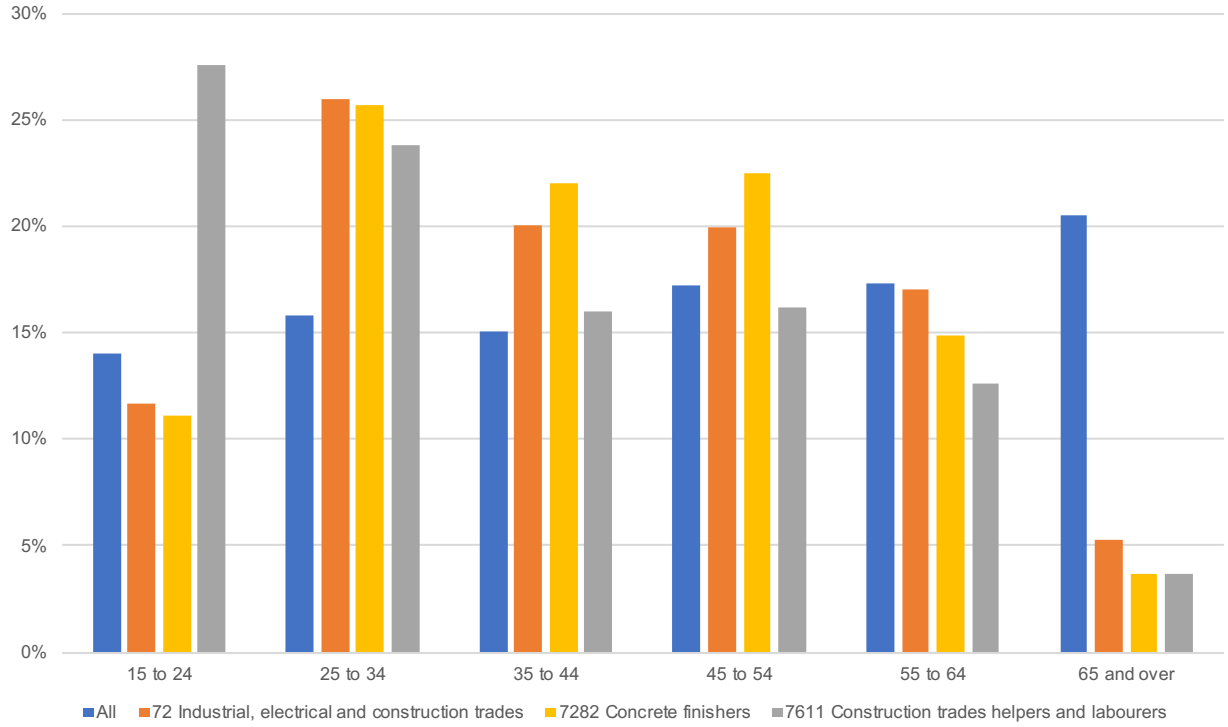
The balance of this section summarizes the demographic characteristics of the NOC 7282 and 7611 with comparisons to relevant benchmarks.

Age

The age profile of concrete finishers is similar to that of the broader trades group (72 Industrial, electrical and construction trades). The work is physically demanding, requiring long days on the job, which likely explains why the proportion of those 55 and over is lower than the construction trades group.[11]

[11] See Table 7 for a list of psychomotor abilities rated as “Important” for the trade based on O*Net data, including Trunk Strength, Multilimb Coordination, and Stamina, among others.

Figure 4: Age distribution of select NOC codes and all occupations[12]



Gender, Visible Minority, Aboriginal

The demographic characteristics of the occupation with respect to gender, visible minority and Aboriginal representatives are broadly similar to those of the wider 72 NOC group. Twenty-six percent of concrete finishers are income earners that self-identify as a visible minority, which is higher than the proportion of income earners in NOC 72 and NOC 7611. Feedback from the advisory committee is that the proportion of female workers is likely lower than the 1% reported in the Census data, citing the occupation requires physical strength attributes more common among men and demanding hours that are not conducive to a more typical work-life balance available with other occupations. Limitations in the response rates to survey questions resulted in a lack of primary data to the labour participation rate of female employees.

Table 3: Percent of income earners that are Female, Visible Minority, Indigenous Peoples[13]

Occupation	% Female	% Visible Minority	% Aboriginal
All	49	29	5
72 Industrial, electrical and construction trades	4	18	6
7282 Concrete finishers	1	26	6
7611 Construction trades helpers and labourers	10	21	7

[12] Source: Statistics Canada - 2016 Census. Catalogue Number 98-400-X2016289.
[13] Sources: Statistics Canada - 2016 Census. Catalogue Numbers 98-400-X2016356, 98-400-X2016357.

Immigrants

The proportion of the workers in NOC 7282 that are immigrants to Canada is slightly higher than the 72 group and slightly higher than B.C. as a whole.

Figure 5: Percent of income earners that are Immigrants, select NOC codes, B.C.[14]

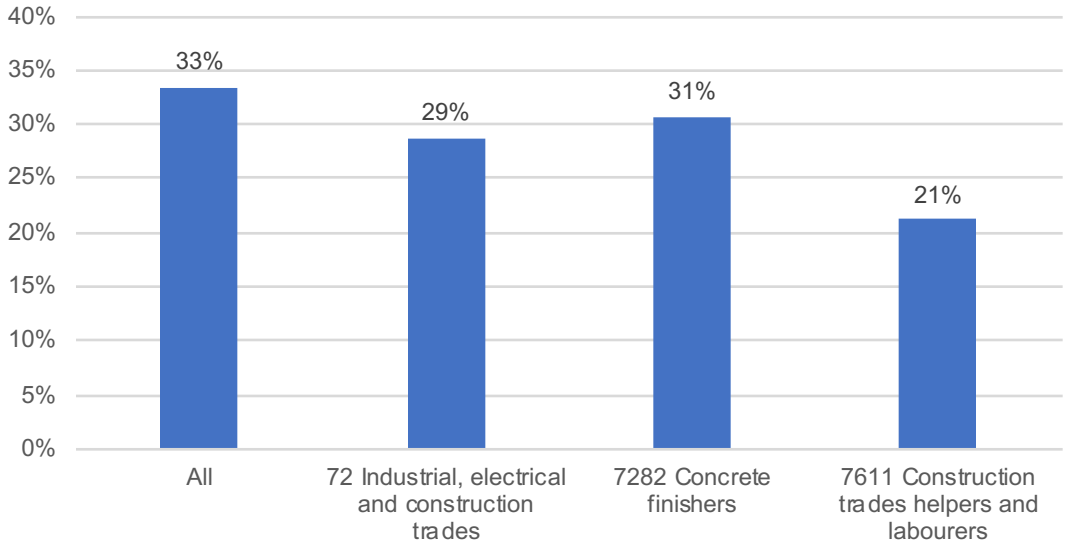
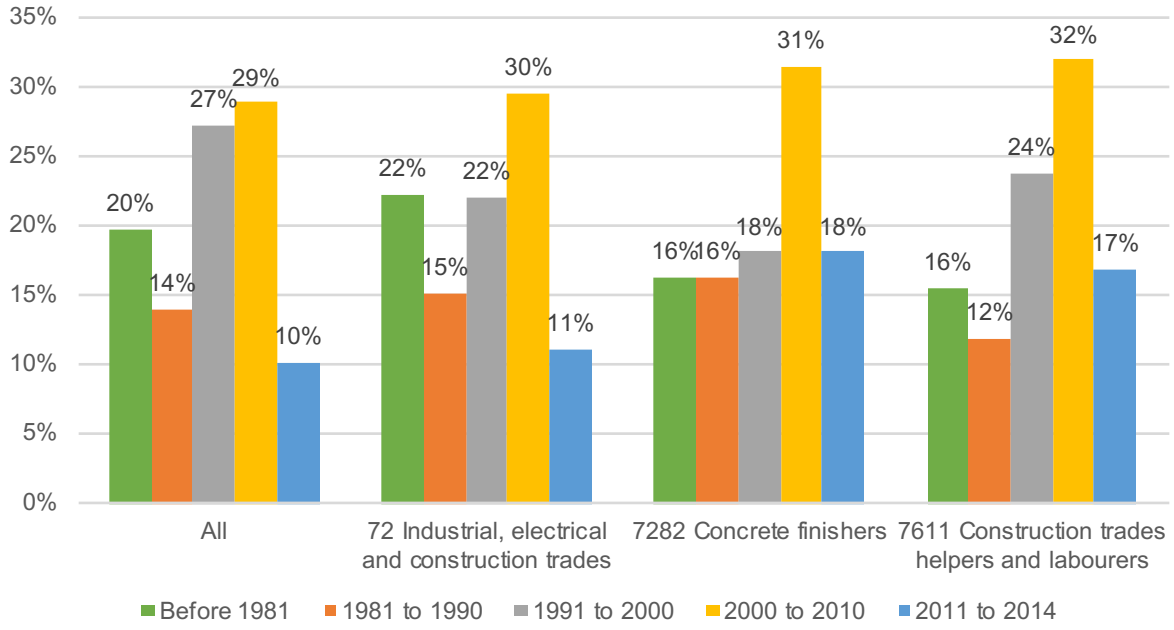


Figure 6, which shows the distribution of immigrants by period of immigration, indicates that the almost half (49%) of immigrants in NOC 7282 in B.C. immigrated between 2000 and 2014. Input from employers suggests much of the immigration during the 2000-10 period was driven by construction activity related to the 2010 Winter Olympics. The intensity of immigration continued into the 2011-14 period.

[14] Source: Statistics Canada - 2016 Census. Catalogue Number 98-400-X2016355.

Figure 6: Distribution of Immigrants by period of immigration, select NOC codes, B.C.[15]



Education

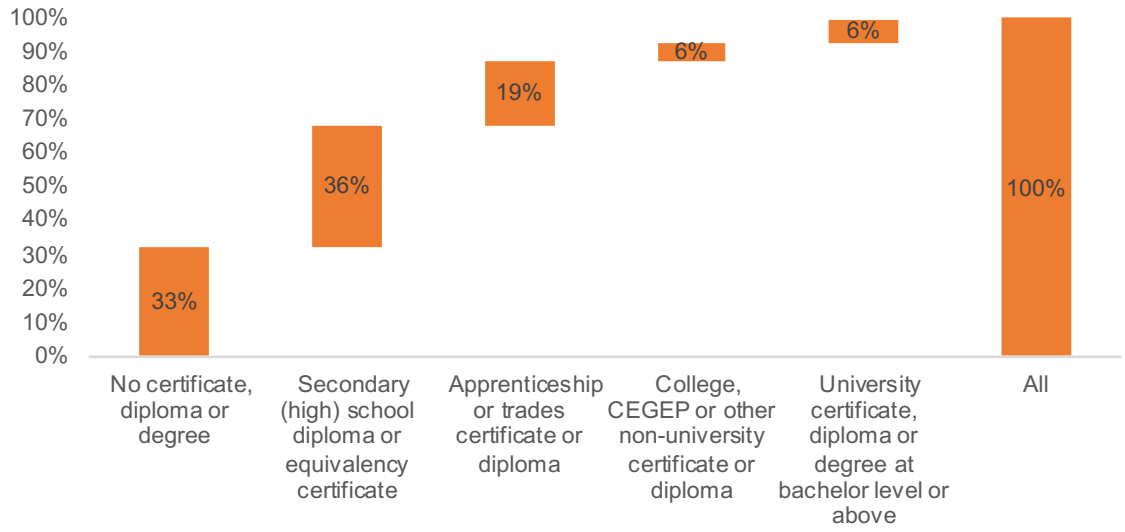
While this report is focused on NOC 7282, information on education was reviewed and analysed for NOC 7611 to understand a more complete picture.

Sixty-nine percent of people in B.C. in NOC 7282 have a high school diploma or no diploma, while 19% have an apprenticeship or trades certificate or diploma, with the remaining 12% having a college or university certificate, diploma or degree.

In general NOC 7611 has a similar education profile as that of NOC 7282, with 71% having a high school diploma or no diploma, and 12% having an apprenticeship or trades certificate or diploma, and the remaining 17% having a college or university certificate, diploma or degree.[16]

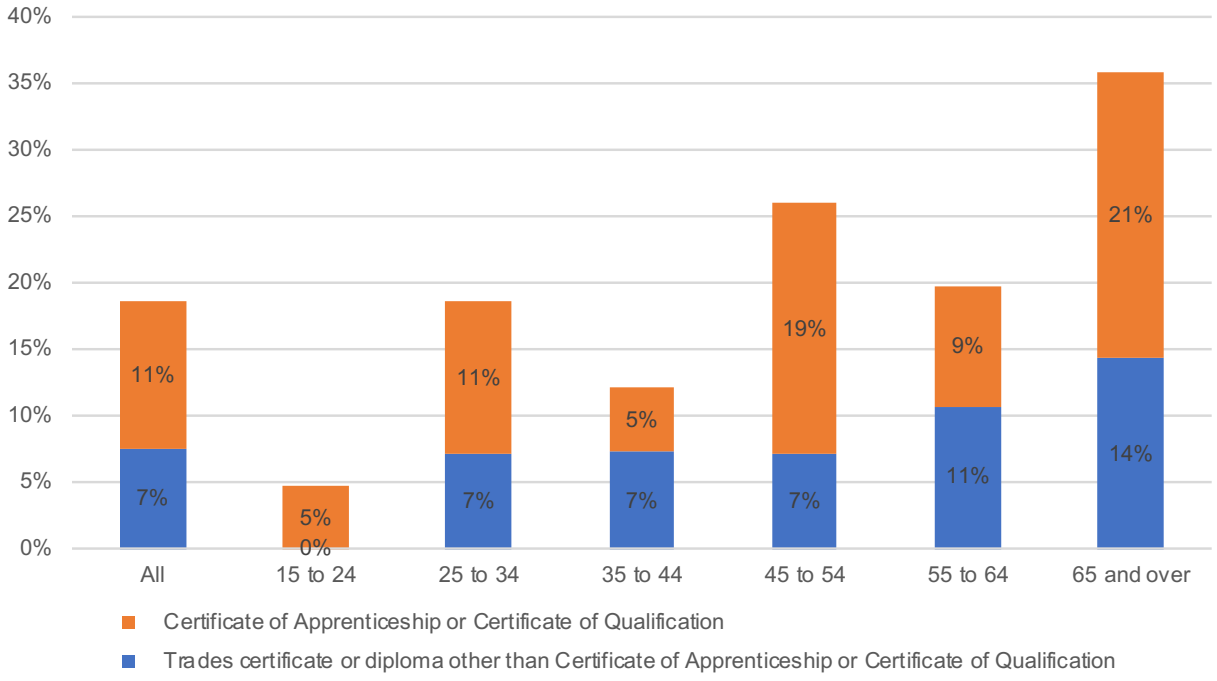
[15] Source: Statistics Canada - 2016 Census. Catalogue Number 98-400-X2016355.
[16] Source: Statistics Canada - 2016 Census. Catalogue Number 98-400-X2016289.

Figure 7: Highest certificate, diploma or degree, NOC 7282, B.C.[17]



Looking at **Figure 8**, among those with an apprenticeship or trades certificate or diploma, little more than half these have an apprenticeship certificate or diploma. These credentials may or may not be specific to concrete finishing.

Figure 8: Percent of 7282 Concrete Finishers with trades training by age, B.C.[18]

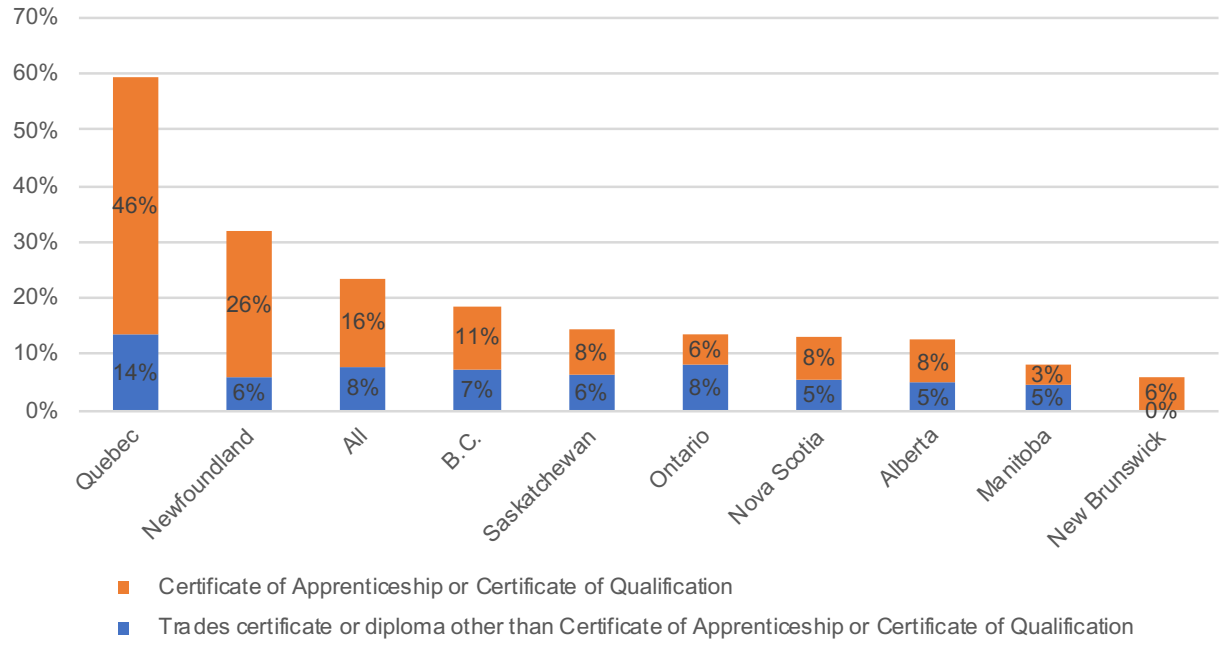


Looking at results from across the country, there is a low prevalence of trades credential attainment for NOC 7282 across all provinces with the exception of Quebec. At 19%

[17] Source: Statistics Canada - 2016 Census. Catalogue Number 98-400-X2016289.
[18] Ibid. Numbers may not align to other totals presented in this report due to rounding.

with apprenticeship or trades certificate or diploma, B.C. ranks third highest out of nine provinces and territories for which results are reported by Statistics Canada.

