Enhancing Mentorship for the Electrical Trade in British Columbia

Final Report

March 2017



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BC Mentorship Project

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Participating Organizations

The **Electrical Joint Training Committee** (EJTC) is a partnership of the Electrical Contractors Association of BC and the International Brotherhood of Electrical Workers Local 213. The EJTC sponsored and managed this project, assisted with the recruitment of participating firms, and reviewed the resulting analysis of skills and performance gaps from an industry perspective.

From its campus in Port Coquitlam, BC, the EJTC develops technical training programs and standards and delivers training for electricians at the pre-apprentice, apprentice and continuing levels. The EJTC's provides its Mentorship Matters™ course on a mandatory basis to all apprentices in its jurisdiction and to training centres and employers anywhere in North America.

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The **Social Research and Demonstration Corporation** (SRDC) is a non-profit organization created to advance the state of knowledge and the delivery of social, education and labour market programs. The SRDC designed the research protocols and led the survey design and analysis for the Mentorship Project and took the lead in the preparation of this report.

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SkillPlan is a not-for-profit organization providing workplace education consulting services to address learning challenges in the construction industry and other sectors. SkillPlan assisted EJTC in the recruitment of exemplar firms for the Mentorship Project and participated with SRDC in the survey design and analysis, focusing on the implication of skills and performance gaps for the future development of training tools.

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SkillSource BC is a non-profit group training organization with a mandate to increase access to trades training and work experience for apprentices. Using a full sample frame of active electrical contractors, SkillSource BC randomly selected a representative sample and administered the project survey.

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Executive Summary

The BC Mentorship Project provides a novel approach to addressing the unique skills development needs within British Columbia's construction sector and skilled building trades, with a focus on electrical journey workers and apprentices.

The construction industry across Canada is estimated to lose 235,000 skilled tradespeople to retirement over the next decade, leading to skilled labour shortages at unprecedented levels. Specifically in British Columbia, about 39,500 workers are expected to retire between 2016 and 2025. With the numbers of younger, less experienced workers increasing as a percentage of the workforce, the need to incorporate industry best practices for on-the-job skills development has never been greater.

How to effectively transfer the skills and knowledge of journeypersons to apprentices entering the industry represents one of the biggest challenges facing the construction industry in the province. An overwhelming majority of employers in the sector recognize this need and report that mentorship is the key to developing a qualified journeyperson. However, employers also report that the quality of mentorship is drastically uneven.

While some journeypersons are well prepared and well suited to take on the mentoring role, many are not. A structured mentorship program – one that builds mentorship skills in precisely the areas where performance gaps are most prevalent – will assist both journeypersons and apprentices in becoming stronger mentors and mentees.

Study Objectives

The ultimate goal of this project is to provide labour market information that will lay the groundwork for the development, implementation, and evaluation of a mentorship training model that can meet the growing need for rapid skills development in BC's construction sector. As part of this foundation, the project profiles the electrical contracting sector in BC showing the demographics of workers, the size and make up of businesses, and explores issues related to economic trends and recruitment and retention challenges.

The research objectives can be broken down into a series of primary and secondary goals that the sector needs analysis fulfils, including:

- Identifying the **skills deficits and job performance gaps** of electrical apprentices and journeypersons most critical to business – including a quantitative picture of their prevalence across the sector – from the perspective of contractors;
- Clarifying which of these gaps are associated with and **responsive to mentorship**, in order to provide a strong basis for the development of the mentorship training model and curricula; and
- Linking these gaps with **business outcomes** in a way that supports the design of rigorous evaluation tools for future ROI studies that will motivate employer training investments throughout the sector.

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In preparing these critical inputs to the development of a future mentorship model, we also compiled a detailed profile of the sector and supporting labour market information including:

- A detailed description of the British Columbia's construction sector specific to National Occupational Code (NOC) 7241, according to Business characteristics and Workforce demographics
- Current and forecasted labour market conditions and economic trends impacting the construction sector for British Columbia; and
- An analysis of recruitment and retention issues/barriers impacting the province (including cross-generational issues).

Methodology

There are five distinct lines of evidence that were used to inform the development of the project and different data collection methods were employed for each component of the research design.

- **Background research** served to construct an initial draft framework that linked skills, job performance standards, and business outcomes, and to develop a broad understanding of current characteristics and forecasted trends pertaining to electrical trades in British Columbia's construction industry.
- **Secondary data analysis** was used to supplement the analysis of the primary lines of evidence collected from stakeholder consultations, interviews with employers, and survey of contractors; to provide an overview of the sector; and to identify any gaps in currently available datasets, guiding the development of the primary data collection tools.
- **Stakeholder consultations** primarily consisted of engaging with steering committee members throughout the study period to review and provide input on draft deliverables; to refine the framework that links skills, job performance standards, and business outcomes; and to "pretest" the online survey to ensure that all questions were relevant and clear.
- **Organizational Needs Assessments (ONAs)** were a series of multi-level depth interviews with six exemplar employers, conducted to identify the most critical business needs and performance gaps of workers as well as the role of mentorship in addressing them. The information collected during the ONAs directly informed the design of the province-wide survey of electrical contractors.
- **Online Survey of BC Electrical Contractors** served to validate findings from the organizational needs assessments (ONAs) with exemplar employers and to provide further LMI to meet the project's objectives. While the qualitative ONA interviews that preceded the survey provided a detailed and comprehensive picture of the business needs and performance gaps which the industry faces, the data collected through the online survey indicated the *prevalence* of these performance gaps, as well as quantified employers' views on the role of mentorship in addressing skills and performance gaps. The survey was developed and administered through a collaboration between EJTC, SRDC, SkillPlan, and SkillSource.

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Working with a combined database of over 4,000 records of potential respondents, SkillSource engaged in a series of steps to compile, review, and consolidate the data to provide a final sample frame. A final sample frame of approximately 1,000 records was confirmed (n=991), which is the best representation of the population of *currently active electrical contractors* in the province of *British Columbia*, who employ at least one *electrician (NOC 7241), for whom mentorship is relevant* (they are not single owner-operators), and for whom we have accurate contact details and can therefore reliably engage to invite them to complete the survey. **Overall, 148 electrical contractors responded to the survey, providing partial or complete responses.**

The Electrical Trade in BC's Construction Sector

Description of the electrical trades in British Columbia

The Survey of BC Electrical Contractors was intended to reach a broad cross-section and representative sample of electricians across the province. Demographic information was collected in order to ensure that respondents participating in the study are indeed representative of the current workforce in BC. The following provides an overview of the workforce demographics and the business characteristics of the survey respondents.

- **Regional distribution:** More than half of all respondents (55 per cent) operate in multiple areas of the province, with a majority of operating in the Lower Mainland and Southwest regions of the province (51 per cent), followed by Vancouver Island and the Coast (41 per cent), Thompson and Okanagan Valley regions (34 per cent) and Kootenay (22 per cent).
- **Primary markets**: Nearly all respondents work in commercial markets (83 per cent), with substantial representatives from the residential construction, renovation, and maintenance sector (72 per cent), as well as from industrial construction (51 per cent). Roughly a third of respondents are engaged in low-rise (single family) residential construction (33 per cent) and just under a third work in institutional construction (31 per cent).
- **Gross revenue**: Generally quite varied, though revenue peaks in categories $100,000 to $249,999 (18 per cent); $250,000 to 499,999 (18 per cent); $1 million to $2,999,999 (21 per cent); and $10 million or more (15 per cent).

Current Labour Market trends

The province of British Columbia has a number of important non-residential construction projects currently underway or expected to commence in the near future. As a result, employment in construction will rise to record levels by 2018.

- Labour requirements for major projects (such as LNG, pipelines, and transportation project) will be responsible for nearly half of the employment growth in the non-residential sector.
- Major investments in the both the non-residential and residential construction sector will increase demand for electricians across the province.

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- Within the short-term (2017-2018), demand for electricians in BC will exceed the supply of labour in local markets. Growth in demand for electricians is expected to slow after 2018, but will remain high throughout 2025.

In the Survey of BC Electrical Contractors, respondents were asked to identify which key developments would have the most important impact on their business objectives and overall operations. Responses were divided between high and low impact developments.

- **High impact developments**: price pressure, increased competitiveness in the market, time-pressure to complete jobs, and economic activity or increased demand.
- **Low impact developments** are more sophisticated and demanding customers, policy or regulatory changes, an aging workforce, and significant foreign or government investments.

Recruitment and retention issues

- Among the factors that contribute to successful recruitment strategies, ***providing strong local referrals*** stands out as being *very important* for a number of respondents.
- The primary factor that contributes to the retention of electrical apprentices is the ***offer of steady work due to a stable business***.
- Overall, respondents were more satisfied in their recruitment and retention efforts with regards to apprentices than journeyworkers.
- The most significant barrier affecting recruitment and retention is the difficulty in recruiting specialized workers with integrated knowledge and skill sets.

Business needs, performance gaps, and the role of mentorship

Business outcomes and priorities

In order to draw a link between the impact of performance gaps and business outcomes, electrical contractors participating in the survey were first asked to rank business outcomes according to their level of importance. Figure I illustrates the breakdown in their responses.

- Results indicate that the three most important business outcomes are *maintaining high service and product quality*, *increasing productivity and efficiency of workers*, and *improving health and safety* with more than 90 percent of contractors reporting each as important or very important.
- Three additional business outcomes including *reducing costs and wastage, improving market share, and enhancing human resources* were also deemed important or very important by between 75 and 85 per cent of electrical contractors.
- None of these primary business outcomes were deemed to be unimportant to any of the respondents' business objectives. As such, addressing any of the emerging performance gaps linked to these six areas may drive business value that is well aligned with contractors' overall objectives.

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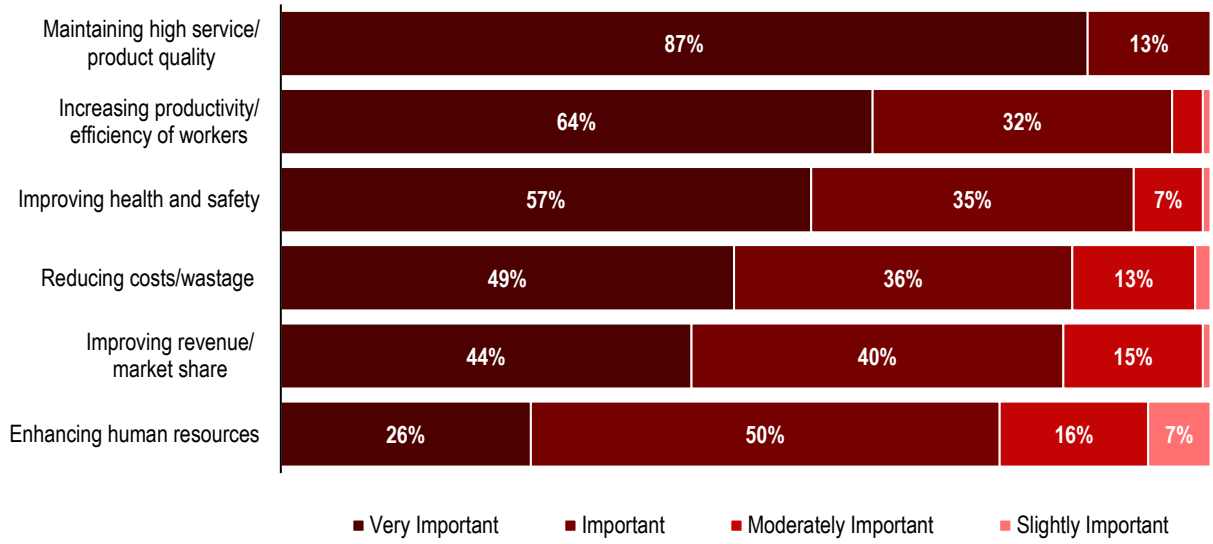
Figure I Business outcomes ranked in order of importance



Respondents were also asked to rank their **business priorities** from most important to least important, both in the short term (the following year) and the medium term (within the next 3 to 5 years). According to the pattern of responses, we can clearly differentiate between high and low priorities, as identified in Table I below.

- Results indicate that the three highest priority business areas for improvement in the short and medium term are *maintaining high service/product quality*, *improving revenue/market share*, and *increasing productivity/efficiency of workers*.

- So while emerging performance gaps in all six business outcome areas should be addressed by a future mentorship training program, the orientation of the business objectives of training and some of the key content drivers would be best aligned with the high priority business areas evident in this ranking.

Table I Business priorities of BC electrical contractors

High Priority	Lower Priority
Maintaining high service/product quality	Reducing costs/wastage
Improving revenue/market share	Improving health and safety
Increasing productivity/efficiency of workers	Enhancing human resources

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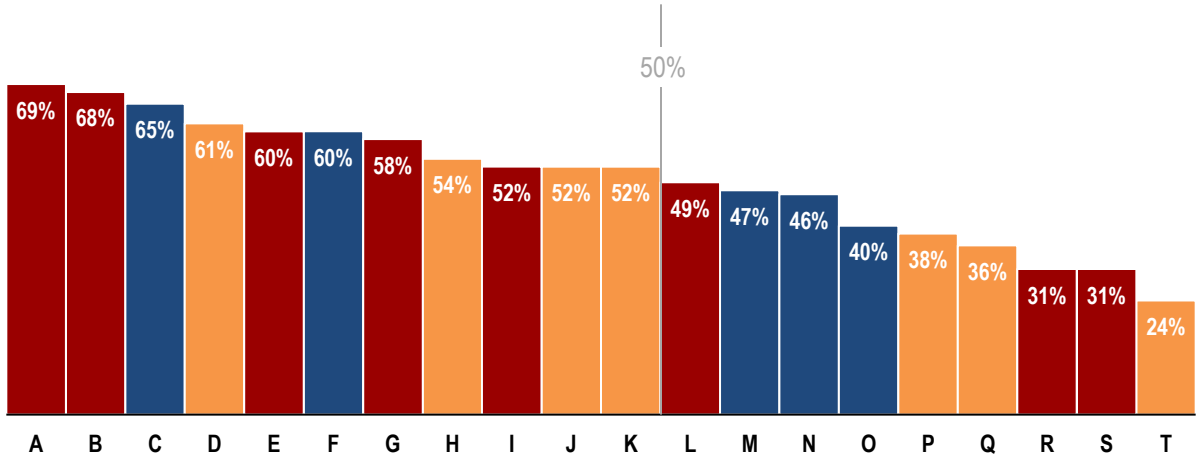
Key Performance Indicators used by BC electrical contractors

Key performance indicators (KPIs) allow businesses to quantify progress in a number of areas that matter to their overall business objectives. In the context of this project, electrical contractors were asked to identify which KPIs they monitor regularly in the three domains of interest: health and safety, productivity and efficiency, and client services. The complete ranking of these results are presented in Figure II below.

Figure II Key performance indicators, ranked according to the frequency of implementation by electrical contractors



Health and Safety	Productivity and Efficiency	Client Services
A # worker injuries	C Task-based efficiency metrics	D Client satisfaction indices
B # accidents	F % of work orders/jobs completed within x% of budget estimates	H # of client complaints
E # safety violations	M $ costs arising from wastage	J % of new customers acquired through referrals
G # days lost to injury, illness	N Unit cost metrics for a work order	K # of incidents/installation errors
I # self-reported near misses	O Efficiency metrics/unit costs compared to industry standards	P # of days over project budget due to errors, re-installations
L $ costs for WCB premiums		Q # / severity of inspection violations
R $ replacement costs for absent workers		T # of days over project budget due to failed inspections
S $ costs for sick leave		

- The majority of Health and Safety (5 of 8) and Client Services (4 of 7) KPIs are monitored by more than half of all firms.

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- In terms of specific KPIs, the most prevalently monitored are the number of worker injuries, the number of accidents, task-based efficiency measures, and client satisfaction indices.
- While the majority of firms measure at least one KPI in each performance area, a non-trivial proportion of firms – between a quarter and a third – do not formally track any KPIs.

As a result, any future tracking system aiming to evaluate training, mentorship quality, or apprentice competencies must be designed to provide suitable means to measure KPIs for those that do not currently do so. At the same time, the system must be suitably aligned with the existing measures for those businesses that do currently maintain them in order to facilitate "pooling" of data across firms and support longer-term strategic planning of training, recruitment, and retention of workers for the industry as a whole.

Critical performance gaps and underlying causes

Respondents were then asked to identify whether they had encountered any performance gaps in their workplace from a list of issues and challenges and, in a second step, to rank existing problems by the severity of their impact on their business objectives.

- These gaps were first identified as the most pervasive and significant performance gaps during ONAs with exemplar employers working in the electrical trades in BC. Included in Table II are highly and moderately critical gaps along with the most important and moderately important underlying causes, as identified in the Survey of BC Electrical Contractors.
- Critical performance gaps and their underlying causes were separated according to three areas of interest: health and safety, productivity and efficiency, and client relations.

Table II Critical performance gaps and most important underlying causes

Health and Safety	Productivity and Efficiency	Client Relations
Critical Performance gaps		
▪ Not maintaining a safe work environment ▪ Not using personal protective equipment (PPE) ▪ Not following regulations WHMIS and Workers' Compensation Board (WCB)	▪ Materials handling - organizing tools and equipment to support work flow on-site ▪ Task inefficiency – knowledge or inexperience with certain types of work order ▪ Handling change orders – adapting to a dynamic environment ▪ Inventory control – material and equipment orders from head office ▪ Labour scheduling – coordinating required resources/crews at right times	▪ Ongoing communications between project managers, foreman, and general contractors/clients ▪ Handling clients' complaints when they arise – implementing mutually satisfactory resolutions to ensure client recovery ▪ Manager's communications with clients during pre-launch

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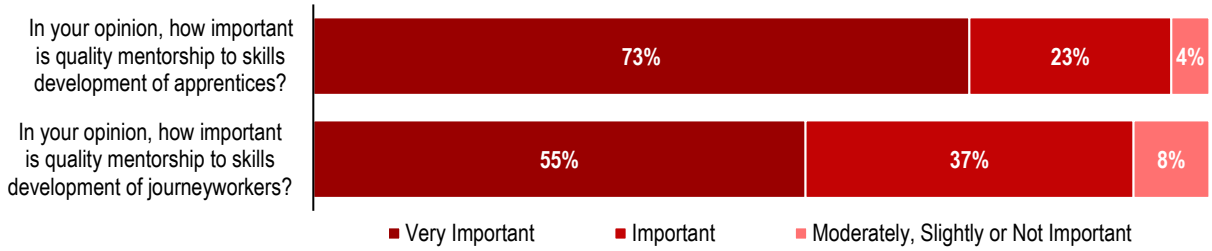
Health and Safety	Productivity and Efficiency	Client Relations
Most important underlying causes		
▪ Too focused on productivity ▪ Complacency, boredom, lack of variety ▪ Gaps in mentorship quality (e.g. journeyworkers not always leading by example) ▪ Poor attitudes towards safety practices – journeyworkers set in their ways	▪ Incomplete information available ▪ Gaps in technical knowledge or experience ▪ Poor planning by the general foreman/foreman	▪ Project manager or foreman is too busy – productivity often comes before client relations ▪ Foreman doesn't fully "buy-in" or appreciate the importance of client relations ▪ Project manager or foreman lacks communication skills, experience with client relations ▪ Project manager or foreman doesn't establish process for information exchange

Mentorship Content and Formats

Electrical contractors provided some guidance on the delivery and format of a future mentorship program. Based on their comments, we can make the following conclusions:

- There is significant room for improving the quality of existing mentorship in the electrical trades.
- Quality mentorship can play a role in addressing performance gaps and is an important tool for skills development in both apprentices and journeyworkers (see Figure III below).

Figure III Importance of quality mentorship for skills development



- Any future mentorship program should be delivered **on-the-job**, rather than on an off-site location.
- Check-lists or guidelines would be a useful format, as well as mobile apps for reference and tracking, or how-to videos.
- The most useful component of a future mentorship program would be a **system for tracking competencies of apprentices**. Other content elements are shown in order of usefulness in Figure IV below.

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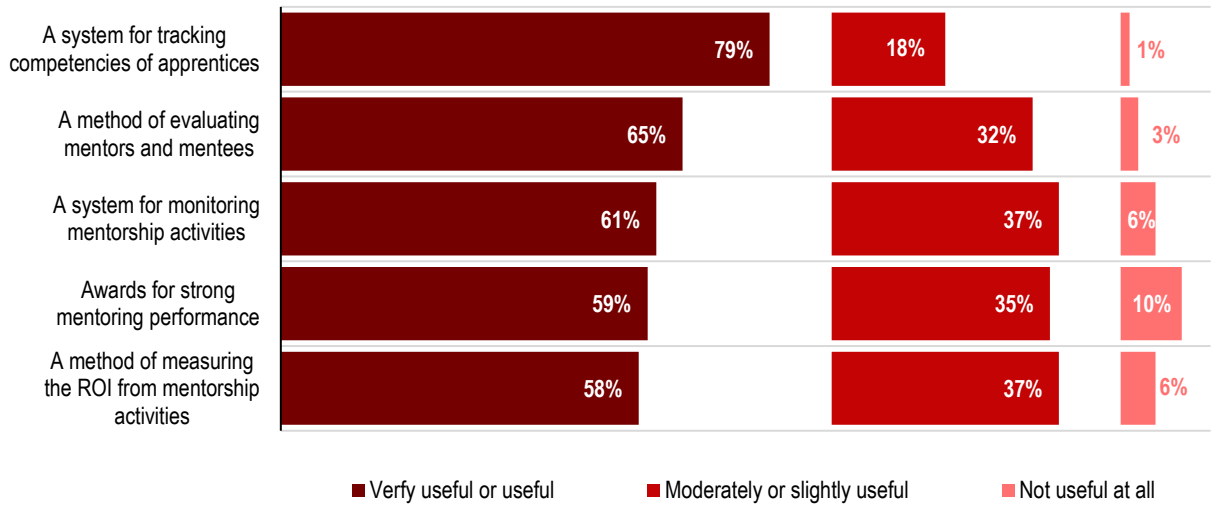
Figure IV Usefulness of content in a future mentorship program



Usefulness of mentorship activities

In order to identify which activities would be most useful in a future mentorship program, respondents were asked to rank a number of activities from most to least useful. Every activity was weighted on a scale of 1 to 5, where "Very useful" was given a score of 5 and "Not useful at all" was given a score of 1. The higher the score, the most useful the item was considered for a future mentorship program. The figure below ranks the proposed activities according to their scores, moving from the highest scoring activities on the left of the graph to the lowed ranking activities on the right of the graph. Those items above the line are those which were given a score above the median.

- **Very little deviation** was found between the perceived usefulness in a mentorship program of most activities. Indeed, activities C through N (see Figure V below) fall relatively close to the median score,
- Five activities (all under Health and Safety) were decidedly out of this range, with two deemed to be **most useful**:
    - Activities that reinforce consistent safe working practices among new apprentices, and
    - Practice and support in conducting high quality job hazard or field-level risk assessments.
- Three were deemed to be **least useful**:
    - Tactics for maximizing engagement to fight complacency,
    - Methods for encouraging variety and freshness, and
    - Guidelines for introducing reward-based practices and incentives.

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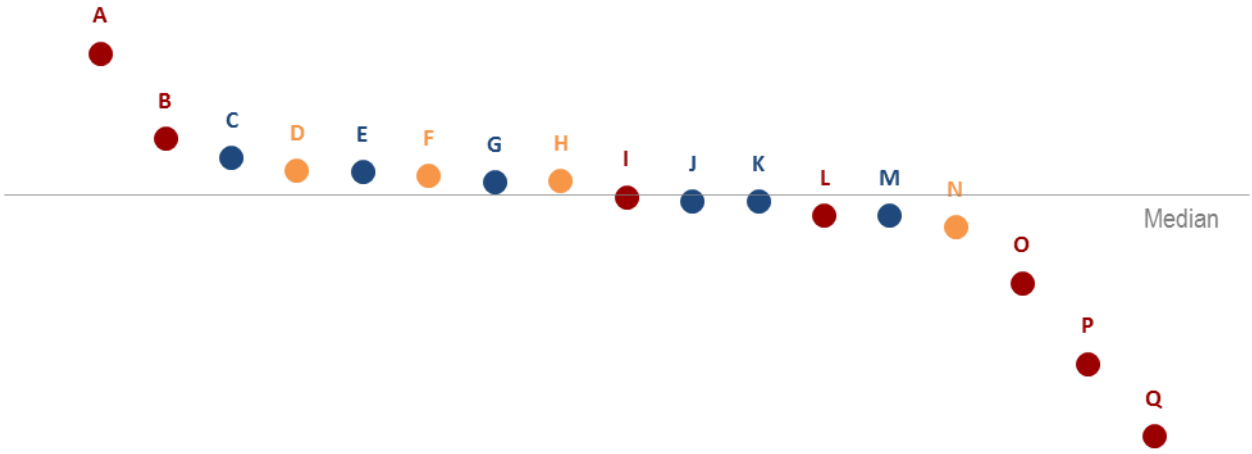
Figure V Mentorship and training activities intended to respond to existing performance gaps, ranked according to their relative usefulness



Health and Safety	Productivity and Efficiency	Client Services
A Activities to reinforce consistent safe working practices among new apprentices	**C** Supports to facilitate proactive communication between project managers and foreman, pre-project launch and during project activity	**D** Support to project managers and foremen in resolving conflicts, complaints, and service recover
B Practice and support in conducting high quality job hazard or field-level risk assessments for all responsible staff and crew	**E** Protocols to reinforce planning skills among foreman with respect to on-site materials handling	**F** Reinforcement for the importance of strong client communication to generate staff buy-in
I Approaches for creating successful toolbox/tail-board meetings	**G** Mentorship supports and reinforcement for foreman and journeyworkers to plan more efficient work flows (e.g. production line) for apprentices	**H** Support to project managers and foremen with communications systems and technology
L Protocols for daily monitoring (e.g. walk arounds, ad-hoc hazard assessments)		
O Tactics for maximizing engagement to fight complacency (e.g. use of personal anecdotes, visuals, assigning speakers, sharing near-miss data)	**J** Assistance with technological solutions (e.g. communication, information sharing, project planning apps)	**N** Support to project managers in building rapport with clients
P Methods for encouraging variety/freshness (e.g. rotating speakers at meetings, shake-up the format, change the content)	**K** Protocols to reinforce planning skills among foreman with respect labour/resource coordination and management	
Q Guidelines for introducing reward-based practices and incentives	**M** Supports for handling change orders and dynamic work environments	

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Implications for an enhanced mentorship model and its evaluation

Findings from the ONAs and the survey of the BC electrical contractors should inform the development of an efficient and effective mentorship system that supports apprentices and journeyworkers working more productively and safely.

Mentor and mentee program factors

The goal is to **embed the learning outcomes** outlined in the table below into **contextualized training** that support learning what it means to be a good mentor and mentee. The training and accompanying resources are also intended to improve business outcomes around health and safety, productivity and efficiency, and client relations.

The mentorship principles for mentors and mentees can summarized as followed:

Mentor Program Factors	Mentee Program Factors
▪ Identifying the points of lessons	▪ Effective communication
▪ Demonstrate the skill	▪ Active listening
▪ Providing feedback	▪ Receiving feedback
▪ Link the lesson	▪ Asking questions
▪ Providing opportunities for practice	▪ Learning styles
▪ Assessing progress	▪ Setting goals

Mentorship program resources, tools, and training supports

The following provides an example of the mentorship program resources, tools, and training supports that could be designed in accordance with the learning outcomes, the content drivers linked to performance areas, and the program implementation feedback provided by contractors.

Engagement and Promotional Support and Material

- A **communication plan** with accompanying tools (including posters, hardhat decals, short videos, etc.) to maximize engagement and program integration with electrical workers.
- An **appreciation and recognition process** from the contractors to acknowledge the efforts of their mentors and mentees and maintain program momentum once integrated into the workplace.

Mentorship Training and Supportive Tools

1. Core Mentorship Program

The core mentorship program would be a formalized training opportunity where the mentors and mentees can learn key principles of what it means to be a strong mentor and mentee using contextualized scenarios that align to performance gaps and business outcomes, such as:

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Health and Safety Issues	Productivity Issues	Client Relationship Issues
▪ Reinforcing consistent safe working practices ▪ Maintaining a safe work environment/assess work hazards	▪ Providing supports to facilitate productivity ▪ Fostering efficient work flows; ▪ Material handling ▪ Job task planning	▪ Maintaining high service quality ▪ Improving communication between leaders and the client ▪ Establishing staff conflict resolution procedures

Core mentorship program could also include, among others:

- **Short videos** reinforcing key mentor and mentee principles around performance gaps
- Practice activities and scenarios
- Pre and post training surveys

2. Informal Mentorship Reinforcement On-the-Job Activities

To ensure that the core program is not considered as a 'one off' and to reinforce what participants have learned, **on-the-job tools and supports** could be provided, including:

- Check list guides and documentation to be used in toolbox and safety meetings;
- Online competency mobile device;
- Skills summaries to provide insight into a tradesperson's ability to implement mentoring; and
- Skills review component to identify areas where more mentorship support is required

3. Quality Assurance

- **Qualitative and quantitative assurance tools** would provide participants with an opportunity to identify what is working well and provide constructive feedback to improve the mentorship program.
- **Surveys** could also be conducted with owners, supervisors, mentors, and mentees to monitor mentorship activities.

