Engineering and Technology Labour Market Study

Survey of Engineers and Engineering Technicians and Technologists

Engineers Canada
and
Canadian Council of Technicians and Technologists

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Canada

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About Engineers Canada

Established in 1936, Engineers Canada is the national organization of the 12 provincial and territorial associations and ordre that regulate the practice of engineering in Canada and license the country's more than 160,000 professional engineers. Engineers Canada serves the associations and ordre, which are its constituent and sole members, by delivering national programs that ensure the highest standards of engineering education, professional qualifications and professional practice.

About the Canadian Council of Technicians and Technologists

The Canadian Council of Technicians and Technologists (CCTT) establishes and maintains national competency standards for certifying members with a 'quality seal of approval' in 14 applied science and engineering technology disciplines: bioscience, industrial, building, instrumentation, chemical, mechanical, civil, mining, electrical, petroleum, electronics, geomatics, forestry, and information technology. CCTT's provincial associations are responsible for issuing these highly regarded credentials, which are recognized by provincial statute in many Canadian provinces.

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Executive Summary

Survey Sample

- The sample comprised 15,585 responses.
- *Practising* engineers, technologists and technicians account for approximately 90% of the survey sample.
- The sample is strongly skewed to persons who are licensed as professional engineers or certified as technologists or technicians. However, the sample of those who are not licensed or certified is sufficiently large for analysis purposes.

Educational Profile

- Roughly 57% of persons with a Bachelor's degree in engineering also have an additional academic or vocational qualification. For engineers, additional educational qualifications may be an emerging norm.
- More than 20% of respondents with an engineering degree report that they also have a college qualification.
- A high proportion of technicians and technologists have university qualifications in engineering (10% in the *Census*, 6% in this survey) or university qualifications in science (6% in this survey).
- Roughly one-third of survey respondents with a college qualification in technology, but with no university degree in engineering, also report having a trade qualification.

Career and Employment

- Managerial roles are an important dimension of engineering and technology careers. The overwhelming majority of managerial responsibilities are in 'engineering (*i.e.*, technical) management,' not in general management or other types of management.
- About half of all engineering and technology professionals work in more than one technical field over the course of their career. Roughly 60-65% of engineering and technology professionals work in more than one industry over their career.
- Six industries – consulting, manufacturing, construction, government, utilities, and oil and gas – account for three-quarters of engineering and technology employment.
- Technical and technical-related functions are overwhelmingly dominant in the work responsibilities of engineering and technology professionals.
- Other findings that emerge from the survey:
    - *Project management is a key function*, and by inference a key skill requirement.
    - *Design may be regarded as the defining technical function of both engineers and technologists*.
    - *Contract administration* is an important function in all three occupations. In light of trends to outsource many business inputs, the importance of this function, and the skills required, may increase.

- Responsibility for computer operations is an important employment function for technologists and technicians

Licensure and Certification

- There is a modest, but noteworthy, overlap between the system of licensure for professional engineers and the system of certification of technologists and technicians.
- *Employer policy is an important factor in both licensure and certification*. *A large majority of engineering and technology employers have policies that support the systems of professional licensure and professional certification*, though many of these employers do not provide financial support for annual licensure or certification fees. Employer support for licensure of engineers is stronger than support for certification of technologists and technicians.
- *Licensed engineers and certified technicians and technologists strongly associate their licence with professionalism, client expectations, better career options, increased employability and, to some degree, with increased earnings.* Persons who are working in engineering and technology, without a licence or certification largely share these perceptions, although a significant number attach less importance to client expectations.
- The survey confirms asymmetries and ambiguities pertaining to the technician certification. Fewer than half of certified technicians in this sample report that they are working as technicians.

Continuing Professional Development

- *Participation in Continuing Professional Development is exceedingly high among engineering and technology professionals.* Approximately 17% of respondents are *currently* taking courses that will lead to further academic qualifications. Over the past three years, 84% of survey respondents report having taken Continuing Professional Development training over the past three years.
- The majority of survey respondents took both technical and non-technical Continuing Professional Development training.
- The most commonly taken non-technical Continuing Professional Development training was in *project management.* This confirms other research which has found that project management is a core function in many engineering and technology careers.
- 67% reported that their Continuing Professional Development training was completely voluntary; 25% reported that the training was required by their employer. Compliance with professional association requirements was cited by 7% of engineers, 3% of technologists and 6% of technicians.
- Overall, 34% of engineers, 22% of technologists, and 19% of technicians reported that they are members of technical associations.

International Engineering and Technology Graduates

- 9.3% of International Engineering Graduates and 9.2% of International Technology Graduates reported that they were either unemployed or working part-time, but seeking full-time employment. For domestic engineering and technology graduates, the proportion was 2.4% and 2.2% respectively.
- 55% of International Engineering Graduates and 43% of International Technology Graduates

cited lack of recognition of experience or qualifications, or lack of Canadian experience as their most important reason for not working in engineering or technology. While qualifications and experience factors are clearly important, there are other obstacles to integration that cannot be discounted.