Figure 9: NOC 7282 percent with apprenticeship or trades certificate or diploma by Province[19]

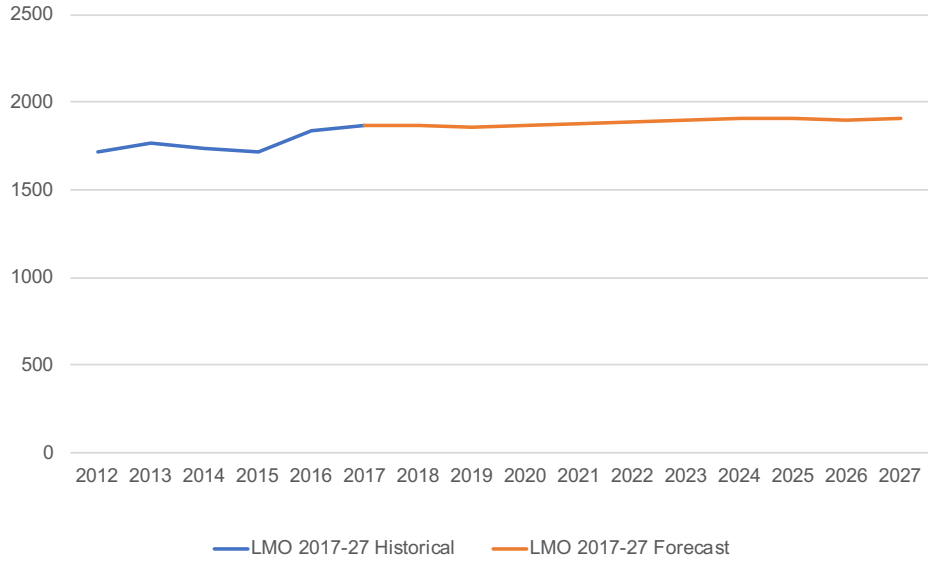


4.1.3. Employment estimates

Employment data from the BC LMO 2017-2027 is shown in **Figure 10**. Values from 2012 through 2017 are actuals based on Labour Force Survey data.

[19] Source: Statistics Canada - 2016 Census. Catalogue Number 98-400-X2016289.

Figure 10: Employment, NOC 7282, historical and forecast[20]



From a regional perspective, based on data from the BC Labour Market Outlook, the majority of the employment in NOC 7282 is in the Lower Mainland at 64%, followed by the Thompson Okanagan at 16%, followed by Vancouver Island Coast at 15%.

Table 4: Employment forecast for 2018, NOC 7282[21]

Economic Region	Employment	% of Total
Mainland South West	1,194	64
Vancouver Island Coast	276	15
North Coast & Nechako	-	0
Cariboo	51	3
Kootenay	46	2
North East	-	0
Thompson Okanagan	300	16
Total	**1,868**	**100**

An attempt was made to estimate the number of labourers that place concrete and do not fit the description of NOC 7282, i.e. are not skilled in wet finishing and therefore are a subset of NOC 7611. Specifically, the proportion of these labourers' workload that is focused on placing is estimated, based on assumptions described in **Table 5** below. An estimated 3,400 people are employed by firms that are described in name as working in concrete, but were determined through interviews to be dry finishers. An estimated proportion of 2/9, or 22%, of their time is focused on concrete placing based on a profile of a high-rise development provided by one large general contractor and verified as

[20] BC Labour Market Outlook, 2017-2027.
[21] Ibid. The author notes that totals for the same variables may not be the same across LMO datasets available online on the BC Data Catalogue and used for this project.

reasonable and typical by the advisory committee. Based on these assumptions, a directional estimate of 756 full-time equivalents (FTE) that focus on placing (and are within NOC 7611) is used in this report.

Table 5: Directional estimate of the concrete placing workload by dry finishers

Driver	Assumption	Source
Number of dry-finisher employers	170	Sized based on the proportion of employers interviewed that specialize in dry finishing and total number of employers in the project's employer database
Average number of employees per dry-finisher employer	20	Employer interviews
Proportion of workload related to placing only	2/9	A project profile sourced from a large general contractor for a commercial high-rise development. It is based on a nine-day pour schedule, with one out of nine days dedicated to placing slab work and one day dedicated to placing columns and core (the other days focused on other labourer activities)
FTEs focused on placing	~756	

4.2. Demand-side factors and trends

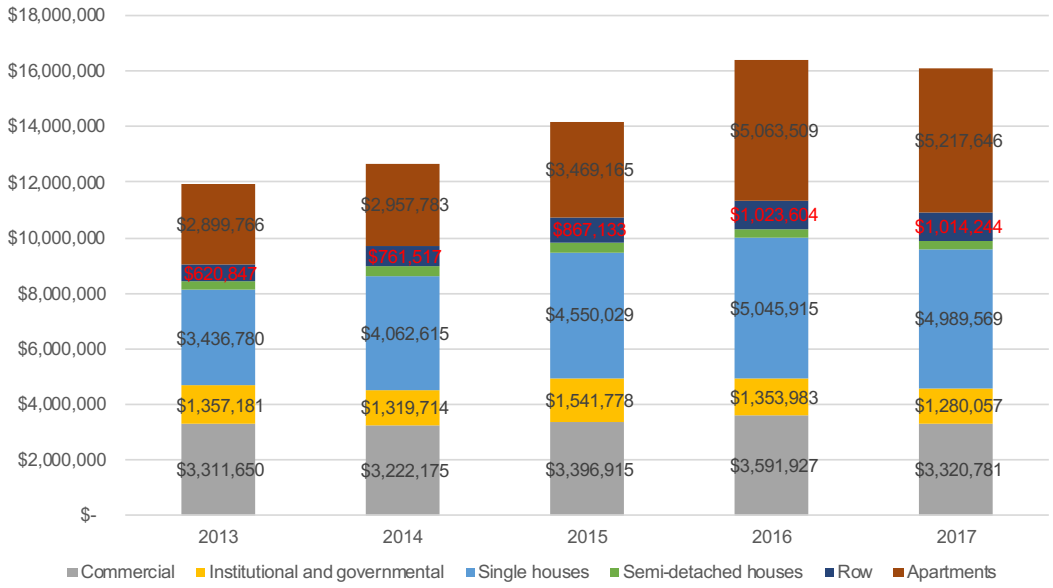
This section explores the factors that drive the demand for concrete finishers. It looks at what drives the quantity of concrete finishers required to meet demand and the kinds of attributes and skills that employers look for in prospective concrete finishers. It also explores what factors about concrete finishing might appeal to prospective new concrete finishers; that is, what is the employee value proposition of concrete finishing.

4.2.1. Construction activity

With over 92% of concrete finishers employed in the construction sector according to the BC LMO, labour demand or NOC 7282 is largely driven by construction activity. Concrete features prominently in all types of construction (residential, commercial, industrial, institutional and government), and this is not expected to change substantially going forward.

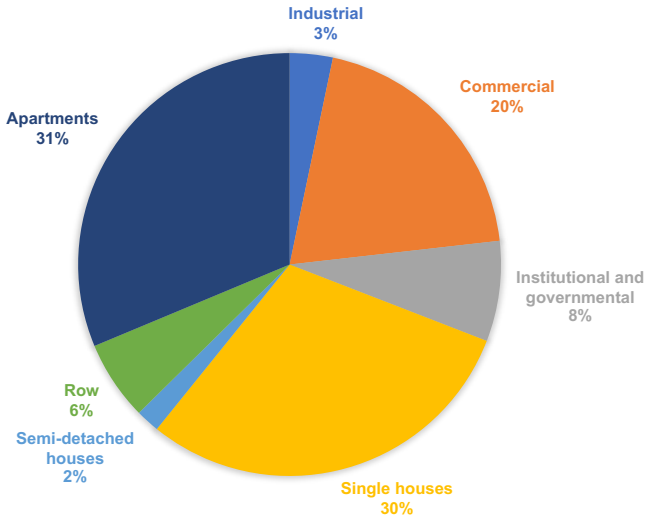
Construction activity in B.C. has increased considerably over the last several years. Building investment as reported by Statistics Canada has grown in real terms from just less than $12 billion in 2013 to almost $17 billion in 2017, a 31% increase. The growth is driven almost entirely by the residential segment, with growth in apartments, single houses, and rows accounting for $2.3 billion, $1.6 billion, and $0.4 billion in growth, respectively, over that period. Growth in other sectors has been flat or slightly negative.

Figure 11: Building investment in BC, 2007 constant dollars[22]



Commercial construction, the largest non-residential category, which accounted for $3.2 billion in 2017 or 20% of total construction investment, remained essentially flat over the period. The amounts by investment type for 2017 are shown in **Figure 12** below.

Figure 12: Proportion of building investment in B.C. in 2017 by type, 2007 constant dollars[23]

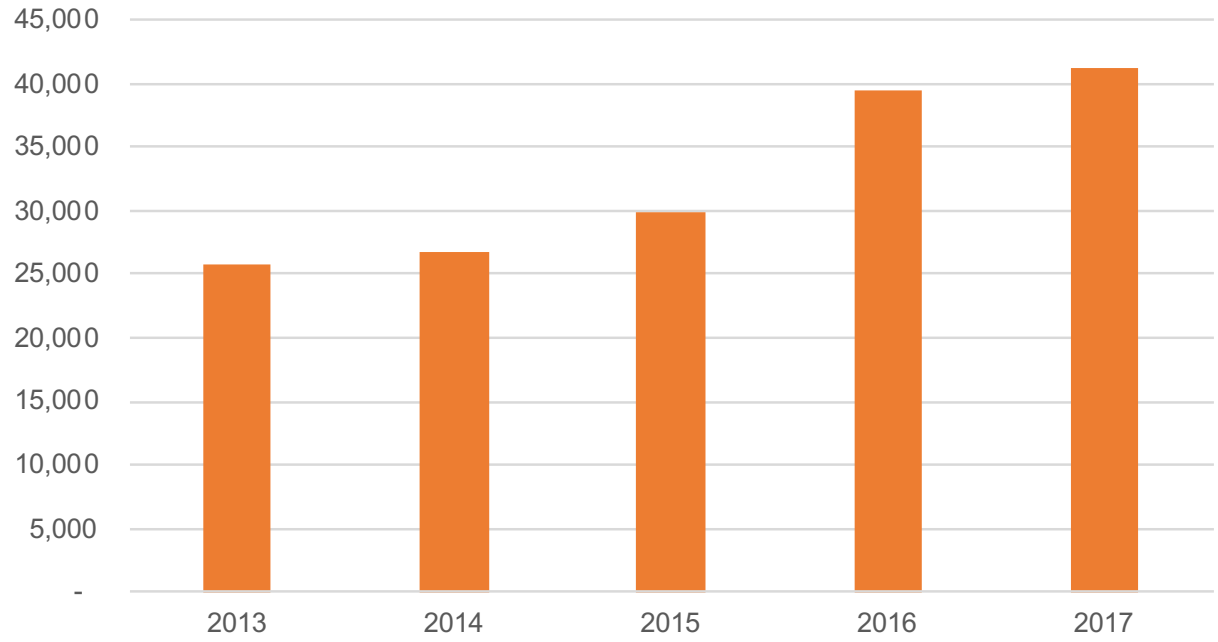


Data on housing starts tell a similar story. Total housing starts across all residential construction types increased 60% from 2013 to 2017, while total residential construction

[22] Statistics Canada. Table 026-0017 - Investment in new housing construction, by type of dwellings, Canada, provinces and territories, monthly (dollars) (accessed: March 24, 2018), Statistics Canada. Table 026-0016 - Investment in non-residential building construction, by type of building, province and census metropolitan area (CMA), quarterly (dollars) (accessed: March 24, 2018).
[23] Ibid.

investment across all related categories – apartments, single houses, row, semi-detached houses – increased 58% in real terms over the same period.

Figure 13: Housing starts in B.C., all types[24]



With over 92% of concrete finishers employed in the construction sector and the significant ramp-up on in construction activity in B.C. over the past several years, the secondary data suggests strongly that there has been a corresponding increase in demand for concrete finishers.

4.2.2. Expansion demand

Looking forward, estimates from BuildForce Canada's employment projections are used to inform this report's perspective on the demand going forward for concrete finishers.

[24] This is non-Statistics Canada information. Table 027-0001 - Canada Mortgage and Housing Corporation, housing starts in centres 10,000 and over, Canada, provinces, selected census metropolitan areas, monthly (units) (accessed: March 23, 2018).

Figure 14: (BuildForce) Non-residential construction employment growth outlook, B.C.[25]

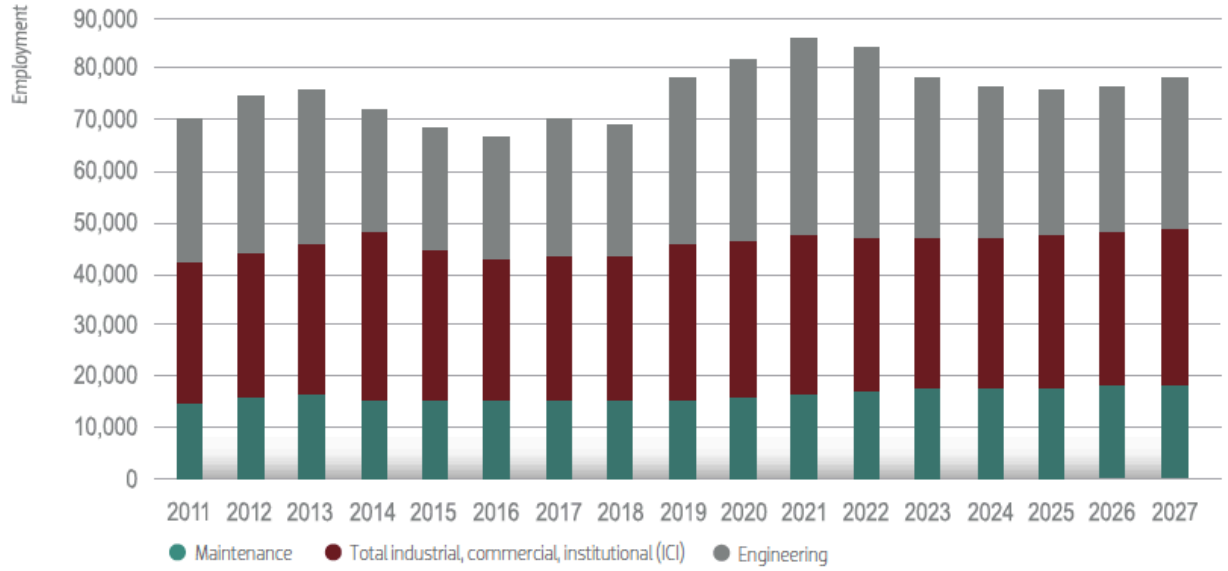
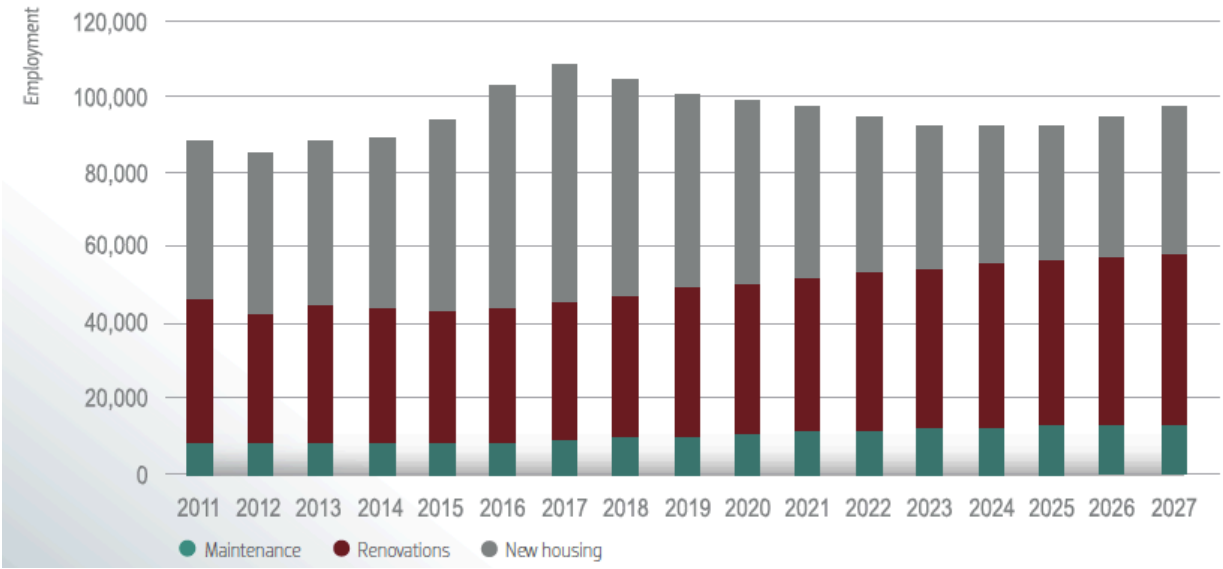


Figure 15: (BuildForce) Residential construction employment growth outlook, B.C.[26]



Combined, data from **Figures 14** and **15** indicate overall employment will grow roughly 1% over the five-year timeframe of 2018 through 2022, and 1% from 2018 through 2027. From the report: “The pace of residential activity is expected to recede in 2018 as many large condo projects near completion. This decline in activity is expected to extend through 2024 in line with slowing population growth and lower household