Evaluating Training Impacts, Mentorship Quality, and Apprentice Competency

Program design involves making decisions about the learning outcomes that should be targeted. Likewise, research design involves making decisions about which outcomes are most likely to be affected by an intervention, which ones are most critical to demonstrate the program's effectiveness, and how and when they can best be measured. These decisions will also help to determine the timing and content of research instruments and the overall evaluation strategy.

One of the key achievements of this project is the identification of key business needs of electrical contractors – and most importantly the most critical underlying performance gaps of workers that drive them. As a result, one can be confident that these are, indeed, the very performance areas that need to be improved (the content drivers for the curricula) – and measured in the evaluation

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strategy (the focus of the performance metrics) – in order to assess the effects of training and link these gains with business outcomes. The future research design can concentrate on decisions around the relative priority of these items as well as refining their measures.

While the development of an evaluation was beyond the scope of this LMI study, the next phase of the project will see the design of a full evaluation framework including instruments for measuring competencies and performance in a way that can be used to determine the impact of mentorship training on workers and business outcomes - and ultimately in measuring the ROI generated for employers and the industry at large. The remainder of this section highlights some of the ways the results of this project will be used to inform that future evaluation strategy and tracking system.

Focusing research measures—linking of performance and business outcomes

- Any evaluation framework should take into consideration input from businesses and focus its firm-level business metrics on key indicators that correspond to high priority areas. However, it should also accommodate lower priority areas where significant performance gaps have been identified by many businesses as "most problematic."
- Suitable measures should be developed to adequately capture not only **business metrics** but also the full range of **task-based performance gains** for workers that can result from mentorship training. Linking indicators between these two levels and focusing them in areas where gaps are most prevalent is key, as mentorship training may drive substantial ROI for some firms even in lower priority areas.

Systematic data collection at multiple waves

- Any future evaluation of mentorship and worker competencies will require **multiple waves of data collection**. The advantage of multi-wave data collection is that it is comprehensive and consistent for all participants at (roughly) similar points in time.
- A future **tracking system for apprentice competencies and mentorship activity** could include "real-time" data collection, longitudinal measurements at consistent intervals (i.e. intervals relative to the onset of mentorship activities). The development of an online competency tool will allow researchers to see if the "real time" competencies recorded in the tool align with longer term results from the later waves of data collection.

Measurability

- The most useful metrics are those that businesses and workers are able to provide valid and reliable data on, whether administrative or survey-based. Indicators with a high non-response because respondents do not know or are unwilling to respond compromises the research. As such, in instances where there are multiple key performance indicators related to a performance gap of interest, it would be best to choose those KPIs that can be aligned effectively with those already collected by the majority businesses.
- Metrics that are currently collected by a minority of businesses nevertheless provide a strong frame of reference for the construction of comparable survey–based indicators. This can

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facilitate the pooling of indicators for a broader assessment of training impacts and ROI measurements for the industry as a whole.

Quality Assurance—linking process to outcomes

- Quality assurance (QA) will be a key part of program delivery to allow for evaluating mentors and mentees, to make adjustments to the mentorship program, and to assist with longer-term strategic planning. QA data will allow for documentation on how the program is actually implemented and how it varies between participants and in different business and project contexts. When linked with outcome data, this is an extremely powerful tool to explain results.

Need for a Counterfactual

- A future evaluation framework and tracking system for measuring training effects and worker competencies should aim to incorporate a counterfactual. In order to address questions such as "what difference or impact does quality mentorship make for apprentices?" or "what is the ROI that mentorship training generates for a contractor?" the evaluation strategy must aim to properly "benchmark" any gains that arise from improved mentorship.
- The challenge is not simply to evaluate how well mentors and mentees are doing but instead how much better (or worse) they are doing compared to what would have happened without a new initiative or effort to improve mentorship quality. There are several ways to incorporate a counterfactual into an evaluation strategy and tracking system – such as through a randomized experiment or quasi-experimental design – and these options should be considered carefully in any future design in order to provide valid and reliable measures of the impacts of mentorship and ROI.

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1. Background

1.1. Rationale

The construction industry across Canada is estimated to lose 235,000 skilled tradespeople to retirements over the next decade, leading to skilled labour shortages at unprecedented levels. Specifically in British Columbia, about 39,500 workers are expected to retire between 2016 and 2025 (BuildForce, 2016). This is equivalent to a 23 per cent loss in the current labour supply. On the other hand, a surge in demand for non-residential construction will result in approximately 12,600 new jobs by the end of 2025 (BuildForce, 2016). Within the residential sector, while new housing activity is expected to slow after 2020, home renovation and maintenance work continue to grow, adding 2,000 jobs (BuildForce, 2016). Increasing labour demand is indeed coupled with rising loss in labour supply due to retirement while the overall demand for electricians is forecasted to grow by nearly 13 per cent between 2015 and 2019. This increase is in addition to an average annual growth rate of 3 per cent during this peak period in most construction and maintenance subsectors (BuildForce, 2016).

While these trends bring significant employment opportunities for younger workers, they give rise to increasing demand for rapid skills development. This has – and will continue – to put significant and increasing pressure on training capacity, not simply within post-secondary training institutions, but particularly for employers, unions, and current supervisors and journeypersons, who are responsible for the large majority of skills development through apprenticeship and mentorship. This is one of the biggest challenges facing British Columbia – how to effectively transfer the skills and knowledge of journeypersons to apprentices entering the industry. With the numbers of younger, less experienced workers increasing as a percentage of the workforce, the need to incorporate industry best practices for on-the-job skills development has never been greater.

An overwhelming majority of employers in the sector recognize this need and report that mentorship is the key to developing a qualified journeyperson. However, employers also report that the quality of mentorship is drastically uneven. While some journeypersons are well prepared and well suited to take on the mentoring role, many are not. A report on apprenticeship training from the Canadian Apprenticeship Forum, *Accessing and Completing Apprenticeship Training in Canada: Perceptions of Barriers,* states that few journeypersons have actually taken training or received any guidance on how to be an effective mentor (CAF, 2004). A structured mentorship program will assist both journeyperson and apprentices in becoming stronger mentor and mentees – and ultimately produce more highly skilled and productive apprentices at the workplace. Another compounding factor that highlights the need for a mentorship training program is that BC is the only jurisdiction in Canada that does not have a required training ratio (journeyperson to apprentice ratio) to ensure transfer of knowledge. As a result employers must be ensure that their workforce is very efficient with addressing knowledge transfer through setting up an effective mentoring and communications strategy.

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1.2. Project Objectives

The ultimate goal of this project was to provide labour market information that will lay the groundwork for the development, implementation, and evaluation of a mentorship training model that can meet the growing need for rapid skills development in BC's construction sector. As part of this foundation, the project profiled the electrical contracting sector in BC showing the demographics of workers, the size and make up of businesses, and explores issues related to economic trends and recruitment and retention challenges.

The research objectives can be broken down into a series of primary and secondary goals that the sector needs analysis fulfils, including:

- Identifying the **skills deficits and job performance gaps** of electrical apprentices and journeypersons most critical to business – including a quantitative picture of their prevalence across the sector – from the perspective of contractors;
- Clarifying which of these gaps are associated with and **responsive to mentorship**, in order to provide a strong basis for the development of the mentorship training model and curricula; and
- Linking these gaps with **business outcomes** in a way that supports the design of rigorous evaluation tools for future ROI studies that will motivate employer training investments throughout the sector.

In preparing these critical inputs to the development of a future mentorship model, the project sought to compile a detailed profile of the sector and supporting labour market information including:

- A detailed description of the British Columbia's construction sector specific to National Occupational Code (NOC) 7241, with the following indicators:
- ***Business characteristics***: the types and number of businesses by subsector, types of occupations by NOC/NAIC codes, etc.; and
- ***Workforce demographics***: age, gender, education levels, certification requirements, and length of service;
- Current and forecasted labour market conditions and economic trends impacting the construction sector for British Columbia; and
- An analysis of recruitment and retention issues/barriers impacting the province (including cross-generational issues).

1.3. Research questions

These six objectives can be restated as a series of primary and secondary research questions that are addressed in this LMI report. The first three primary research questions support the development, implementation, and evaluation of a future mentorship training model and can be stated as follows:

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- What are the most critical skills and performance gaps of workers in terms of their effects on business outcomes? How prevalent are these gaps across the sector?
- Which of these skills and performance gaps are most suitable to be addressed through quality mentorship? Why are they not currently being addressed effectively through mentorship?
- What are the core business priorities of the sector and how are these outcomes measured? What are some of the key underlying performance metrics of workers that drive these business objectives, which would facilitate measurement of training ROI?

The secondary research questions provide supporting LMI and can be stated as follows:

- What are the demographic characteristics of electricians in BC (i.e., age, gender, education levels, certification requirements, and length of service)? What is the profile of businesses employing electricians in BC (i.e., types and number of businesses by subsector, types of occupations by NOC/NAIC codes, etc.)?
- What are the current economic and labour market conditions pertaining to electrical contractors in BC? What are the forecasted future trends?
- What kinds of issues or barriers exist in recruiting electrical apprentices and journeypersons in BC? How are these barriers related to the cross-generational transfer of skills and knowledge within the sector?

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2. LMI Study Design

2.1. Methodology and Project Stages

The LMI study design was divided into four primary stages of research activity:

- **Background research** – the development of a conceptual performance framework and set of research tools for the subsequent qualitative fieldwork;
- **Qualitative fieldwork** – a series of organizational needs assessments with exemplar firms involving multi-level depth interviews with staff;
- **Quantitative survey** – a cross-province survey of electrical contractors; and
- **Analysis and reporting** – an integrated analysis of all data sources and preparation of a final LMI report consistent with BC Government guidelines for LMI studies.

Each of these stages is described in further detail below, along with a more in-depth look at the target groups, recruitment strategy, and data collection activities.

Background research: development of a performance framework and research tools

In the first stage of the study, SRDC, EJTC, and SkillPlan conducted a preliminary analysis of NOC 7241. In addition to gathering data on the workforce demographics, information on the performance requirements of the occupation were collected. The primary objective of this phase was to construct an initial draft framework that illustrates the primary links between fundamental skills, job performance standards, and business outcomes. In preparing this framework, SRDC reviewed the Red Seal Occupational standards (RSOS) for Construction Electricians, the BC Industry Training Authority's (ITA) Occupational Analysis Charts (OAC), and a series of related documents from provincial and national associations such as Buildforce on skills and mentorship. While these documents have similar *content* in terms of occupational performance standards, their *structure* varies considerably and they provide little detail on fundamental connections with – or measurement of – business outcomes of interest to employers. This explicit framework does not currently exist, particularly in its relation to mentorship, but is vital to developing a well-aligned model for mentorship training and the evaluation tools for measuring its effectiveness and ROI.

Once the skills and performance framework was completed, qualitative protocols for conducting organizational needs assessments with exemplar firms were developed. These protocols reviewed the key elements of the performance framework where critical skills and performance gaps exist. They also focused on demonstrating the role that quality mentorship can play in addressing these gaps and what the underlying metrics for measuring success should be.

Qualitative fieldwork – organizational needs assessments with exemplar firms

In the second stage of the project we validated the framework and identified which skill sets and performance areas have critical gaps – those that compromise business outcomes most frequently and most pervasively – and which are most responsive to mentorship. This involved a "deep-dive"

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into the nature of skills and performance gaps with a group of "exemplar" employers and their staff referred to as organizational needs assessments (ONAs).

ONAs were scheduled and conducted with a total of seven employers in late August through mid-September 2016. Each involved a coordinated "site visit" for the purpose of completing multi-level depth interviews including those with senior managers, middle managers (project managers, general foreman), experienced journey workers/ supervisors (mentors), and apprentices and early year journey workers (mentees). Site visits included interviews at each employers head office (senior and middle management interviews) and on job sites (journeyworker and apprentice interviews). The process of recruiting for each of these interviews varied somewhat by firm, but was largely led by middle managers, who selected journeyworkers and apprentices based on availability and scheduled them in 30 minute to 1 hour time slots where EJTC and the research team could meet them in private. All interviews were conducted, confidentially, either in a private trailer on the job-site or in a closed-door office at the employers head office.

Most ONAs required no more than 1-2 days on site (one at the head office, one at the job-site) and involved approximately 6-12 interviews (depending on the size of the firm) of no more than 1 hour in length.

Quantitative survey of electrical contractors

The results of the ONAs were analyzed in mid-to-late September 2016 as part of the development of the quantitative survey of electrical contractors, which would be subsequently used to validate qualitative findings and collect additional supporting information about the sector. The analytic approach followed the protocols quite closely, which were designed with clear links to the research objectives and, importantly, to the structure of the performance framework that provided the link between skills and occupational requirements and business outcomes. A thematic analysis was conducted on all questions and responses in each business outcome area (e.g. productivity, health and safety, service quality, client relations) to identify the recurring priorities and metrics. Within each business area, thematic analysis was also conducted on all sub-components in each of the skill and performance area to identify recurring performance gaps and which of these respondents felt could be addressed through mentorship. This analysis was consolidated in the draft of the quantitative survey, with the qualitative responses directly informing the design of the response items (i.e. the answers that survey respondents would have available to them) for the survey. This

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would allow for not only validation of the qualitative results but quantification of the responses, which directly addresses the primary goals of the study.

Data Analysis and Reporting

SRDC worked closely with EJTC, SkillPlan, and other project partners in completing a thorough analysis of the resulting survey data and integrated it with analyses from the qualitative fieldwork, document review, and secondary data sources to form an enhanced picture of the sector and labour market conditions. The results of this consolidated analysis – the subject of this report – is organized to address each of the primary and secondary research objectives.

2.2. Target Groups, Recruitment strategy

The sample of participants for this project consisted of a range of stakeholders at various levels of management and labour throughout the electrical industry in the province of British Columbia, including senior and middle managers, journeyworkers, mentors, apprentices, and mentees. The target groups and recruitment strategy are outlined below for the qualitative and quantitative phases separately.

Qualitative Phase

Selection and recruitment of exemplar employers

The qualitative phase used a ***purposive sampling*** strategy whereby exemplar employers were selected purposefully based on their suitability for contributing to the goals of the sector needs analysis. More specifically, they has a long standing presence in the sector and a wide breadth of knowledge in the areas of inquiry, including but not limited to: labour market trends, workforce challenges related to recruitment and retention, skills development needs, the role of mentorship in workforce development, and performance measurement.

The following table provides a list of employers who participated in the organizational needs assessments. The table also documents the number of sessions that were held with employees from the organization, the location where these consultations were held, and the mode of engagement (e.g.: face to face, individual interviews, group-based workshops).

Table 1 Summary of stakeholder engagement

Company name	Number of interviews	Location	Mode of engagement
Houle Electric	▪ 3 senior managers; ▪ 2 middle managers; ▪ 3 journeyworkers; ▪ 4 apprentices	▪ Head office, ▪ Job-site	▪ In-person ▪ Confidential interviews

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Company name	Number of interviews	Location	Mode of engagement
Mott Electric	▪ 1 senior manager; ▪ 2 middle managers; ▪ 2 journeyworkers; ▪ 2 apprentices	▪ Head office, ▪ Job-site	▪ In-person ▪ Confidential interviews
SeaSpan	▪ 1 senior manager; ▪ 2 middle managers; ▪ 2 journeyworkers; ▪ 4 apprentices	▪ Head office, ▪ Job-site	▪ In-person ▪ Confidential interviews
Sasco Contractors Ltd.	▪ 1 senior manager; ▪ 2 middle managers; ▪ 3 journeyworkers; ▪ 2 apprentices	▪ Head office	▪ In-person ▪ Confidential interviews
Bemister Electric	▪ 1 senior manager; ▪ 1 middle manager; ▪ 1 journeyworker; ▪ 1 apprentice	▪ Head office, ▪ Job-site	▪ In-person ▪ Confidential interviews
WPE	▪ 1 senior manager; ▪ 2 middle managers; ▪ 2 journeyworkers; ▪ 2 apprentices	▪ Head office, ▪ Job-site	▪ In-person ▪ Confidential interviews
Villa Electric	▪ 1 senior manager; ▪ 2 middle managers; ▪ 2 journeyworkers; ▪ 2 apprentices	▪ Head office, ▪ Job-site	▪ In-person ▪ Confidential interviews

Recruitment of staff members for interviews within exemplar employers

Once participation of an exemplar employer had been confirmed, the EJTC Operations Manager coordinated the scheduling of the organizational needs assessments (ONAs) with senior management of the firm in consultation with SkillPlan and SRDC. The process of recruiting specific individuals within each firm was confirmed in coordination with senior managers. Some firms wished to lead the selection and scheduling of all interviews on behalf of EJTC. Other firms wished to recommend individuals and complete an initial communication with each, and left the follow-up contact and scheduling to the project partners.

Quantitative Phase

Sampling and recruitment for the survey of electrical contractors

The survey aimed to reach a representative cross-section of electrical contractors including firms of various sizes and in all regions throughout the province. While SRDC led the design of the survey and the analysis of its results, the sampling, recruitment, and administration of the online

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instrument was conducted by SkillSource, in coordination with EJTC. Working with a combined database of over 4,000 records of potential respondents, SkillSource engaged in a series of steps to compile, review, and consolidate the data to provide a final sample frame that best represents the target population for this study and for whom accurate contact information is available. A final sample frame of approximately 1,000 records was confirmed (n=991), which is the best representation of the population of *currently active electrical contractors* in the province of *British Columbia*, who employ at least one *electrician (NOC 7241), for whom mentorship is relevant* (they are not single owner-operators), and for whom we have accurate contact details and can therefore reliably engage to invite them to complete the survey.

Overall, 148 electrical contractors responded to the survey, providing partial (n=72) or complete (n=76) responses. For a description of the respondents' firms, including the composition of their workforce, the location and regional distribution of their operations, their primary markets, and their total gross revenues, the reader can consult table 1 in section 4.1 of this report.

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3. Overview: The Electrical Trade in BC's Construction Sector

A key part of the LMI study's objective is to provide a descriptive analysis of the current state of the province's electrical trade. As described in section 2.2 of this report, this analysis has three key components each which support the broader objectives of this study:

- A detailed description of British Columbia's electrical trade, including Business characteristics and Workforce demographics;
- Current and forecasted labour market conditions and economic trends impacting British Columbia's construction sector; and
- An analysis of recruitment and retention issues and barriers.

In order to provide a detailed analysis of the electrical trade in British Columbia, we relied on secondary data collected by reliable third party sources (including BuildForce, Statistics Canada, WorkBC, and other research organisations) and primary data, taken from the analysis of the Survey of BC Electrical Contractors.

Each sub-section below begins by highlighting facts based on secondary data followed by results from primary data derived from the survey of electrical contractors.

3.1. Description of the electrical trade in British Columbia

The description of the electrical trade in British Columbia is separated into two levels of analysis. The first looks at the workforce demographics in an effort to describe the various types of workers currently employed in the electrical trades in BC. The second analysis looks at the business characteristics of the firms that provide electrical services, including where they operate, their primary markets of operation, and their gross revenue.

Workforce demographics

Statistics Canada's 2011 National Household Survey provides the most up-to-date analysis of the composition of British Columbia's electrical trade workforce. According to these data—which were analyzed by WorkBC—there are roughly 12,500 workers currently employed as electricians (NOC 7241) in BC, of which 98 per cent are male and only 2 per cent are female (WorkBC, 2017). The vast

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majority of electricians work in the construction industry (83 per cent), with a workforce that is almost evenly split between the residential and non-residential sectors (WorkBC, 2017; BuildForce Data, 2016). Nearly half of all electricians are working mostly full-time (48 per cent).

Of importance to the objectives of this project is the distribution of the workforce according to age and how this distribution may affect knowledge transfer between journeypersons and apprentices entering the electrical trades. Just over a third of BC's electricians (36 per cent) are at or near retirement age, falling within the age bracket of 45 years of age and over. Nevertheless, the majority of current electricians working in BC (51 per cent) are within prime working age, between the ages of 25 and 44 years. A small proportion of electricians (13 per cent) are entering the workforce, between the ages of 15 and 24 years of age.

The Survey of BC Electrical Contractors was intended to reach a broad cross-section and representative sample of electricians across the province. Demographic information was collected in order to ensure that respondents participating in the study are indeed representative of the current workforce in BC. Table 1 below provides a breakdown of the demographic questions collected through the Survey of BC Electrical Contractors. The purpose of this analysis is to assess the extent to which the survey sample adequately represents the range of workplaces currently operating in the province.

Some of the categorizations of the National Household Survey data presented by BC's Labour Market Outlook differ from those in the Survey of BC Electrical Contractors, making direct comparisons impossible. Nevertheless, we are able to comment on some differences and similarities between the two groups according to some similar categories.

For instance, the Survey of BC Electrical Contractors includes firms with a much higher average proportion of female employees (8.6 per cent) compared to the proportion of women working in the industry across the province (2 per cent). There also appears to be a larger proportion of workers near retirement age in the research sample compared to the entire population. With about 59 per cent of workers under the age of 45, this means that 41 per cent of electricians working in the sample's firms are within the 45 and over bracket, compared to 36 per cent of the province's electricians.

Table 2 Descriptive information of respondents' workforce

	Average	St. Dev.	Minimum	Median	Maximum
Workforce size					
Total employees	92	320	0	7	2,500
Office and management staff	17	64	0	2	600
Tradesworkers	74	250	0	5	1,900
Gender					
Women	8.6%	11.9%	0%	3%	50%

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	Average	St. Dev.	Minimum	Median	Maximum
Age					
<30 Years old	31.8%	29.0%	0%	30%	100%
Between 30 and 44	27.2%	26.3%	0%	20%	100%
Ethnicity and Language					
Aboriginal	1.8%	4.9%	0%	0%	33%
English as a second language	9.9%	25.0%	0%	0%	100%
Visible minorities	6.9%	15.3%	0%	0%	90%
Highest Level of Education					
High school diploma or less	72.5%	40.3%	0%	100%	100%
College	34.7%	35.6%	0%	20%	100%
University	7.8%	13.5%	0%	0%	75%
Apprenticeship Status					
Apprentices	27.7%	25.0%	0%	25%	100%
Journeypersons	42.9%	28.5%	0%	50%	100%

Business characteristics

Regional distribution

In order to participate in the Survey of BC Electrical Contractors, respondents were required to operate within the province. Most respondents operate either on a local or provincial basis, with more than half of all respondents (55 per cent) operating in multiple areas of the province and roughly a third of participating contractors operating on a local level (32 per cent). Nevertheless, some contractors conduct business outside of the province, either on a national or international level, though this concerned only a minority of respondents. Figure 1 below offers a breakdown of the location of respondents' operations.

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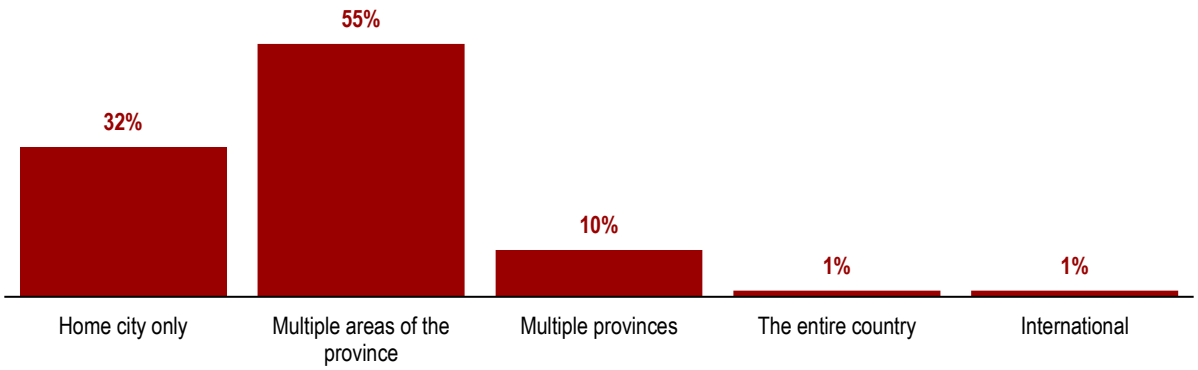
Figure 1 Location of respondents' operations



According to the government of British Columbia's analysis of the 2011 National Household Survey, the majority of the province's electricians are located in the Lower Mainland/Southwestern region (55.2 per cent). Roughly a third can be found in either the Vancouver Island Coastal region of the province (17.6 per cent) or the Thompson-Okanagan region (13.7 per cent). The remaining four regions of the province count relatively small proportions of electricians, including Cariboo (5.2 per cent), Kootenay (3.6 per cent), the Northeast (3.0 per cent) and the North Coast and Nechako region (1.7 per cent).

As seen in Figure 1 above, many respondents operate in multiple areas across the province. In order understand where electricians operate in the province, a follow-up question was asked. The main distinction between the survey's analysis and those provided by the government of BC's analysis is that the survey of electrical contractors did not consider residency but rather the location of operation, meaning that respondents could operate their business in multiple areas. As such, the proportions between the two data sources are not comparable.

The majority of respondents in the survey operate in the Lower Mainland and Southwest regions of the province (51 per cent), followed by Vancouver Island and the Coast (41 per cent) and Thompson and Okanagan Valley regions (34 per cent) and Kootenay (22 per cent). The full breakdown by region of operations is shown in Figure 2 below.

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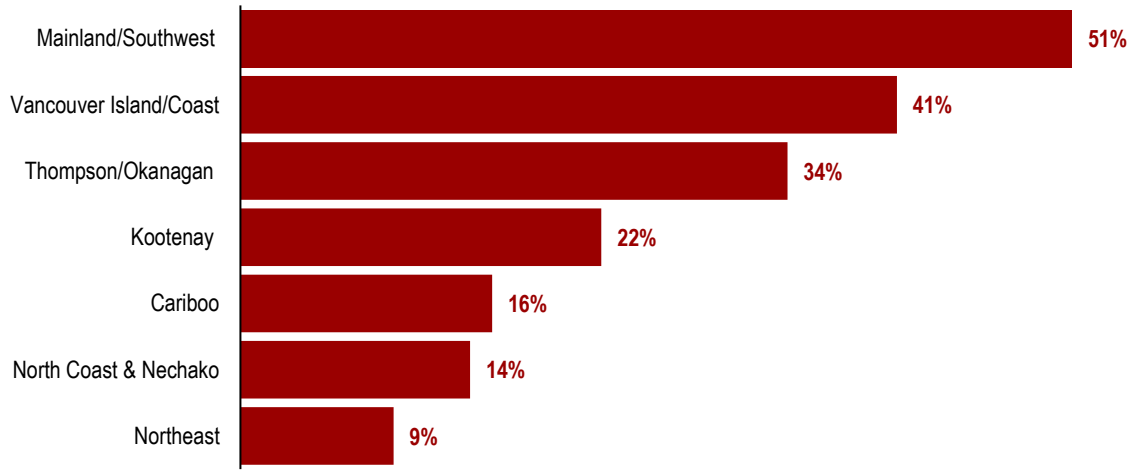
Figure 2 Operations within the province



Labour force by industry and primary markets

According to the 2011 National Household Survey, workers in the BC's electrical trades are primarily employed in the construction industry (83 per cent), with very few employed in other industries, including educational services (3 per cent), public administration (2 per cent), transportation and warehousing (2 per cent), and wholesale and retail (2 per cent).

The survey of electrical contractors was interested in discerning the primary markets of electrical contractors for electricians working in the construction industry. Nearly all respondents work in commercial markets (83 per cent), with substantial representatives from the residential construction, renovation, and maintenance sector (72 per cent), as well as from industrial construction (51 per cent). Roughly a third of respondents are engaged in low-rise (single family) residential construction (33 per cent) and just under a third work in institutional construction (31 per cent). Few respondents are engaged in high-rise (multi-family) residential construction (12 per cent) or in civil engineering (2 per cent).