- *International Engineering Graduates showed stronger support for the system of professional licensure* of engineers than domestic engineering graduates. By contrast, *International Technology Graduates showed significantly weaker support for the system of professional certification* in technology occupations in comparison with the domestic technology graduates in the sample.
- Consistent with their lower support for professional certification, International Technology Graduates were also notably *less* likely to take up certification than domestic graduates, although this conclusion may be affected by sampling biases.
- There are no strong patterns in the country-of-origin of International Engineering Graduates. Only 9% of International Engineering Graduates immigrated from 'Washington Accord' jurisdictions. This implies that for over 90% of International Engineering Graduates there are complex qualification reviews involved in assessing their eligibility for licensure.

1. Survey Sample

Key Points

1. The sample comprises 15,585 responses.
2. *Practising* engineers, technologists and technicians account for approximately 90% of the survey sample.
3. The sample is strongly skewed to persons who are licensed as professional engineers or certified as technologists or technicians. However, the sample of those who are not licensed or certified is sufficiently large for analysis purposes.
4. The sample is broadly representative of most facets of the engineering and technology labour market across regions, age groups, gender, technical fields, and industries.
5. On a national basis, the survey sample will be reliable within +/- 1.1%, 99% of the time. At the provincial level, the reliability is somewhat reduced, but falls no lower than +/- 4%, 95% of the time.

Practising Engineers, Technologists and Technicians:

This survey should be interpreted primarily as a survey of practising engineers, technologists and technicians. While some survey respondents are not currently working in engineering or technology, the overwhelming majority are so employed. Approximately 84% of survey respondents describe themselves as 'currently working in engineering or technology.'

Licensure and Certification:

The sample is strongly skewed to persons who hold a professional licence or certification. This bias was unavoidable, given reliance on professional and technical associations and the principal channels for promoting the survey. In the current sample, 88% of persons with an engineering degree were licensed or in the process of becoming licensed, while 57% of persons with a college or equivalent qualification were certified or in the process of becoming certified. In addition, approximately 3% of the total sample reported holding a recognized Canadian professional certification as a technician or a technologist, but having an educational qualification other than a college qualification in technology.

Regional Representation in the Sample:

Figure No. 1 compares the regional representation of the survey sample with 2006 *Census* data. While there are imbalances between the sample and the *Census*, these are not so significant as to call into question the trends identified in the survey.

Figure No. 1
Regional Distribution of Sample compared to 2006 Census

Province/Territory	Sample	Census
Newfoundland & Labrador	2.8%	1.3%
Prince Edward Island	0.3%	0.2%
Nova Scotia	2.3%	2.2%
New Brunswick	3.3%	1.6%
Quebec	20.4%	23.6%
Ontario	39.2%	38.5%
Manitoba	3.3%	2.5%
Saskatchewan	2.4%	2.0%
Alberta	11.8%	16.5%
British Columbia	13.4%	11.1%
Territories	1.0%	0.2%
	100.0%	100.0%

Age Group Representation in the Sample:

Figure No. 2 compares the representation of age groups in the sample compared to the 2006 *Census*. Again, there are no radical asymmetries between the sample and the *Census*. The median age in the survey is approximately 43.5. The median age from the *Census* is 42.4.

Figure No. 2
Age Group Distribution of Sample compared to 2006 Census

	Engineering Degree		College Qualification	
	Survey	Census	Survey	Census
<25	4.1%	7.1%	4.8%	9.9%
26-35	25.7%	24.4%	26.6%	21.3%
36-45	27.3%	32.1%	27.5%	28.4%
46-55	26.7%	22.4%	28.0%	25.8%
56-65	12.9%	10.9%	11.2%	12.4%
66+	3.3%	3.1%	2.0%	2.1%

Gender Representation in the Sample:

For persons with engineering degrees, the sample closely mirrors the *Census*: 85.1% male in the survey, 87.7% in the *Census*. For persons with college qualifications, the survey under-weights women. In the survey sample, 88.1% of college-qualified respondents are male, compared to 78.5% in the *Census*.

Statistical Reliability:

On a national basis, the survey sample will be reliable within +/- 1.1%, 99% of the time. At the provincial level, the reliability is somewhat reduced, but falls no lower than +/- 4%, 95% of the time.

2. Educational Profile

This chapter presents an educational profile of survey respondents. The chapter first discusses engineers and then looks at technicians and technologists.

Key Findings:

1) Roughly 57% of persons with a Bachelor's degree in engineering, also have an additional academic or vocational qualification. Additional qualifications may be an emerging norm.

2) A high proportion of technicians and technologists have university qualifications in engineering (10% in the *Census*, 6% in this survey) or university qualifications in science (6% in this survey). These additional science-related university qualifications held by many technicians and technologists may be a significant contributor to occupational overlap with engineers.