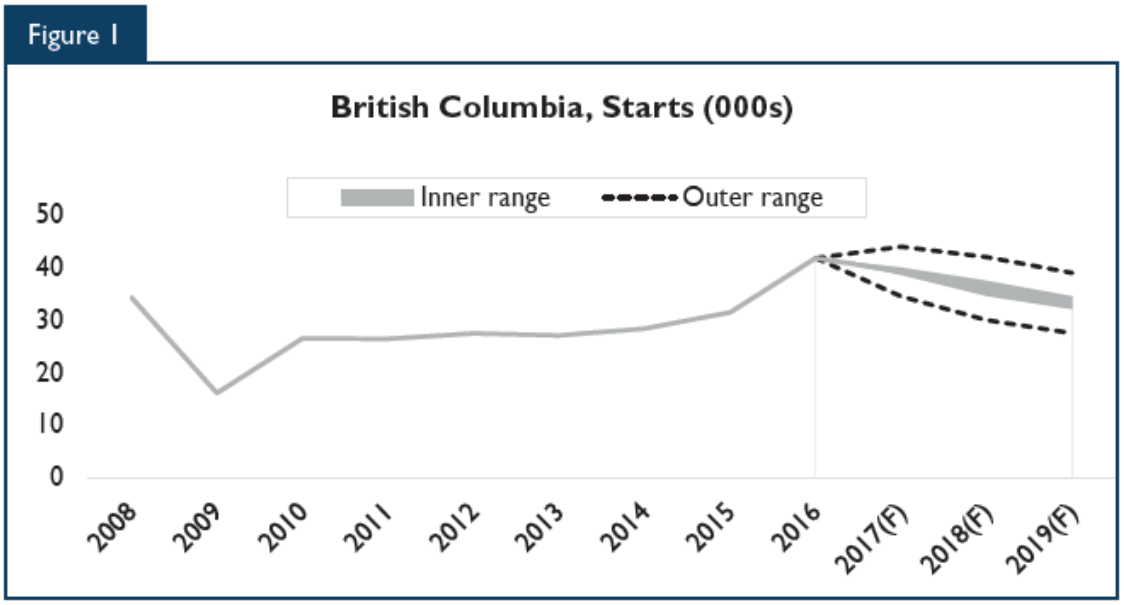
[25] BuildForce Canada. Construction & Maintenance Looking Forward, British Columbia, Highlights 2018-2017. This figure is reproduced from Figure 2 on page 4 of the report.
[26] BuildForce Canada. Construction & Maintenance Looking Forward, British Columbia, Highlights 2018-2017. This figure is reproduced from Figure 2 on page 7 of the report.

formations. Across the scenario period, moderate increases in renovation investment should partly offset declining new housing demand requirements." Also from the report, with respect to non-residential construction: "Current and proposed new major project investments are expected to add more than $35 billion between 2019 and 2021. Projects are diverse, including major pipeline, LNG, mining, electrical generation and transmission, and other infrastructure projects…Major project completions after 2021 release more than 8,000 workers but some are expected to be absorbed by rising maintenance and other non-residential construction markets."[27] Note that some of these released workers may be brought from overseas for these projects and may not be available to work on other projects in B.C.

The Canada Mortgage and Housing Corporation (CMHC) in its most recent housing outlook for B.C. from Fall 2017 forecasts that a pull-back in the number of housing starts in B.C. is likely through 2019 (see **Figure 16**). The report states: "Following two years of elevated new home construction, housing starts will move lower in British Columbia in 2018 and 2019. Gradually rising mortgage rates, coupled with slower employment growth and declining migration, will contribute to the pullback in production. The number of units under construction is also at a record high level and the capacity to increase construction levels further is limited. Together these factors will lead housing starts to pull-back over the next two years, moving closer to historical norms."[28] The report highlights two additional downside risks: the potential for additional government policies to reduce household mortgage debt or limit speculative activity in the housing market, and uncertainty surrounding the results of the NAFTA negotiations and the softwood lumber dispute.

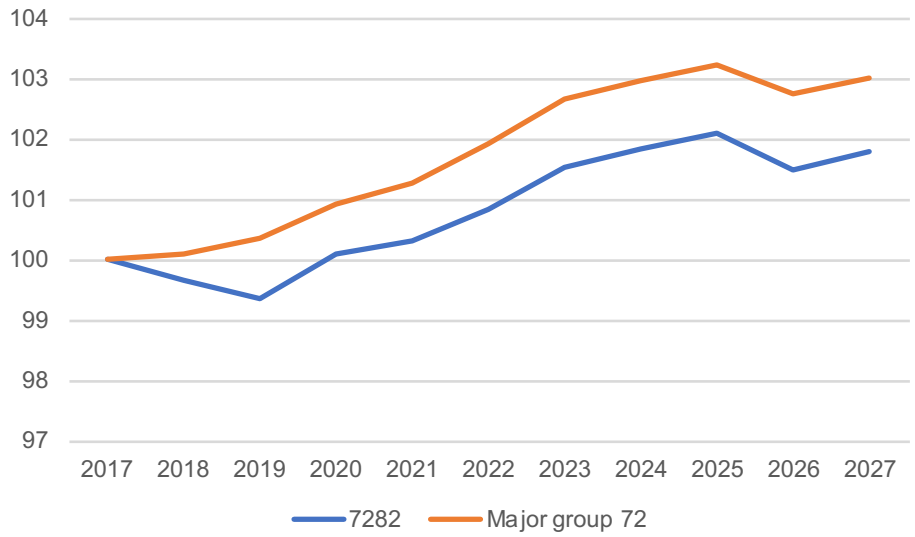
[27] BuildForce Canada. Construction & Maintenance Looking Forward, British Columbia, Highlights 2018-2017. Pages 4, 7. Some released workers could include workers brought in from overseas for these projects only.
[28] CMHC. Housing Market Outlook – BC Region Highlights. Date released: Fall 2017, page 1.

Figure 16: BC housing starts, CHMC, Fall 2017



In comparison, the 2017-27 BC Labour Market Outlook forecasts employment growth in NOC 7282 over the same five-year period at 0.3%, compared to growth in major group 72 of 1.3% (see **Figure 17** below). Based on discussions with the BC Labour Market Information Office (LMIO), the reason for the slight decline in 7282 through 2019 is due to a forecasted drop in building starts and the LMIO's assumption that NOC 7282 is more sensitive to housing construction activity than is NOC 72 as a whole.

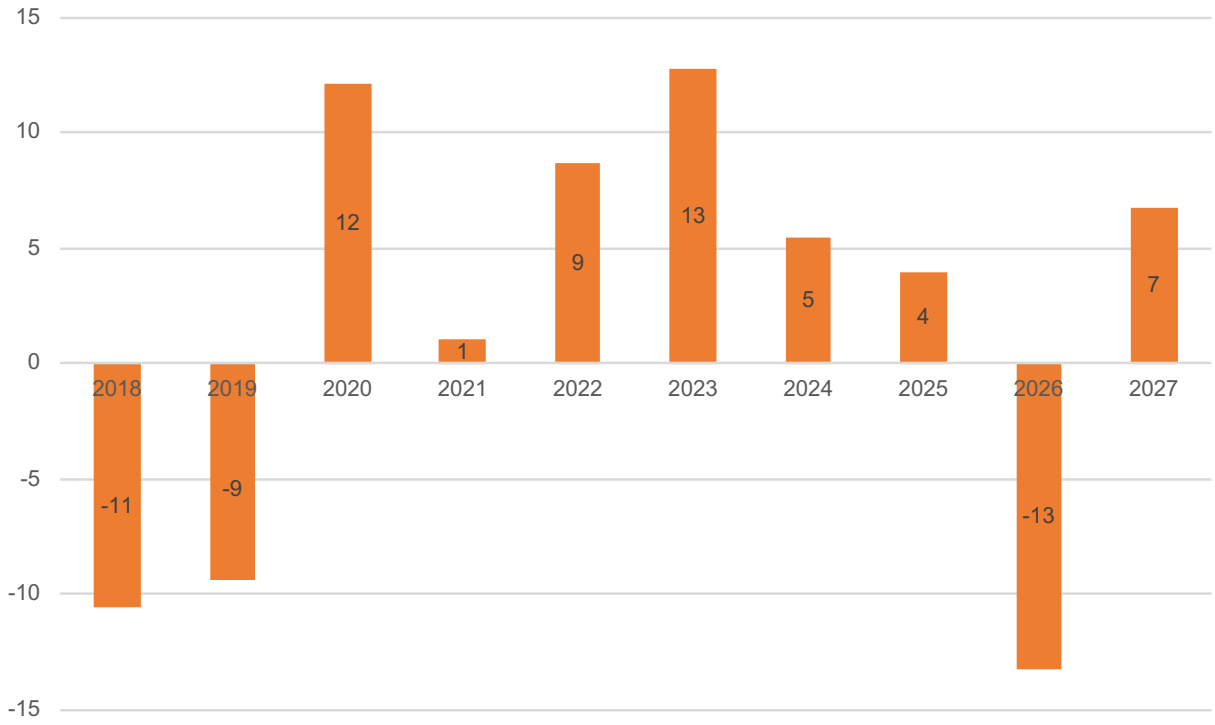
Figure 17: Employment indexed to 2017 levels, select NOC codes[29]



[29] BC Labour Market Outlook.

Accordingly, the LMO forecast for job openings due to expansion demand is moderate, with an annual average of two such job openings in 2018 through 2027.

Figure 18: Job openings from expansion demand, NOC 7282



4.2.3. Desired worker attributes

Employers were asked for their perspective on the qualities they prefer when hiring for concrete finishers. These qualities include:

- Eye for detail
- Dependability
- Willingness to learn
- Good attitude
- Ability to apply knowledge to the job
- Drive and willingness to get the job done (i.e. acknowledgement that concrete finishing is not a 9-to-5 job)
- Hands-on learner

At the April workshop with the advisory committee, additional job attributes were discussed. These included: need to be a quick learner; like variety, as every job and location is different; need to be able to measure; and like to work outdoors.

Data from the US Occupational Information Network (O*NET) Online service for the US-based Standard Occupational Classification System (SOC) occupation code for

concrete finishers – 47-2051.00 - Cement Masons and Concrete Finishers[30] – on abilities and skills found to be important for this occupation. O*NET is a database of worker attributes and job characteristics built around a standard taxonomy. Data is collected from stakeholders and regularly updated for all codes under the SOC to describe the occupations. An ability or skill must have a score of at least 50 out of a maximum score of 100 to be considered “Important” for a given occupation.

Twenty-five of 52 abilities in the O*NET taxonomy are scored as “important” for this occupation (see **Table 6**). An ability, per the O*NET definition, is an enduring attribute of the individual that influences performance. Of these 25 abilities, 15 are psychomotor abilities (shaded orange), including the top five most important, while 10 are cognitive abilities (shaded blue).

Table 6: Abilities rated as Important, SOC 47-2051.00 - Cement Masons and Concrete Finishers[31]

Importance	Ability	Ability Description
69	Arm-Hand Steadiness	The ability to keep your hand and arm steady while moving your arm or while holding your arm and hand in one position.
69	Manual Dexterity	The ability to quickly move your hand, your hand together with your arm, or your two hands to grasp, manipulate, or assemble objects.
66	Trunk Strength	The ability to use your abdominal and lower back muscles to support part of the body repeatedly or continuously over time without 'giving out' or fatiguing.
66	Near Vision	The ability to see details at close range (within a few feet of the observer).
63	Multilimb Coordination	The ability to coordinate two or more limbs (for example, two arms, two legs, or one leg and one arm) while sitting, standing, or lying down. It does not involve performing the activities while the whole body is in motion.
60	Information Ordering	The ability to arrange things or actions in a certain order or pattern according to a specific rule or set of rules (e.g., patterns of numbers, letters, words, pictures, mathematical operations).
60	Visualization	The ability to imagine how something will look after it is moved around or when its parts are moved or rearranged.
56	Oral Comprehension	The ability to listen to and understand information and ideas presented through spoken words and sentences.
56	Oral Expression	The ability to communicate information and ideas in speaking so others will understand.
56	Problem Sensitivity	The ability to tell when something is wrong or is likely to go wrong. It does not involve solving the problem, only recognizing there is a problem.
56	Deductive Reasoning	The ability to apply general rules to specific problems to produce answers that make sense.
56	Control Precision	The ability to quickly and repeatedly adjust the controls of a machine or a vehicle to exact positions.

[30] The O*NET-SOC Description for this occupation is: “Smooth and finish surfaces of poured concrete, such as floors, walks, sidewalks, roads, or curbs using a variety of hand and power tools. Align forms for sidewalks, curbs, or gutters; patch voids; and use saws to cut expansion joints.” Source: https://www.onetcodeconnector.org/ccreport/47-2051.00.

[31] US Occupational Information Network (O*NET) Online service.

56	Stamina	The ability to exert yourself physically over long periods of time without getting winded or out of breath.
56	Extent Flexibility	The ability to bend, stretch, twist, or reach with your body, arms, and/or legs.
53	Finger Dexterity	The ability to make precisely coordinated movements of the fingers of one or both hands to grasp, manipulate, or assemble very small objects.
53	Speed of Limb Movement	The ability to quickly move the arms and legs.
53	Far Vision	The ability to see details at a distance.
53	Depth Perception	The ability to judge which of several objects is closer or farther away from you, or to judge the distance between you and an object.
50	Inductive Reasoning	The ability to combine pieces of information to form general rules or conclusions (includes finding a relationship among seemingly unrelated events).
50	Selective Attention	The ability to concentrate on a task over a period of time without being distracted.
50	Static Strength	The ability to exert maximum muscle force to lift, push, pull, or carry objects.
50	Dynamic Strength	The ability to exert muscle force repeatedly or continuously over time. This involves muscular endurance and resistance to muscle fatigue.
50	Gross Body Coordination	The ability to coordinate the movement of your arms, legs, and torso together when the whole body is in motion.
50	Speech Recognition	The ability to identify and understand the speech of another person.
50	Speech Clarity	The ability to speak clearly so others can understand you.

Eight out of 35 skills in the O*NET taxonomy are considered important for this occupation. Four of these eight skills are Basic, defined as “developed capacities that facilitate learning or the more rapid acquisition of knowledge”, and four are Cross-Functional, defined as “developed capacities that facilitate performance of activities that occur across jobs.”

Table 7: Skills rated as Important, SOC 47-2051.00 - Cement Masons and Concrete Finishers[32]

Importance	Skill	Type	Skill Description
56	Monitoring	Basic	Monitoring/Assessing performance of yourself, other individuals, or organizations to make improvements or take corrective action.
53	Active Listening	Basic	Giving full attention to what other people are saying, taking time to understand the points being made, asking questions as appropriate, and not interrupting at inappropriate times.
53	Critical Thinking	Basic	Using logic and reasoning to identify the strengths and weaknesses of alternative solutions, conclusions or approaches to problems.
53	Coordination	Cross Functional	Adjusting actions in relation to others' actions.
53	Judgment and Decision Making	Cross Functional	Considering the relative costs and benefits of potential actions to choose the most appropriate one.

[32] US Occupational Information Network (O*NET) Online service.

50	Speaking	Basic	Talking to others to convey information effectively.
50	Quality Control Analysis	Cross Functional	Conducting tests and inspections of products, services, or processes to evaluate quality or performance.
50	Time Management	Cross Functional	Managing one's own time and the time of others.

In summary, data from O*NET emphasizes the importance of a select set of basic skills as well a number of psychomotor, or physical, abilities. While broadly in-line and complementary to employers' input, the O*NET data does not recognize the importance of the quality of drive and willingness to get the job done, which was emphasized by employers.

Employers interviewed and the advisory committee emphasized that proficiency in concrete finishing does not rely on classroom-based educational attainment. What is valued, however, is an ability to learn on the job. In a similar vein, employers generally agreed that formal training for new entrants to the occupation would be valuable insofar that it focuses on the practical, on-the-job experience of concrete finishing. Achieving proficiency in considering how multiple factors – such as temperature and climate conditions, the quality of the formwork, the redi-mix materials and qualities, and required design specifications work – interact to impact how concrete needs to be placed and finished can only be gained onsite. The state of current training available is considered in section 4.3.4. of the report.

4.2.4. Employee value proposition

Employers and the advisory committee highlighted a number of qualitative aspects of the trade that prospective workers might find appealing. Compared to other trades, concrete finishing results in a permanent physical structure, which creates a level of ownership and 'pride of work' in those that do the job well. Concrete finishing is now a year-round profession with above-average annual incomes. Employers say retention is not a problem and that they are able to keep employees because they are loyal to their employees during slow periods, wages are good and employers typically accommodate family commitments, and there are perks such as side jobs, dinners, and informal gatherings.

Four employees were interviewed for the project. They agreed that on-the-job mentoring is critical to success. They also identified a range of factors relevant to success in the trade. In response to the question, "what makes a good concrete finisher," one respondent said "being able to think ahead and prepare a plan for what's coming," another said, "you have to know how to read concrete," and another said, "punctuality, persistence, the will to overcome obstacles." Pride-of-work was apparent in the responses including one that said, "I stay because it's in my blood," in response to the question, "what are the reasons you would choose to stay or leave your job." Another said, "I will stay because I love the speed of work."

Analysis of Census data demonstrates that concrete finishing has a high rate of full-time employment and high wages, controlling for skill level and educational attainment. While

on the low end among occupations selected for the analysis, 88% of concrete finishers in B.C. nonetheless worked full-time, full-year according to Census data (see **Table 8**).