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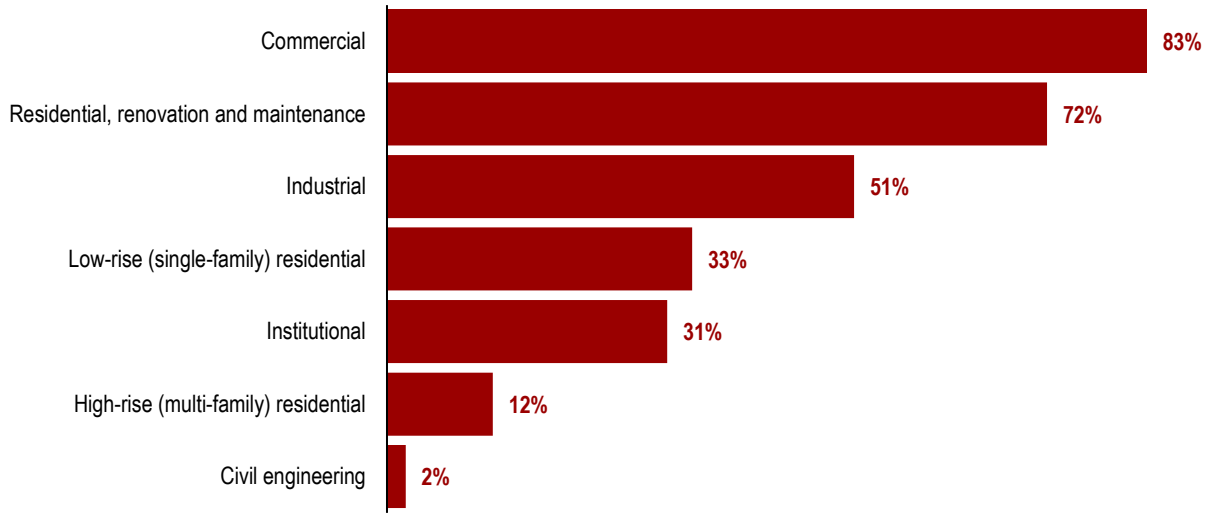
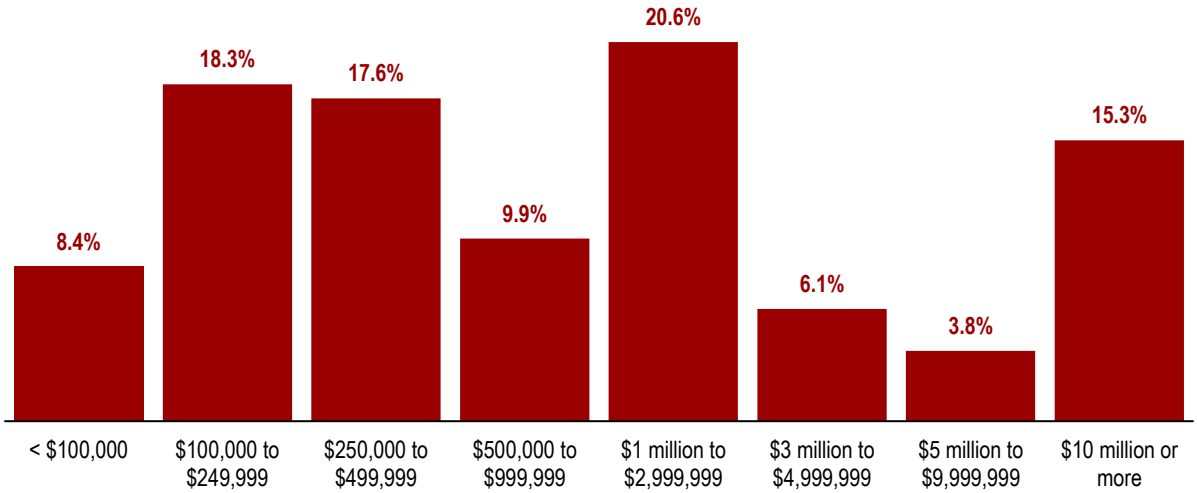
Figure 3 Primary markets of respondents' firms



Gross revenue

The size of responding organizations' gross revenue in the last fiscal year is quite varied, with peaks at revenue categories $100,000 to $249,999 (18 per cent); $250,000 to 499,999 (18 per cent); $1 million to $2,999,999 (21 per cent); and $10 million or more (15 per cent). There were nevertheless respondents across all revenue categories, representing very small businesses to very large multimillion dollar organizations.

Figure 4 Total gross revenue of responding organizations in the last fiscal year



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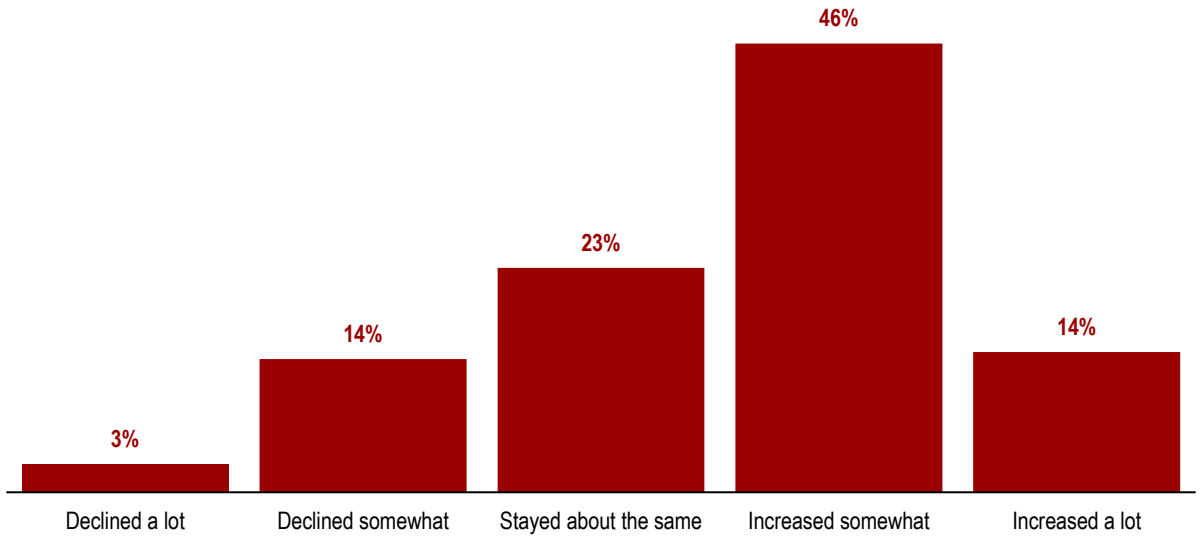
When asked about the trend of their firm's revenue over the last 2 to 3 years, 46 per cent of respondents claimed that their revenues had somewhat increased during that time, while another 14 per cent had seen a significant increase (increased a lot). The magnitude of this increase varied quite substantially from a minimum growth rate of 1 per cent to a maximum of 300 per cent (the average rate was 37 per cent). Conversely, about 17 per cent of respondents saw a decline in their gross revenues over this period, with a magnitude loss ranging between a rate of 10 per cent and 80 per cent (the average rate was 33 per cent).

Figure 5 Trend of responding firms' gross revenues over the last two to three years



3.2. Current and forecast economic trends, labour market conditions

The province of British Columbia has a number of important non-residential construction projects currently underway or expected to commence in the near future. BuildForce projects that multi-billion dollar engineering projects, such as the Pacific Northwest LNG Pipeline, the Kinder Morgan's Trans Mountain Pipeline and other proposed pipeline projects, as well as investments in mining projects, transportation, and electric power (such as the Site C Clean Energy Project) will help drive demand for labour in non-residential construction. These projects are expected to constitute a substantial level of investment in the province, reaching a peak of nearly $28 billion in 2018 and declining after 2021, though investments are nevertheless expected to remain above historical levels after this point.

Moving in tandem with population growth and expected household formation, residential investments are also expected to rise as housing capital stock increase moderately through to 2018, then declining until 2022, and rising moderately until 2026.

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Major investments in the both the non-residential and residential construction sector will inevitably increase demand for electricians across the province. BuildForce expects that requirements for major projects (such as LNG, pipelines, and transportation project) will be responsible for nearly half of the employment growth in the non-residential sector, with employment in construction rising to record levels by 2018. In fact, total employment in the non-residential sector is expected to rise by more than 20 per cent between 2016 and 2019, and despite contracting slightly after this period, forecasts are predicted that total employment will be 17 percent higher in 2025 compared to 2016 levels.

Looking specifically at electricians, labour market conditions are expected to be favourable for workers in the short and medium term. In fact, BuildForce predicts that within the short-term (2017-2018), demand will exceed supply of labour in local markets and it is expected that recruitment strategies will require going beyond traditional sources. Demand is expected to calm down after 2018, but demand for electricians will remain high throughout 2025.

Key developments that impact business and workforce

A recent study by Electro-Federation Canada (EFC) explores the factors that can impact the profitability of businesses in the electrical trades. While the study was national in its scope, the results mirrored in many ways those from the Survey of BC Electrical Contractors. It should also be noted that the categories presented to both samples do not match precisely, yet there are some corresponding themes.

In the Survey of BC Electrical Contractors, respondents were asked to identify which key developments would have the most important impact on their business objectives and overall operations. Among the list of key developments that will impact their business, we can separate them into two groups: high impact developments (those which are cited by over half of all respondents) and low impact developments (those that are cited by a minority of respondents). If should be noted, however, that the extent of the impact of these developments (i.e. how much financial gain or loss is expected) is not measured, only the incidence of respondents who believe that this development will have an impact on their business.

Among high impact developments, we find price pressure (69 per cent), increased competitiveness in the market (66 per cent), time-pressure to complete jobs (57 per cent) and economic activity or increased demand (51 per cent). Among low impact developments are more sophisticated and more demanding customers (30 per cent), policy or regulatory changes (27 per cent), an aging workforce (22 per cent), and significant foreign or government investments (6 per cent).

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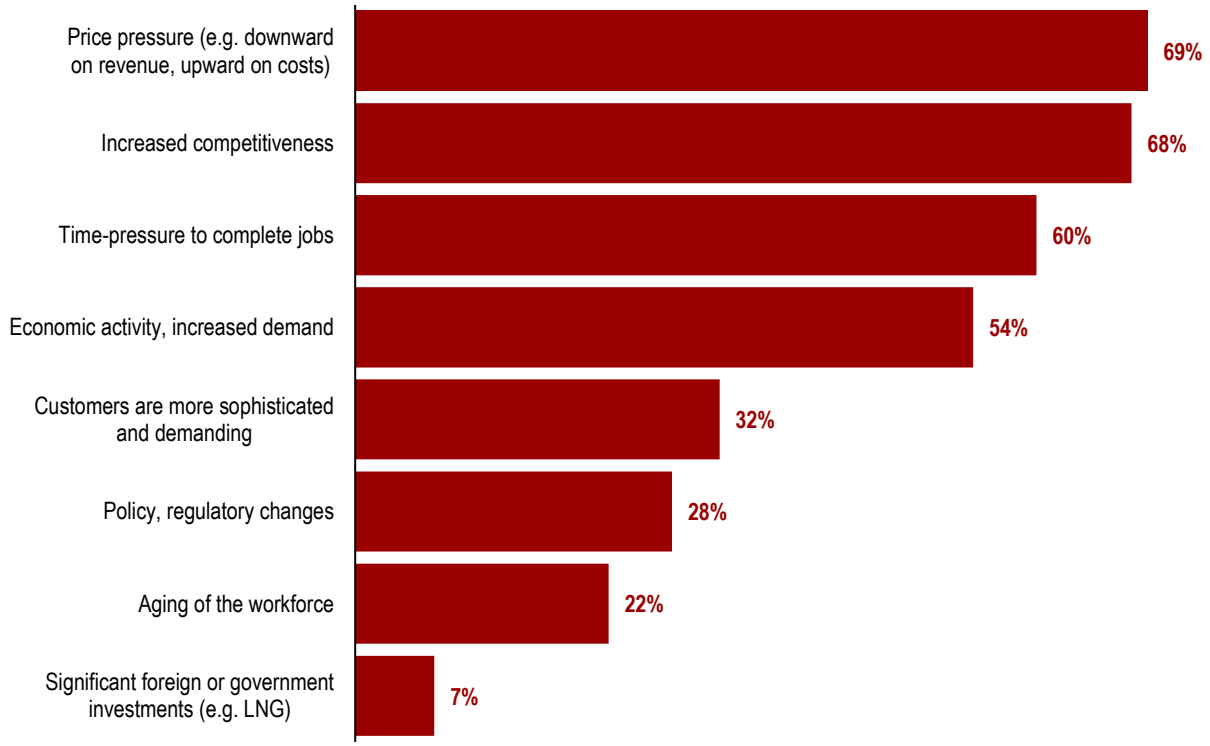
Figure 6 Key developments that impact business ranked in order of importance



Many of these same themes were identified in EFC's study. In particular, economic conditions (66 per cent) and the volatility of commodity prices (45 per cent) were cited as the factors that would have the highest impact on the profitability of their firms. In EFC's study, factors that affect the workforce were ranked against all other factors that affect a firm's profitability, which may have led to an underestimation of the weight of these factors. Nevertheless, labour availability (30 per cent) was the fourth highest ranked factor that would have an impact on the profitability of the firm, which was followed by having unqualified staff (26 per cent).

The BC survey of electrical contractors, on the other hand, explored the factors that may have a potential impact on their workforce and supply of labour, but not directly on how these issues affect their profitability. In order of importance, contractors stated that increasing wages (56 per cent), increasing need for skills development (53 per cent), labour supply shortages (52 per cent), and the need for quality mentorship (51 per cent) have nearly the same impact on their workforce. The remaining two key developments relate to challenges with knowledge transfer between older and younger workers (40 per cent) and challenges with technological change (30 per cent).

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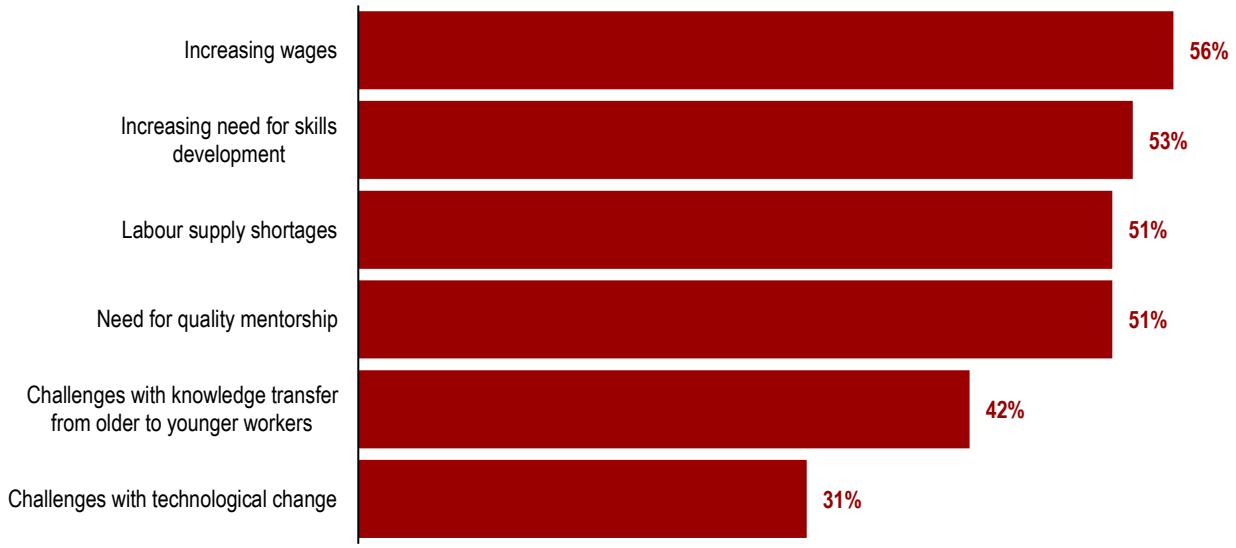
Figure 7 Key developments that impact the workforce ranked in order of importance



3.3. Recruitment and retention issues

BC's Industry Training Authority (ITA) lists "Construction Electrician" as one of the province's top 10 "in-demand" trades, while British Columbia's 2025 Labour Market Outlook lists both Construction and Industrial Electricians on its "Top 100 High Opportunity Occupations" List. Nevertheless, the pathway to a career in the electrical trades, as with all trades, requires specific skills and aptitudes that can be acquired through training and on-the-job mentorship.

The candidate who can present the right skills and aptitudes is at the start line of a career in the electrical trades. When they find employment, they enter a long period of learning and adaptation. Given that apprentices are learning on the job, it is not surprising that employers are highly aware of training issues. In the BC electrical contractor's survey, more than half the respondents named the "increasing need for skills development" and the "need for quality mentorship" as having an impact on their current workforce, while 42 per cent said "challenges with knowledge transfer from older to younger workers" were having an impact. Skills training and ongoing mentorship, in other words, are widely seen as requirements for ensuring the success and retention of apprentice-level electricians.

Sources for Apprenticeship Recruitment

BC's skills training system has achieved increasing success in attracting and preparing suitable candidates for the electrical trades. Close to a third of recent new entries into the electrical apprenticeship stream have benefited from approved post-secondary foundation training, while others have acquired key trades skills at the high-school level.

As of March 31, 2016 (the 2015/16 year-end) the ITA listed 7,531 active construction electrical apprentices. Of these, 1,919 were registered during fiscal year 2015/16. During the same year, the

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ITA funded 1,034 seats in post-secondary electrical trade foundation courses offered by public colleges, private colleges or industrial joint training committees. These programs act as an effective screening mechanism for the trades, setting clear and consistent requirements for trades entry – typically English 11, pre-Calculus Math 11 and Physics 11, or their equivalents. As stated above, foundation-level electrical trainees may come directly from high school, or they may bring the experience of a decade or more in other occupations. Through class work, lab work and field experience, foundation program graduates earn credit for Level 1 completion in the four-level BC apprenticeship program.

The ITA reports that the "Continuation Rate" for electrical foundation program graduates was 62.5 per cent in 2015/16. This metric describes "the percentage of individuals who successfully complete a Foundation program and become an apprentice registered with the ITA [in any trade] 12 months from their Foundation credential achievement date." The annual apprentice registration figure and the Continuation Rate cover slightly different time periods, but it is reasonable to infer that on the order of 600 apprentice registrants in 2015/16 came from the post-secondary foundation programs.

Also in 2015/16, 35 of BC's 60 school districts offered the Construction Electrician Youth Train in Trades (formerly Ace-It) program. These courses can also offer a useful introduction to electrical theory and to the electrical equipment and systems that are in use at commercial, industrial and marine worksites. Some of the participating school districts are working closely with public colleges to guide youth trainees toward the apprenticeship stream.

Candidates who lack foundation or Youth Train in Trades credentials may enter the electrical trades through more traditional routes – that is, by showing interest and registering with an employer to gain work experience on the way to register as an apprentice. And in a few cases, apprentices who have partly completed apprenticeship programs in other Canadian jurisdictions may transfer to BC and register within the province.

Level of satisfaction in achieving recruitment needs

When asked to comment on how satisfied they are in their ability to recruit and retain workers to meet their needs, respondents to the BC survey of electrical contractors seemed more satisfied in their recruitment and retention efforts with regards to apprentices than journeyworkers. In fact, nearly two thirds of all respondents (65 per cent) were either very satisfied (18 per cent) or satisfied (47 per cent) in their ability to recruit and retain apprentices, with only a quarter (26 per cent) feeling only moderately or slightly satisfied. This result contrasts with their experience recruiting and retaining suitable journeyworkers, where far fewer respondents felt satisfied (32 per cent), yet nearly half (44 per cent) were either moderately or slightly satisfied. In both circumstances, only a handful of respondents (9 per cent each) felt that they were not satisfied at all with their recruitment and retention efforts.

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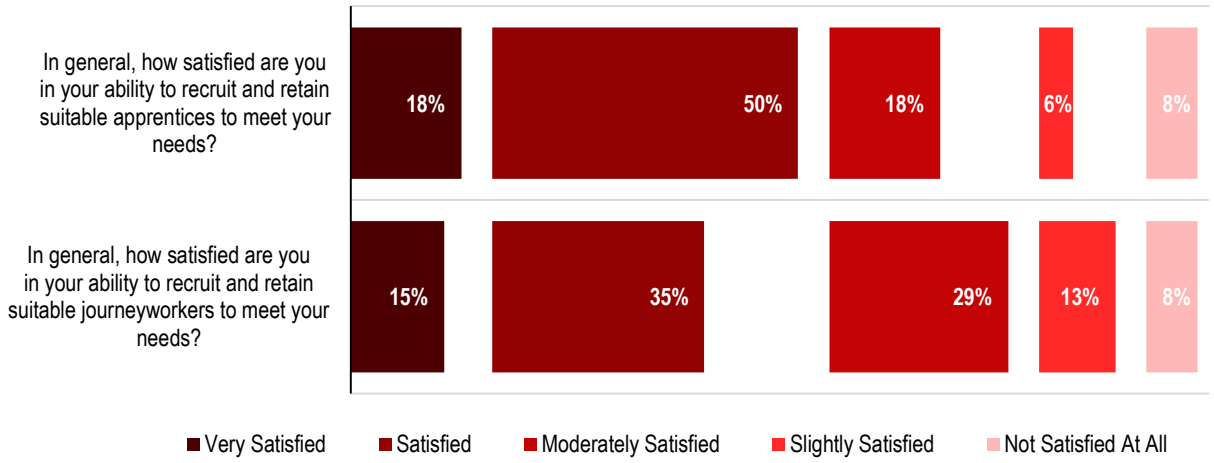
Figure 8 Level of satisfaction in recruiting and retaining suitable apprentices and journeyworkers



Importance of factors contributing to recruitment successes

Respondents were asked to qualify the degree of importance that each of a series of eight factors contribute to both recruitment of workers and their retention in the workplace. When asked to comment on the factors that contribute to successful recruitment strategies, one factor stands out as being *very important* for a plurality of respondents: providing strong local referrals (47 per cent). The following two factors, offering good learning opportunities and offering steady work, were deemed to be as important as they are very important by an equivalent proportion of respondents (40 per cent each). Three factors were deemed as primarily *important* factors in promoting recruitment successes, including having a strong safety record (48 per cent), offering competitive wages and benefits (48 per cent), and providing a supportive work environment (47 per cent). Although a majority of respondents felt that having career advancement potential was either very important or important (65 per cent), nearly a third believed it was only moderately or slightly important (31 per cent). And finally, a majority of respondents overwhelming felt that proactively engaging with the union to communicate their needs was not at all important (60 per cent).

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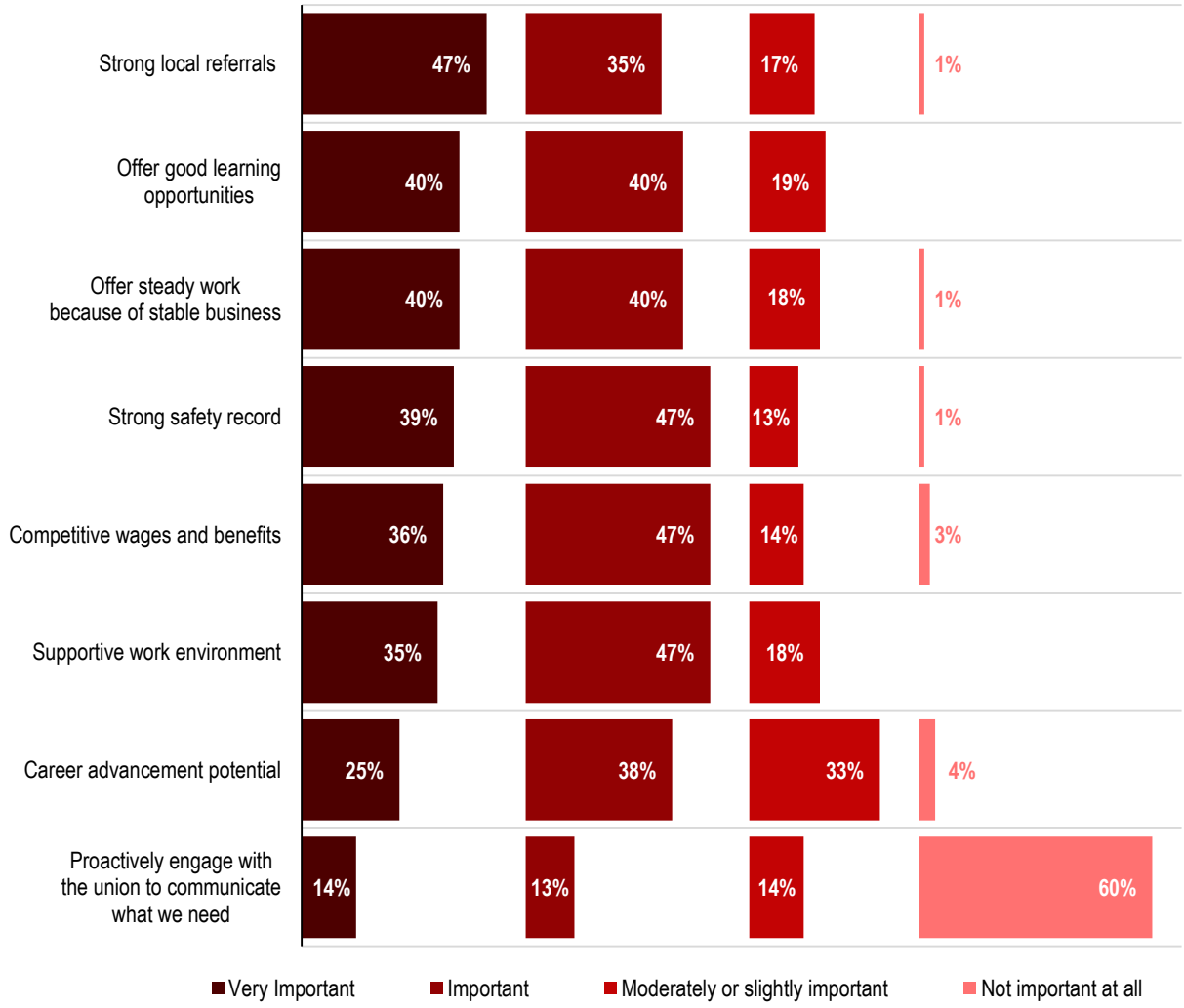
Figure 9 Level of importance of various factors that contribute to recruitment successes



The workforce profiles gathered at the beginning of the survey also point to a different kind of recruiting issue. For the past decade or more, the ITA and industry associations have emphasized the need to recruit women, Aboriginal people and visible minorities into the trades in order to avoid a future skills shortage in the growing provincial economy. However, the survey suggests that these demographic groups continue to be under-represented in the industrial workforces of the respondent companies. The need to close this gap poses an ongoing challenge for training organizations, employers, unions and government. A continued effort to attract Aboriginal and visible minority students to high school trades training programs is one obvious part of the solution.

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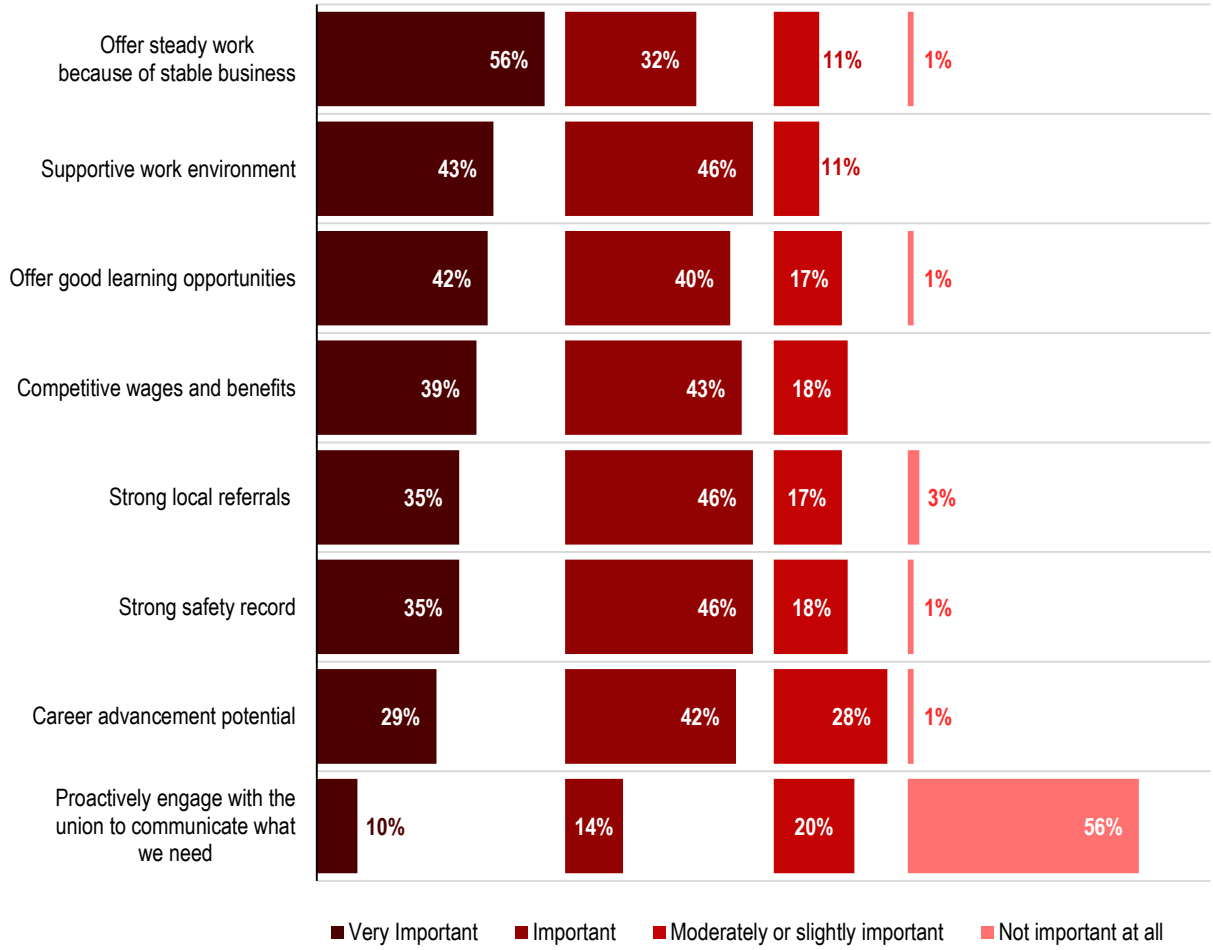
Importance of factors contributing to retention successes

According to survey respondents, the primary factor that contributes toward the retention of electrical apprentices is a stable business offering steady work (53 per cent found this to be very important). The next three factors, having a supportive work environment, offering good learning opportunities, and providing competitive wages and benefits, were deemed to be very important or important by an almost equivalent proportion of respondents (ranging from 40 per cent to 44 per cent as very important factors, and 40 per cent to 45 per cent as important factors). The next three factors (strong local referrals, strong safety record, and career advancement potential), were all deemed to be important factors by nearly half of all respondents (44 per cent, 47 per cent, and 43 per cent, respectively). The last factor, proactively engage with the union to communicate the contractors' needs, was the only factors deemed to be not important at all by a majority of respondents (55 per cent).