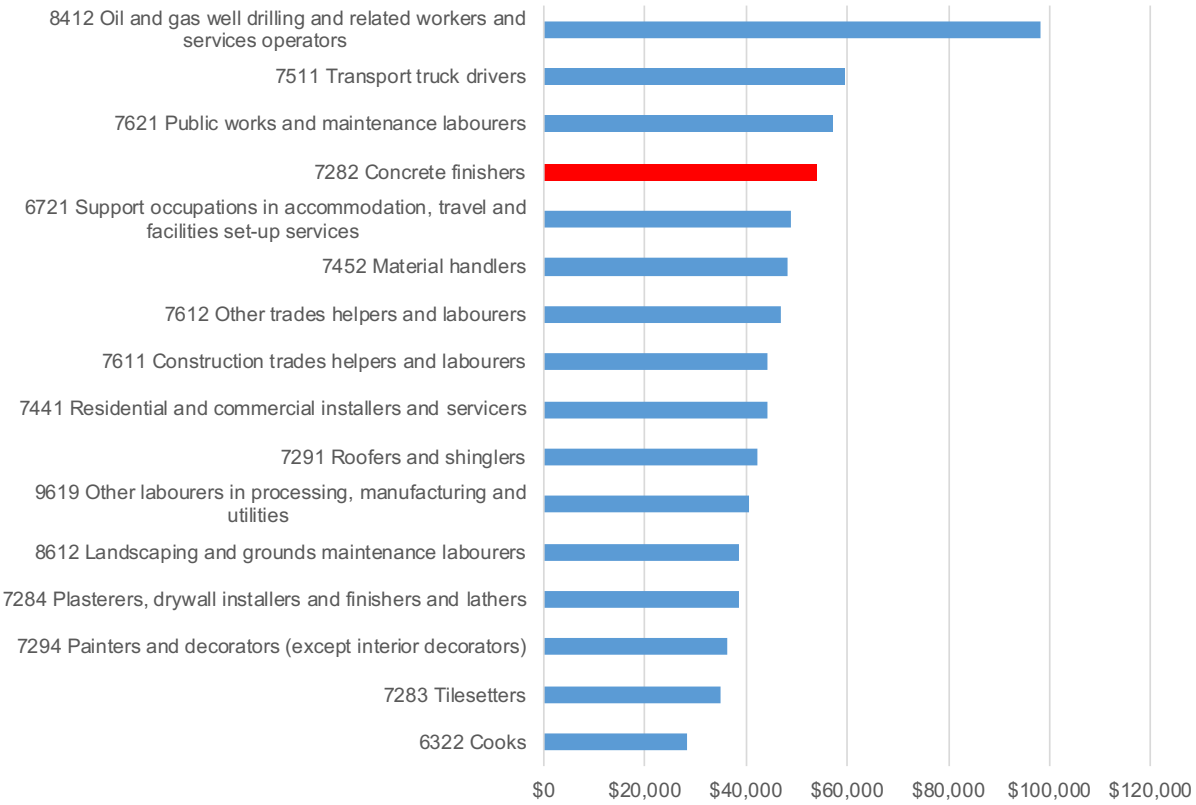
Table 8: Select NOC codes, percent that worked full-time, full-year with High School diploma or lower, BC[33]

Select National Occupation Classification (NOC) codes	% Full time l Full year
8412 Oil and gas well drilling and related workers and services operators	100
7283 Tilesetters	98
7511 Transport truck drivers	97
7284 Plasterers, drywall installers and finishers and lathers	97
7291 Roofers and shinglers	96
7441 Residential and commercial installers and servicers	95
7611 Construction trades helpers and labourers	94
7294 Painters and decorators (except interior decorators)	92
7452 Material handlers	92
9619 Other labourers in processing, manufacturing and utilities	90
7621 Public works and maintenance labourers	89
7282 Concrete finishers	**88**
8612 Landscaping and grounds maintenance labourers	82
7612 Other trades helpers and labourers	80
6721 Support occupations in accommodation, travel and facilities set-up services	80
6322 Cooks	76

Selecting only those with a High School diploma or lower who worked full-time, full-year, concrete finishing had the fourth highest average employment income at almost $53,694. This was highest among construction trades selected for the analysis including tilesetters (7283), painters and decorators (except interior decorators) (7294), roofers and shinglers (7291), plasterers, drywall installers and finishers and lathers (7284), construction trades helpers and labourers (7611), and other trades helpers and labourers (7612).

[33] Source: Statistics Canada - 2016 Census. Catalogue Number 98-400-X2016355.

Figure 19: Select NOC codes, average employment income, full-time, full-year with High School diploma or lower, BC[34]



Input from interviews suggested that aspects of the employee value proposition are different for placers compared to wet finishers. Placing tends to be more physically demanding and pays less than wet finishing. Placers are often part of crews that do other labourer activity, including dry finishing. The work of dry finishing is more conducive to a nine-to-five work schedule and is typically less exposed to the elements than wet finishing. Dry finishing and placing also tends to pay less than wet finishing.

The project conducted two school visits where a total of 37 high school students interested in the trades were interviewed to understand their education motivations, plans for entering the workforce, and awareness of and interest in particular trades including concrete finishing. Of the 37 interviewed, 29 (78%) knew someone in a trade. Of these, 19 (51%) knew an electrician, 16 (43%) knew a carpenter, 15 (41%) knew a plumber, 15 (41%) new a roofer, 12 (32%) knew a floorer, 11 (30%) knew a drywaller, 9 (24%) knew a rebar specialist, followed by 8 (22%) who knew a concrete finisher. Twelve of the 37 answered “yes” to the question “Have you narrowed down what kind of job you want and think you would be good at.” Of these, five indicated a construction trade, and one indicated concrete finishing. Overall, the school visits indicated there was interest in the construction trades but limited awareness of concrete finishing.

[34] Ibid.

4.3. Supply-side factors and trends

This section of the report explores factors that impact the labour market's ability to meet demand for labour for concrete finishing. It considers entry pathways and training available, demographic conditions, and supply sources such as new entrants entering the labour market and immigrants.

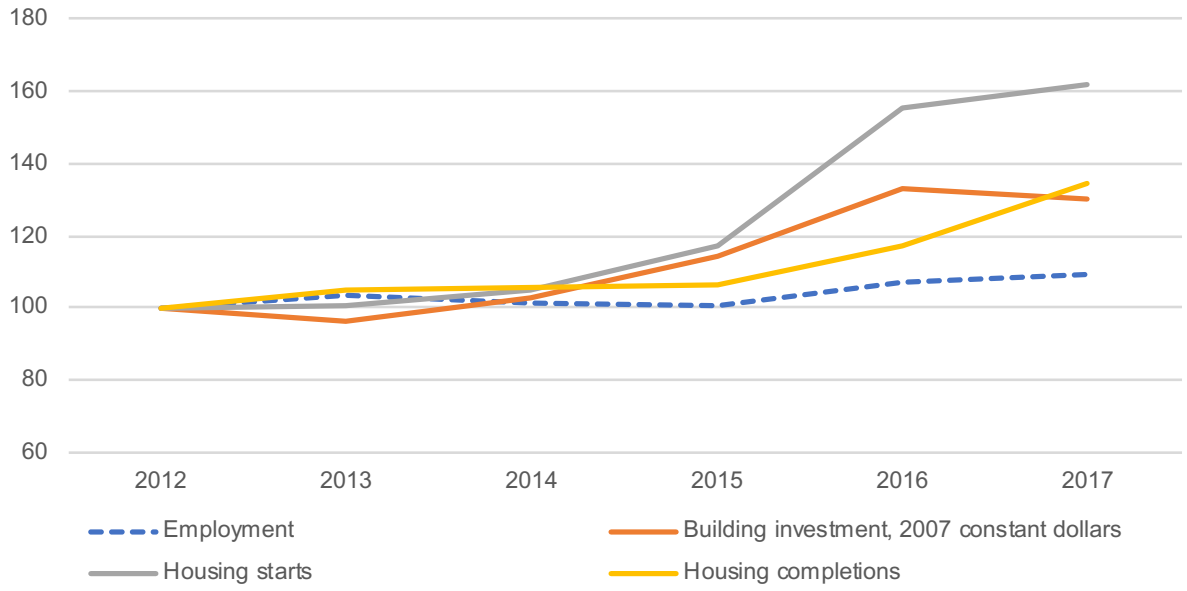
4.3.1. Labour shortages

All wet finishing employers interviewed reported they would immediately hire at least one qualified concrete finisher full-time if presented with fully qualified and vetted candidates, to meet current demand. It is assumed, therefore, that there is one vacancy per wet finishing firm. Of the 754 companies in the database, an estimated 584 are wet finishing firms; the remainder are dry finishing firms. Based on this information, there are an estimated 584 vacancies in NOC 7282. Employers interviewed said they have had to turn away or delay jobs given their labour shortages. Looking forward, they generally agreed that the underlying conditions are getting worse, with high rates of retirements and fewer new entrants being available being the most significant factors.[35]

Comparing historical employment to construction activity, it appears that employment in NOC 7282 has not kept pace with growth in construction, which might help explain why employers are reporting widespread shortages. **Figure 20** shows employment compared to three construction-related indicators: building investment, housing starts and housing completions. All values are indexed to 2012 levels. Building investment data is based on constant 2017 dollars. The construction indicators outpaced employment by at least 20 basis points between 2012 and 2017, which helps explain the prevalence of shortages reported by employers.

[35] Data is not available from the Job Vacancy and Wage Survey (JVWS) as a secondary data source on job vacancies for this NOC code in B.C., to compare to the interview data.

Figure 20: NOC 7282 employment and construction indicators, B.C, indexed to 2012 = 100[36]



Input from employers suggests current labour conditions are tighter than reported by BuildForce and its "market rankings" for NOC 7282. Definitions of its supply tightness rankings are as follows.[37]

- 5 – Needed workers meeting employer qualifications are not available in local markets to meet current demand so that projects or production may be delayed or deferred. There is excess demand, competition is intense and recruiting reaches to remote markets.
- 4 - Workers meeting employer qualifications are generally not available in local markets to meet any increase. Employers will need to compete to attract additional workers. Recruiting and mobility may extend beyond traditional sources and practices
- 3 – The availability of workers meeting employer qualifications in the local market may be limited by large projects, plant shutdowns or other short-term increases in demand. Employers may need to compete to attract needed workers. Established patterns of recruiting and mobility are sufficient to meet job requirements.

[36] Employment data from LMO 2017-2027 (unpublished, provided by the BC Labour Market Information Office, and is based on Labour Force Survey data), housing starts and completions data from CANSIM 027-0001, and building investment data from CANSIM 026-0016 and CANSIM 026-0017.
[37] BuildForce Canada. Construction & Maintenance Looking Forward, British Columbia, Highlights 2018-2017. Page 5.

- 2 – Workers meeting employer qualifications are available in local markets to meet an increase in demand at the current offered rate of compensation and other working conditions.
- 1 – Workers meeting employer qualifications are available in local markets to meet an increase in demand at the current offered rate of compensation and other current working conditions. Excess supply is apparent and there is a risk of losing workers to other markets.

Table 9: BuildForce supply tightness market rankings, NOC 7282[38]

Sector	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Residential	4	3	3	3	3	3	3	3	3	3	3
Non-Residential	3	3	4	3	4	2	2	3	3	3	3

The BuildForce data suggests there is some tightness in the residential market which will recede somewhat and stay level in future years, while tightness in the non-residential segment could increase in 2019.

4.3.2. Replacement demand

An estimated 20% of the current labour force for NOC 7282 will retire by 2026, or roughly 37 retirements per year, given the current age distribution based on census results and assumed retirement probabilities in **Table 10** below. Because concrete finishing is physically demanding, employers generally agree that there is limited opportunity to expect the typical retirement age to increase significantly going forward. The age distributions in the census data are in line with input from the employer interviews.

Table 10: Estimated retirements and probabilities to retire by 2026 based on Census 2016 data and assumed probabilities of retirement, NOC 7282[39]

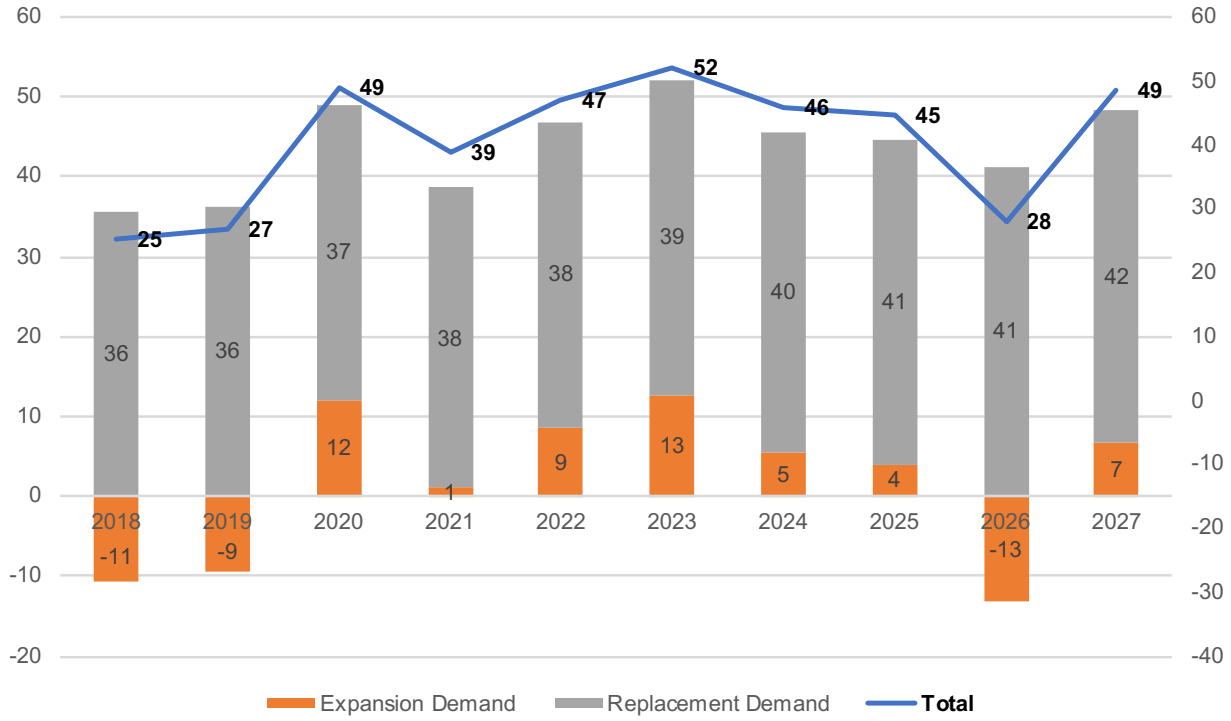
Age Bracket	Proportions, Labour Force, Census 2016, NOC 7282	Probability of Retiring by 2026	Retirements by 2026 applied to 2018 LMO Employment Forecast of 1,861
15 to 19 years	2%	0%	0
20 to 24 years	8%	0%	0
25 to 29 years	11%	0%	0
30 to 34 years	15%	0%	0
35 to 44 years	22%	2%	6
45 to 54 years	23%	20%	84

[38] BuildForce Canada. Construction & Maintenance Looking Forward, British Columbia, Highlights 2018-2017.
[39] Source: Statistics Canada, 2016 Census of Population, Statistics Canada Catalogue no. 98-400-X2016294.

55 to 64 years	15%	80%	229
65 to 74 years	3%	90%	43
75+ years	1%	100%	10
Total	**100%**	**N/A**	**373**

These estimates align reasonably well with forecasts in the BC Labour Market Outlook. **Figure 21** shows the number and breakdown of job openings for NOC 7282. Job openings result from expansion (job openings that arise due to economic growth) or replacement (job openings that are generated by a permanent exit from the labour force due to retirements, illness, disabilities, deaths and other reasons). Over the ten-year period of 2018 to 2027, job openings for replacement reasons average 39 per year, while job openings arising from expansion average two per year.

Figure 21: Job openings, NOC 7282



Evaluation of the LMO's estimates for supply composition for NOC 7282 highlights another component that creates the need for additional supply. The LMO estimates the amounts from different supply sources to fill the job openings. The LMO acknowledges that people might exit an occupation but not retire or otherwise exit for reasons that align to the definition of "replacement," but instead switch to a different occupation or leave to work in another jurisdiction. **Table 11** shows supply addition estimates based on data from the LMO for NOC 7282. Assuming the negative net values for "Net In-Migration – Interprovincial" and "Inter-Occupational Mobility – Other" also need to be replaced, an additional average of 21 people a year need to enter the occupation (210

divided by 10 years). Therefore, an average annual total of 60 additions to NOC 7282 need to be sourced from various supply sources available.[40]

Table 11: Supply composition, 2017-2027, NOC 7282[41]

	New Entrants (17 to 29 years old)		Net In-Migration		Inter-Occupational Mobility		Total Supply Addition (Net)	Total Positive Supply Addition
	Public Post-Secondary & All Trades	Other	International	Interprovincial	Public Post-Secondary & All Trades	Other		
10-year total	135	160	248	-30	60	-180	**393**	**603**
Average Annual	14	16	25	-3	6	-18	**39**	**60**
% of Total Supply Additions	22%	27%	41%		10%			**100%**

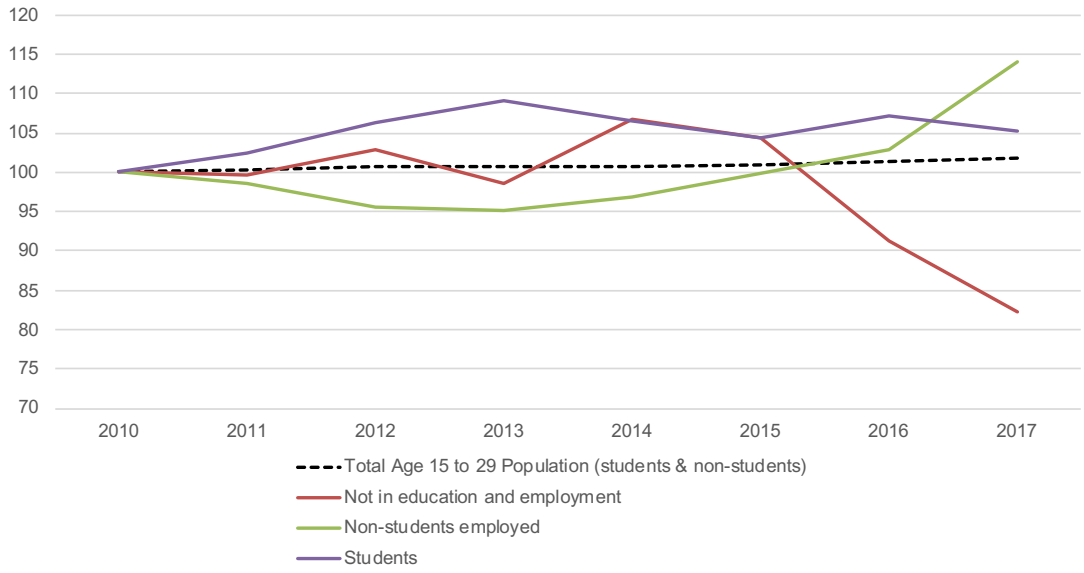
4.3.3. Demographic considerations

Per **Table 11**, the LMO forecasts that roughly 49% of supply additions will come from New Entrants, and the remainder from Net In-Migration and Inter-Occupational Mobility. As defined by the LMO, New Entrants are 17 to 29 years old. Employers confirmed that this young demographic is a primary source of new talent for the trade, and therefore it is important to understand how this age cohort has changed and will change over time. Due to limitations of available secondary data, demographic analysis in this section focuses on populations between 15 to 29 years old rather than 17 to 29 years old.

Over the 2010 to 2017 period, the population of those aged 15 to 29 in B.C. increased slightly from 878,000 to 894,000 based on Labour Force Survey data (see **Figure 22**). Within this demographic, the proportion of those who are employed and are not students increased especially from 2016 to 2017, while the proportion who are students also increased. The proportion of those who are not students and are either unemployed or not in the labour force declined sharply from 2014 to 2017. To the extent this last category is a potential labour supply pool for concrete finishing to target, it would appear it has been more difficult to attract people from this pool given its recent decline in numbers and the corresponding increases in the other categories.[42]

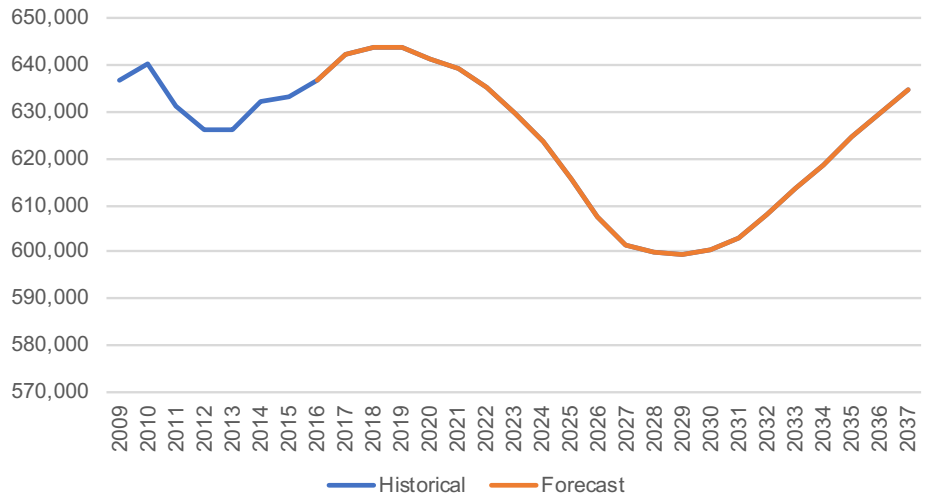
[40] Does not include supply additions required to fill existing vacancies.
[41] For definitions, refer BC Labour Market Outlook: 2017 Edition, with detail by occupation provided in Appendix 8. In the LMO, 'Total Supply Addition' conforms to 'Total Supply Addition Net' in this table. 'Total Positive Supply Addition' is calculated by the author.
[42] Statistics Canada. Table 282-0095 - Labour Force Survey estimates (LFS), by full- and part-time students during school months, sex and age group, annual (persons unless otherwise noted) (accessed January 11, 2018).

Figure 22: People age 15 to 29 by employment and student status, B.C., indexed to 2010 = 100



Looking forward, the 2017 B.C. Labour Market Outlook (LMO) forecasts that new entrants will account for 48% of supply additions to the labour force to 2027 across all occupations, compared to 49% for NOC 7282. However, this demographic will shrink over the next several years (see **Figure 23**). Based on calculations using data from BC Stats, the number of labour market participants aged 15 to 29 is expected to peak in 2018, then decline by 7% from 644,000 in 2018 to 599,000 in 2029 before beginning to rise again in 2030.

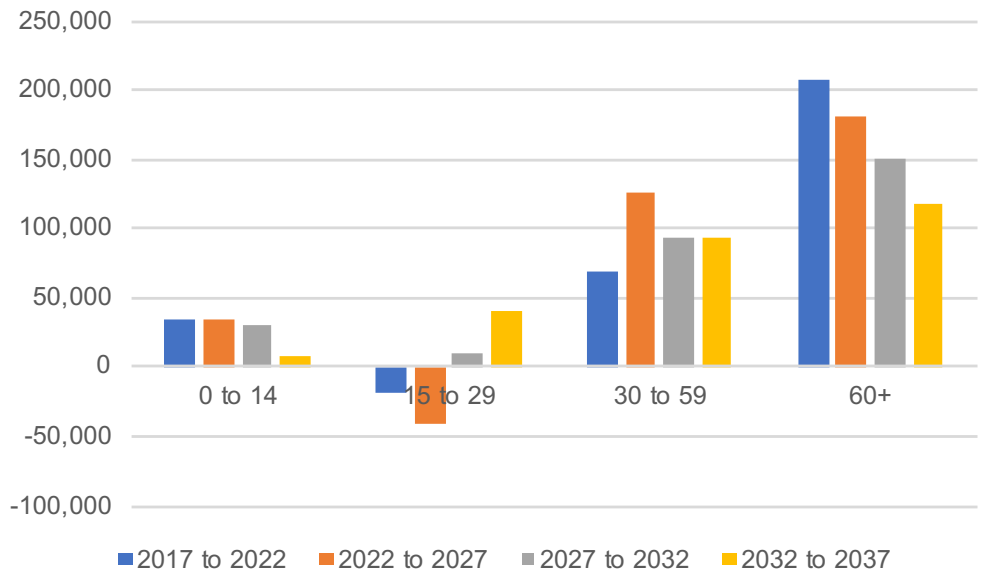
Figure 23: Labour market participation forecast for ages 15 to 29 in BC[43]



[43] Calculations are on the most recent population data available from BC Stats and labour force participation forecasts. Sources are as follows. BC Stats. Population Projections (May 2017) [Accessed January 2018]. BC Stats. B.C. Labour Force Participation Rate Projection: 2013 Edition. Labour Market Statistics, March 2013.

This forecasted decline corresponds to a population decline of those aged 15 to 29. **Figure 24** below shows forecasted changes in population for BC for the periods of 2017 to 2022, 2022 to 2027, 2027 to 2032, and 2032 to 2037 for four age categories 0 to 14, 15 to 29, 30 to 59, and over 60. The population is forecast to grow in all age categories and in all periods except for age category 15 to 29 which is forecast to shrink through 2029. The significant increase in the age 30 to 59 age group may at least be partially explained by positive net in-migration from other provinces and other countries.[44]

Figure 24: Forecasted BC population growth by period and age category[45]

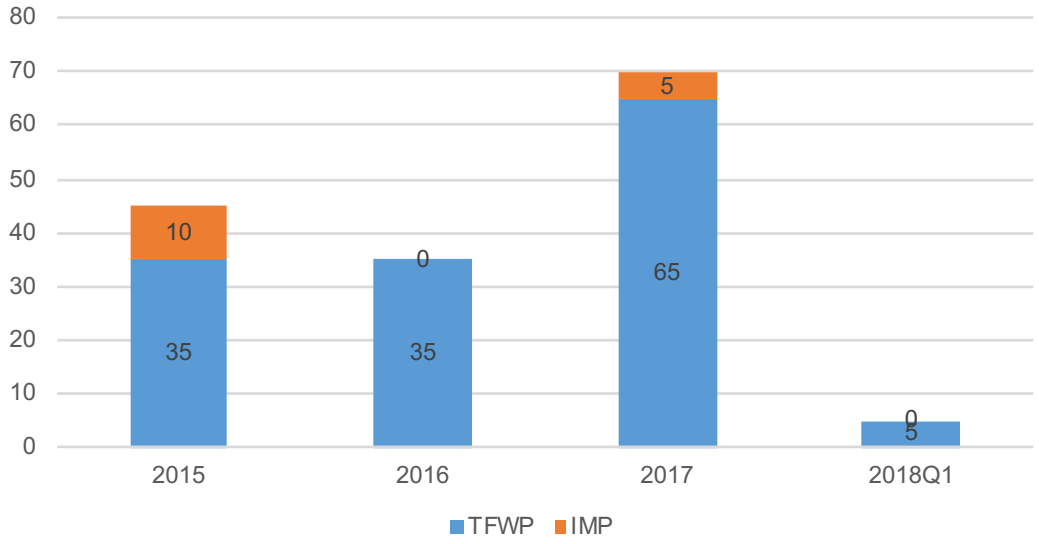


While acknowledging it is harder now to recruit new workers than in the past, employers continue to rely mostly on word-of-mouth and connections through friends and family to recruit new workers. Less than half the employers interviewed used Craigslist, Indeed, or other employment-related search engines as they have had limited success finding workers using these tools. Fewer still said they actively pursue foreign hires, because of the additional effort and time required to recruit from abroad.

Data was sourced from Immigration, Refugees and Citizenship Canada on the permit holders by intended destination (B.C.) and occupation (7282) under the Temporary Foreign Worker Program (TFWP) and International Mobility Program (IMP) (see **Figure 25**). These and only these two programs require an intended occupation as part of the application process.

[44] BC Stats population forecasts indicate both positive net in-migration from other provinces and from other countries for all years from 2016-17 to 2040-41. BC Stats. British Columbia-Level Population Projections (May 2017) [Accessed August 2018].
[45] Ibid.

Figure 25: Work permit holders year in which permit became effective, Temporary Foreign Worker Program (TFWP) and International Mobility Program (IMP), NOC 7282[46]



The majority of permits issued for NOC 7282 were issued under the TFWP. The total number of permits issued has been higher than might be expected when compared to estimates based on LMO supply composition data (i.e. see estimate in **Table 11** of 25 for average annual international net in-migration).

A prominent theme that emerged from both employer and stakeholder interviews was the perceived extensive use of foreign labour in especially dry finishing, and speculation that many or most of these people are working in Canada under permits issued under other immigration programs such as the International Experience Canada (IEC) Working Holiday and Young Professionals programs, or no longer have a valid work permit and are working under the table. Under the Working Holiday program, permits are open, meaning the permit holder can work for any employer in Canada with few exceptions. Under the Young Professionals program, the permit holder must secure employment to be issued a permit. Data is not available from the government of Canada on IEC permits issued by or otherwise associated with a given occupation or sector. While persons from another country with a work or study permit are included in census counts, it may be the case that they are underrepresented in the data if they are difficult to reach or where language is a barrier. Meanwhile persons working under the table would not be included in census counts.[47] To the extent LMO forecasts rely on census counts and other survey data, the prevalence of such foreign labour might help explain why growth in construction activity has outpaced observed growth in employment in NOC 7282.

[46] Source: IRCC, January 31, 2018 (data access on March 24, 2018 from webpage).
[47] Respondents to the long-form Census include "Canadian citizens, landed immigrants (permanent residents), persons asking for refugee status (refugee claimants), persons from another country with a work or study permit and family members living here with them." (see link to questionnaire)

4.3.4. Skills gaps

According to Census data presented earlier in the report, 19% of workers in NOC 7282 had an apprenticeship or trades certificate or diploma. There is one training program offered in B.C. that is singularly focused on concrete finishing, which is the Red Seal apprenticeship program offered through the Operative Cement Masons' and Plasterers' International Association of the United States and Canada, Local 919 and delivered by the Trowel Trades Training Association. Union membership is a *de facto* requirement for enrollment. There are 320 members in Local 919, of which 63 are apprentices and 257 are Red Seal journeymen. These journeymen represent an equivalent of 14% of 1,861 people employed in NOC 7282 in the LMO forecast for 2018.[48] The remaining 5% of those reported in the Census as having an apprenticeship or trades certificate or diploma in NOC 7282 could have a diploma or certificate for a different trade and are now working in concrete finishing. For example, the Construction Craft Worker (Labourer) Red Seal program trains apprentices on a range of labourer activities including assisting on concrete.[49]

According to representatives interviewed from Local 919, roughly half its members are on dispatch and the other half are employees of concrete finishing companies or other companies that employ concrete finishers. The majority of work by its members is on projects with a provincial investment of over $15 million and therefore are subject to apprenticeship requirements. Specifically, the prime contractor must either use, or ensure that its applicable subcontractors use, registered apprentice(s) in respect of any and all contracts for specified trades (including Concrete Finisher) valued at $500,000 or more. Dispatch data from the union suggest that demand for union labour may exceed supply: 240 members are active in the labour force while 80 are available for dispatch. It is unclear whether some of these 80 may be working with open employers while others may be waiting for major public projects to start. Roughly a quarter of union members specialize in dry finishing.

Numerous pros and cons were offered in employer interviews for why someone might want to join the union. Non-union workers are able to make comparable or higher wages without having to pay member fees. On the other hand, union membership provides access to apprenticeship training, a benefits program, and the opportunity to

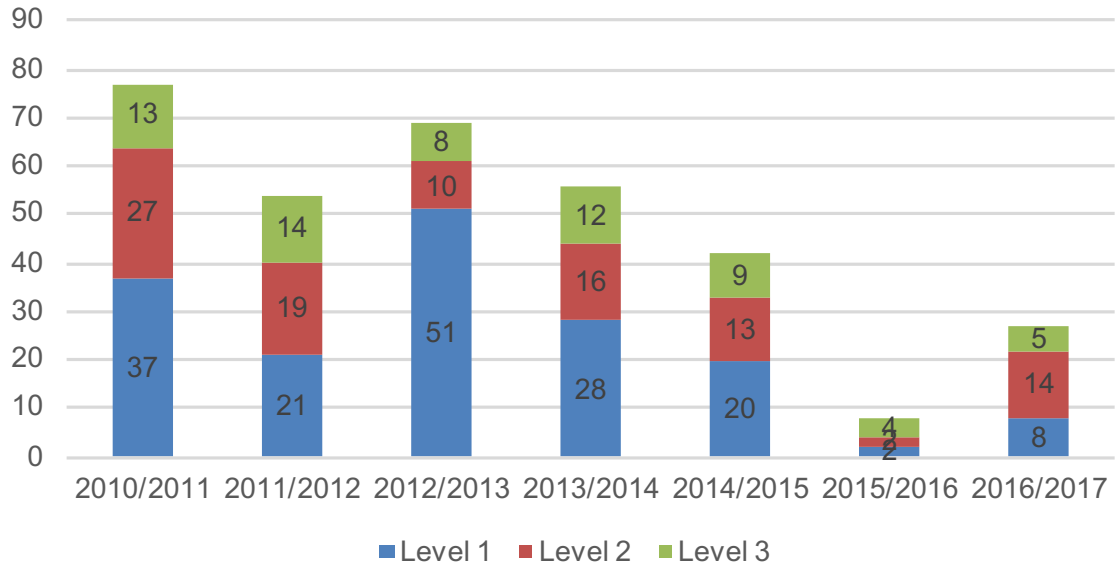
[48] While some of these journeymen may specialize in dry finishing, for the purpose of this report, they are considered within NOC 7282, because their certification in theory includes proven competence in wet finishing.

[49] From the ITA website: “A Construction Craft Worker (Labourer) works mostly on construction sites in residential, institutional, commercial, and industrial settings, including pipelines, utilities, hydroelectric dams, roadways, bridges, tunnels, shipyards, mining and railways. Construction Craft Worker (Labourer) tasks include site preparation and cleanup, setting up and removing access equipment, and assisting on concrete, masonry, steel, wood and pre-cast erection projects. They handle materials and equipment and perform demolition, excavation and compaction activities. They may also perform site safety and security checks.” (link)

work on high-profile public projects. For those interested in working on residential and commercial projects, the value proposition of union membership is weaker.

The tight linkage between apprenticeship training, union membership, and the types of projects that apprentices work on goes a long way to explaining why less than 20% of concrete finishers have formal trades training. Data provided by the Industry Training Authority (ITA) show that participation in apprenticeship training trended downward from 2012/13 to 2015/16, before rebounding somewhat in 2016/17 (see **Figure 26**). Inconsistent enforcement by the Province of its apprenticeship requirements for major public projects was offered as one potential reason for this decrease.