Figure 10 Level of importance of various factors that contribute to retention successes



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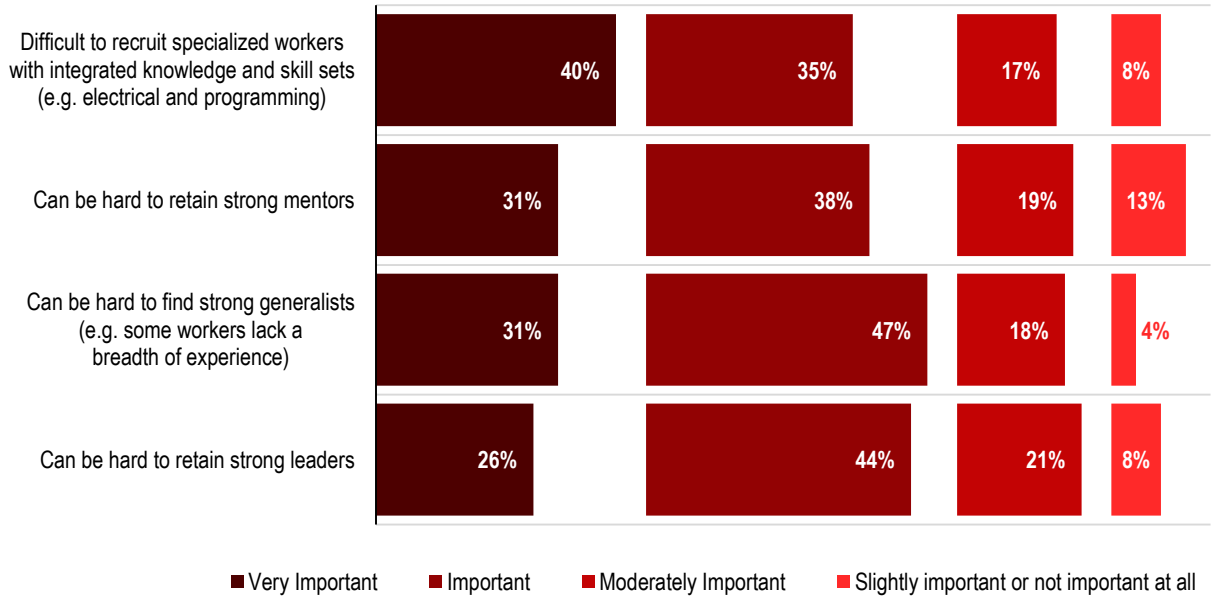
Recruitment and retention barriers

According to respondents in the Survey of BC Electrical Contractors, the most significant barrier affecting recruitment and retention is the difficulty in recruiting specialized workers with integrated knowledge and skill sets (40 per cent cited this as very important, 34 per cent as important). The ability to retain strong leaders (31 per cent said it was very important, 36 per cent said it was important) was deemed very important by slightly more respondents than those who found it difficult to find strong generalists (31 per cent said this was very important, 47 per cent said it was important). Finally, finding strong mentors was deemed very important by 29 per cent of respondents, and important by 44 per cent.

Figure 11 Level of importance of barriers that contribute to recruitment and retention challenges



These concerns point to an ongoing loss of promising or qualified people from the electrical trades. Judging from ITA statistics, this process begins at the novice level, where more than a third of the 2015 graduates from electrical foundation programs have not proceeded to apprenticeship. The outflow continues through the apprentice period: the failure of apprentices in all trades to complete their programs is an ongoing subject of study and discussion at industry bodies such as the Canadian Apprenticeship Forum. A 2014 report on trades training commissioned by the Government of BC (Recalibrating for Higher Performance) states that industry joint training committees achieve better completion rates than the average, and offers some reasons: "Their success is largely premised on their ability to recruit and screen for strong candidates, provide ongoing support and mentorship to apprentices through counselors, and to indenture apprentices, allowing them to move apprentices around to different worksites thereby exposing them to the whole trade."

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Among seasoned tradespeople, there is anecdotal evidence that many leave the construction site for positive reasons aside from simple retirement -- to become full-time technical trainers, for example, or to move up into the ranks of management and ownership. If there are negative reasons for leaving the electrical trades, they may be related in part to the business issues that are raised in the contractors' survey: concerns about unsafe conditions, productivity barriers, or a lack of clear communications at work. The survey suggests that these issues in the business environment could be mitigated through the application of more widespread and systematic programs of mentorship.

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4. Business needs, performance gaps, and role of mentorship

The Survey of BC Electrical Contractors administered as part of this project covers a number of themes that seek to uncover the business outcomes and priorities or electrical contractors, perceived performance gaps and their sources, as well as identifying how quality mentorship can help minimize the impact of these gaps on business outcomes. The following section will describe the results of this survey in order to provide a more substantive account of where mentorship is needed and in which areas can mentorship best address existing performance gaps affecting the electrical trades.

4.1. Business outcomes and priorities

In order to draw a link between the impact of performance gaps and business outcomes, electrical contractors participating in the survey were asked to rank a list of business outcomes according to their level of importance. Interestingly, none of the listed business outcomes were deemed to be unimportant to any of the respondents' business objectives while over three quarters of all respondents agreed that all listed outcomes are either important or very important. Respondents overwhelming agreed that the most important business outcome was **maintaining high service and product quality**, with all respondents judging it to be either very important (87 per cent) or important (13 per cent). The two business outcomes that followed in terms of their relative importance to electrical contractors relate to employees' performance and their workplace environment, such as **increasing their productivity and efficiency** (64 per cent thought this was very important) and **improving health and safety standards** (57 per cent). Less than half of all respondents thought that financial outcomes, such as reducing costs and wastage (49 per cent) and improving revenue and market shares (44 per cent) were very important, while only a quarter of respondents (26 per cent) felt the same about enhancing human resources.

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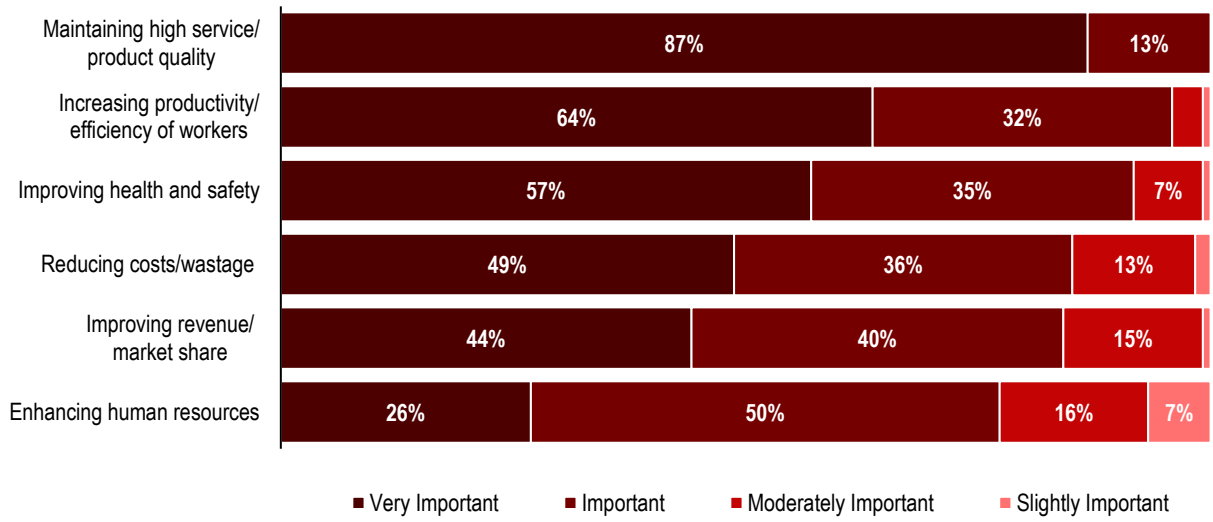
Figure 12 Business outcomes ranked in order of importance



In a follow-up question, respondents were asked to identify their business priorities in the short and medium term according to the same business outcomes they had ranked according to their level of importance. Not surprisingly, a similar pattern emerges in how respondents ordered their priorities, with one significant difference. While maintaining high quality service and product quality is the primary short-term objective for most respondents (33 per cent), the second most important short-term objective is in fact improving their revenue and market share (31 per cent), which is also the most important medium term outcome for most respondents (40 per cent). The remainder of the list of short-term priorities follows the pattern established in Figure 12 above, with increasing productivity placing third (22 per cent), followed by reducing costs and wastage (6 per cent), improving health and safety standards (6 per cent), and enhancing human resources (2 per cent). In the medium term, increasing productivity and efficiency remains in the third rank, though the number of respondents who prioritize this objective is halved (12 percent). The order of the bottom three priorities is inverted slightly with enhancing human resources falling in fourth place (7 per cent), followed by a reduction in costs and wastage (4 per cent) and finally improving health and safety (2 per cent).

There appears to be two sets of priorities that emerge from this list, which we can categorize as **high priorities** and **low priorities**. We can clearly see how most electrical contractors prioritize three business outcomes over others: maintaining high service and product quality, improving revenues and markets shares, and increasing the productivity and efficiency of workers are the primary objectives of electrical contractors.

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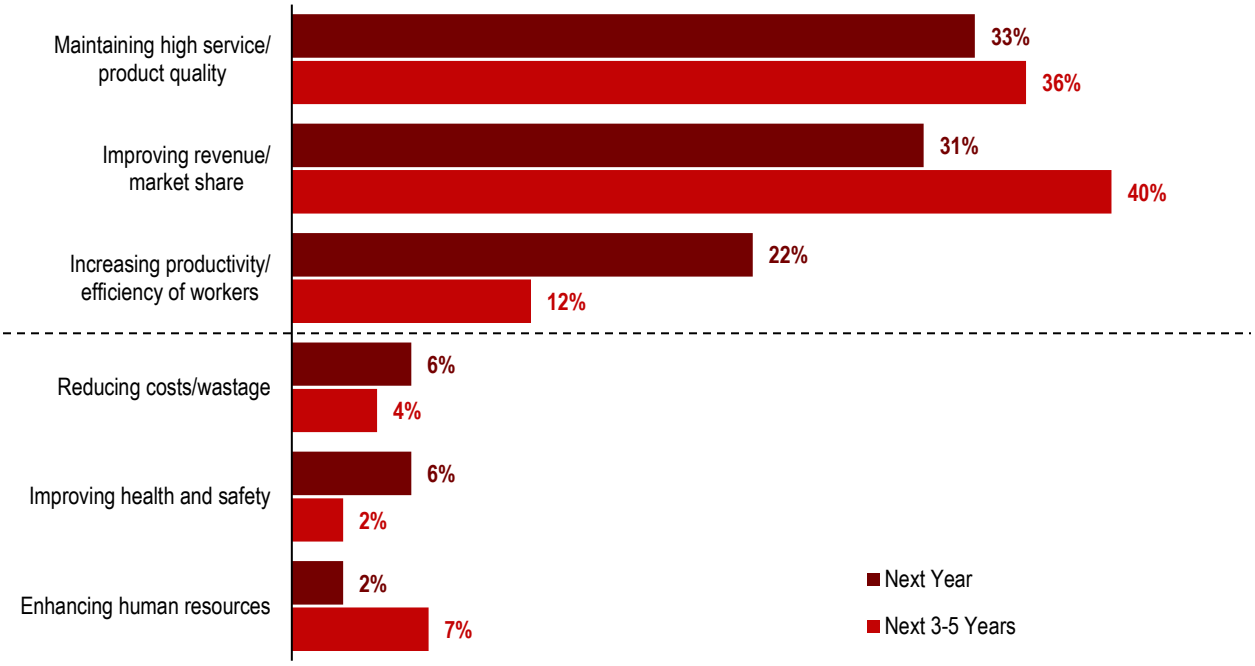
Figure 13 Business priorities in the short- and medium-term



4.2. Performance gaps, causes and solutions

Performance gaps can and often do have an impact on an organization's ability to meet its business outcomes. These gaps often impede employees' abilities to successfully perform their duties and responsibilities in accordance with their employer's objectives.

The section will assess existing performance gaps according to their respective business outcomes as identified in section 4.1, in order to provide an accurate picture of how performance gaps are impacting each of these outcomes. The following section will provide an overview of gaps affecting safe working practices, health and safety practices and procedures, productivity and efficiency in the workplace, client relations and quality of service, and human resources outcomes.

Safe working practices

Respondents were first asked to identify existing gaps in their workplace, then to rank selected gaps in order from most to least problematic. In Figure 14 below, we present the percentage of respondents who identified the gap as having an effect on safe working practices in their workplace (in blue), and those respondents who identified that gap as being the most problematic (in red).

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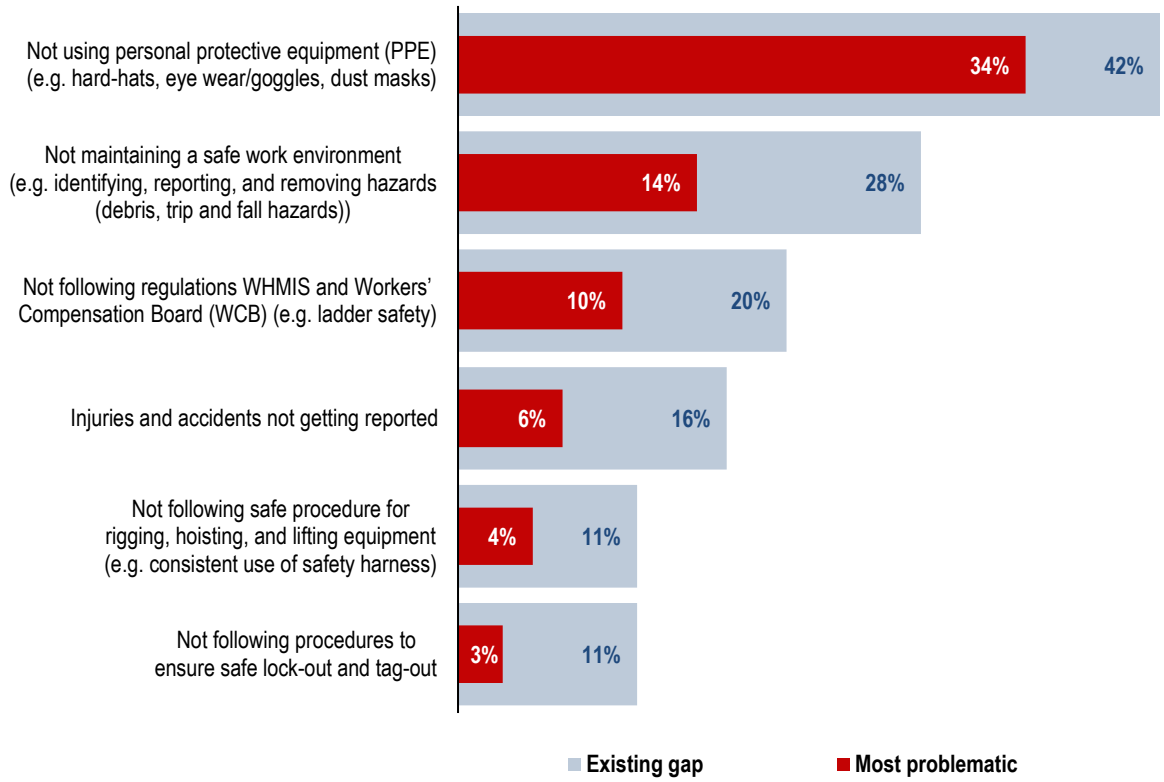
Figure 14 Recurring gaps affecting safe working practices



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The recurring gap that is affecting safe working practices in most workplaces concerns employees not wearing personal protecting equipment (42 per cent). This gap was also identified as being the most problematic by most respondents (34 per cent). The second and third most problematic gaps were not maintaining a safe work environment (28 per cent identified as an existing gap; 14 per cent as most problematic) and not following WHIMIS and Workers' Compensation Board regulations (20 per cent identified as an existing gap; 10 per cent as most problematic). The last three existing gaps (injuries and accidents not getting reported (16 per cent); employees not following safe procedures for rigging, hoisting and lifting equipment (11 per cent); and employees not following procedures to ensure safe lock-out and tag-out (11 per cent)) were seen as being most problematic by only a handful of respondents, ranging from 3 to 6 per cent.

Of course, it is imperative to understand the source of these gaps if they are to be addressed. Respondents were asked to provide some indication as to the source of these gaps and their relative importance in contributing to the problem.

The two primary underlying causes of gaps affecting safe working practices are related to employees' attitudes and behaviour in the workplace. In fact, complacency, boredom, and a lack of variety is the primary cause of the gaps affecting safe working practices as identified by most respondents (41 per cent). Indeed, a significant number of respondents who identified complacency as a cause of the gaps also identified it as the most important cause (25 per cent of all respondents). The second underlying cause (too focused on productivity), was identified as a cause by roughly a third of all respondents (32 per cent), and was deemed an important cause by more than half of all those who identified it as a cause (20 per cent of all respondents).

The three causes that follow were deemed to be important by similar proportions. These include working with other trades and consequently adopting their poor practices (identified as a cause by 30 per cent; identified as an important cause 9 per cent), gaps in knowledge or inexperience of new apprentices (30 per cent; 9 per cent), and poor attitudes towards safety practices (27 per cent; 9 per cent).

While and gaps in mentorship quality were identified as underlying causes by just over a quarter of respondents (25 per cent), they were identified as an important cause by 13 per cent of all respondents. Under-trained workers and increasingly dynamic and complex work environments were judged to be a cause by only a few respondents (12 per cent and 10 per cent, respectively).

Finally, underreporting arising from disincentives from regulation were deemed important by a negligible number of respondents (3 per cent), with none considering this as an important problem.

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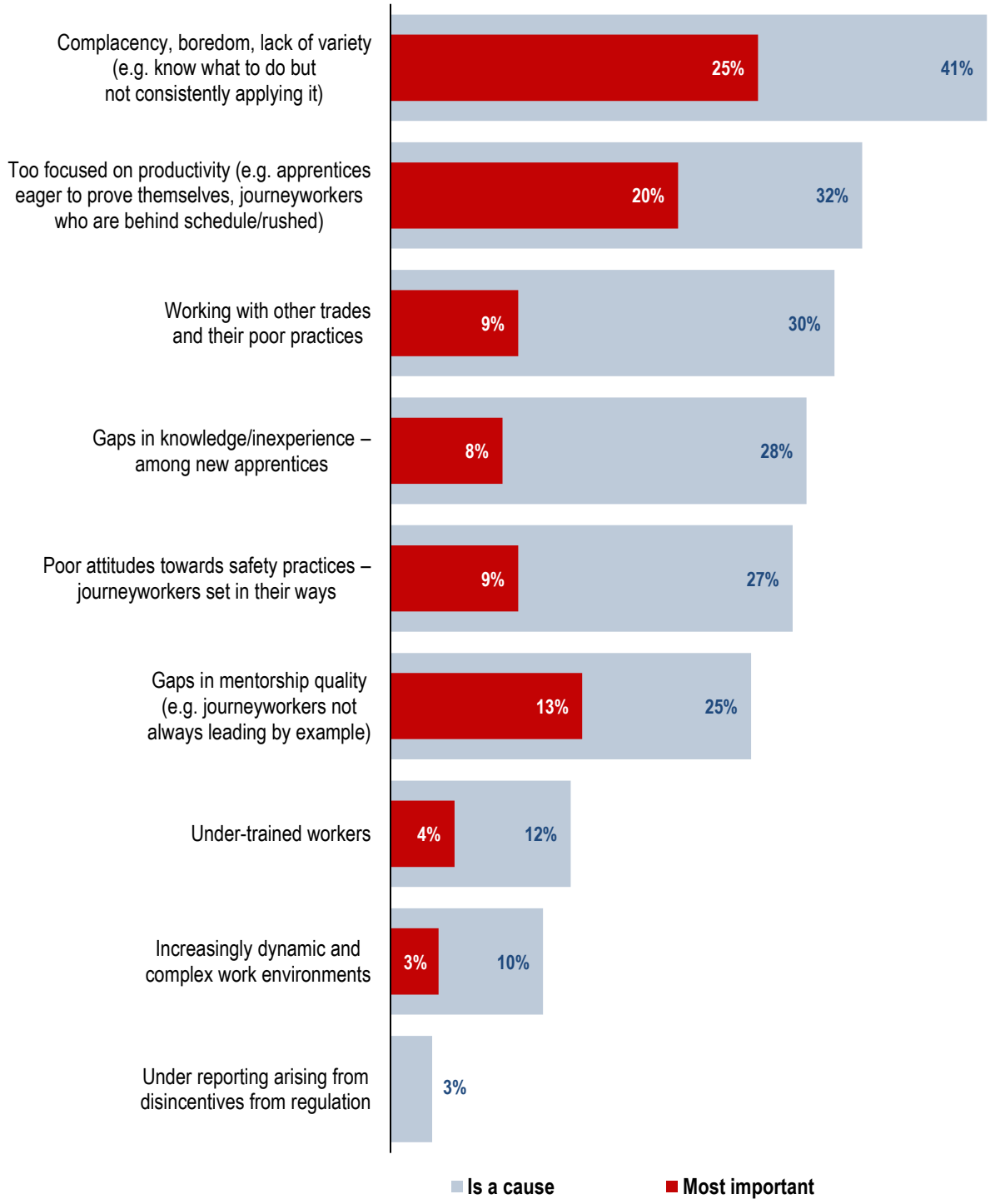
Figure 15 Underlying causes of gaps affecting safe working practices



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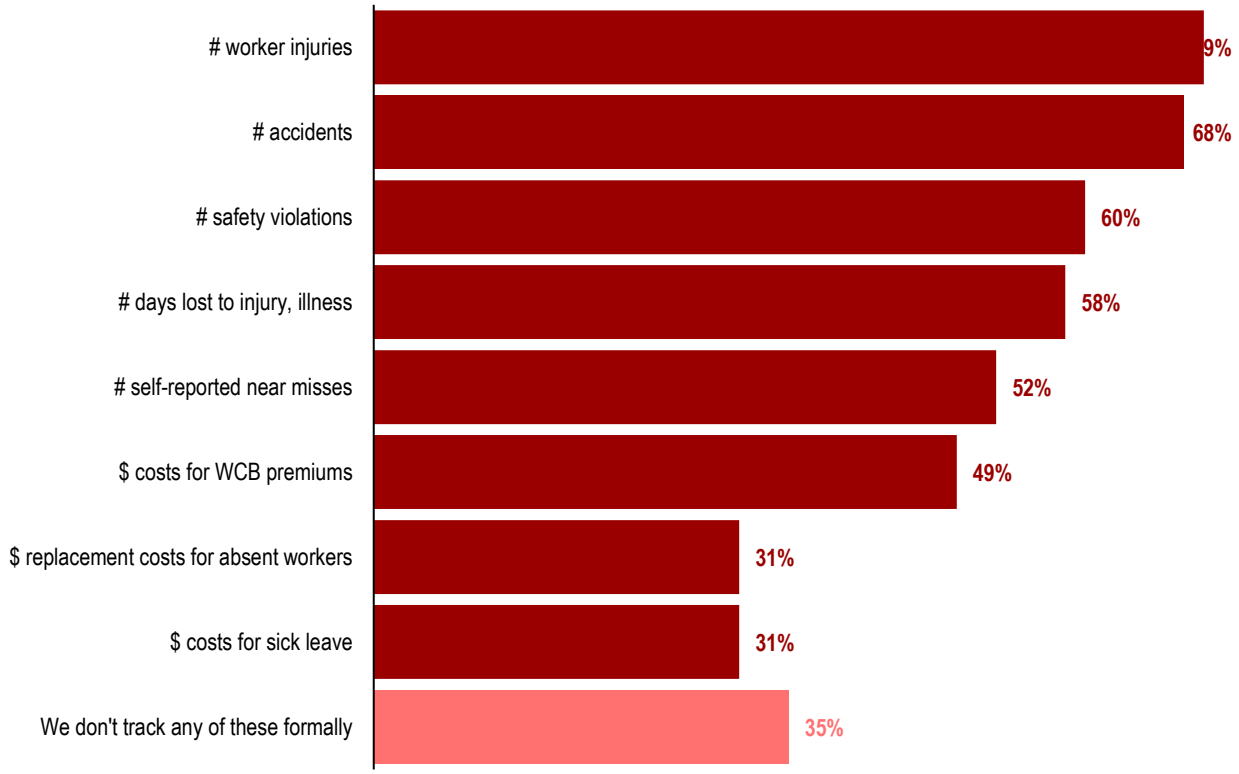
Health and safety practices and procedures

Key performance indicators currently in use

Two KPI are measured by roughly two-thirds of all respondents: number of worker injuries (67 per cent) and number of accidents (65 per cent). The next four KPI that are measured by most respondents include: the number of safety violations (57 per cent), the number of days lost to injury or illness (55 per cent), the number of self-reported near misses (50 per cent), and the costs for WCB premiums (46 per cent). The KPI that were least implemented by responding firms were the replacement costs for absent workers (28 per cent) and the costs for sick leave (28 per cent). It should also be noted that over a third of all respondents (35 per cent) do not formally track any health and safety KPIs.

Figure 16 Health and safety key performance indicators



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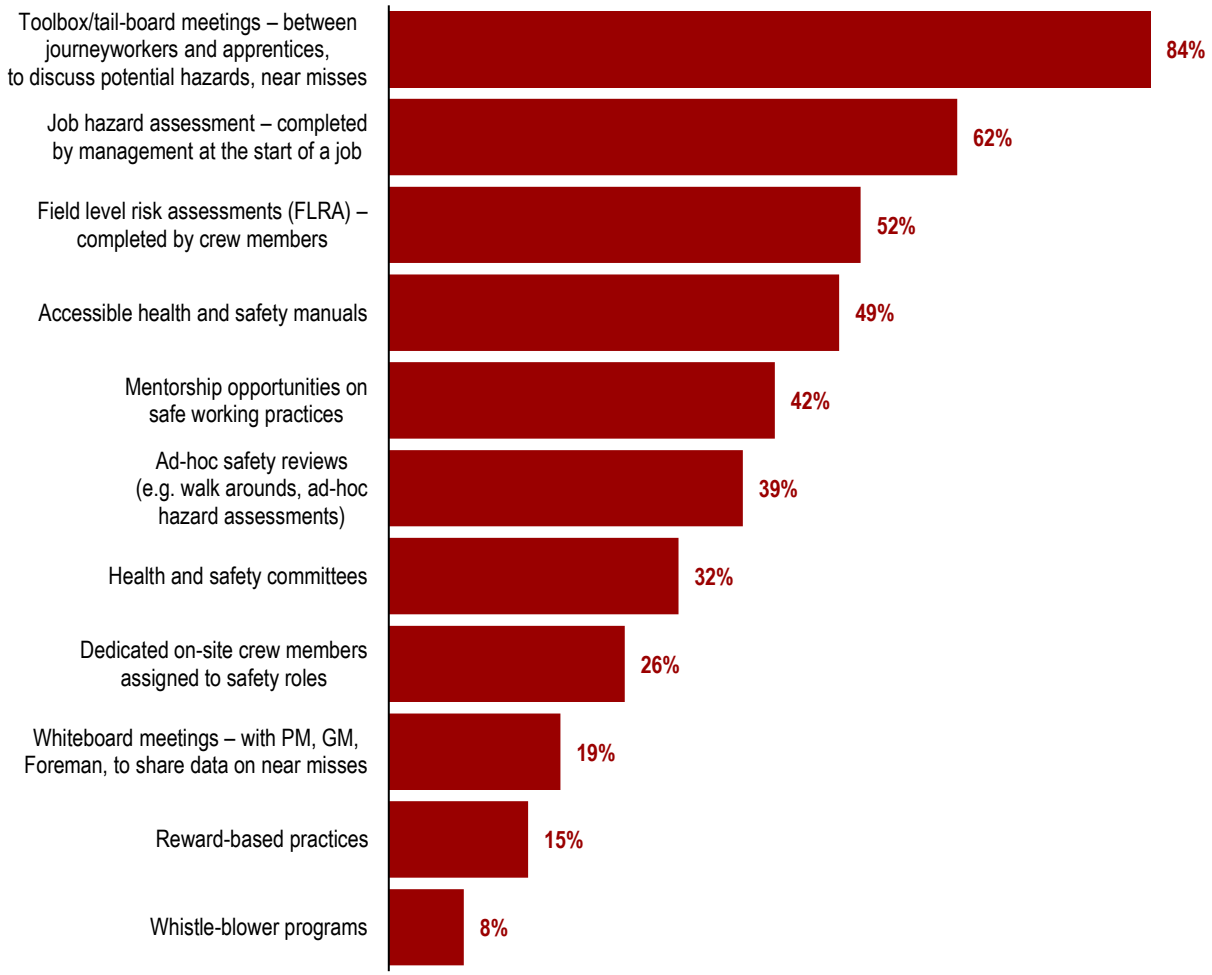
Health and safety processes and practices

Among the health and safety processes and practices presented to respondents, the range of their implementation varied substantially. Nearly all respondents (83 per cent) have some form of toolbox or tail-board meeting structure in place allowing journeyworkers and apprentices to discuss potential hazards and near misses in the workplace. The next four processes and practices were implemented by less than two-thirds of respondents but by more than roughly half: job hazard assessments (59 per cent), field level risk assessments completed by crew members (49 per cent), accessible health and safety manuals (46 per cent), and mentorship opportunities on safe working practices (41 per cent). The least implemented health and safety processes and practices include whiteboard meetings (17 per cent), reward-based practices (14 per cent), and whistle-blower programs (8 per cent).

Figure 17 Processes and practices in place to monitor and address health and safety issues



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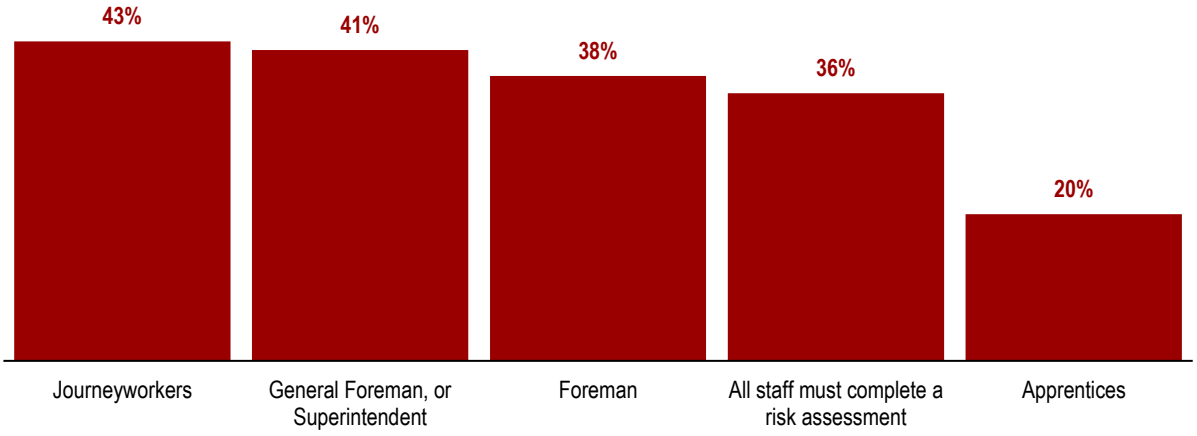
Risk assessments and safety meetings

Risk assessments and on-site safety meetings provide staff with an opportunity to address health and safety concerns and risks in the workplace. In slightly more than half of all responding firms (52 per cent), risk assessments involve formal reporting by staff. Who is responsible for completing these assessments varies quite considerably, though in the majority of cases (44 per cent), the responsibility lies with journeyworkers. This is followed by the general foreman or superintendent (39 per cent of firms). Roughly the same proportion of responding firms require the foreman (36 per cent) to complete the risk assessment as they do the entire staff (35 per cent). In a fifth of responding firms (20 per cent), apprentices are responsible for completing risk assessments.

Figure 18 Responsibility for completing risk assessments



The frequency of on-site safety meetings generally follows three different schedules. Roughly a quarter of responding firms (26 per cent) have daily meetings, roughly a third (30 per cent) have weekly meetings, and more than a quarter (29 per cent) have ad hoc meetings, as needed with no standard timeframe. The remaining firms have meetings on a frequency that ranges from twice a week (3 per cent) or every two weeks (2 per cent), to once a month (6 per cent) or at the start of the job (4 per cent).

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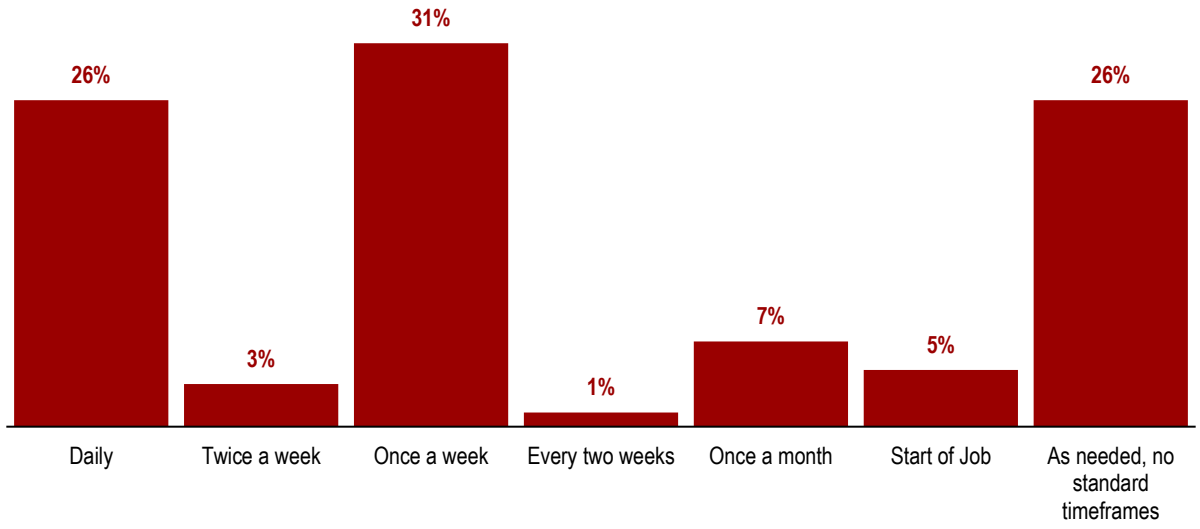
Figure 19 Frequency of on-site safety meetings



Usefulness of mentorship to address health and safety gaps

Overall, respondents see mentorship as a useful tool in addressing health and safety gaps in the workplace. Indeed, across all identified health and safety activities and outcomes, more than half of survey respondents agreed that mentorship would be very useful or useful in addressing performance gaps. Moreover, three mentorship activities were deemed to be *very useful* or *useful* in addressing health and safety gaps by more than three quarters of all respondents: activities to reinforce consistent safe working practices among new apprentices (89 per cent very useful or useful), practice and support in conducting high quality job hazard or field-level risk assessments for all responsible staff and crew (82 per cent), and approaches for creating successful toolbox/tail-board meetings (75 per cent). Three other activities were deemed to be *useful* by most respondents, such as introducing protocols for daily monitoring (44 per cent useful), developing tactics for maximizing engagement and fighting complacency (46 per cent), and developing methods for encouraging freshness and variety (38 per cent).

The last remaining activity (introducing guidelines for was nevertheless found to be very useful or useful by a majority of respondents (51 per cent), but were also deemed to be slightly useful or not at all useful by a fifth of all respondents (20 per cent), the highest proportion in that category for any of the options listed.

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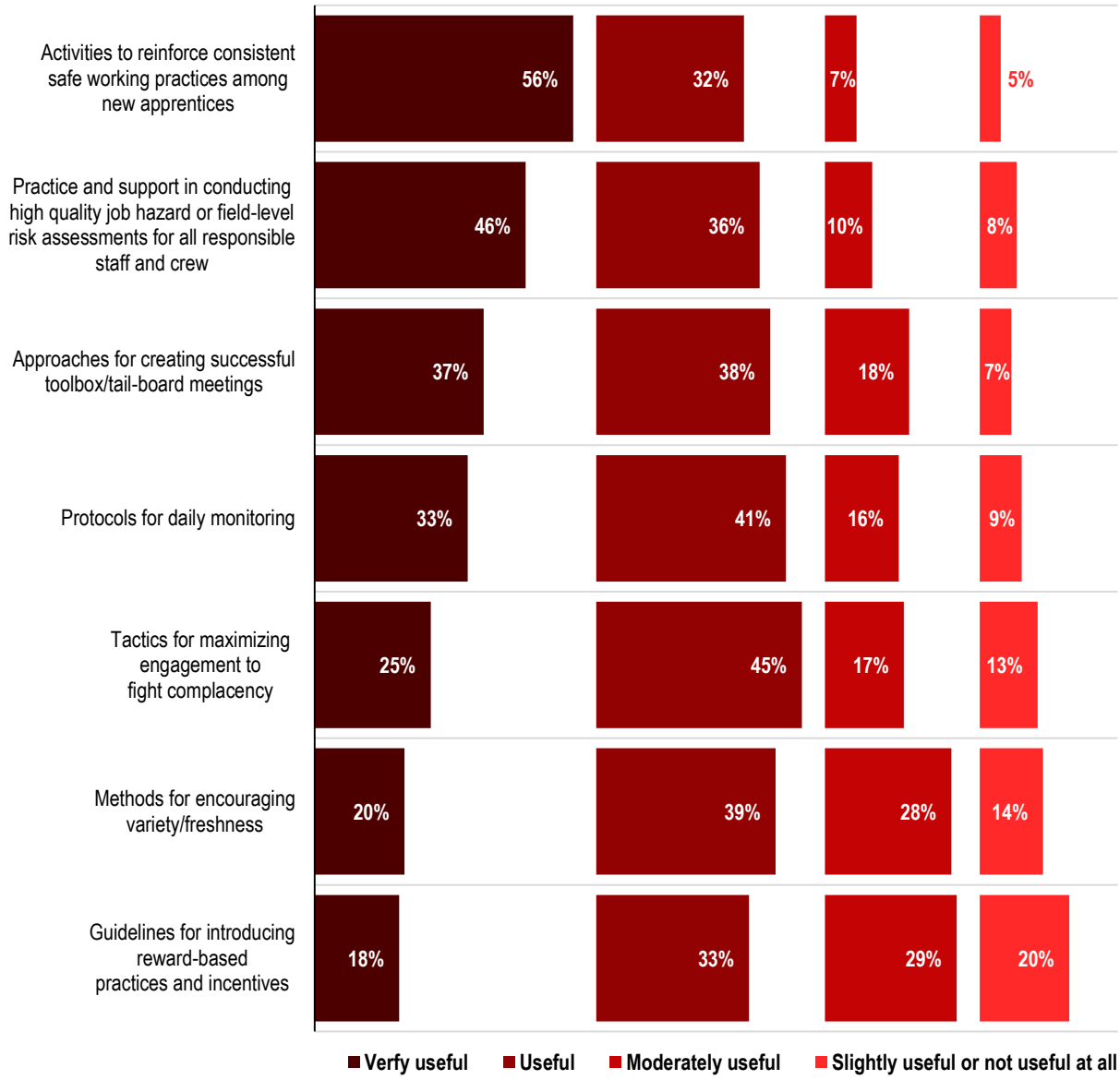
Figure 20 Usefulness of mentorship activities to address health and safety gaps



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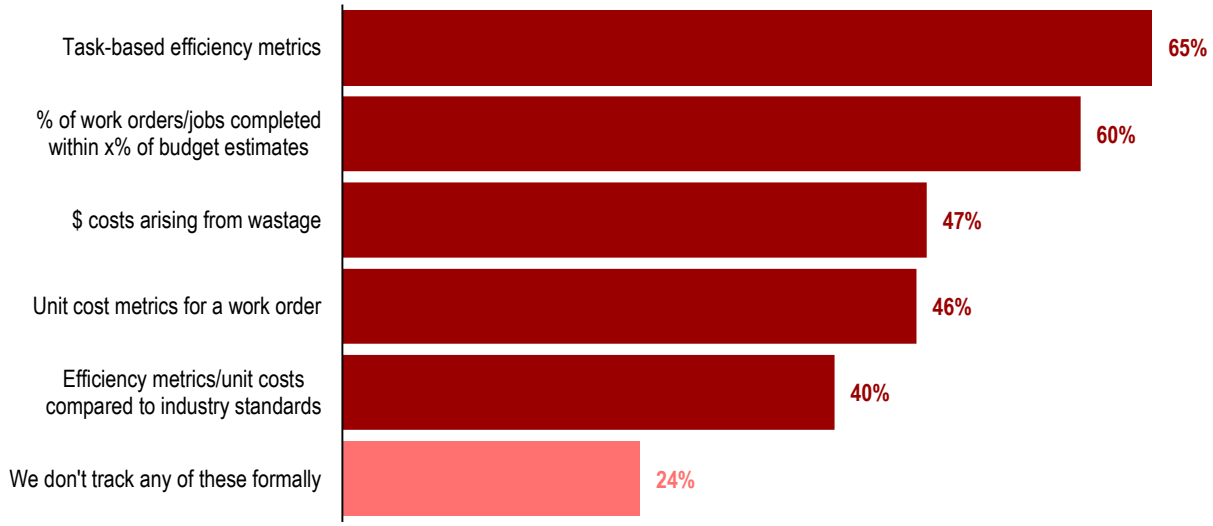
Productivity and efficiency in the workplace

Key performance indicators currently in use

Two KPI measures of productivity and efficiency are currently implemented by a majority of respondents: task-based efficiency metrics (63 per cent) and the percentage of work orders or jobs completed within projected budget estimates (57 per cent). The other three KPI measures are implemented in the firms of over a third of all respondents: costs arising from wastage (45 per cent), unit cost metrics for a work order (44 per cent), and comparisons between efficiency metrics or unit costs to industry standards (37 per cent). Roughly a quarter of respondents (24 per cent) report have no formal mechanism in place to track productivity and efficiency performance in their workplace.

Figure 21 Key performance indicators used to measure productivity and efficiency



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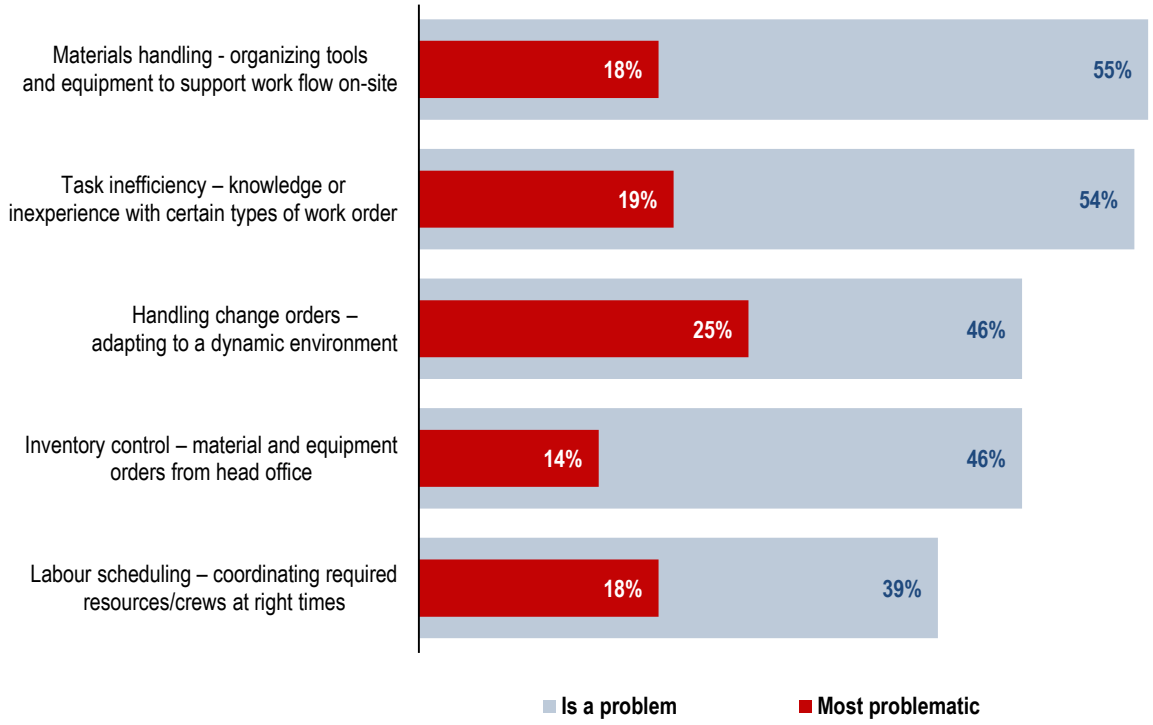
Gaps affecting productivity and efficiency in the workplace

Among all gaps affecting productivity and efficiency in the workplace, the two most problematic gaps are materials handling and task inefficiency, identified as problems by 55 per cent and 54 per cent of respondents, respectively. They were deemed to be the most problematic gaps by less than a fifth of respondents, 18 per cent and 19 per cent, respectively.

Handling change orders and adapting to a dynamic environment was cited as the most problematic gap by the largest proportion of respondents (25 per cent) despite having been identified as a problem by fewer respondents than the previous two gaps (46 per cent of respondents), The final two gaps listed are concerned with management issues such as inventory control and labour scheduling, and were nevertheless cited as being problematic by nearly half of respondents (46 per cent and 39 per cent, respectively).

Figure 22 Inefficiencies and problem areas relating to productivity and efficiency on the job



Productivity and efficiency processes and practices

Electrical contractors do have some processes and practices currently in place to monitor and address productivity and efficiency challenges in their workplaces. Among those presented to respondents, the two processes and practices that are implemented by the most workplaces include keeping morale high and promoting the importance of productivity (32 per cent) and providing

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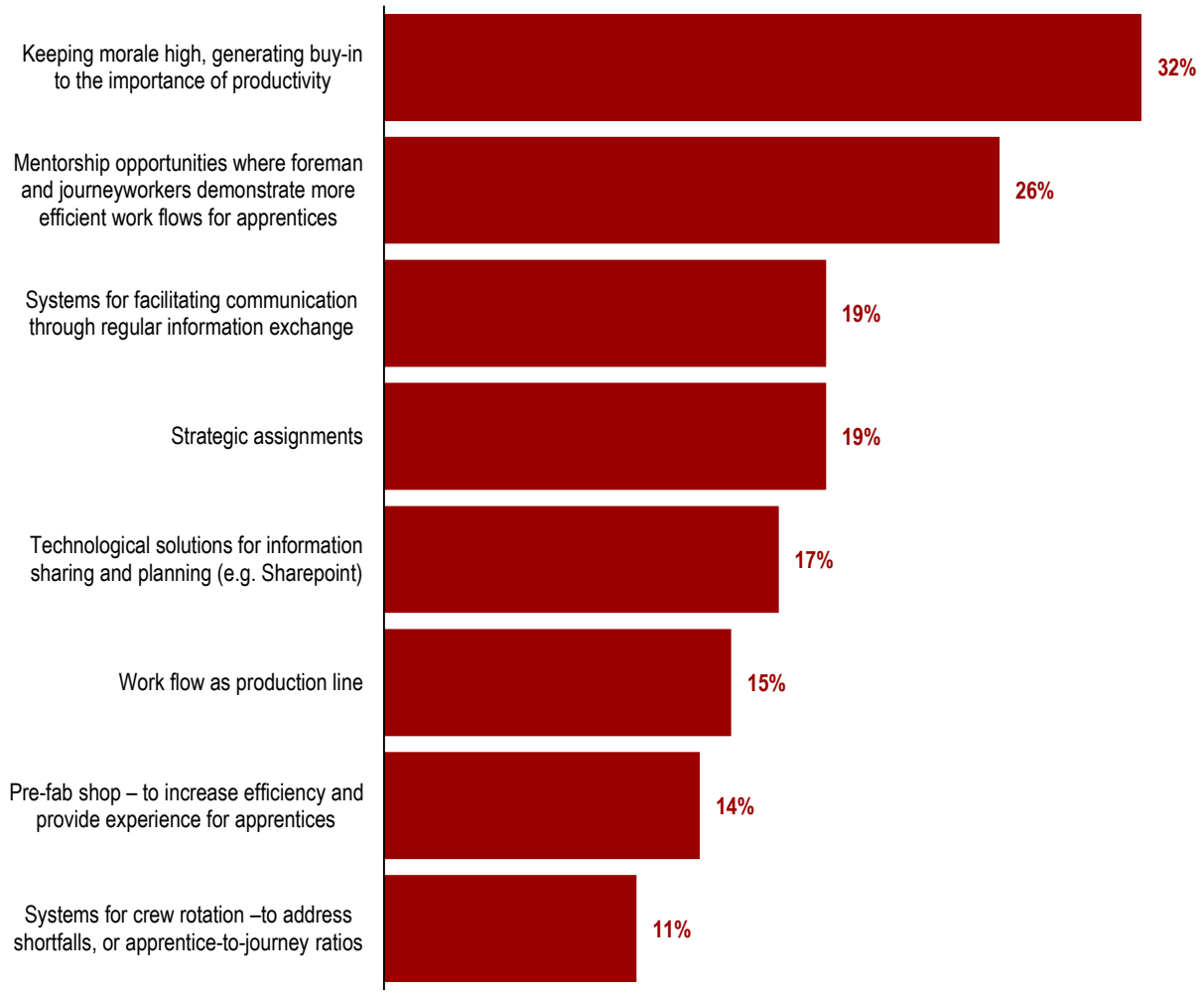
mentorship opportunities where foremen and journeyworkers demonstrate more efficient work flows for apprentices (26 per cent). The processes and practices that are implemented by the least number of responding firms are treating work flows as a production line (15 per cent), establishing a pre-fab shop (14 per cent), and developing systems for crew rotations (11 per cent). Figure 23 below provides a detailed breakdown of the implementation of all processes and practices presented to respondents in the survey.

Figure 23 Processes and practices in place to monitor and address productivity and efficiency challenges



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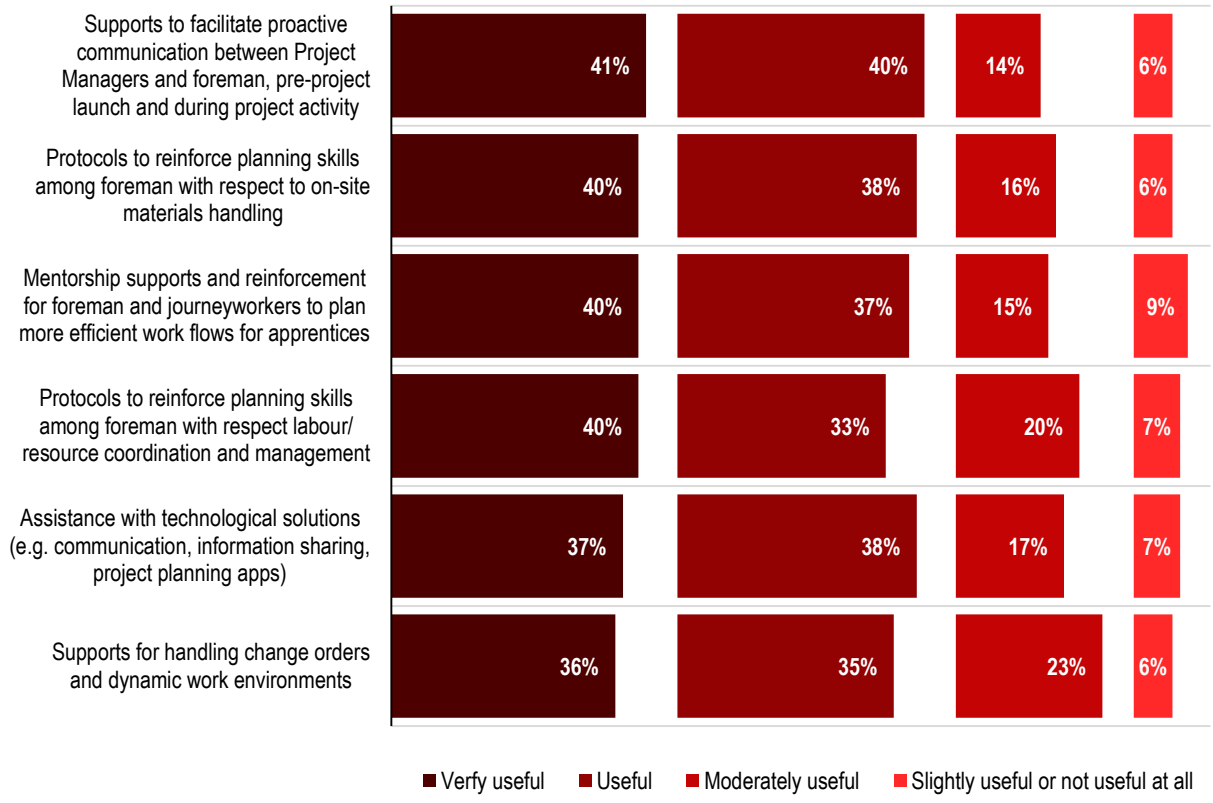
Usefulness of mentorship to improve efficiency and productivity

When asked to identify the usefulness of mentorship in improving efficiency and productivity in the workplace, respondents were generally consistent in their responses. In fact, across all six mentorship activities (supports to facilitate proactive communication, protocols with respect to on-site materials handling, mentorship to plan more efficient work flows for apprentices, assistance with technological solutions, protocols with respect to labour and resource coordination and management, and supports for handling change orders and dynamic work environments) we find very little variation in responses.

Across the activities, we find between 71 per cent and 81 per cent of respondents who believe that mentorship would be either very useful or useful, between 14 per cent and 23 per cent who believe that mentorship would be moderately useful, and between 6 and 9 per cent who believe that mentorship would be slightly useful or not useful at all. Indeed, there is very little variation in support for the various mentorship activities listed, with most respondents agreeing that these would be useful in the context of a mentorship program.

Figure 24 Usefulness of mentorship to improve efficiency and productivity



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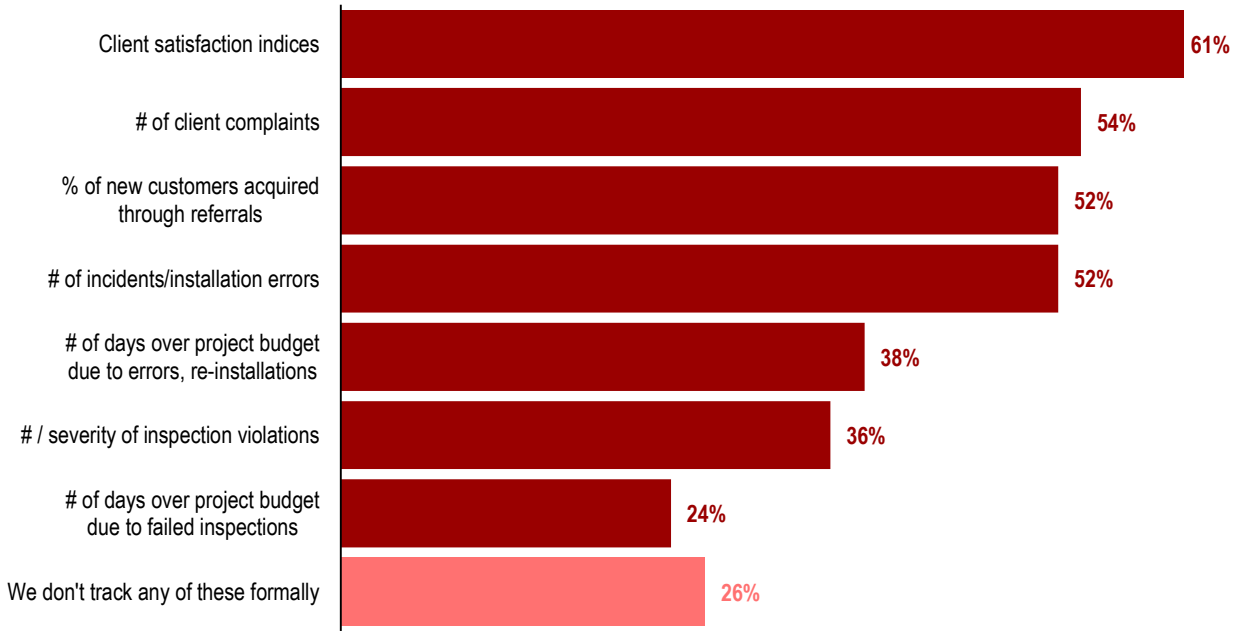
Client relations and quality of service

Client relations and the quality of services is one of the primary objectives of electrical contractors. Indeed, contractors responding to this survey identified maintaining high service quality as their most important business outcome and was also cited the most often as the most important short-term business priority. Therefore, addressing gaps in client relations and the quality of service provided is imperative to achieving their business objectives.

Key performance indicators currently in use

Nearly two thirds of responding firms measure client satisfaction using various indicators (60 per cent). Roughly half take measurements of the number of client complaints (52 per cent), the percentage of new customers acquired through referrals (50 per cent), and the number of incidents or installation errors (50 per cent). Just over a third of respondents track the number of days that extend beyond the projected timeline due to errors or re-installations (36 per cent) and the number or the severity of inspection violations (34 per cent). The least tracked indicator (number of days that extend beyond the projected timeline due to failed inspections) was still measured by roughly a quarter of respondents (22 per cent). It should also be noted that over a quarter of all respondents (26 per cent) do not formally track any KPI relative to the quality of their services.