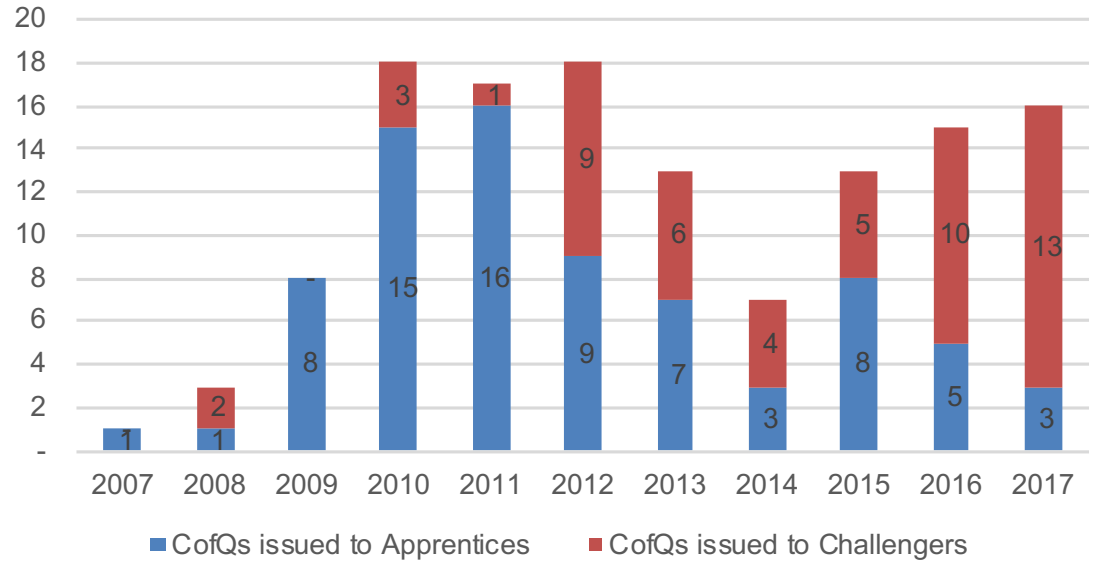
Figure 26: Apprentices trained by level, Concrete Finisher program[50]



Meanwhile, there has been a steady increase in the number of Certificates of Qualification (i.e. Red Seal) issued since 2010 except for a dip in 2014. In the past two years, there have been more certificates issued to challengers than to apprentices, and from 2012 through 2017, the total number of certificates issued to challengers was 47 compared to 35 issued to apprentices. Feedback from employers is that some concrete finishers are motivated to challenge for their Certificate of Qualification to qualify for employment on public projects that are subject to apprenticeship requirements.

[50] Industry Training Authority, special data request.

Figure 27: Certification of Qualification issued, Concrete Finisher program[51]



Employers that serve market segments other than major public projects that were interviewed were unanimous in saying that the lack of training available is a problem. In contemplating how to address this training gap, feedback from employer interviews about the Red Seal program is that work hours are not always focused on concrete finishing activities, the quality of onsite supervision and mentoring by journeypersons is inconsistent, and there is no a check upon issuance of the certificate of apprenticeship that the quality of work-based training met a pre-defined standard. The other major critique is that classroom-based training has limited value compared to hands-on training onsite and may alienate those with the skills and attributes that are important to the trade but who may not perform well in a classroom setting. Employers are generally supportive of a modular training approach that focuses on on-the-job-training with structure and rigour to ensure graduates have practical and useful skills/knowledge coming out of the program.

With concrete mix designs constantly evolving, continuous education opportunities were also identified as a gap area. An example provided was the introduction of supplementary cementitious materials such as fly ash to achieve LEED certification. These products have different drying properties from traditional cement which impacts the techniques concrete placers and finishers must apply to get suitable results. Knowing how to work with and having a command of the pros and cons of different mix designs make concrete finishers more effective at their job. There are limited continuous education opportunities for concrete finishers to learn about new mix designs and other innovations in concrete. The World of Concrete, an annual conference held in the United States, is the primary such opportunity. The American Institute of Concrete (ACI), which describes itself as “a leading authority and resource worldwide for the development, dissemination, and adoption of its consensus-based standards, technical

[51] Industry Training Authority, special data request.

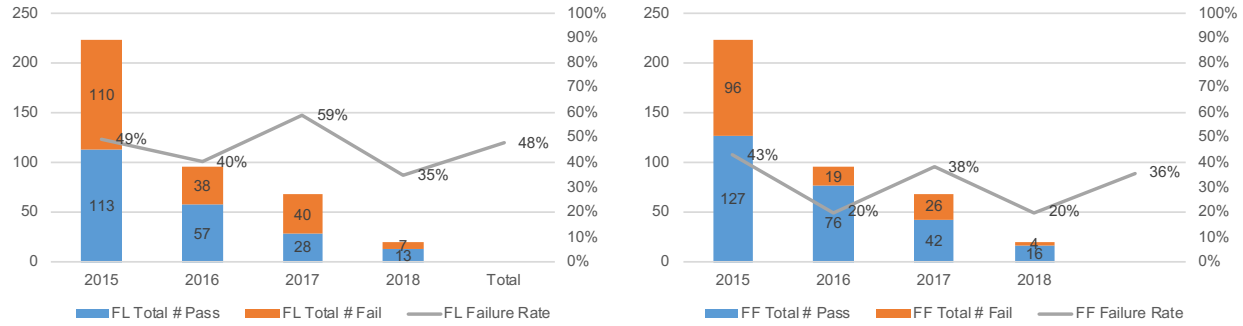
resources, educational & training programs, certification programs, and proven expertise for individuals and organizations involved in concrete design, construction, and materials," has local chapters including one in B.C. However, feedback from the advisory committee and employer interviews was that ACI's primary stakeholders are concrete manufacturers and engineering firms and its services offer limited practical value to concrete finishers.

Finally, and perhaps most importantly, knowledge transfer is a critical factor in making new concrete finishers successful. Knowledge transferred from seasoned finishers to new people in the trade is an important complement to technical training. Gaining an understanding of how weather conditions, redi-mix designs, form construction, types of finishes, quality requirements such as floor flatness and levelness (see more on floor flatness and levelness below), and other onsite conditions interact to affect how concrete cures and therefore how it should be finished, can only be done through knowledge transfer, in the moment, from experienced finishers, and onsite. The loss of the most experienced concrete finishers through retirements presents a significant risk to the trade's ability to deliver consistently high-quality work, unless new entrants can be found and trained prior to older finishers retiring.

4.3.5. Quality concerns

Data was collected to try and understand the impact on building quality from labour shortages in concrete finishing. A place to start is measured quality based on test results, such as for floor flatness and floor levelness. In general, all but single family residential builds are likely to have specifications for floor flatness and levelness written into the design requirements. Once a slab is poured and cured, the project may engage a testing company to measure the slab for its levelness (slope from one point to another) and flatness (departure from that slope, or "waviness"). Data on floor flatness (FF) and floor levelness (FL) tests were sourced from one concrete testing company for all projects in B.C. for which they completed such testing from 2015 through 2018. The data is summarized in **Figure 28**. In the figure, year is the year the project started. The test procedure used complies with the leading ACI and Canadian Standards Association (CSA) standard for the specification and measurement of concrete floor flatness and levelness. Sixty-nine percent of the tests related to commercial and institutional projects and 31% related to residential projects.

Figure 28: Floor levelness (FL) and floor flatness (FF) test results for 2015 to 2018, for one testing company, all tests[52]



Unfortunately, in discussing the results with the testing company, it is clear they do not reveal much that is conclusive about labour challenges; however, they do highlight other issues. Floor flatness and levelness specifications may be written into the design but are not attained and therefore downstream trades such as windows, framing, and flooring are affected. Alternatively, the specifications sometimes exceed the functional requirements of the building adding unnecessary costs to projects. Finally, test results might be a pass, but deflection of the slab – especially for slabs that are elevated – might still occur after the test (the tests have to be performed within three days of the pour). In short, such testing currently does little to impose consistent quality standards on concrete finishing that would help drive the need for skilled labour.

Two interviews were conducted with flooring companies who reported that observed quality in terms of concrete floor flatness and leveling has deteriorated especially on commercial, row, residential and high-rise projects. One interviewee cited two jobs in the previous week they chose not to do because the floors were beyond repair for the type of flooring to be installed. The interviewee also noted they had recently been approached by two separate companies that specialize in repairing concrete.

Representatives from six general contractor companies were asked if higher quality placing and finishing leads to lower overall project costs. They were asked if concrete installations using experienced and trained concrete are more cost-effective than installations that utilize less experienced crews, considering any additional costs such as grinding, patching, and installation of self-levellers to bring a substandard concrete slab up to industry standard. All agreed that higher quality concrete finishing tends to decrease overall project costs. One general contractor mentioned they have not achieved floor flatness requirements for any project in the last three years, resulting in costly repair work needed on all projects. Another said quality has degraded to the point that all projects require repair work. Three general contractors noted shortcomings in forming and rebar installation as well as in concrete finishing. One general contractor interviewed said he would not contract separately for placing and finishing, citing concerns about quality.

[52] Testing company requested to keep its name confidential.

The observation from general contractors is particularly relevant for the high-rise residential and commercial segment. The advisory committee confirmed an inference gleaned from employer interviews that low quality placing on these projects leads to quality deficiencies in wet finishing, requiring more dry finishing work; because formwork, placing, and dry finishing are typically done by the same crews, this dynamic serves the interests of those firms at the expense of the firms that focus on wet finishing. For projects where placing and finishing crews are contracted separately, finishing companies, increasingly, are no longer willing to sign contracts with terms that require them to take accountability for the quality of the finished product.

There are several reasons why placing and finishing crews tend to be separate on these types of projects. The construction process for these projects incorporates a rigid pour cycle, with one day focused on pouring a floor and the remaining days of the cycle focused on repairs on the dried floor and prepping for the next floor. General contractors may find it convenient to work with a subcontractor to provide a dedicated crew throughout the pour cycle and have that labour do placing on pour days and various other activities throughout the cycle, since these types of firms are available in the marketplace, and because the labour can be sourced at a lower wage rate than wet finishers. There may also be a utilization challenge for a wet finishing company if it is to provide placing services, as placing is required for only part of the pour day and for parts of days when columns, stairs, and cores are poured. This separation of labour has historical roots in how concrete services were traditionally (and more commonly) sourced through unions. Today, Local 919 provides wet concrete expertise while Local 1611, an affiliate of the Laborers' International Union of North America (LiUNA), provides general construction labour expertise including concrete placing, primarily for major public projects. Finally, there are different skill sets and worker preferences that align to placing vis-à-vis finishing, as some individuals may be better suited to one versus the other trade.

4.4. Labour productivity

Whether and to what extent the slower growth in employment in NOC 7282 compared to construction activity over the past several years can be explained by an increase in labour productivity was explored. The consensus from employers and the advisory committee is that there have not been any innovations over the past five or so years that have substantially impacted the nature of the job, and would have driven up labour productivity as a result. The most significant productivity-improving innovation that has impacted the occupation is the ride-on trowel machine which was introduced decades ago and has undergone only minor improvements over time. New redi-mix designs are introduced regularly to improve performance and drying times but have not increased the productivity of concrete finishers significantly. The proportion of concrete-based building relative to other construction methods such as mass timber high-rise construction has also not changed significantly over the timeframe.

Looking forward, there is speculation of a theoretical nature that automation may reduce the demand for concrete finishing employment at some unknown point in the future. Online research was conducted to find evidence of potential new innovations such as

automation that could impact the nature of concrete finishing going forward. One report suggested there is some potential for technology to automate some of the work concrete finishers currently do based on a theoretical assessment of the work activities involved.[53] However, concrete finishing requires nuanced consideration of multiple factors including weather conditions, redi-mix materials, onsite conditions, and design specifications, which is not easily automated. No research was found that points to imminent timelines for such replacement of labour with technology to occur, nor describes actual automation technologies in production or under development.

Broader changes to the construction sector as a whole may impact the demand for onsite concrete finishing. Again, however, the certainty of such changes is unclear and the timelines for change are likely long-term. A 2017 report by the McKinsey Global Institute found that labour productivity growth in the construction sector lags that of manufacturing and the total economy and identified seven factors that in combination could increase labour productivity by up to 60% and reduce overall construction costs by up to 38%. Among these factors is “moving toward thinking about construction as a production system, where possible encouraging off-site manufacture, minimizing onsite construction through the extensive use of pre-cast technology, assembling panels in factories and then finishing units onsite.”[54] It highlights the need for scale to generate a return on investment in pre-fabricated manufacturing and alignment of/with building regulations among the conditions that are necessary for transitioning construction to a “production system” model. Again, the timelines of such changes and the corresponding impact on concrete finishing employment are uncertain and long-term.

Returning to the point of lower recent growth in employment in NOC 7282 than building activity, other potential explanatory factors may be growth in the concrete placing activity associated with NOC 7611, as well as growth in undocumented foreign nationals in the sector.

4.5. Integration and modelling

The preceding sections highlighted that the concrete finishing trade is currently experiencing extensive vacancies resulting from a substantial ramp-up of construction activity in recent years. Looking forward, new job openings will be created resulting from expansion demand and replacement demand. This section presents results from an analysis of potential supply additions to the trade and considers:

- The filling of existing vacancies
- The replacement of retiring workers
- The replacement of other workers who leave the trade
- The addition of workers to address future growth

[53] Midwest Economic Policy Institute. The Potential Economic Consequences of a Highly Automated Construction Industry. January 2018.
[54] McKinsey Global Institute. Reinventing Construction: A route to higher productivity. February 2017. Page 6.

4.5.1. Analysis

Existing vacancies – There are an estimated 584 existing vacancies in NOC 7282 as discussed in section 4.3.1. It is assumed for this analysis that all these vacancies are eventually filled. The potential implications of these vacancies not getting filled include demand going unmet (projects are deferred indefinitely or use building approaches that do not use concrete) and supply being provided by other occupations or labour pools.

Replacement demand – In the BC LMO, over the ten-year period of 2018 through 2027, job openings for replacement reasons average 39 per year. Modeling based on age distributions from the Census and estimated probabilities of retiring by age produced an average annual retirement a similar but slightly lower estimate of 37. The LMO estimates are used because replacements in LMO include exits for reasons in addition to retirement, such as illness, disabilities, and deaths. It is assumed for this analysis that no supply additions retire during the 10-year timeframe which would otherwise need to be replaced.

Occupational exits for other reasons – The BC LMO estimates negative values for NOC 7282 for net interprovincial in-migration and inter-occupational mobility (other) over the 2018 to 2027 timeframe. In other words, more people are expected to leave the occupation for other provinces than join the occupation from other provinces, and more people are expected to exit the occupation for another occupation in B.C. than join the occupation from another occupation in B.C. These workers also need to be replaced. The rate of replacement for these reasons is estimated at 1.0% of employment based on the total average annual negative values for net interprovincial migration and inter-occupation mobility (other) divided by the average annual employment for the 2017 to 2027 timeframe.

Expansion demand – Based on the BC LMO projections, the average annual number of job openings from expansion from 2018 through 2027 is four. A slightly higher number of job openings from expansion is used in this analysis based on the following considerations. Secondary research suggests residential construction correlates closely with population growth.[55] One of these studies (Coleman, Karagedikli) also found that population growth is positively correlated with the number of residential construction workers. Data from the Sub-Provincial Population Projections - P.E.O.P.L.E. 2017 (Aug 2017) program suggest BC's population will grow at a compound annual rate of 1.2% for the period of 2018 through 2027.[56] Meanwhile, the major projects inventory includes

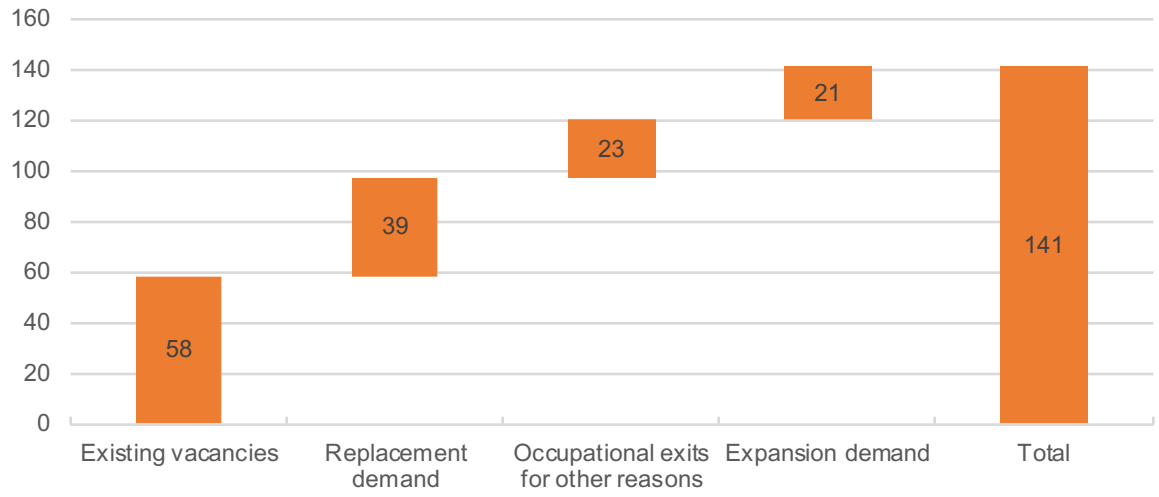
[55] See Edward L. Glaeser & Joseph Gyourko & Raven E. Saks, 2006. "Urban growth and housing supply," Journal of Economic Geography, Oxford University Press, vol. 6(1), pages 71-89, January; and Andrew Coleman & Ozer Karagedikli, 2018. "Residential construction and population growth in New Zealand: 1996-2016," Reserve Bank of New Zealand.

[56] Sub-Provincial Population Projections - P.E.O.P.L.E. 2017 (Aug 2017) accessed July 30, 2018. P.E.O.P.L.E data was also analyzed at the school district level to differentiate areas that are expected to grow and those expected to contract. Of the 59 school district areas, 55 of 59 are forecast to grow and the remaining four, which range in 2018 population from 1,684 to 11,300, are forecast to contract. The compound annual population growth rate across the 55 school district areas is 1.2% for the period of 2018 through 2027, the same growth rate as for the province has a whole.

close to $3.0 billion worth of proposed projects across project types that have not yet started construction, compared to $0.75 billion worth of projects that are underway, suggesting potential incremental labour demand. This analysis, therefore, assumes expansion demand growth at a 1.2% compound annual rate.