Figure 25 Key performance indicators used to measure the quality of services



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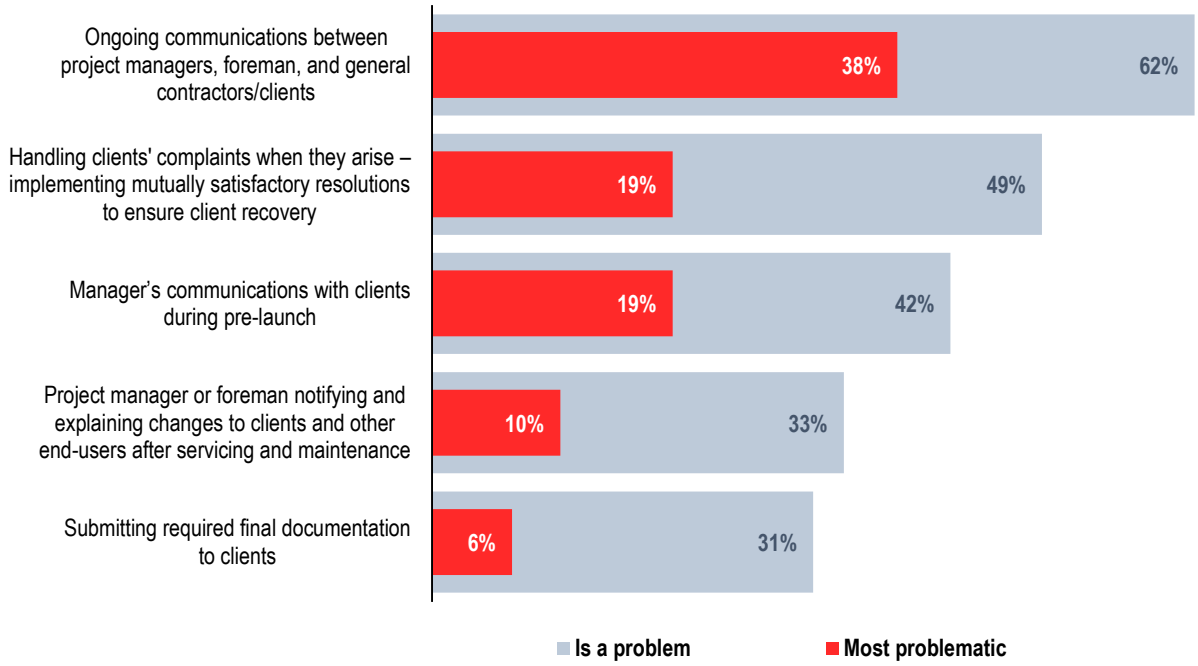
Gaps affecting client relations

The most cited performance gaps affecting client relations are concerned with communication at various points throughout the project between project leaders (project managers/foremen) and the client. Among the top three performance gaps, the failure to maintain ongoing communications between project managers, foremen and general contractors or clients was cited by most respondents (62 per cent cited as a problem; 38 per cent as most problematic), followed by the mishandling of clients' complaints when they arise (49 per cent; 19 per cent), and issues around the manager's communications with clients during the project pre-launch (42 per cent; 19 per cent).

The remaining two performance gaps—notifying and explaining changes to clients and other end-users and submitting required final documentation to clients—were cited as problems by a third of all respondents (33 per cent and 31 per cent, respectively), but were identified as being the most problematic by very few respondents (10 per cent and 6 per cent, respectively).

Figure 26 Performance gaps affecting client relations and quality of service that could be improved



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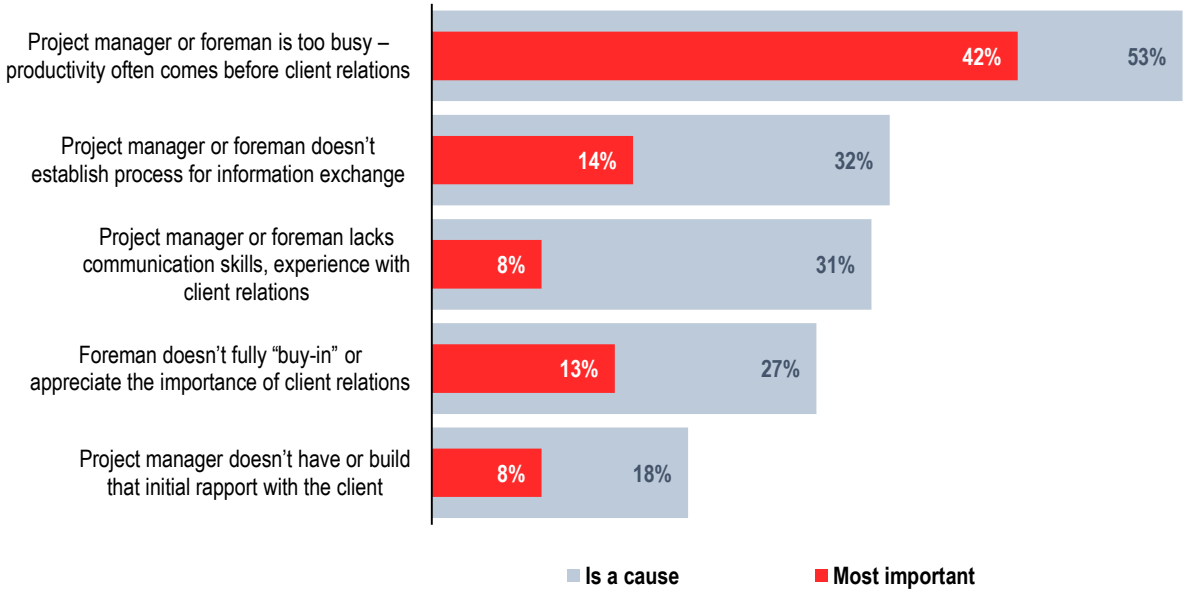
More than half of all respondents (53 per cent) agreed that the primary cause of client relation problems, and also the most important (42 per cent), is the workload borne by the project manager. According to respondents, by prioritizing productivity over client relations, project managers may lack the necessary time and resources to adequately achieve their business objectives. This finding seems to corroborate those highlighted in Figure 26 above, wherein the two primary gaps (ongoing communication between the project manager/foreman and the client, and handling client issues when they arise) may be exacerbated by the lack of time afforded to project managers.

Other gaps were also identified, though by less than a third of respondents, including a lack of processes for information exchange (32 per cent identified as a cause; 14 per cent identified as the most important), inadequate communication skills (31 per cent; 8 per cent), lack of buy-in or appreciation for the importance of client relations (27 per cent; 13 per cent), and a lack of initial rapport with the client (18 per cent; 8 per cent).

Figure 27 Key underlying causes of the gaps affecting client relations



Usefulness of mentorship to improve client relations

In order to properly identify which mentorship activities might be most useful to address these gaps, respondents were asked to qualify each of the four suggested activities listed in the survey according to their perceived level of usefulness. Overall, there was very little variation in how respondents felt about mentorship for improving client relations. Mentorship was deemed to be most useful in supporting staff in conflict resolution, complaints and service recovery, with 45 per cent of respondents finding this activity to be very useful and a third (33 per cent) finding it useful. The remaining three activities—reinforcing the importance of strong client communication to

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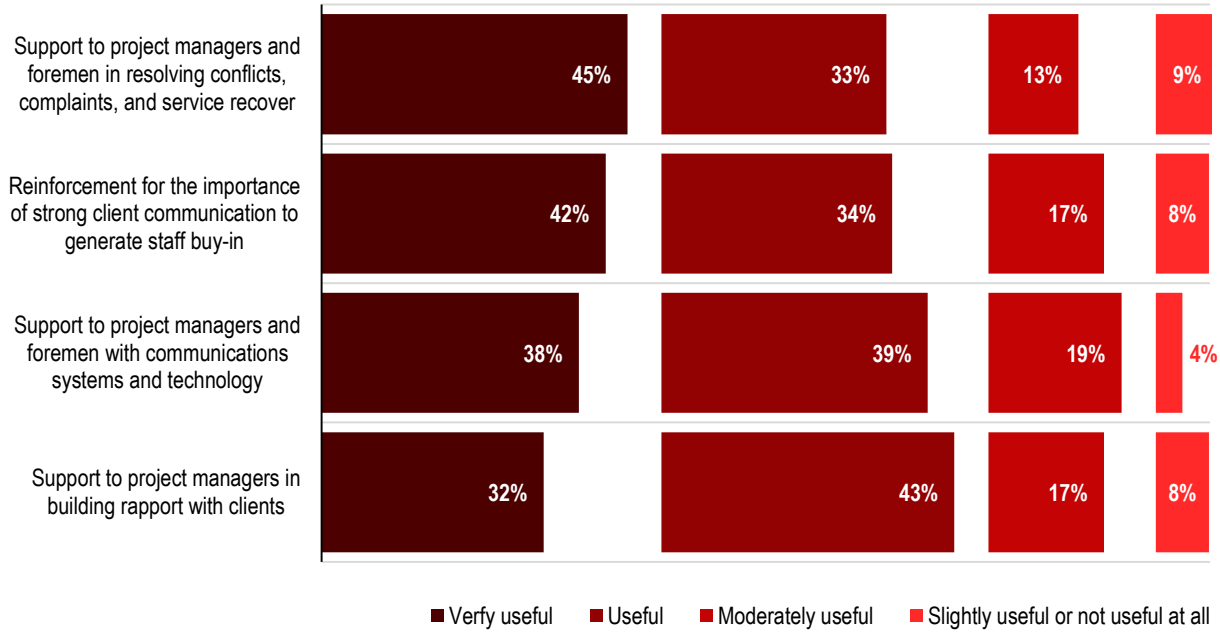
generate staff buy-in, providing support to project managers and foremen with communications system and technology, and offering supports to project managers in building rapport with clients—nevertheless received substantial positive support from respondents, with roughly three quarters finding them to be either very useful or useful mentorship activities (76 per cent, 77 per cent, and 75 per cent, respectively).

Figure 28 Usefulness of mentorship to improve client relations



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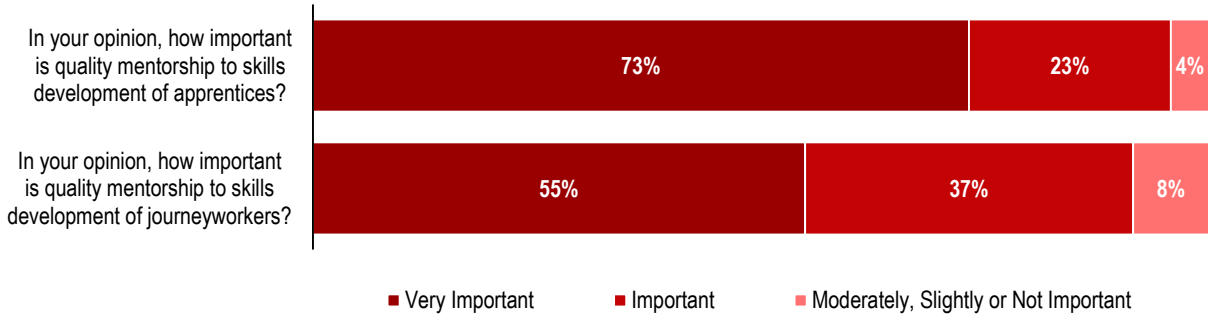
4.3. Mentorship programs in the electrical trades

The Survey of BC Electrical Contractors is intended to inform the development of a mentorship program with a view to improve the performance of worker in the electrical trades and facilitate the knowledge transfer between journeypersons and apprentices. While the previous sections identified key target areas for future mentorship programs, the following section provides some guidance on the importance of mentorship programs, as well as the content and format of a future mentorship program targeting the electrical trades.

Attitudes and perceptions towards quality mentorship

Overall, respondents see quality mentorship as being an important tool for skill development. This finding is particularly true in the context of skills development of apprentices, where three quarters of respondents agreed that quality mentorship is very important (74 per cent), while the remaining quarter believe it to be important (22 per cent). Only a handful of respondents feel that mentorship is only moderately, slightly, or not important (4 per cent). When asked to comment on the importance of quality mentorship to skills development for journeyworkers, respondents reported similar level of importance attached to this process, though fewer believed that quality mentorship is indeed very important (54 per cent) for journeyworkers compared to apprentices. Nevertheless, more than a third believe that it is important (38 per cent), with only a few respondents (8 per cent) commenting that quality mentorship moderately, slightly, or not important.

Figure 29 Importance of quality mentorship for skill development



Moreover, respondents overwhelmingly agreed that quality mentorship can play a role in addressing performance gaps, regardless of the business outcomes that are being considered. This was especially true when respondents were asked whether quality mentorship could help address performance gaps in health and safety standards, where 89 per cent of respondents agreed. Nevertheless, an almost equivalent proportion of respondents (83 per cent) also agreed that mentorship has a role to play in addressing productivity and efficiency gaps, while just over three quarters (77 per cent) felt the same about client relations.

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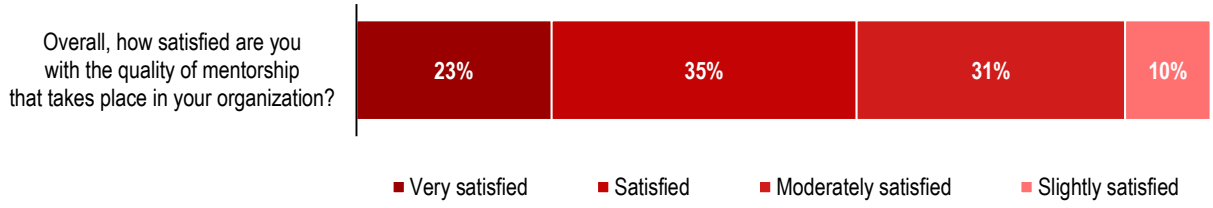
Figure 30 Percentage of respondents who believe that mentorship can address performance gaps for various business outcomes

Respondents were mostly satisfied (36 per cent) or moderately satisfied (29 per cent) with the quality of existing mentorship. It should be noted that although no respondent was unsatisfied, roughly a quarter were very satisfied with the quality of mentorship (24 per cent). This result does indeed indicate that, despite a high level of satisfaction, respondents believe there is sufficient room for improving the quality of mentorship in the electrical trades.

Figure 31 Satisfaction with the quality of existing mentorship



Overall, a majority of respondents thought that eight of the nine factors were very important in developing better mentors (57 per cent to 68 per cent of respondents). Many other respondents agreed that these factors are indeed important (26 per cent to 33 per cent), if not very important. Moreover, for six of the nine factors, over ninety per cent of respondents felt that they were either important or very important. In the three other instances, the proportion is slightly over eighty per cent.

The only factor where less than half of all respondents believe it to be very important in developing better mentors is evaluating mentees' performance. In this instance, 41 per cent of respondents found it to be very important, while another 41 per cent believe that it is indeed important.

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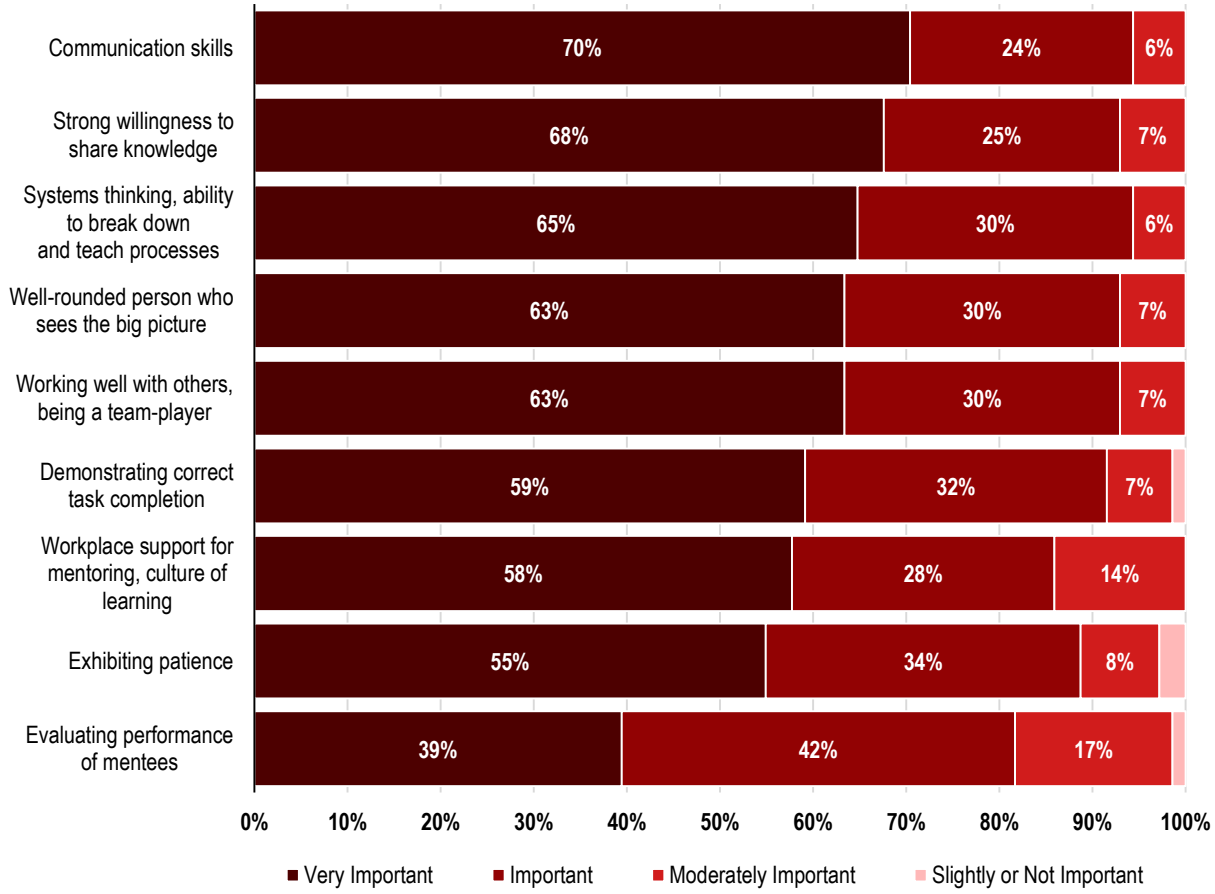
Figure 32 Level of importance of various factors in developing better mentors



As for mentees, seven of the nine factors were deemed to be either very important or important by over 90 per cent of respondents. The top three factors (strong and active listening, asking good questions, and communication skills) emphasize the importance of better communication skills among mentees. The only two factors where half of all respondents or less found these to be very important in developing better mentees were exhibiting patience (50 per cent) and being academically inclined (32 per cent).

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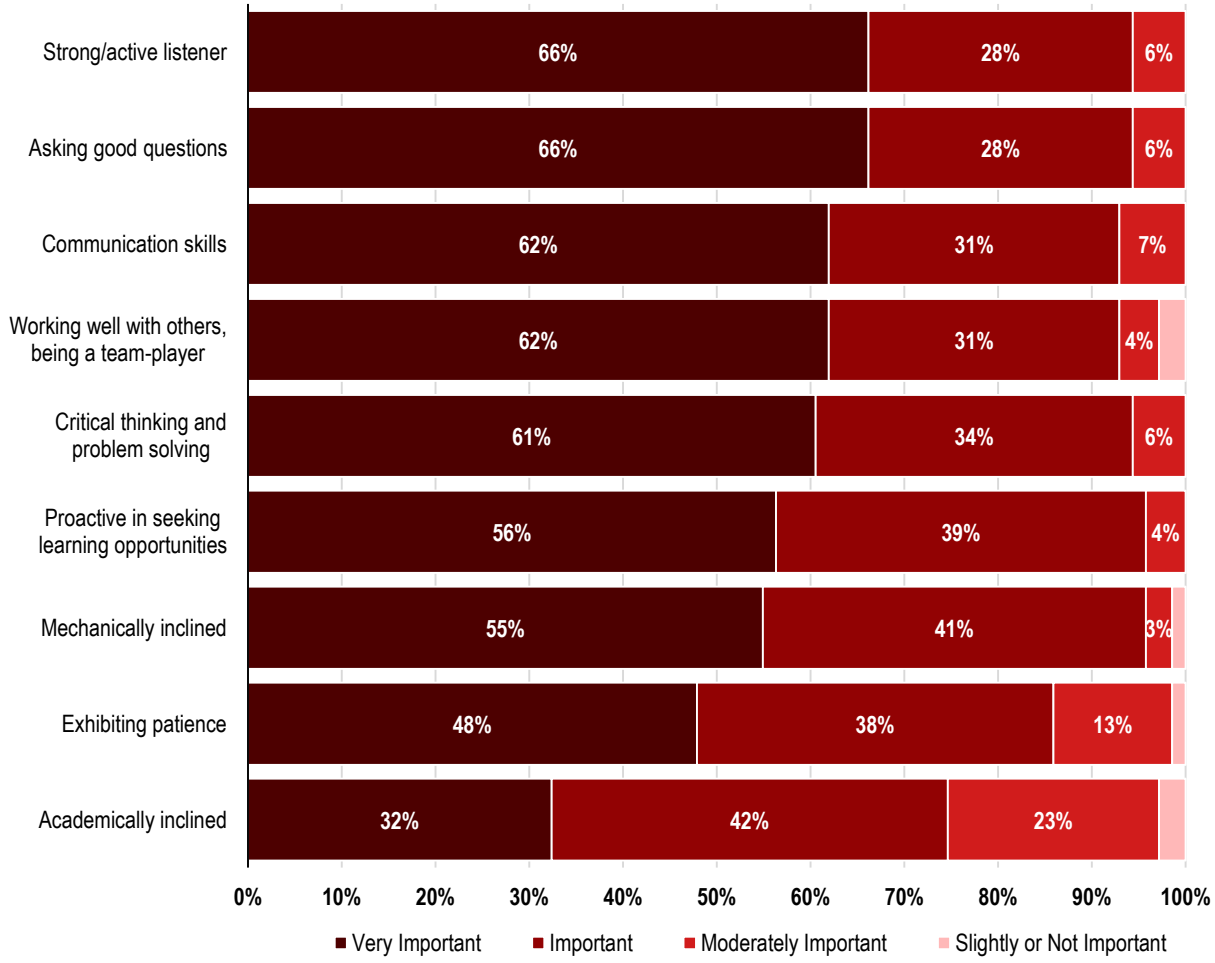
Figure 33 Level of importance of various factors in developing better mentees



Future mentorship program

In order to help inform the design and the content of a future mentorship program, electrical contractors were asked to provide their feedback and perspective with what they believe to be the most useful aspects of a mentorship program.

Overwhelmingly, respondents agreed that any future mentorship program should be delivered on-the-job (80 per cent), rather than on an off-site location (11 per cent). Very few respondents believed that this type of training program would be best delivered in a union hall (5 per cent) or during a site orientation (3 per cent).

As for the usefulness of the content, respondents were generally receptive of the activities proposed, with a majority of respondents finding them to be either very useful or useful. One activity that was identified as being most useful is a system for tracking competencies of

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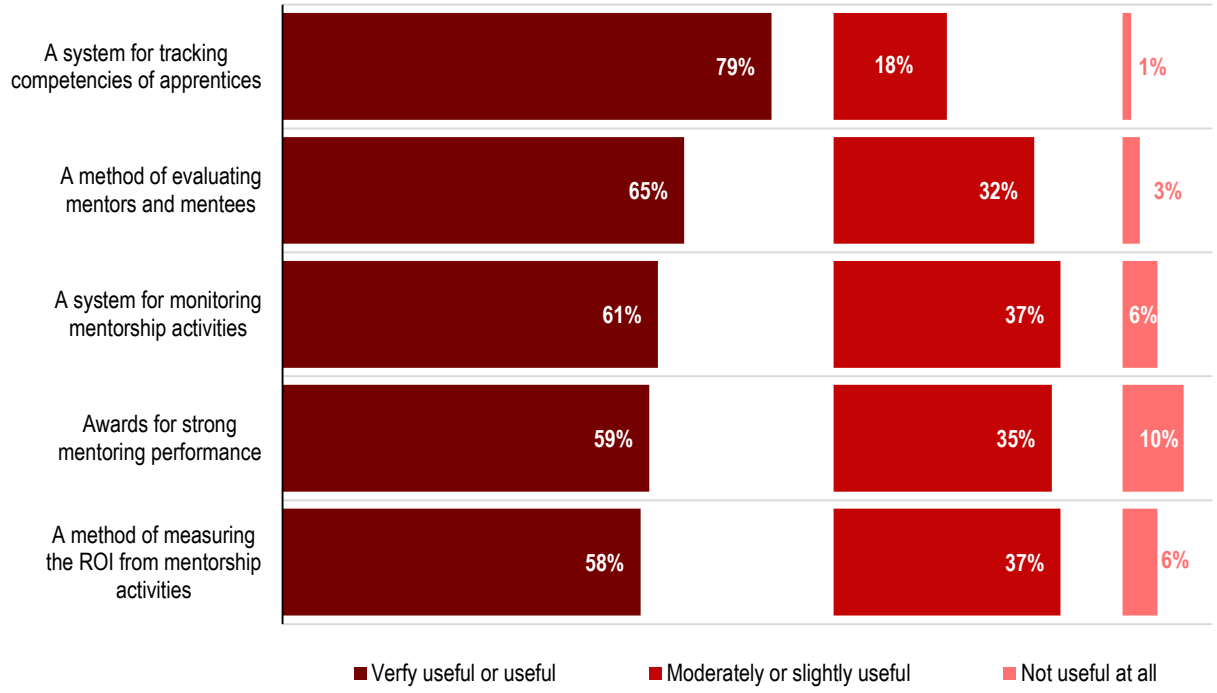
apprentices (79 per cent found this to be either very useful or useful). Moreover, roughly two-thirds of respondents believed that a method of evaluating mentors and mentees would be very useful or useful (66 per cent). The remaining three activities, a system for monitoring mentorship activities, providing awards for strong mentoring performance and developing a method of measuring the return on investment (ROI) from mentorship activities, were nevertheless found to be useful or very useful by a majority of respondents (61 per cent, 59 per cent and 58 per cent, respectively), though more than a third of respondents also found these activities to only be moderately or slightly useful (37 percent, 34 per cent and 36 per cent, respectively).

Figure 34 Usefulness of content in a future mentorship program



In terms of formats, most respondents (76 percent) believe that check-lists or guidelines would be a very useful or useful format. Just over two thirds of respondents (70 per cent) think that practice activities or scenarios, mobile apps for reference and tracking (68 per cent), or how-to videos (68 per cent) would be very useful or useful. Instruction manuals were found to be very useful or useful by a majority of respondents (54 per cent), yet a substantial number of respondents (39 per cent) believe that this may only be moderately or slightly useful.

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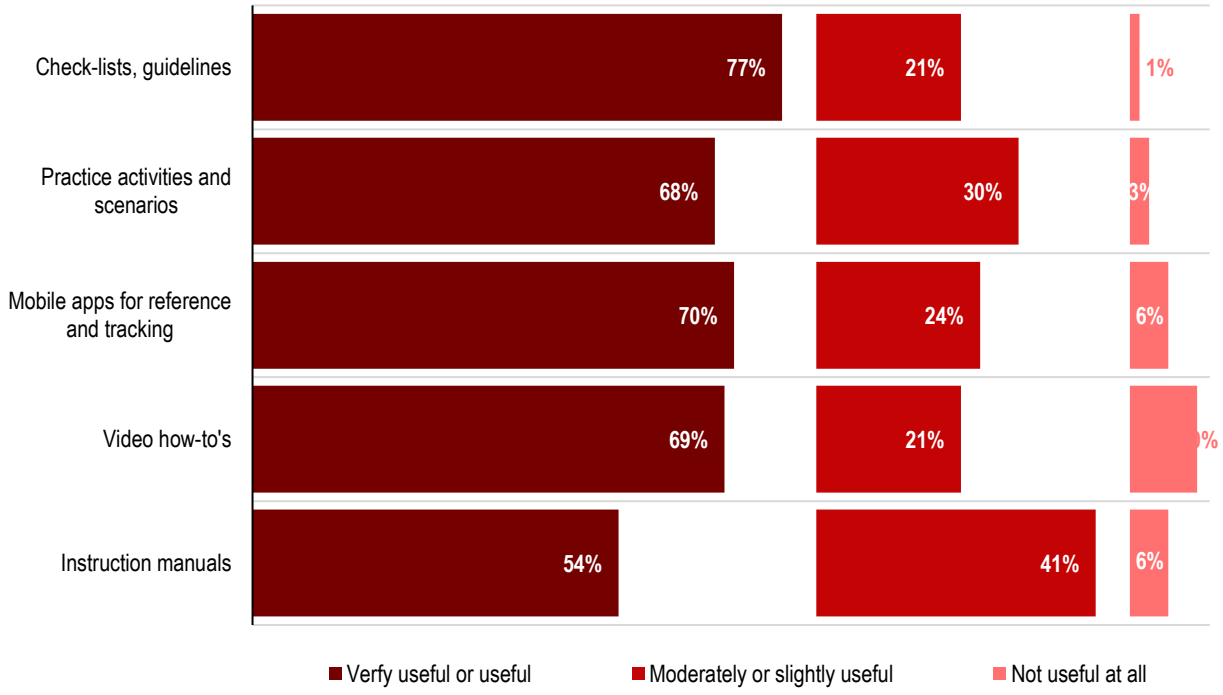
Figure 35 Usefulness of various formats for a future mentorship program



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5. Synthesis and Recommendations

5.1. Business priorities and most critical performance gaps

With a view towards providing key recommendations for the development of targeted curricula and an evaluation framework, the following section attempts to synthesize the results of the survey in a manner that allows for simple and succinct analysis. In effect, this section provides a review of the key short- and medium-term business priorities as described by respondents in the Survey of BC Electrical Contractors, and then provides a synthesized analysis of the most critical performance gaps, the most prevalent underlying causes of these gaps, and a ranking of proposed mentorship and training activities to respond to these gaps according to their perceived usefulness by electrical contractors.