Figure 29 shows the average annual number of supply additions resulting from each of these factors. The key outcome of this analysis is that the sector should aim to attract roughly 141 new workers on annual basis to join the trade, or just over 1,400 over the next 10 years.

Figure 29: Projected average annual supply additions by factor



4.5.2. Considerations

Meeting the conditions necessary to achieve these supply additions will require urgent implementation of a holistic workforce development strategy as outlined in the Opportunities for Action section of this report. Failure to do so may result in a further shift of concrete finishing activity to lower-skilled trades, resulting in further concerns about building quality. Finding and training new additions is especially important so that knowledge transfer from seasoned to new finishers can occur before seasoned finishers retire.

Looking forward, the advisory committee sees promise in attracting more entrants out of high school into the trades, including concrete finishing. School visits for this project revealed potential interest and aptitude from a wide spectrum of students, including females, which are underrepresented in this sector. Recent efforts demonstrate the benefits of promoting the trade: at Trades Expo 2017, 24 students participated in a concrete finishing trades challenge, of which 5 (3 females, 2 males) demonstrated aptitude for and interest in pursuing the trade.

Also, there may be opportunities for employers to collaborate and work collectively to share best practices when accessing immigration programs to recruit new workers. One possibility (to illustrate) is to establish presence in foreign countries that have become

significant sources of labour to the trades in B.C., such as Mexico, to match prospective workers to employers to gain access to the Canadian labour market via the Young Professionals “experience” under the International Experience Canada program. Finally, attracting people from other occupations also holds promise, notwithstanding the LMO’s estimate of more people leaving NOC 7282 for other occupations than the other way around. These and other ideas are explored in the Opportunities for Action section below.

While the primary focus of this section is on NOC 7282, there are concrete placers amongst those workers in NOC 7611 that will retire and need to be replaced, while expansion will drive the need for further supply additions in this occupation. A rough estimate of 2/9, or just over 20%, of dry finishing labour focuses on concrete placing, per **Table 5** in section 4 above. This translates into a directional estimate of 756 full-time equivalent of concrete placers. Assuming this labour grows at the same 1.2% annual rate as for NOC 7282, employment will increase by 86 from 756 in 2018 to 841 in 2027. An estimated 158 placers in NOC 7611 will need to be replaced over the 10-year period because of retirements. Therefore, between expansion demand and replacement demand, a total of approximately 244 supply additions are required for placers over the 2018-2027 period, or 24 annually. As placers become better trained, this may displace some employment in the dry finishing business as concrete placing and finishing improves and the need for repair work declines. This effect is not considered in this estimate.

4.6. Summary of challenges

The preceding section highlighted that an estimated average of up to 141 new additions to NOC 7282 will be required annually over the next ten years. The large majority of these additions are required to fill vacancies and replace people who are retiring or exiting the occupation for another occupation or to work in another jurisdiction. There is also an ongoing requirement for supply additions to that pool of labour captured in NOC 7611 who place but do not finish concrete. From a training perspective, 19% of people in NOC 7282 have an apprenticeship or trades certificate or diploma compared to 12% in NOC 7611; employers interviewed agreed resoundingly that more training capacity is required for concrete finishers. The labour and skills gaps in concrete finishing and placing are described in further detail by market segment in this concluding part of the report’s section on key findings.

4.6.1. Small scale residential

Small scale residential construction, including single family residences and semi-detached and row houses, represented just over of a third of construction investment in B.C. 2017, and therefore is assumed to account for roughly a similar proportion of concrete finishing activity. The concrete finishing firms engaged in this sector are generally small companies with 60% of wet finishing employers having fewer than five concrete finishers and placers. Finishers both finish and place concrete and may also do formwork. Employers interviewed for this report reported having vacancies that are causing long hours for the existing finishers and scheduling delays for future projects.

The labour is non-unionized and therefore new entrants lack access to formal training that is available through Local 919 and Trowel Trades Training Association. Employers, given their small size, have limited capacity to focus on administrative activities such as succession planning, recruitment, training program development, continuous education, and recruiting immigrants through programs such as the Temporary Foreign Worker Program. Finally, a theme emerged from employer interviews and advisory committee meetings that this segment of the market provides excellent hands-on training opportunities for finishers because the projects include many types of finishing including foundations, driveways, floors, sidewalks, curbs, landscape and specialty features such as swimming pools, and decorative concrete such as stamping, color, acid staining, and polishing.

4.6.2. High-rise residential and commercial

As discussed at multiple points in this report, there has emerged a division of labour between concrete placing and dry finishing, and wet finishing, in the high-rise residential and commercial segment. This segment accounts for roughly half of the construction investment in B.C. in 2017, and therefore a similar proportion of concrete finishing activity. Speculation among those interviewed for this report was that the much of the placing is done by underqualified workers. This has created challenges for wet finishing, with some wet finishing firms not willing to take contractual responsibility for the quality of their finished product. The same labour shortage and training gaps exist for those wet finishers engaged in this type of work as for small-scale residential projects.

4.6.3. Institutional and governmental, infrastructure

Eleven percent of construction activity in B.C. in 2017 was in the institutional and governmental, and infrastructure segments. These are generally large-scale public projects financed by government, and therefore tend to draw on unionized labour from Local 919 and other unions involved in concrete, such as Local 1611 for placers. Indeed, there are 320 Local 919 members, which represent just less than 20% of those employed in NOC 7282, and the union reports that just over half their members are engaged on projects in these segments. For this segment, the issue is rather one of labour surplus than shortage, as 80 of the 320[57] members are available for dispatch and awaiting new public projects to initiate. Input from the union is that an increase in low-cost finishers, including undocumented foreign nationals, has dampened demand for unionized labour.

[57] Includes members that specialize in or focus on dry finishing.

4.6.4. Specialty

Many wet finishing companies provide some specialty services such as stamping and colouring in addition to standard placing and finishing services. The use of concrete for architectural purposes to impart an aesthetic quality is another specialty area. Companies that provide such specialty services face similar labour challenges to other finishing firms but have more knowledge to transfer from retiring to new workers. Specialty services require additional attention to detail, potentially making them a good fit for some women and other like-minded individuals.

5. OPPORTUNITIES FOR ACTION

The following high-level opportunities for action are identified, and comprise a holistic set of recommendations to help address the challenges and opportunities currently facing the concrete finishing sector in B.C. They serve as a starting point for Phase 3 'Strategy Development' of the initiative.

Opportunities for Action

The following high-level opportunities for action are identified, and comprise a holistic set of recommendations to help address the challenges and opportunities currently facing the concrete finishing sector in B.C. They serve as a starting point for Phase 3 'Strategy Development' of the initiative.

I. Articulate a compelling employee value proposition to support recruiting efforts.

The research identified a number of worker attributes that are desired by employers in new entrants. Academic success is not necessarily a good predictor of competence in the concrete sector, however, a range of physical abilities, cognitive skills, and work style preferences are valuable. For those for whom concrete finishing is a good fit, it offers good pay and a high rate of full-time employment. There is an opportunity to refine these findings further and incorporate them in a compelling value proposition to use when recruiting new entrants from target populations.

II. Target underemployed and underrepresented populations.

Concrete finishing offers a long and rewarding career to those for whom it is a good fit. Competition for new entrants to the workforce is increasingly stiff as older workers continue to retire and the number of 15 to 29 year olds participating in the labour market begins to shrink over the next several years. Especially to those students who have ambition, a good attitude and willingness to learn, concrete finishing could offer a compelling career option to those entering the workforce. Based on Census 2016 data, the occupation is 1% female, 26% visible minority, 31% immigrant, and 6% Indigenous Peoples. While similar to the wider construction workforce, these proportions are below those for B.C. as a whole. There is an opportunity to undertake targeted outreach to these populations. Part of the value proposition could be an opportunity to participate in modular training described below.

III. Introduce training that focuses on onsite and hands-on experience.

A significant training gap exists, with less than 20% of concrete finishers having formally recognized trades training. Steady numbers of aging workers retiring requires a continual stream of new entrants to the occupation that are productive on day one. Classroom-based training is less important than on-the-job training. However, the onsite activities need to be relevant, and the training needs to be properly supervised and led by experienced instructors. The modular training pilot project currently underway led by

CNT and BC Formwork Association and BC Floor Covering Association should be evaluated as a potential model to emulate. Under that pilot, Module 1 is 2.5 hours and introduces the individual to a site to have them self-evaluate as to whether construction work is a good fit for them. Module 2 is 4 to 6 hours and introduces the individual to an employer to try the trade and for the trainer to evaluate if the individual has the right attributes to be successful long-term. With Module 3 and subsequent modules, the individual is employed, and tuition-based training begins. Finding and training new entrants in anticipation of retirements is especially important so that knowledge transfer from seasoned to new finishers can occur.

IV. Evaluate options for recruiting qualified immigrants.

While the new entrant supply pool is expected to be the primary source of supply additions, international immigration is another important source of new labour. There are several immigration programs that can be accessed through which foreigners can become employed as concrete finishers. These include the Temporary Foreign Worker Program and the International Experience Canada (IEC) program. The Working Holiday and Young Professionals streams under the IEC program holds promise, because they do not require a labour market opinion. One idea is for employers to engage with trusted parties in signatory countries – for example, Mexico, from which many placers and finishers in B.C. arrived – to assist people with securing employment in B.C. before departing their country.

V. Grow local capacity to deliver continuing education.

Redi-mix and building designs are continuously evolving and impact concrete placing and finishing. With limited local continuing education opportunities available, attending the World of Concrete conference held annually in the United States is the primary continuing education opportunity for B.C. companies. However, affordability and timing of the conference may be a challenge for some companies who wish to attend. Having B.C.-based continuing education services that take local conditions, such as different climate zones, into consideration would be beneficial.

VI. Collaborate with upstream and downstream trades on best practices.

The quality of the finished concrete product depends critically on upstream trades such as forming and concrete placing that may be contracted separately. Likewise, downstream trades such as glaziers, framing, and flooring depend critically on the quality of the finished concrete product. There is an opportunity for these trades to collaborate to document and promote best practices. As well, there may be an opportunity to integrate modular training across disciplines. For high-rise and commercial projects where placing is typically contracted separately from finishing, best practices for concrete placing should also be developed and advocated to general contractors.

VII. Advocate for more consistency in concrete testing.

More consistent testing to measure the quality of finished concrete, such as for floor flatness (FF) and floor levelness (FL), would increase demand for higher quality concrete finishers and therefore would lead to higher quality concrete construction and lower overall project costs. There is an opportunity to work with testing companies, general contractors and architecture firms to investigate possibilities to establish more rigorous testing standards and protocols, especially for commercial, institutional and high-rise residential projects.

VIII. Establish an industry organization to achieve gains from scale and advance the quality of the trade.

With three quarters of the firms in concrete finishing having fewer than ten employees, a collaborative approach to addressing the sector's workforce challenges is necessary. An industry organization would play a central role in developing and implementing the recommendations presented in this report. The association should be directed by concrete finishing employers and engage stakeholders including upstream and downstream trades and related associations such as the BC Formwork Association and BC Floor Covering Association, the redi-mix sector, general contractors, and material testing companies.

6. APPENDICES

6.1. Employer Interview Template (Brief)

Effort will be made to contact as many employers that are active in the concrete finisher sector as can be identified. This template will be used when contacting all employers. A subset of these employers will be asked to participate in a more in-depth interview using the Employer Interviews (Detailed) template.

Business Contact

Company Name: _____

Primary Contact Name: _____

Phone: _____ Email: _____

Interview Questions

Q1. How many years have you been in business?

Q2. Where is your business located (city)?

Q3. What area/region do you primarily service?

Note to interviewers: Collect best description of the region and we can translate that to the correct economic region. A map of the regions is included as Appendix A.

- ☐ North Coast & Nechako
- ☐ Northeast
- ☐ Vancouver Island / Coast
- ☐ Mainland / Southwest
- ☐ Kootenay
- ☐ Thompson-Okanagan
- ☐ Cariboo

Q4. What does your company do?

Note to interviewers: terms in the table below are defined as follows.

Sector:
Residential – houses, apartments, condominiums
Commercial – non-residential, warehouses, greenhouse, parkades, large builds and not public infrastructure projects
Industrial – very large infrastructure projects (i.e. Site C, LNG, Dams)
Infrastructure – other public infrastructure projects (e.g. bridges, overpasses, sky train, hospitals)
Institutional - (e.g. schools, hospitals)
Specialty – Color, stamp, decorative, underwater, acid stain, polish, shot crete
Curb & Gutter – Sidewalks, drains, ramps
Patching & Grinding – grinding and filling
Other: sawcutting and coring

Service:
Forming – building forms for concrete pours
Placing – pouring concrete into the forms
Finishing – flatwork, broom, edges
Waterproofing – coating on concrete (parkades, balconies)
Repairs – grinding, patching concrete imperfections

Sector	Check	% of	Check if provided				
	If Applicable	Business (equal 100%)	Forming	Placing	Finishing	Waterproofing	Repairs
Residential - Houses							
Residential - Apts							
Residential - Townhouses							
Commercial							
Industrial							
Infrastructure							
Institutional							
Specialty							
Curb & Gutter							
Patching & Grinding							
Other							
Other							

Q5. What is the size of your company?

(One way to think about this is in terms of annual revenues, for example:)

- ☐ Small ($0 - $250,000)
- ☐ Medium ($250,000 - $500,000)
- ☐ Large ($500,000 - $1 Million)
- ☐ Very Large (over $1 Million)

Q6. How many employees do you have?

Q7. How many concrete finishers do you employ? Are they owners, dispatchers and foremen who also work as concrete finishers?

Q8. How many of these individuals are over the age of 55?

Q9. Do concrete finishers need training?

If yes, what kind do you think works best: _____

Q10. Do you currently have registered Industry Training Authority (ITA) apprentices with your company?

- ☐ Yes
  If yes, which program: _____
- ☐ No
  If no, why not:_____

Q11. Does your company have a working Red Seal Cement Mason Journeyman?

- ☐ Yes How many: _____
- ☐ No

Q12. Has your company ever been union-affiliated?

- ☐ Yes
  Are you still? ☐ Yes ☐ No
  If yes, which Union: _____
- ☐ No

Q13. If Yes, is your company an open or closed shop?

- ☐ Open - one is not required to join or financially support a union
- ☐ Closed - employer agrees to hire union members only

Q14. Are you facing a concrete finishing labour shortages or surplus.

☐ Shortage ☐ Surplus

If a shortage why do you think that is:

_____

Q15. Would you support module training?

--- END OF INTERVIEW ---

6.2. Employer Interview Template (In-Depth)

Business Contact and select other information is collected using the Brief template. The goal is to follow up and conduct at least 100 more in-depth interviews using this template. Some identical questions are included in the Brief and In-Depth templates. Interviewers can pre-populate this template with data collected using the Brief template, or confirm or skip duplicate questions.

Business Contact

Company Name: _____

Primary Contact Name: _____

Phone: _____ Email: _____

Operations

Q1. How many years have you been in business?

Q2. Where is your business located (city)?

Q3. What area/region do you primarily service (pick one)?

Note to interviewers: Collect best description of the region and we can translate that to the correct economic region. A map of the regions is included as Appendix A.

- ☐ North Coast & Nechako
- ☐ Northeast
- ☐ Vancouver Island / Coast
- ☐ Mainland / Southwest
- ☐ Kootenay
- ☐ Thompson-Okanagan
- ☐ Cariboo

Q4. What does your company do?

Note to interviewers: terms in the table below are defined as follows.

Sector:
Residential – houses, apartments, condominiums
Commercial – non-residential, warehouses, greenhouse, parkades, large builds and not public infrastructure projects
Industrial – very large infrastructure projects (i.e. Site C, LNG, Dams)
Infrastructure – other public infrastructure projects (e.g. bridges, overpasses, sky train, hospitals)
Institutional - (e.g. schools, hospitals)
Specialty – Color, stamp, decorative, underwater, acid stain, polish, shot crete
Curb & Gutter – Sidewalks, drains, ramps
Patching & Grinding – grinding and filling
Other: sawcutting and coring

Service:
Forming – building forms for concrete pours
Placing – pouring concrete into the forms
Finishing – flatwork, broom, edges
Waterproofing – coating on concrete (parkades, balconies)
Repairs – grinding, patching concrete imperfections

Sector	Check	% of	Check if provided				
	If Applicable	Business (equal 100%)	Forming	Placing	Finishing	Waterproofing	Repairs
Residential - Houses							
Residential - Apts							
Residential - Townhouses							
Commercial							
Industrial							
Infrastructure							
Institutional							
Specialty							
Curb & Gutter							
Patching & Grinding							
Other							
Other							

Q5. What finishing services do you provide?

Type	Check if applicable	Definitions
Hand Finish - Trowel		
Machine Finish - Walk Behind		
Machine Finish - Double		
Broom Finish		
Exposed		
Stamp		
Color		
Decorative (acid stain)		
Polished		

Q6. What is the size of your company?

One way to think about this is in terms of annual revenues, for example:

- ☐ Small ($0 - $250,000)
- ☐ Medium ($250,000 - $500,000)
- ☐ Large ($500,000 - $1 Million)
- ☐ Very Large (over $1 Million)

Q7. What is the approximate distribution of work by season:

Season	%
Winter	
Spring	
Summer	
Fall	

Q8. Has your company ever been union-affiliated?

- ☐ Yes

  Are you still? ☐ Yes ☐ No

  If yes, which Union: _____

- ☐ No

Q9. If Yes, is your company an open or closed shop?

- ☐ Open - one is not required to join or financially support a union
- ☐ Closed - employer agrees to hire union members only

WORKFORCE CHARACTERISTICS

Q11. How many total employees do you have?

Q12. What is the breakdown of employees?

Employee Type	Total Count	Full Time	Part Time	Count of those that work as a Concrete Finisher	Notes
Owner					
Dispatcher					
Foreman					
Finisher				N/A	
Placer				N/A	
Labourer				N/A	
Administration				N/A	

Q13. How many of your concrete finishers are over the age of 55?

Q14. How many sub-contractors do you typically employ?

Sub-contractor Type	Total Count	Notes
Finisher		
Placer		
Former		

Notes: Are subs employed per job? on a consistent basis? Or at all times of the year?

Q15. Do you regularly use temporary labour services (eg: labour ready companies)?

- ☐ Yes
- ☐ No

Q16. How long have your employees worked with you?

Employee Position	Count				
	Under 1 yr	Between 1 – 5 yrs	Between 5 – 10 yrs	Between 10 – 20 yrs	Over 20 yrs
Dispatcher #1					
Dispatcher #2					
Forman #1					
Foreman #2					
Finisher #1					
Finisher #2					
Finisher #3					
Placer #1					
Placer #2					
Placer #3					
Labourer					
Administration					

Add more if necessary:

Q17. We would like to understand the demographic characteristics of your concrete finishers, placers and labourers:

a. Concrete Finishers

Age	Total Count	Count Male	Count Female	Count Immigrants	Count Aboriginal
15 - 24					
25 – 34					
35 – 44					
45 – 59					
60 and over					
Total					

b. Placers

Age	Total Count	Count Male	Count Female	Count Immigrants	Count Aboriginal
15 - 24					
25 – 34					
35 – 44					
45 – 59					
60 and over					
Total					

c. Labourers

Age	Total Count	Count Male	Count Female	Count Immigrants	Count Aboriginal
15 - 24					
25 – 34					
35 – 44					
45 – 59					
60 and over					
Total					

d. Management

Age	Total Count	Count Male	Count Female	Count Immigrants	Count Aboriginal
15 - 24					
25 – 34					
35 – 44					
45 – 59					
60 and over					
Total					

e. Administration

Age	Total Count	Count Male	Count Female	Count Immigrants	Count Aboriginal
15 - 24					
25 – 34					
35 – 44					
45 – 59					
60 and over					
Total					

Q18. What wage rates do you pay your concrete finishers?

Position	Hourly pay
Labourer	
Placer	
Entry-level concrete finisher	
Mid-level concrete finisher	
Senior-level concrete finisher (Journeyman)	
Registered ITA Apprentice	
Red Seal Journeyman	

Q19. Do you pay over-time

- ☐ Yes
- ☐ No

Q20. What makes a good concrete finisher? What characteristics would an ideal concrete finisher have? What would you need to see to "give them a chance"?

Note to interviewers: The goal is to engage employers on the full range of desirable attributes – cognitive, physical, attitudes, preferences. See Appendix B to this template for example such attributes to help facilitate this discussion. The trial set of ~10 interviews will determine whether there is a pattern and if this question should be modified to be a checklist rather than open.

RECRUITMENT AND RETENTION

Q21. Are you facing a concrete finishing labour shortages or surplus.

☐ Shortage ☐ Surplus

If a shortage, how these shortages are affecting your business.

a. I have trouble finding qualified concrete finishers
☐ Agree ☐ Disagree ☐ Depends

Depends on?_____

~~b.~~ I have trouble retaining employees as they are often not suited for the trade
☐ Agree ☐ Disagree ☐ Depends

Depends on?_____

c. I have had to turn away jobs because of labour shortages
☐ Agree ☐ Disagree ☐ Depends

Depends on?_____

d. I have had to scale back operations because of labour shortages
☐ Agree ☐ Disagree ☐ Depends

Depends on?_____

e. I have to rely on hiring under-skilled people who may not be reliable, dependable or productive
☐ Agree ☐ Disagree ☐ Depends

Depends on?_____

f. I have had to raise wages and/or other benefits to attract or retain skilled people
☐ Agree by how much: _____

- ☐ Disagree
- ☐ Depends

Depends on? _____

Q22. Do you feel that these labour conditions are**:**

- ☐ Getting better
- ☐ Same
- ☐ Worse

Q23. If you are experiencing shortages in concrete finishers, please identify and rank what is causing this:

Rank 1 = biggest cause	Cause	Notes
	Increase in retirements	
	Increase in demand for our services	
	Fewer new entrants available	
	Leaving for other industries	
	Lack of skills training	
	Other	
	Other	

Q24. Do you expect your business to be operating 5 years from now?

- ☐ Yes
- ☐ No

Q25. If No, why not:

Q26. What strategies do you use when recruiting new employees?
(select all that apply and rank in importance)

Check If applicable	Strategies	Rank for use 1 - 10
	Word of mouth	
	Friends and family	
	Hiring Incentives	
	Craigslist, Kijiji, Indeed.com, LinkedIn and/or other employment-related search engines	
	Postings on WorkBC job boards	
	Recruiting companies	
	Social media (e.g. Facebook, Twitter)	
	Actively pursuing foreign hires	
	Other, please specify:	

Q27. Have you looked at alternative hires:

Check If applicable	Special efforts	# Hired
	Immigrants	
	Women	
	Indigenous peoples	
	Students	
	Other, please specify:	

Q28. If Yes to any of these, how would you rate your success at hiring people from these groups (select best option, for each group)

Note to interviewers: ask for explanation.

Special efforts	Highly successful	Moderately successful	Not successful	Notes
Immigrants				
Women				
Indigenous				
Students				
Other, please specify:				

Q29. If you were presented with fully qualified and vetted candidates, how many of them would you hire immediately on a full-time basis?

a. For existing projects

Role	# Required
Placers	
Finishers	

b. For expansion (taking on more jobs)

Role	# Required
Placers	
Finishers	

Q30. How many of your placers and current concrete finishers do you expect will retire within the next 5 years?

Role	# Required
Placers	
Finishers	

Q31. Why do you think employees/individuals leave the concrete trade (select all that apply and rank)?

Check If applicable	Issues	Rank 1 - 10
	Actual skills don't meet the requirements of the job	
	Wages and/or benefits are not high enough	
	Physical work conditions	
	Time management working under pressure	
	Transportation	
	Other, please specify:	

Q32. Rate the following as Substantial, Somewhat, Not at All, or I Don't Know in terms of their impact on the concrete finishing trade over the next 5 or years:

a. Industry change (such as new mix designs, tools of the trade, changes to upstream or downstream trades)

☐ Substantial ☐ Somewhat ☐ Not at all ☐ Don't know

b. Regulatory change (such as building code changes)

☐ Substantial ☐ Somewhat ☐ Not at all ☐ Don't know

c. Other change: _____

☐ Substantial ☐ Somewhat ☐ Not at all ☐ Don't know

Q33. For those that you rate as Substantial or Somewhat, please explain what the impacts are on the concrete finishing workforce.

Q34. Why do you think your long term employees 15 yrs+ stay?

TRAINING

Q34. Do your concrete finishers have training?

☐ Yes, formal training (see below depending on answer)
☐ Yes, informal training (see below depending on answer)

TRAINING - Formal

Q35. How many of your concrete finishers have their Red Seal?

Q36. For the remainder of your concrete finishers, is it a priority to you for them to get their Red Seal?

☐ Yes, for all
☐ Yes, for some
Why: _____

☐ No
Why:_____

Q37. How relevant is the Red Seal program to your company?

☐ Substantial ☐ Somewhat ☐ Not at all ☐ Don't know

Why:_____

TRAINING – Informal

Q38. Does your company have to train concrete finishers?

☐ Yes ☐ No

If yes, why: _____

If yes, who trains them: _____

Q39. How do you train concrete finishers?

a. Classroom ☐ Yes ☐ No

b. On the job ☐ Yes ☐ No

Q40. How important is classroom training for concrete finishers?

☐ Extremely ☐ Somewhat ☐ Not at all

Explanation to answer: _____

Q41. How important is on the job training for concrete finishers?

☐ Extremely ☐ Somewhat ☐ Not at all

Explanation to answer: _____

Q42. How important are weather conditions to concrete finishing training?

☐ Extremely ☐ Somewhat ☐ Not at all

Explanation to answer: _____

Q43. How do concrete finishers learn the various surface finishes?

Examples for interviewers: sidewalks, patios, flatwork, house floors, parkades, balconies etc

Q44. How long do you think it would take to become a competent finisher (one you would send to the various job types by themselves)?

Years: _____

Q45. Would you support a modular on-job training program?

☐ Yes ☐ No

CONCLUSION

Q46. Do you have additional input you would like to provide?

--- END OF INTERVIEW ---

6.4. Employee Interview Template

Approximately up to 50 employees will be interviewed across the province. Employees will be sourced through employer interviews and CNT's network. The goal is to achieve a split of approximately 80% concrete finishers and 20% placers and collect perspectives from diverse viewpoints (e.g. region, employer size, gender, experience level, other demographic attributes).

EMPLOYEE CHARACTERISTICS

Q1. Ask / note the following:

Region	
Age	
Gender	

Q2. Are you working as an immigrant to Canada?

Q3. Do you self-identify as Indigenous, Metis, or Inuk?

Q4. Are you a concrete placer or a finisher?

- ☐ Placer
- ☐ Finisher

Q5. If a Finisher, are you:

- ☐ A registered apprentice
- ☐ A Red Seal journeyman
- ☐ Tradesman

Q6. If a Finisher, how many years have you worked as a concrete finisher?

Total years as a concrete finisher	Years
Years with current employer	Years

Q7. What is your typical work pattern per week (select one):

- ☐ 5-7 days
- ☐ 3-4 days
- ☐ 0-2 days

Q8. What hourly wage are you paid?

Q9. Do you get paid overtime?

Q10. What additional benefits do you receive (check all that apply):

- ☐ Medical
- ☐ Dental
- ☐ Parking
- ☐ Training
- ☐ Tools
- ☐ Vehicle Maintenance
- ☐ Gas
- ☐ Other
  Describe: _____

Q11. Do you work as an employee with multiple employers?

- ☐ Yes
- ☐ No

Q12. What was your previous employment prior to being a concrete finisher?

- ☐ Concrete-related labourer
- ☐ Concrete placer
- ☐ Other trade (note which one)
- ☐ Non-trade
  What: _____
- ☐ Straight from school – High school
- ☐ Straight from post-secondary: Which program: _____

Q13. Are you or were you in the concrete union?

- ☐ Yes, I'm currently in the union
- ☐ Have never been in the union
- ☐ No, but I was previously in the union

Q14. If No, why did you leave the union?

WORKPLACE CHARACTERISTICS

Q15. What makes a good concrete finisher? What attributes do successful concrete finishers share?

Note to interviewers: The goal is to engage employees on the full range of desirable attributes – cognitive, physical, attitudes, preferences. See the Appendix B to this template for example such attributes to help facilitate this discussion.

TRAINING

Q16. What is your highest level of education attained (select one)?

- ☐ Completed some high school
- ☐ High school graduate
- ☐ Completed some college
- ☐ College diploma
- ☐ Bachelor's degree or higher
- ☐ Other

Q17. What apprenticeship training have you taken for concrete finishing (select one)?

- ☐ I completed my Red Seal through an employer
- ☐ Learned on the job from a seasoned, non-Red Seal mentor
- ☐ I have completed some formal apprenticeship training
- ☐ I am not in a formal apprenticeship training but would like to
- ☐ None

Q18. If you have partially completed your apprenticeship, are you planning to complete?

- ☐ Yes
- ☐ No

Q19. If you have answered question 18.

a. If yes, why are you planning to complete the apprenticeship training?

b. If No, why are you not planning on completing the apprenticeship training?

Q20. If you answered Q17. with one of the first three options, rate the importance of apprenticeship training to your success as a concrete finisher:

- ☐ Critical
- ☐ Important
- ☐ Somewhat important
- ☐ Not important

Q21. How would you rate the importance, quality and availability of on-the-job training or mentoring you receive with your current employer:

Note to interviewers: circle one option under each column		
Importance	**Quality of Mentors**	**Availability**
Critical	Excellent	Time is regularly taken to mentor me
Average	Moderate	Sometimes I am mentored
Not important	Poor	I am rarely mentored

SATISFACTION

Q22. Do you see yourself working as a concrete finisher 12 months from now?

- ☐ Yes
- ☐ No
- ☐ Maybe

Q23. What are the reasons you would choose to stay or leave your job?

Note to interviewers: Consider using the following checklist to facilitate the discussion. Select all that apply and indicate top 2 or 3.

- ☐ The wages are not high enough
- ☐ The benefits (like health, dental or pension) are not good enough or don't exist
- ☐ There are not enough career advancement opportunities or a clear career path
- ☐ The hours are not flexible enough
- ☐ Hours are too flexible. Not a 9-5 job.
- ☐ The hours are not guaranteed or the schedule is too unpredictable
- ☐ There is not enough variety in the work
- ☐ The job is too stressful
- ☐ I don't like the management and/or supervision I receive

- ☐ I don't want to work outside all year long
- ☐ The commute is too long/difficult
- ☐ Other

Q24. How long is your typical commute to work?

- ☐ Under 30 minutes
- ☐ 30 minutes to an hour
- ☐ Over an hour

Q25. How do you travel to work?

- ☐ Drive my own car
- ☐ Car share with fellow employees
- ☐ Public transit
- ☐ Other

Q26. Are you willing to travel distances for work with your current employer?

- ☐ Yes
- ☐ No

Q27. Are you willing to travel to another region or province for a similar job?

Q28. Any other comments, suggestions, insights ect.?

Q29. What would make you stay with a company?

--- END OF INTERVIEW ---

6.5. Forming Interview Questions

1. How many employees are in your company? What sector(s) does it primarily serve: residential, commercial or industrial? Where is the company located?

2. Do you do…
   a. Residential forming? ☐ Yes ☐ No
      - ☐ Foundations
      - ☐ Walls
      - ☐ Patio's
      - ☐ Driveways
      - ☐ others _____

   % of business: _____

   b. High-rise forming? ☐ Yes ☐ No
      i. Vertical
         - ☐ Columns
         - ☐ Walls

      ii. Horizontal
         - ☐ Slabs
         - ☐ Parkades

   % of business: _____

   If no, who does it _____

3. Do you or does your employer employ concrete finishers? Why or why not?

4. Do you observe gaps in concrete finishing labour

   a. Availability of concrete finishers

   b. Quantity of concrete finishers

   c. Insufficient skills and experience (quality), or both quantity and quality?

5. Is there formal training for form building?

6. If applicable, Do form builders need to know about concrete finishing to do their jobs well?

7. Should form builders receive more training about concrete finishing?

8. Are there innovations in forming that will impact concrete finishing – what they do, and how they do it?

6.6. Flooring Interview Questions

1. How many employees are in your company? What sector(s) does it primarily serve: residential, commercial or industrial? Where is the company located?

2. Does concrete affect all your flooring types?

    a. How much of your work is laid on concrete?

        i. Percentage approx. _____

    b. Other types of surfaces _____

3. In today's construction is the final concrete finishing product better or worse than 5 years ago?

4. Concrete Standards

    a. Is the floor flatness and floor levelness left by concrete finishers adequate?

    b. Is concrete cured properly for your flooring needs

    c. Other issues:

5. Are there innovations in flooring that will impact concrete finishing – what they do, and how they do it?

6.7. Prospective Employee Interview Template

The following template has been prepared to use with students at school career events and job seekers at WorkBC sites. Wording that is specific to students is noted with SCHOOL and wording that is specific to job seekers is highlighted with WORKBC.

Q1. Do you know anyone who works in the trades?

- ☐ Yes
- ☐ No

Q2. If Yes

- ☐ Who
- ☐ Which trade(s)

Q3. Do you know anyone who works in concrete finishing?

- ☐ Yes
- ☐ No

Q4. What are your expectations about getting a job?

- ☐ Confident – I'm confident I will get a job in the field I like
- ☐ Optimistic – I'm hopeful I will be find a job that will be a good fit for me
- ☐ Pessimistic – It's going to be difficult for me to find a job
- ☐ I don't know

Q5. What steps do you plan to take to find a job (select all that apply)?

- ☐ Get advice from friends and families
- ☐ SCHOOL – Get advice from school career counsellors
- ☐ SCHOOL – Learn from job fairs organized by my school
- ☐ WORKBC – Utilize WorkBC resources
- ☐ Do research online to find jobs that fit my preferences
  Which sites: _____
- ☐ Other
  Notes:_____
- ☐ I don't know

Q6. Have you narrowed down what kind of job you want and you think you would be good at?

- ☐ Yes
- ☐ No not yet

Q7. If Yes, which one?

Q8. Would you move to another city for work?

- ☐ Yes
- ☐ No
- ☐ Depends

  Depends on: _____

Q9. What are your future plans (select one)?

- ☐ SCHOOL – Complete high school
- ☐ Complete training to qualify me for a specific job
- ☐ Complete trades training
- ☐ Complete a college diploma
- ☐ Complete a university degree (bachelors)
- ☐ Get a job

Q10. Circle up to 10 words that best describe your style. There is no right or wrong answer.

*Note to interviewers: **Provide the following page as a separate handout**. The following are attributes that may be best-fit for concrete finishing (subject to change based on employer and employee survey responses). The handouts could be "scored" on-site to predict "fit" with concrete finishing and to provide immediate feedback to interviewees (and potentially collect leads for recruiting).*

Q11. WORKBC – What was your last steady job?

- ☐ I have never had steady employment
- ☐ Trades (not which one)
- ☐ Other

Q12. In closing the interview, ask or make note of the following:

- ☐ SCHOOL – School
- ☐ SCHOOL – Grade
- ☐ WORKBC – WorkBC site
- ☐ Gender

Circle **at least 10 words** that best describe your style.

Indoors

Working alone

Outdoors

Sitting

Reading & writing

Computers

Moving

Building or fixing

Tools

Adrenaline junkie

Working on a team

Regular routine

Follow a plan

Constant change

Perfectionist

Laid back

Wing it

Make a plan

Creative

Structured

Musical

Left-handed

Sports

Numbers

Art

Drama