Business priorities

Respondents ranked their business priorities from most important to least important, both in the short term (the following year) and the medium term (within the next 3 to 5 years). From these respondents, we can clearly differentiate between high priorities and low priorities. In the table below, high business priorities are identified in red, while low business priorities are identified in blue, where the darkest colours represent the extreme values (highest values are represented by dark red, lowest values by dark blue).

The top three priorities in both the short and medium term include maintaining high service and product quality, improving revenue and market share, and increasing productivity and efficiency of workers. Issues such as reducing costs and wastage, improving health and safety, and enhancing human resources were deemed as lower priorities compared to the others.

Table 3 Business priorities of BC electrical contractors

		Next year	Next 3 to 5 years
High Priority	Maintaining high service/product quality	1	2
	Improving revenue/market share	2	1
	Increasing productivity/efficiency of workers	3	3
Low Priority	Reducing costs/wastage	4	5
	Improving health and safety	4	6
	Enhancing human resources	6	4

Note: The proportions under "Next year" range from 32 per cent of respondents (for *maintaining high service/product quality*) to 3 per cent (for *enhancing human resources*). The proportions under "Next 3 to 5 years" range from 40 per cent (for *improving revenue/market share*) to 3 per cent (for *improving health and safety*).

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Critical performance gaps

The following figures are intended to help uncover the most critical performance gaps according to their prevalence and severity in the workplace. As described in the report, respondents were asked to identify from a list of gaps whether they had encountered these problems in their workplace, and in a second step, to rank existing problems by the severity of their impact. These gaps were first identified as some of the most pervasive performance gaps with the most significant impact on business priorities during ONAs with exemplar employers working in the electrical trades in BC.

In order to provide a clear synthesis of the analysis, results were tiered according to the proportion of respondents who (a) identified an item as a gap, and (b) identified the problem as being most problematic. Based on these proportions, three colour-coded categories were created:

Tier 1: Identified in red. Proportion of respondents equal to or above 50 per cent (i.e. a clear majority of respondents).

Tier 2: Identified in grey. Proportion of respondents is equal to or above 25 per cent, but less than 50 per cent.

Tier 3: Identified in blue. Proportion of respondents is less than 25 per cent.

From these results, we were able to identify which gaps are most critical, which are of moderate concern, and which are the least critical. In order to establish a systematic approach to make these determination, we applied a set of rules according to the proportion of respondents who identified a gap as existing in their workplace and the proportion of respondents among those who identified a gap as existing who then identified this gap as being the most problematic.

Level	Identified as a gap	Most problematic
Highly critical	Tier 1	Tier 1
	Tier 2	Tier 1
	Tier 1	Tier 2
Moderately critical	Tier 2	Tier 2
	Tier 3	Tier 1
	Tier 1	Tier 3
Least critical	Tier 3	Tier 3
	Tier 3	Tier 2
	Tier 2	Tier 3

Using the tiered approach defined above, we are able to distinguish between those performance gaps which are highly critical, moderately critical, and the least critical to the objectives of electrical contractors. Overall, seven performance gaps were identified as being highly critical using this methodology, which are outlined in the table below.

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Table 4 Highly critical performance gaps

	Identified as a gap	Most problematic
Health and Safety		
Not maintaining a safe work environment (e.g. identifying, reporting, and removing hazards (debris, trip and fall hazards))		
Not using personal protective equipment (PPE) (e.g. hard-hats, eye wear/goggles, dust masks)		
Productivity and efficiency		
Materials handling - organizing tools and equipment to support work flow on-site		
Task inefficiency – knowledge or inexperience with certain types of work order		
Handling change orders – adapting to a dynamic environment		
Client relations		
Ongoing communications between project managers, foreman, and general contractors/clients		
Handling clients' complaints when they arise – implementing mutually satisfactory resolutions to ensure client recovery		

Table 5 Moderately critical performance gaps

	Identified as a gap	Most problematic
Health and Safety		
Not following regulations WHMIS and Workers' Compensation Board (WCB) (e.g. ladder safety)		
Productivity and efficiency		
Inventory control – material and equipment orders from head office		
Labour scheduling – coordinating required resources/crews at right times		
Client relations		
Manager's communications with clients during pre-launch		

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Table 6 Least critical performance gaps

	Identified as a gap	Most problematic
Health and Safety		
Not following procedures to ensure safe lock-out and tag-out		
Not following safe procedure for rigging, hoisting, and lifting equipment (e.g. consistent use of safety harness)		
Injuries and accidents not getting reported		
Client relations		
Submitting required final documentation to clients		
Project Manager or foreman notifying and explaining changes to clients and other end-users after servicing and maintenance		

Underlying causes

Using the same tiered approach defined in the gap analysis above, we conducted an analysis of the underlying causes responsible for creating these gaps. This analysis allowed us to identify those causes which were the most important, moderately important, or the least important in causing the performance gaps identified above.

Table 7 Most important underlying causes

	Identified as a cause	Most important cause
Health and Safety		
Too focused on productivity (e.g. apprentices eager to prove themselves, journeyworkers who are behind schedule/rushed)		
Complacency, boredom, lack of variety (e.g. know what to do but not consistently applying it)		
Productivity and efficiency		
Incomplete information available		
Client Services		
Project Manager or foreman is too busy – productivity often comes before client relations		

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Table 8 Moderately important underlying causes

	Identified as a cause	Most important cause
Health and Safety		
Gaps in mentorship quality (e.g. journeyworkers not always leading by example)		
Poor attitudes towards safety practices – journeyworkers set in their ways		
Productivity and efficiency		
Gaps in technical knowledge or experience		
Poor planning by the general foreman/foreman		
Client Services		
Foreman doesn't fully "buy-in" or appreciate the importance of client relations		
Project Manager or foreman lacks communication skills, experience with client relations		
Project Manager or foreman doesn't establish process for information exchange		

Table 9 Least important underlying causes

	Identified as a cause	Most important cause
Health and Safety		
Gaps in knowledge/inexperience – among new apprentices		
Working with other trades and their poor practices		
Increasingly dynamic and complex work environments		
Under-trained workers		
Under reporting arising from disincentives from regulation		
Productivity and Efficiency		
Communication breakdowns between project managers and general foreman		
Poor communication with other trades on a site		
Communication breakdowns between general contractor and project management		
Poor crew composition		
Inability to adapt to changes		
Technological constraints		
Communication breakdowns between foreman and crews		

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	Identified as a cause	Most important cause
Problems with management's initial estimate	■	■
Communication breakdowns within crews, among journeyworkers and apprentices	■	■
Client Services		
Project Manager doesn't have or build that initial rapport with the client	■	

Usefulness of mentorship and training activities

Finally, responding to performance gaps requires a number of targeted activities that can be organized through quality mentorship programs. In order to provide a succinct analysis of which training or mentorship activities that are deemed to be the most useful by electrical contractors, ever item was weighted on a scale of 1 to 5, where "Very useful" was given a score of 5 and "Not useful at all" was given a score of 1. The higher the score, the most useful the item was considered for a future mentorship program. These activities were then ranked according to their scores against all activities for each of the three domains: Health and Safety, Productivity and Efficiency, and Client Services. Figure 36 below illustrates ranks the items according to the highest scores, moving from the left of the graph to the right of the graph. Those items above the line are those which were given a score above the median.

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Figure 36 Mentorship and training activities intended to respond to existing performance gaps, ranked according to their relative usefulness

Health and Safety	Productivity and Efficiency	Client Services
A Activities to reinforce consistent safe working practices among new apprentices	**C** Supports to facilitate proactive communication between project managers and foreman, pre-project launch and during project activity	**D** Support to project managers and foremen in resolving conflicts, complaints, and service recover
B Practice and support in conducting high quality job hazard or field-level risk assessments for all responsible staff and crew	**E** Protocols to reinforce planning skills among foreman with respect to on-site materials handling	**F** Reinforcement for the importance of strong client communication to generate staff buy-in
I Approaches for creating successful toolbox/tail-board meetings	**G** Mentorship supports and reinforcement for foreman and journeyworkers to plan more efficient work flows (e.g. production line) for apprentices	**H** Support to project managers and foremen with communications systems and technology
L Protocols for daily monitoring (e.g. walk arounds, ad-hoc hazard assessments)		
O Tactics for maximizing engagement to fight complacency (e.g. use of personal anecdotes, visuals, assigning speakers, sharing near-miss data)	**J** Assistance with technological solutions (e.g. communication, information sharing, project planning apps)	**N** Support to project managers in building rapport with clients
P Methods for encouraging variety/freshness (e.g. rotating speakers at meetings, shake-up the format, change the content)	**K** Protocols to reinforce planning skills among foreman with respect labour/resource coordination and management	
Q Guidelines for introducing reward-based practices and incentives	**M** Supports for handling change orders and dynamic work environments	

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5.2. Implications for the focus of an enhanced mentorship model

Program design and delivery involves making decisions about learning outcomes that best address the particular needs, interests, and circumstances of the participants, workplace and industry. It requires a clear understanding of benchmarking participants, understanding desired learning outcomes, and comparing these to identify skill performance gaps relative to business outcomes. Above all, it clarifies priorities for learning, the ways in which those priorities will be addressed, and how the electrical apprentices and journeyworkers need to progress in mentorship training.

Findings from the organizational needs assessment with exemplar employers and from the Survey of BC Electrical Contractors provided an accurate picture of key performance gaps relative to business outcomes. These results should inform the development of an efficient and effective mentorship system that supports both the apprentices and journeyworkers, enabling them to work more productively and safely for their respective contractors. Moreover, the data provides a path forward in identifying learning outcomes and contextualizing material that aligns with key performance gaps. Ultimately, these materials should provide the greatest opportunity to maximize engagement. The next steps should focus on building sustainable tools, products and a support system that can be continually used for electrical contractors, unions and associations beyond this project.

Overall, there are six key **business outcomes** that will be thematic drivers for program design with an emphasis on top three below:

- Maintaining high service and product quality;
- Improving revenue and market shares;
- Increasing their productivity and efficiency;
- Reducing costs and wastage;
- Improving health and safety standards; and
- Enhancing human resources.

The performance gaps identified as the high and moderately critical priorities in Tables 4 and 5 above, could serve as drivers for contextualizing the curriculum development. To reiterate, these gaps include:

- Safe Working Practices
- Not maintaining a safe work environment (e.g. identifying, reporting and removing hazard such as debris, trip and fall hazards)
- Not using personal protective equipment
- Not following regulations
- Productivity and Efficiency
- Materials handling – organizing tools and equipment to support work flow on-site

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- Task inefficiency – knowledge or inexperience with certain types of work orders
- Handling change orders – adapting to a dynamic environment
- Inventory control and labour scheduling
- Client Relations
- Ongoing communications between project managers, foreman and general contractors/clients
- Handling clients' complaints when they arise – implementing mutually satisfactory resolutions to ensure client recovery

Based on feedback from contractors, a number of key mentor and mentee principles/learning outcomes emerged that could form the foundation of a mentorship program. They include the following:

Mentor Program Factors

While mentors are indeed expected to possess a number of attributes, strong communication skills, a willingness to share knowledge, and an ability to breakdown complex processes are among those that are essential to their work. Ideally, mentors are well-rounded individuals who can see the big picture while still able to connect the dots. In terms of their interpersonal skills, mentors must be able to work well with others, demonstrate tasks clearly and effectively, and provide proper supports for their mentee. Through their leadership, mentors should create a supportive workplace environment that promotes this type of learning culture. Overall, the mentorship principles can summarized as:

- Identifying the points of lessons
- Demonstrate the skill
- Providing feedback
- Link the lesson
- Providing opportunities for practice
- Assessing progress

Mentee Program Factors

Mentees should be active listeners with strong communication skills and have the ability to ask good questions. To succeed as mentees, they need to work well with others and be team players, have the ability to think critically and solve problems efficiently, and take advantage of learning opportunities. Overall, the mentee principles can summarized as:

- Effective communication
- Active listening
- Receiving feedback
- Asking questions
- Learning styles
- Setting goals

Ultimately, the learning outcomes identified above should be embedded into contextualized training in order to respond to the performance gaps. The objective, in effect, is to support learning

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through training and the provision of resources and tools that impart what it means to be a good mentor and mentee. Simultaneously, this training should strive to improve areas around health and safety, productivity and efficiency, and client relations.

The following sections provide an example of the mentorship program resources, tools, and training supports that can be designed in accordance with the learning outcomes, the content drivers linked to performance areas, and the program implementation feedback provided by contractors.

Engagement and Promotional Support and Material

Implementing a mentorship program into the workplace requires a coordinated effort that starts first with effectively promoting the value of mentorship to the workers from the owners, president and/or senior management. Working with the contractors, a communication plan with accompanying tools will be developed to ensure that the messaging is out to maximize engagement and program integration with the electrical workers. Examples of promotional tools include posters, hardhat decals, short videos, etc.

Also, an appreciation and recognition process from the contractors to acknowledge the efforts of their mentors and mentees will be developed to maintain program momentum once integrated into the workplace. This appreciation and recognition will allow the contractor to honour all participants, progress made when mentorship program is implemented, inspire others to be involved and reinforce and continue to build a mentoring company culture.

Mentorship Training and Supportive Tools

1. Core Mentorship Program

The core mentorship program would be a formalized training opportunity where the mentors and mentees will learn key principles of what it means to be a strong mentor and mentee using contextualized scenarios that align to performance gaps and business outcomes, such as:

- Health and Safety Issues – reinforce consistent safe working practices, maintaining a safe work environment/assess work hazards, approaches for creating successful toolbox/tailboard meetings, tactics on how to address job task complacency, etc.
- Productivity Issues – supports to facilitate productivity, efficiency work flows, material handling, job task planning, inventory control, etc.
- Client Relationship Issues – maintaining high service quality, communication between leaders and the client, staff conflict resolution, complaints and service recovery, etc.

This program should have the flexibility to be delivered in short multiple lunch and learn sessions in the workplace or in longer jobsite orientation training session, for example.

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Core mentorship program could include the following:

- Short videos reinforcing key mentor and mentee principles revolving around performance gaps
- Practice activities and scenarios
- Pre and post training surveys
- Instructions on how to utilize on-the-job mobile mentoring app
- Reminder check-lists and/or guidelines for how to implement mentorship on the job
- Trainer guide and material with accompanying participant workbooks
- Short online follow up course to reinforce formal learning and on-the-job supports
- Completion certification that is endorsed by the electrical industry

2. Informal Mentorship Reinforcement On-the-Job Activities

The core mentorship program should provide the necessary tools for workers to integrate and apply what they have learned in their everyday tasks on the job site. To ensure that the core program is not considered as a 'one off' and to reinforce what participants have learned, on-the-job tools and supports could be provided, such as:

- Check list guides and documentation that can be use in toolbox and safety meetings
- Online competency mobile device with the following capabilities:
    - Logbook entries, provides detailed information on tasks performed relative to performance job gaps
    - Photos capability to provide a visual record and further evidence of work
    - Skills summaries to provide insight into a tradesperson's ability to implement mentoring and how that will relate to practical experience, skills development and competency
    - Skills review component to identify areas where more mentorship support is required
- Mentor and mentee pocket guides that showcase and reinforce mentorship principles
- Marketing and engagement site material – hard hat decals, posters, etc.
- Process for mentor and mentee to identify workers for scholarship awards from industry/government
- Bi-weekly short YouTube clips to showcase successes in implementation, reinforce key principles, etc.
- Jobsite mentorship orientation program
- Social media strategy and online forum

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- On the job feedback support, 'ask the expert', respond to their critical questions
- Online follow up mentorship short programs.

3. Quality Assurance

A majority of contractors agreed that there needs to be a system in place for tracking competencies of apprentices and a method for evaluating the performance of mentors and mentees. In addition, many would like the ability to make adjustments to the mentorship program when deemed necessary. In order to respond to these requests, qualitative and quantitative assurance tools could be designed and implemented. This will provide an opportunity to participants to identify what is working well and to provide constructive feedback to fine-tune the mentorship program. To monitor mentorship activities, surveys could also be conducted with owners, supervisors, mentors, and mentees.

5.3. Implications for key metrics and the evaluation strategy

As indicated in the previous section, program design involves making decisions about the learning outcomes that should be targeted. Likewise, research design involves making decisions about which outcomes are most likely to be affected by an intervention, which ones are most critical to demonstrate the program's effectiveness, and how and when they can best be measured. These decisions will also help to determine the timing and content of research instruments and in turn the overall evaluation strategy.

One of the key achievements of this project is the identification of key business needs of electrical contractors – and most importantly the critical underlying performance gaps of workers that drive them. As a result, one can be confident that these are, indeed, the very performance areas that need to be improved (the content drivers for the curricula) – and measured in the evaluation strategy (the focus of the performance metrics) – in order to assess the effects of training and link these gains with business outcomes. The future research design can concentrate on decisions around the relative priority of these items as well as refining their measures.

While the development of an evaluation was beyond the scope of this LMI study, results of the consultations with electrical contractors indicate that any future initiative to improve mentorship quality should have an evaluation approach that will allow industry to determine its impact on workers and business outcomes - and ultimately in measuring the ROI generated for employers and the industry at large. Based on feedback from contractors, the remainder of this section highlights some of the ways the results of this LMI project can guide a future evaluation strategy to ensure it meets these needs of industry as expressed in these consultations.

Focusing research measures—linking of performance and business outcomes

Suitable measures must be developed to adequately capture not only **business metrics** but also the full range of **task-based performance gains** for workers that can result from mentorship training. Linking indicators between these two levels and focusing them in areas where gaps are most prevalent is key, as mentorship training may drive substantial ROI for some firms even in lower

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priority areas. As mentioned previously, results of the survey identified 6 core business needs of which 3 can be considered high priority and 3 a lower priority (see Table 3). This provides one clue as to how future research and evaluation can be prioritized—concentrating the key indicators on areas of higher priority. However, this will not be the only factor guiding the decisions around measurement priorities. Another consideration is that some lower priority business needs have associated performance gaps, which many businesses consider the "most problematic". Where some of these lower priority business needs contain critical performance gaps that can be reduced through improved mentorship, they are likely to lead to significant gains for some businesses. As a result, though they may affect a minority of businesses, the research strategy must accommodate them i.e. suitable measures should also be developed to adequately capture improvements resulting from mentorship training, as these firms may experience substantial ROI.

Systematic data collection at multiple waves

Any future evaluation of mentorship training will require multiple waves of data collection. While a future tracking system for apprentice competencies and mentorship activity may well include "real-time" data collection, it will also incorporate longitudinal measurement (measurement over-time) and at pre-established milestones, at consistent intervals, based on "relative-months" i.e. intervals relative to the onset of mentorship activities. For example, three waves of data collection; one prior to mentorship training, one immediately following each of the key stages of mentorship training, and one or more at set intervals **after** the completion of all mentorship activities. The advantage of multi-wave data collection is that it is comprehensive and consistent for all participants at (roughly) similar points in time, which facilitates pooling of data and the measurement of both short and long term effects of mentorship training.

The development of an online competency tool mentioned above is an exciting development for the industry and the evaluation strategy. Researchers can compare to see if the "real time" competencies recorded in the tool align with longer term results from the later waves of data collection. As well the online app/tool can be used to stay in touch with respondents to ensure high quality data and response rates.

Measurability

An additional consideration when developing research metrics is measurability. Simply put, the most useful metrics are those that the respondents have the ability to answer. Questions with a high non-response because the respondent does not know or is not willing to say compromises the research. The recent Survey of BC Electrical Contractors provides important information with regards to measurability. Under each of the key business outcomes respondents were asked for which key performance outcomes they currently collect metrics. In instances where there are multiple key performance indicators which align with a performance gap of interest, it would be best to choose the KPIs that are already used by the most businesses. Furthermore, even for those metrics that are currently collected by only a small minority of businesses, they provide a strong frame of reference for the construction of comparable survey–based indicators. This can facilitate pooling of indicators for the broader assessment of training impacts and ROI measurement for the industry as a whole.

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Multi-level instruments

As was the case for the exemplar ONAs, future research in this industry will need to develop multiple research instruments that are applicable to various levels within an organization. The individual as well as their immediate supervisor are best placed to answer detailed questions related to individual performance; however, supervisors and management are best placed to speak about the overall business outcomes of the company.

Inclusion of contextual measures

While much of the focus of the research will be on measuring performance and business outcomes, it is also necessary to measure a limited number of additional factors which can broadly be described as contextual variables for assessing success conditions. These can include measures such as employees' attitudes, confidence, levels of engagement, as well as how well 'networked' journeypersons and apprentices are. Previous research indicates that these factors are often important success conditions; in other words they can explain why some individuals and companies who receive the same program show better results than others – and can ultimately be used by stakeholders to better target and refine training and mentorship activities to maximize ROI.

Quality Assurance—linking process to outcomes

It was noted in the previous section that quality assurance will be a key part of program delivery to allow for evaluating mentors and mentees and to make adjustments to the mentorship program. In addition to providing for immediate program adjustments, quality assurance information would assist with longer-term strategic planning for mentorship, training, and recruitment and retention more broadly. For example, the quality assurance data will allow for documentation on how the program is actually implemented—such as the amount of time spent between mentor and mentee—and how it varies between participants and in different contexts. When linked with outcome data this is an extremely powerful tool to explain results, particularly in circumstances where some individuals and companies show larger improvements in performance and ROI than others. Understanding the conditions in which mentorship training can work best will continue to inform the delivery as the model is implemented at a wider scale.

Need for a counterfactual

In the Survey of BC Electrical Contractors, respondents indicated that in any future mentorship program it would be valuable to include a number of evaluation and tracking activities (Figure 38). These include a system for tracking competencies, a method of evaluating mentors and mentees, a system for monitoring mentorship activities, and a method of measuring ROI from mentorship.

In order to introduce these effectively, any evaluation strategy and tracking system for measuring training effects and worker competencies should aim to incorporate a counterfactual – a measure of what would have happened without a new initiative or investment. In order to address questions such as "what difference or impact does quality mentorship make for apprentices?" or "what is the ROI that mentorship training generates for a contractor?" the evaluation strategy must aim to

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properly "benchmark" any gains that arise from improved mentorship against a measure of what would have happened without the initiative.

The challenge is not simply to evaluate how well mentors and mentees are doing but instead how much better (or worse) they are doing compared to what would have happened without a new initiative or effort to improve mentorship quality. Likewise return on investment is best calculated as the return attributable to any incremental gains from enhancing mentorship. There are several ways to incorporate a counterfactual into an evaluation strategy and tracking system – such as through a randomized experiment, or quasi-experimental design – and these options should be considered carefully in any future design in order to provide valid and reliable measures of the impacts of mentorship and ROI.

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Appendix A: Project Brochure

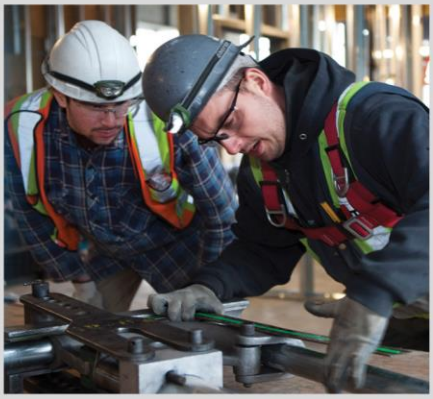
BC Mentorship Project

ELECTRICAL JOINT TRAINING COMMITTEE

Background

The construction industry is estimated to lose 235,000 skilled tradespeople to retirements over the next decade leading to skilled labour shortages – at unprecedented levels. Compounding these large increases in retirement is the massive expansion of LNG projects potentially slated for British Columbia (BC) as well as Site C.

While this brings significant employment opportunities for younger workers, it gives rise to increasing demand for rapid skills development. This is placing significant pressure on training capacity, not simply within post-secondary training institutions, but particularly for employers, unions, and current supervisors and journeypersons, who are responsible for the large majority of skills development through apprenticeship and mentorship. This is one of the biggest challenges facing British Columbia – how to effectively transfer the skills and knowledge of journeypersons to apprentices entering the industry. With the numbers of younger, less experienced workers increasing as a percentage of the workforce, the need to incorporate industry best practices for on-the-job skills development has never been greater.



An overwhelming majority of employers in the sector recognize this need and report that mentorship is the key to developing a qualified journeyperson. However, employers also report that the quality of mentorship is drastically uneven. While some journeypersons are well prepared and well suited to take on the mentoring role, many are not. A report on effective mentoring from the Canadian Apprenticeship Forum states that very few journeypersons have actually taken training or received any guidance on how to be an effective mentor. A structured mentorship program will assist the journeyperson and produce more highly skilled and productive apprentices at the workplace. Another compounding factor that highlights the need for a mentorship training program is that BC is the only jurisdiction in Canada that does not have a required journeyperson to apprentice ratio to ensure transfer of knowledge.

It is in response to this critical need that SkillPlan, EJTC and SRDC are suggesting to implement a mentorship program that can be analyzed on effectiveness and be expanded to further support BC's need to develop a skilled workforce in an efficient, effective and safe manner.

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BC Mentorship Project

ELECTRICAL JOINT TRAINING COMMITTEE

Research

In partnership with SRDC and SkillPlan, EJTC will undertake a sector needs analysis, which will explore, in depth, the most prominent skills and job performance gaps among the skilled electrical trades – and the consequences of these gaps for business outcomes of employers. The primary goal of this analysis is to understand the role that quality mentorship can play in addressing skills and performance gaps – and similarly, to uncover the types of gaps that are compromising mentorship quality.

We will recruit up to four employers in the sector to participate in a series of organizational needs assessments (ONAs). SRDC and SkillPlan will conduct the ONAs through a series of depth interviews with senior and middle management, journey workers and mentors, and apprentices and mentees. The aim is elucidate the nature of skills and performance gaps, their relation to mentorship quality, and their links with business outcomes. We will also conduct the survey of a representative sample of electrical contractors in the province of BC in order to validate the findings from the exemplar ONAs.

About the Project Partners

EJTC is leading/managing this project for Industry through the Sector Labour Market Partnership Program funded through the Ministry of Jobs Tourism and Skills Training and Responsible for Labour and it is sub-contracting to SRDC and SkillPlan for research and implementation.

SkillPlan is a nationally recognized leader in workforce development programs. They have 25 years of experience providing workforce development consulting services and resources to the mining and construction industry, as well as other sectors.

The Social Research and Demonstration Corporation (SRDC) is a non-profit research organization, with offices in Ottawa, Toronto, and Vancouver, created specifically to develop, field test, and rigorously evaluate social programs.

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Appendix B: Project Workplan

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Phase 1: Project Workplan, Communication Strategy, Marketing Material, Steering Committee & Research Design – May 17 to June 31, 2016

Project Activities	Detail	Responsible	Schedule
Finalize Contracts	Present contracts to project partners for review, input and signatures.	EJTC	May 31, 2016
Develop Draft Project Workplan	This will set the framework for how the project will be managed and delivered. It will include key milestones, expected date of completion and detailed budget. The draft workplan will be used for agenda for partner launch meeting.	EJTC with SRDC and SkillPlan support	Present high level draft workplan to project partners for input June 3, 2016
Confirm Steering Committee and Governance Protocol	Develop governance protocol and define industry consultation.	EJTC	June 2, 2016
Subcontractors Meeting	Goal of meeting is to finalize workplan, discuss steering committee, research framework deliverables and engagement and communication strategy.	EJTC, SRDC and SkillPlan	June 3, 2016
Introductory Steering Committee Meeting	Teleconference with Steering Committee, EJTC, JTST, and subcontractors		June 14, 2016
Development of LMI Research Design	Refine the LMI research design including the objectives, target groups, and data collection methods	SRDC leads with SkillPlan and EJTC supporting	June 15-June 30th
	Development of the communications strategy with respect to the role of the research	EJTC leads with SRDC and SkillPlan providing support	
	Begin a review of national standards, RSOS, and any related apprenticeship documentation specific to NOC 7241 to inform the development of the skills-performance framework	SRDC leads with SkillPlan and EJTC providing support	
Present Draft Workplan	Present draft workplan to JTST for input.	EJTC	By June 20, 2016
Finalize Workplan	Based upon input from JTST, finalize and submit workplan.	EJTC	By June 30, 2016
Marketing Material	Develop project marketing engagement material for employers. Present draft marketing material to JTST for input and approval	EJTC and SkillPlan leads with SRDC providing support	By June 27, 2016
Engagement Presentations	Commence delivery of presentation to employers, including follow up.	EJTC	June 30, 2016
Deliverable 1: LMI Methodology Report			**June 30, 2016**

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Phase 2: Research Tools (Qualitative) – July 1 to July 31, 2016

Activities	Detail	Responsible	Schedule
Background Research to Support LMI Report	Conduct a preliminary analysis of NOC 7241 using existing sources (e.g. Labour Force Survey, BuildForce LMI reports) to support the description of the sector for the LMI report.	SRDC	June 15-July 15, 2016
	Continue the review of national standards, RSOS, and any related apprenticeship documentation specific to NOC 7241 to inform the development of the skills-performance framework	SRDC, SkillPlan and EJTC	June 15-July 15, 2016
Skills-Performance Framework	Develop and finalize skills-performance framework for NOC 7241 in coordination with project partners.	SRDC leads with EJTC and SkillPlan support	June 15-July 31, 2016
Qualitative Research Protocols	Develop all qualitative research protocols for conducting the organizational needs analysis (ONAs)	SRDC, EJTC and SkillPlan	July 15-July 31st
Scheduling Interviews	Co-ordinate scheduling interviews with employers	EJTC and SkillPlan	July 1-July 31, 2016
Deliverable 2: Research Tools - Qualitative			**July 31, 2016**

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Phase 3: Research Tools (Quantitative) – July 1 to September 30, 2016

Activities	Detail	Responsible	Schedule
Validate Framework	Collaborate with project partners in completing organizational needs assessments (ONAs) with up to four employers in an effort validate the framework, explore skills and performance gaps, and the design of evaluation metrics.	EJTC, SkillPlan and SRDC	Ongoing July 8-September 30, 2016
Design of Quantitative Survey	Lead the design of the quantitative survey of electrical contractors to validate the ONA results and to obtain information to support the LMI report, as per LMP guidelines. SRDC is responsible for designing the survey on paper and in conducting the data analysis. EJTC and SkillPlan will review the quantitative survey	SRDC with EJTC and SkillPlan support	Ongoing July 8th – September 30th
Secure and create employer database	Programming the survey, engaging respondents, administering the survey, and compiling the data. SRDC will collaborate with the partners to support a pre-test of the survey and review the resulting data quality, but will NOT be responsible for any of the survey administration or the implementation of data quality control measures. EJTC and SkillPlan will collaborate	Skills Source and SRDC	Ongoing July 8th – September 30th
Deliverable 3: Research Tools – Quantitative			**September 30, 2016**

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Phase 4: Interim LMI Activity Report – October 1 to November 30, 2016

Activities	Detail	Responsible	Schedule
Analysis of Survey Modules	Lead the analysis of survey modules for the description of the sector and the labour market conditions Analyze integrated gaps analysis and refine skills performance framework, implication for training model and assessment	SRDC, with EJTC and SkillPlan support	Ongoing October 1-November 30, 2016
LMI Report	Prepare an LMI Activity Interim Report 2 incorporating the partners' feedback and submit to JTST for approval. This report will include activity summary that describes the scope of project activities completed to date including results of the stakeholder engagement, any challenges encountered, documentation of stakeholder engagement activities, including names of companies, the number of sessions, location(s).	EJTC, SRDC and SkillPlan	By November 30, 2016
Deliverable 4: Interim LMI Activity Report			**November 30, 2016**

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Phase 5: Draft LMI Report – December 1 to February 28, 2017

Activities	Detail	Responsible	Schedule
Draft LMI Report	Prepare the Draft Interim Report including the description of the sector, the labour market conditions, and a summary of results from the fieldwork and survey. The report will include: ▪ Detailed description of BC's construction sector to NOC 7241, including: types and number of businesses by subsector, types of occupations by NOC/NAIC codes, characteristics of workplace age, gender, education levels, certification, requirements and length of service ▪ Current and forecasted labour market conditions and economic trends impacting the construction sector for BC ▪ Analysis of recruitment and retention issues/barriers impacting the province (including cross-generational issues) ▪ Appendices containing any relevant materials or information created and/or disseminated for the purpose of research, including aggregate data The report will be submitted to JTST for approval	SRDC completes report with EJTC and SkillPlan support	February 28, 2017
Deliverable 5: Draft LMI Report			**February 28, 2017**

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Phase 6: Final LMI Report and Recommendations – March 1 to March 31, 2017

Activities	Detail	Responsible	Schedule
Final LMI Report	Prepare the Final LMI Report including the description of the sector, the labour market conditions, and a summary of results from the fieldwork and survey. The report will include: ▪ Detailed description of BC's construction sector to NOC 7241, including: types and number of businesses by subsector, types of occupations by NOC/NAIC codes, characteristics of workplace age, gender, education levels, certification, requirements and length of service; ▪ Current and forecasted labour market conditions and economic trends impacting the construction sector for BC; ▪ Analysis of recruitment and retention issues/barriers impacting the province (including cross-generational issues); and ▪ Appendices containing any relevant materials or information created and/or disseminated for the purpose of research, including aggregate data. The report will be submitted to JTST for approval.	SRDC completes report with EJTC and SkillPlan Support	By March 31, 2017
Deliverable 6: Final LMI Report and Recommendations			**March 31, 2016**

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Appendix C: Survey of Electrical Contractors

Introduction

Thank you for participating in this survey! The purpose of this survey is to gather information from electrical contractors such as yourself in three key areas:

- The skills deficits and job performance gaps of electrical apprentices;
- The link with business priorities and how these gaps compromise outcomes; and
- Which of these gaps are best addressed through mentorship

The results of this survey will be used to support the development of a high quality mentoring model and curricula as well as assessments and evaluation tools.

This survey is being undertaken as part of the BC Mentorship Project which is being run by Electrical Joint Training Committee in association with the Social Research and Demonstration Corporation, SkillPlan and SkillSource BC with funding from the Government of British Columbia.

What does your participation entail?

Your participation in this evaluation is voluntary and you can decline to participate. However, your feedback, opinions, and experiences are important to learning about key issues facing the electrical contracting industry.

The survey will take you approximately 30 minutes to complete. If you need to stop the survey at any point, you can select the "Exit" option at the top of each page. Your responses will be saved up to that point and you can return to your current page by clicking the 'Yes' button on the original email you received.

Confidentiality

Your responses will be kept confidential and will not be shared with anyone other than project researchers from Skillsource and SRDC. Researchers will only publish aggregate analyses in our reports.

No individuals will be named or identified in any reports or publications without their prior consent. When the research related to this project is complete, all of the data will be destroyed.

1. Do you consent to participate in this evaluation?

- Yes
- No

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2. What is the name of your company?

3. What is your job title?

Section I: Your Organization and Workforce

We would like to start with a short series of questions about your business and the composition of your workforce. If you are not sure, approximate answers are fine.

4. What type of ownership is your business? Please select one.

- Sole proprietorship, independent contractor
- Partnership
- Corporation
- Subsidiary of a larger company
- Don't know
- Other (please specify)

5. What are your primary markets? Check all that apply.

- Industrial
- Institutional
- Commercial
- Residential, renovation and maintenance
- Low-rise (single-family) residential
- High-rise (multi-family) residential
- Civil engineering
- Other (please specify)

6. What is the geographic scope of your business? Please select one.

- Home city only
- Multiple areas of the province
- Multiple provinces
- The entire country
- International. If so, which countries?

7. Which economic regions of BC do you serve? Check all that apply.

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

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8. What was the total gross revenue of your establishment in the last fiscal year? Please select one.

- < $100,000
- $100,000 to $249,999
- $250,000 to $499,999
- $500,000 to $999,999
- $1 million to $2,999,999
- $3 million to $4,999,999
- $5 million to $9,999,999
- $10 million or more
- Don't know
- Don't want to say

9. What has been the trend in your revenues over the last 2-3 years? Please select one.

- Declined a lot
- Declined somewhat
- Stayed about the same
- Increased somewhat
- Increased a lot
- Don't know
- Don't want to say

10. Approximately how much would you say your revenue has increased over that period?

- Don't Know
- Don't want to say
- Approximate percentage

11. Approximately how much would you say your revenue has decreased over that period?

- Don't Know
- Don't want to say
- Approximate percentage

12. How many people in total are currently working for this business? If you are not sure, approximate answers are OK.

a) Approximate Number of Employees (Total)

- Don't Know
- Don't want to say
- Number

b) Approximate Number of Office/Management Staff

- Don't Know
- Don't want to say

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- Number

c) Approximate Number of Tradesworkers

- Don't Know
- Don't want to say
- Number

13. What is the approximate turnover rate among your staff? i.e., the number of staff members who have left your organization during the last 12 months as a percentage of the current size of your workforce?

- Don't know
- Don't want to say
- Approximate Turnover Rate

14. How does the current size of your staff compare to what it was a year ago at this time? Please select one.

- Much smaller
- Somewhat smaller
- About the same
- Somewhat larger
- Much larger
- Don't know
- Don't want to say

15. Are your trades workers union or non-unionized?

- Union
- Non-union

16. What is the name the union?

17. Please indicate the percentage of employees on staff who have the following characteristics. How many…

a) Are female?

- Don't Know
- Don't want to say
- Percentage

b) Are under 30 years of age?

- Don't Know
- Don't want to say
- Percentage

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c) Are age 30-44?

- Don't Know
- Don't want to say
- Percentage

d) Are Aboriginal?

- Don't Know
- Don't want to say
- Percentage

e) Speak English as a second language?

- Don't Know
- Don't want to say
- Percentage

f) Are members of a visible minority group?

- Don't Know
- Don't want to say
- Percentage

18. Please indicate the percentage of employees on staff who have the following educational characteristics. How many…

a) Have a high school diploma or less

- Don't Know
- Don't want to say
- Percentage

b) Have a college degree?

- Don't Know
- Don't want to say
- Percentage

c) Have a university degree?

- Don't Know
- Don't want to say
- Percentage

d) Are currently registered apprentices?

- Don't Know
- Don't want to say
- Percentage

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e) Are journeypersons?

- Don't Know
- Don't want to say
- Percentage

Section II: Business Priorities

We would like to ask you about your business priorities and, more specifically, how you define and measure business success.

19. Please rate the importance of each of the following business outcomes for your firm? Use the following 5 point scale for each.

Business outcomes	5-point scale
Improving health and safety	▪ Very important ▪ Important ▪ Moderately important ▪ Slightly important ▪ Not important at all
Increasing productivity/efficiency of workers	
Maintaining high service/product quality	
Reducing costs/wastage	
Improving revenue/market share	
Enhancing human resources	
Other (please specify below)	

20. If you had to pick only one area, which is the biggest priority for your firm over the next year?

- Improving health and safety
- Increasing productivity/efficiency of workers
- Maintaining high service/product quality
- Reducing costs/wastage
- Improving revenue/market share
- Enhancing human resources

21. If you had to pick only one area, which is the biggest priority for your firm over the next 3-5 years?

- Improving health and safety
- Increasing productivity/efficiency of workers
- Maintaining high service/product quality
- Reducing costs/wastage
- Improving revenue/market share
- Enhancing human resources

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22. When tracking "health and safety" outcomes for your firm, what are some of the specific key performance indicators (KPIs) and measures that you use? Check all that apply.

- o # safety violations
- o # accidents
- o # worker injuries
- o # self-reported near misses
- o # days lost to injury, illness
- o $ replacement costs for absent workers
- o $ costs for sick leave
- o $ costs for WCB premiums
- o We don't track any of these formally
- o All of the above
- o Other (please specify)

23. When tracking productivity in your firm, what are some of the specific key performance indicators (KPIs) and measures that you use? Check all that apply.

- o Task-based efficiency metrics - # of resource days/hours it takes a worker/crew to complete a specific set of tasks
- o Unit cost metrics for a work order - $ cost per specific type of work orders
- o Efficiency metrics/unit costs compared to industry standards
- o % of work orders/jobs completed within x% of budget estimates
- o $ costs arising from wastage
- o All of the above
- o We don't track any of these formally
- o Other (please specify)

24. When tracking the quality of the services that your firm provides, what are some of the specific key performance indicators (KPIs) and measures that you use? Check all that apply.

- o # of incidents/installation errors
- o # of days over project budget due to errors, re-installations
- o # / severity of inspection violations
- o # of days over project budget due to failed inspections
- o # of client complaints
- o Client satisfaction indices
- o % of new customers acquired through referrals
- o All of the above
- o We don't track any of these formally
- o Other (please specify)

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25. When tracking human resource outcomes in your firm, what are some of the specific key performance indicators (KPIs) and measures that you use? Check all that apply.

- Apprentice success/development indicators
- Various types of training needs
- Indicators of staff morale/employee satisfaction
- Retention/Turnover rates
- Replacement/hiring costs
- All of the above
- We don't track any of these formally
- Other (please specify)

Section III: Performance Gaps, Causes, and Solutions

We would now like to ask you a few questions about the underlying performance gaps that may be compromising your business goals in each area.

26. With respect to safe working practices are there any recurring gaps where workers may not be doing what they need to consistently, thereby contributing to higher risks of injury? Check all that apply, where gaps may be present, even if only occasionally.

- Not using personal protective equipment (PPE) (e.g. hard-hats, eye wear/goggles, dust masks)
- Not maintaining a safe work environment (e.g. identifying, reporting, and removing hazards (debris, trip and fall hazards))
- Not following safe procedure for rigging, hoisting, and lifting equipment (e.g. consistent use of safety harness)
- Not following procedures to ensure safe lock-out and tag-out
- Not following regulations WHMIS and Workers' Compensation Board (WCB) (e.g. ladder safety)
- Injuries and accidents not getting reported
- Other (please specify)

27. In terms of frequency or severity how would you rank these gaps from most to least problematic for your firm?

- Not using personal protective equipment (PPE) (e.g. hard-hats, eye wear/goggles, dust masks)
- Not maintaining a safe work environment (e.g. identifying, reporting, and removing hazards (debris, trip and fall hazards))
- Not following safe procedure for rigging, hoisting, and lifting equipment (e.g. consistent use of safety harness)
- Not following procedures to ensure safe lock-out and tag-out
- Not following regulations WHMIS and Workers' Compensation Board (WCB) (e.g. ladder safety)
- Injuries and accidents not getting reported
- [Insert text from Other]

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28. In your opinion, what are some of the key underlying causes of these types of gaps? Check all that apply.

- Complacency, boredom, lack of variety (e.g. know what to do but not consistently applying it)
- Gaps in mentorship quality (e.g. journeyworkers not always leading by example)
- Too focused on productivity (e.g. apprentices eager to prove themselves, journeyworkers who are behind schedule/rushed)
- Gaps in knowledge/inexperience – among new apprentices
- Poor attitudes towards safety practices – journeyworkers set in their ways Increasingly dynamic and complex work environments
- Working with other trades and their poor practices
- Under-trained workers
- Under reporting arising from disincentives from regulation
- Other (please specify)

29. Among these causes, how would you rank their importance in contributing to the problem?

- Complacency, boredom, lack of variety (e.g. know what to do but not consistently applying it)
- Gaps in mentorship quality (e.g. journeyworkers not always leading by example)
- Too focused on productivity (e.g. apprentices eager to prove themselves, journeyworkers who are behind schedule/rushed)
- Gaps in knowledge/inexperience – among new apprentices
- Poor attitudes towards safety practices – journeyworkers set in their ways
- Increasingly dynamic and complex work environments
- Working with other trades and their poor practices
- Under-trained workers
- Under reporting arising from disincentives from regulation
- [Insert text from Other]

30. What kinds of processes and practices do you have in place to monitor and address health and safety issues? Check all that apply.

- Job hazard assessment – completed by management at the start of a job
- Field level risk assessments (FLRA) – completed by crew members
- Toolbox/tail-board meetings – between journeyworkers and apprentices, to discuss potential hazards, near misses
- Whiteboard meetings – with PM, GM, Foreman, to share data on near misses
- Ad-hoc safety reviews *(e.g. walk arounds, ad-hoc hazard assessments)*
- Mentorship opportunities on safe working practices Accessible health and safety manuals
- Health and safety committees
- Dedicated on-site crew members assigned to safety roles
- Reward-based practices *(e.g. financial incentives, safety employee of the month)*
- Whistle-blower programs
- Other (please specify)

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31. Do your risk-assessments involve formal reporting by staff?

- Yes
- No

32. Who is responsible for completing risk assessments? Check all that apply.

- General Foreman, or Superintendent
- Foreman
- Journeyworkers
- Apprentices
- All staff must complete a risk assessment

33. What is the frequency of your on-site safety meetings? Select one.

- Daily
- Twice a week
- Once a week
- Every two weeks
- Once a month
- Start of Job
- As needed, no standard timeframes

34. Does mentorship have a role to play in addressing any of these gaps?

- Yes
- No

35. How useful do you think training and mentorship supports may be in each of the following areas to improve health and safety practices? Use the following 5 point scale for each.

Training and mentorship supports	5-point scale
Activities to reinforce consistent safe working practices among new apprentices	▪ Very useful ▪ Useful ▪ Moderately useful ▪ Slightly useful ▪ Not useful at all
Practice and support in conducting high quality job hazard or field-level risk assessments for all responsible staff and crew	
Approaches for creating successful toolbox/tailboard meetings	
Tactics for maximizing engagement to fight complacency (e.g. use of personal anecdotes, visuals, assigning speakers, sharing near- miss data)	
Methods for encouraging variety/freshness (e.g. rotating speakers at meetings, shake-up the format, change the content)	
Protocols for daily monitoring (e.g. walk arounds, ad-hoc hazard assessments)	
Guidelines for introducing reward-based practices and incentives	
Other (please specify below)	

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36. With respect to productivity and efficiency on the job where are some the big areas you may be falling short, or where do inefficiencies tend to arise that cause you to go over budget? Check all that apply, where gaps may be present.

- Materials handling - organizing tools and equipment to support work flow on-site *(e.g. efficiency loss from poor placement of tools and equipment)*
- Inventory control – material and equipment orders from head office *(e.g. delays due to material shortfalls)*
- Handling change orders – adapting to a dynamic environment (e.g. cost overruns because change orders cause delays or are not costed)
- Labour scheduling – coordinating required resources/crews at right times *(e.g. crews are idling because work flow isn't planned properly)*
- Task inefficiency – knowledge or inexperience with certain types of work order *(e.g. newer apprentice not taking most efficient route to complete task)*
- Other (please specify)

37. In terms of frequency or severity how would you rank these gaps from most to least problematic for your firm?

- Materials handling - organizing tools and equipment to support work flow on-site *(e.g. efficiency loss from poor placement of tools and equipment)*
- Inventory control – material and equipment orders from head office *(e.g. delays due to material shortfalls)*
- Handling change orders – adapting to a dynamic environment *(e.g. cost overruns because change orders cause delays or are not costed)*
- Labour scheduling – coordinating required resources/crews at right times *(e.g. crews are idling because work flow isn't planned properly)*
- Task inefficiency – knowledge or inexperience with certain types of work order *(e.g. newer apprentice not taking most efficient route to complete task)*
- [Insert text from Other]

38. In your opinion, what are some the key underlying causes of these types of gaps? Check all that apply.

- Problems with management's initial estimate (e.g. constraints not accounted for in the budget)
- Poor planning by the general foreman/foreman
- Inability to adapt to changes
- Technological constraints Incomplete information available
- Communication breakdowns between general contractor and project management
- Communication breakdowns between project managers and general foreman
- Communication breakdowns between foreman and crews
- Communication breakdowns within crews, among journeyworkers and apprentices

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- Poor communication with other trades on a site
- Poor crew composition
- Gaps in technical knowledge or experience
- Other (please specify)

39. Among these causes, how would you rank their importance in contributing to the problem?

- Problems with management's initial estimate (e.g. constraints not accounted for in the budget)
- Poor planning by the general foreman/foreman
- Inability to adapt to changes
- Technological constraints
- Incomplete information available
- Communication breakdowns between general contractor and project management
- Communication breakdowns between project managers and general foreman
- Communication breakdowns between foreman and crews
- Communication breakdowns within crews, among journeyworkers and apprentices
- Poor communication with other trades on a site
- Poor crew composition
- Gaps in technical knowledge or experience
- [Insert text from Other]

40. What kinds of processes and practices do you have in place to monitor and address these types of productivity and efficiency challenges? Check all that apply.

- Systems for facilitating communications –between Project Managers, foreman, and crews, through regular information exchange
- (e.g. productivity whiteboards, tail-boards)
- Technological solutions for information sharing and planning *(e.g. Sharepoint)*
- Systems for crew rotation –to address shortfalls, or apprentice-to-journey ratios
- Strategic assignments – clearly define roles and responsibilities, and challenge productive workers into leadership roles
- Pre-fab shop – to increase efficiency and provide experience for apprentices
- Work flow as production line – foreman plan and break repetitive jobs into chunks and reorder task completion for efficiency gains
- Mentorship opportunities where foreman and journeyworkers demonstrate more efficient work flows for apprentices
- Keeping morale high, generating buy-in to the importance of productivity
- Other (please specify)

41. Does mentorship have a role to play in addressing any of these gaps?

- Yes
- No

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42. How useful do you think training and mentorship supports may be in each of the following areas to improve productivity and efficiency? Use the following 5 point scale for each.

Training and mentorship supports	5-point scale
Supports to facilitate proactive communication between Project Managers and foreman, pre-project launch and during project activity	▪ Very useful ▪ Useful ▪ Moderately useful ▪ Slightly useful ▪ Not useful at all
Supports for handling change orders and dynamic work environments	
Protocols to reinforce planning skills among foreman with respect to on-site materials handling	
Protocols to reinforce planning skills among foreman with respect labour/resource coordination and management	
Assistance with technological solutions (e.g. communication, information sharing, project planning apps)	
Mentorship supports and reinforcement for foreman and journeyworkers to plan and demonstrate more efficient work flows (e.g. production line) for apprentices	
Other (please specify below)	

43. With respect to maintaining good client relations are there any gaps in the performance of your managers or staff that could be improved to enhance your business development efforts or ability to retain clients? Check all that apply.

- o Manager's communications with clients during pre-launch (e.g. managing their expectations, setting clear deliverables, processes for information exchange, etc.)
- o Ongoing communications between Project Managers, foreman, and general contractors/clients – handling change orders, keeping clients informed
- o Handling clients' complaints when they arise – implementing mutually satisfactory resolutions to ensure client recovery
- o Project Manager or foreman notifying and explaining changes to clients and other end-users after servicing and maintenance
- o Submitting required final documentation to clients
- o Other (please specify)

44. In terms of frequency or severity how would you rank these gaps from most to least problematic for your firm?

- o Manager's communications with clients during pre-launch (e.g. managing their expectations, setting clear deliverables, processes for information exchange, etc.)
- o Ongoing communications between Project Managers, foreman, and general contractors/clients – handling change orders, keeping clients informed
- o Handling clients' complaints when they arise – implementing mutually satisfactory resolutions to ensure client recovery

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- Project Manager or foreman notifying and explaining changes to clients and other end-users after servicing and maintenance
- Submitting required final documentation to clients
- [Insert text from Other]

45. In your opinion, what are some the key underlying causes of these types of gaps? Check all that apply.

- Project Manager doesn't have or build that initial rapport with the client
- Project Manager or foreman doesn't establish process for information exchange
- Project Manager or foreman is too busy – productivity often comes before client relations
- Project Manager or foreman lacks communication skills, experience with client relations
- Foreman doesn't fully "buy-in" or appreciate the importance of client relations
- Other (please specify)

46. Among these causes, how would you rank their importance in contributing to the problem?

- Project Manager doesn't have or build that initial rapport with the client
- Project Manager or foreman doesn't establish process for information exchange
- Project Manager or foreman is too busy – productivity often comes before client relations
- Project Manager or foreman lacks communication skills, experience with client relations
- Foreman doesn't fully "buy-in" or appreciate the importance of client relations
- [Insert text from Other]

47. Does mentorship have a role to play in addressing any of these gaps?

- Yes
- No

48. How useful do you think training and mentorship supports may be in each of the following areas to improve client relations?

Training and mentorship supports	5-point scale
Support to Project Managers in building rapport with clients	▪ Very useful ▪ Useful ▪ Moderately useful ▪ Slightly useful ▪ Not useful at all
Support to Project Managers and foremen with communications systems and technology	
Support to Project Managers and foremen in resolving conflicts, complaints, and service recovery	
Reinforcement for the importance of strong client communication to generate staff buy-in	
Other (please specify below)	

Section IV: Economic, Policy, and Labour Market Conditions

We would now like to ask you a few questions about the context your business faces in terms of the economic and labour market trends, or policy changes that may have an impact on your business.

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49. Are there any key developments that have impacted your business over the last few years? Check all that apply.

- o Economic activity, increased demand
- o Policy, regulatory changes
- o Increased competitiveness
- o Significant foreign or government investments *(e.g. LNG)*
- o Customers are more sophisticated and demanding
- o Time-pressure to complete jobs
- o Price pressure *(e.g. downward on revenue, upward on costs)*
- o Aging of the workforce
- o Other (please specify)

50. How do you think these developments may affect your workforce? Check all that apply.

- o Labour supply shortages
- o Increasing wages
- o Challenges with technological change
- o Challenges with knowledge transfer from older to younger workers
- o Increasing need for skills development
- o Need for quality mentorship
- o Other (please specify)

Section V: Recruitment and Retention Challenges

Next, we would like to discuss in a little more detail any recruitment and retention challenges you may face with your workforce and the overall quality of mentorship that takes place.

51. In general, how satisfied are you in your ability to recruit and retain suitable apprentices to meet your needs?

- o Very satisfied
- o Satisfied
- o Moderately satisfied
- o Slightly satisfied
- o Not satisfied at all

52. In general, how satisfied are you in your ability to recruit and retain suitable journeyworkers to meet your needs?

- o Very satisfied
- o Satisfied
- o Moderately satisfied
- o Slightly satisfied
- o Not satisfied at all

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53. Please rate the importance of the following factors in contributing to your <u>recruitment</u> successes?

Contributing factors	5-point scale
Strong local referrals	▪ Very important ▪ Important ▪ Moderately important ▪ Slightly important ▪ Not important at all
Proactively engage with the union to communicate what we need	
Offer steady work because of stable business	
Offer good learning opportunities	
Career advancement potential	
Competitive wages and benefits	
Supportive work environment	
Strong safety record	
Other (please specify below)	

54. Please rate the importance of the following factors in contributing to your <u>retention</u> successes?

Contributing factors	5-point scale
Strong local referrals	▪ Very important ▪ Important ▪ Moderately important ▪ Slightly important ▪ Not important at all
Proactively engage with the union to communicate what we need	
Offer steady work because of stable business	
Offer good learning opportunities	
Career advancement potential	
Competitive wages and benefits	
Supportive work environment	
Strong safety record	
Other (please specify below)	

55. Please rate the following barriers that contribute to recruitment and retention challenges?

Contributing factors	5-point scale
Difficult to recruit specialized workers with integrated knowledge and skill sets (e.g. electrical and programming)	▪ Very important ▪ Important ▪ Moderately important ▪ Slightly important ▪ Not important at all
Can be hard to find strong generalists (e.g. some workers lack a breadth of experience)	
Can be hard to retain strong leaders	

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Can be hard to retain strong mentors	
Other (please specify below)	

Section VI: Wrapping Up

Throughout this survey we have asked you about mentorship in the context of addressing specific performance gaps among your workforce. We would like to take a step back and consider, overall, how you feel about mentorship in your organization.

56. In your opinion, how important is quality mentorship to skills development of apprentices?

- o Very important
- o Important
- o Moderately important
- o Slightly important
- o Not important at all

57. In your opinion, how important is quality mentorship to skills development of journeyworkers?

- o Very important
- o Important
- o Moderately important
- o Slightly important
- o Not important at all

58. Overall, how satisfied are you with the quality of mentorship that takes place in your organization?

- o Very important
- o Important
- o Moderately important
- o Slightly important
- o Not important at all

59. Improving mentorship quality is a priority for my organization.

- o Very important
- o Important
- o Moderately important
- o Slightly important
- o Not important at all

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60. Please rate the importance of each of the following in developing better MENTORS.

Factors	5-point scale
Communication skills	▪ Very important ▪ Important ▪ Moderately important ▪ Slightly important ▪ Not important at all
Working well with others, being a team-player	
Systems thinking, ability to break down and teach processes	
Exhibiting patience	
Strong willingness to share knowledge	
Well-rounded person who sees the big picture	
Workplace support for mentoring, culture of learning	
Evaluating performance of mentees	
Demonstrating correct task completion	
Other (please specify below)	

61. Please rate the importance of each of the following in developing better MENTEES.

Factors	5-point scale
Communication skills	▪ Very important ▪ Important ▪ Moderately important ▪ Slightly important ▪ Not important at all
Working well with others, being a team-player	
Critical thinking and problem solving	
Exhibiting patience	
Proactive in seeking learning opportunities	
Asking good questions	
Strong/active listener	
Academically inclined	
Mechanically inclined	
Other (please specify below)	

62. In addition to improving the skills and performance of your workforce, what else would you like to see in a mentorship training and support program? Use the following 5 point scale to rate the usefulness of each.

Elements of a mentorship training and support program	5-point scale
A system for monitoring mentorship activities	▪ Very useful ▪ Useful ▪ Moderately useful
A system for tracking competencies of apprentices	
A method of evaluating mentors and mentees	

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A method of measuring the ROI from mentorship activities	▪ Slightly useful ▪ Not useful at all
Awards for strong mentoring performance	
Other (please specify below)	

63. How useful do you think each of the following FORMATS would be for providing supports to mentors and mentees in your organization?

Formats of a mentorship training and support program	5-point scale
Instruction manuals	▪ Very useful ▪ Useful ▪ Moderately useful ▪ Slightly useful ▪ Not useful at all
Practice activities and scenarios	
Check-lists, guidelines	
Video how-to's	
Mobile apps for reference and tracking	
Other (please specify below)	

64. Where is the best location for mentorship training and support to take place?

- On-the-job
- Site orientation
- Off-site location
- Union hall
- Other (please specify)

65. Are there particular types of supports that we have NOT mentioned earlier that you think are needed to help improve mentorship quality in your company or the industry as a whole?

66. Do you have an additional comments you would like to add about the topics covered by this survey?

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