3) Roughly one-third of survey respondents with a college qualification in technology, but with no university degree in engineering, also report having a trade qualification.

Engineers:

In this sample, 81.5% of respondents obtained their undergraduate engineering degree in Canada, while 18.5% obtained their degree outside Canada. In the 2006 *Census*, the proportions were approximately 57% with Canadian undergraduate degrees in engineering and 43% with international degrees. The sample, therefore, under-weights persons with a non-Canadian engineering degree.

Approximately 57% of engineers who participated in this survey have another academic or vocational qualification, in addition to their Bachelor's degree in engineering. Among respondents with a Canadian engineering degree, the proportion with an additional qualification is 55%. The proportion rises to 65% for respondents with a non-Canadian engineering degree. There are no differences related to gender. There were only moderate differences across age groups. *An important finding of this survey, therefore, is that for persons with a Bachelor's degree in engineering, an additional academic or vocational qualification is common and may be an emerging norm.*

More than 20% of respondents with an engineering degree report that they also have a college qualification. Approximately 20% of those with an undergraduate degree in engineering also have a graduate degree in engineering; 6.5% have an MBA. Engineers with an international degree in engineering were significantly more likely to also have a graduate degree and somewhat more likely to have a college qualification. Figure No. 3 summarizes these data.

Figure No. 3
Percent of Survey Respondents with a Bachelor's Degree in Engineering who report also having Another Academic or Vocational Qualification

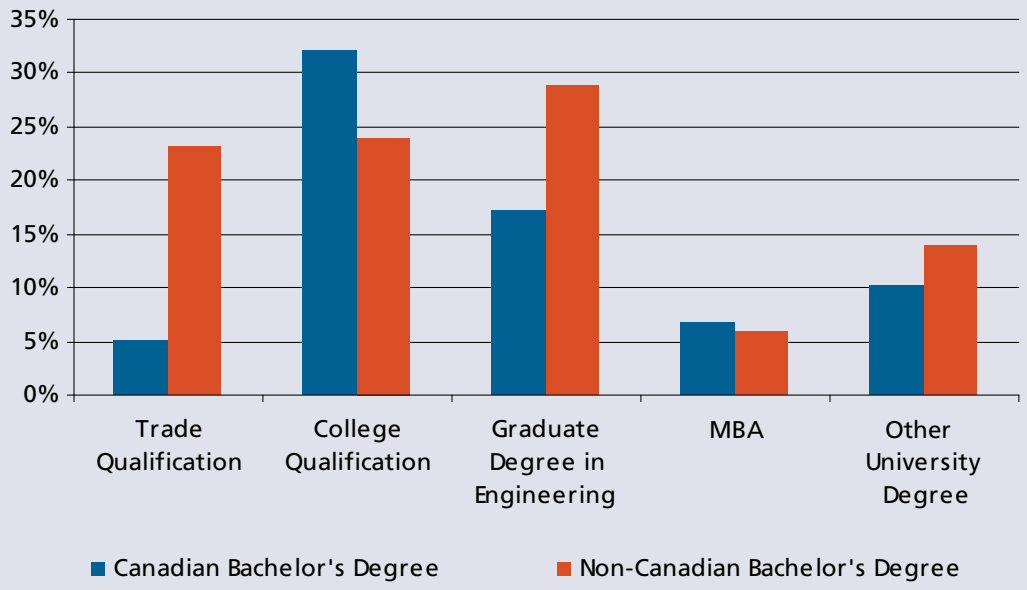


Figure No. 4 summarizes the distribution of survey respondents with engineering degrees by the technical field in which they report being academically qualified. The sample is broadly consistent with recent graduation trends, except that civil is over-represented in the sample.

Figure No. 4
Distribution of Survey Respondents with a Bachelor's Degree in Engineering by Field of Academic Qualification

Mechanical	20.1%	Bio-Science/Biological/Bio-Medical/ Bio-Chemical Engineering	1.3%
Civil	19.8%	Materials	1.3%
Electrical	15.0%	Architectural/Building/Structural	1.3%
Chemical	6.9%	Systems	1.0%
Electronics	4.9%	Petroleum and Gas	<1.0%
Industrial/Manufacturing	4.2%	Agricultural/Bio-resource	<1.0%
Information Technology/Computer/ Software	4.0%	Survey/Geomatics	<1.0%
Environmental	3.9%	Marine/Naval	<1.0%
Engineering Science/Engineering Physics	3.2%	Nuclear	<1.0%
Aerospace/Aeronautical	2.1%	Forestry	<1.0%
Geological and Related	2.0%	Wood	<1.0%
Instrumentation/Control Systems	1.7%	Food	<1.0%
Metallurgical	1.7%	Renewable Resources and Forestry	<1.0%
Mineral Resources/Mining	1.6%	Space	<1.0%

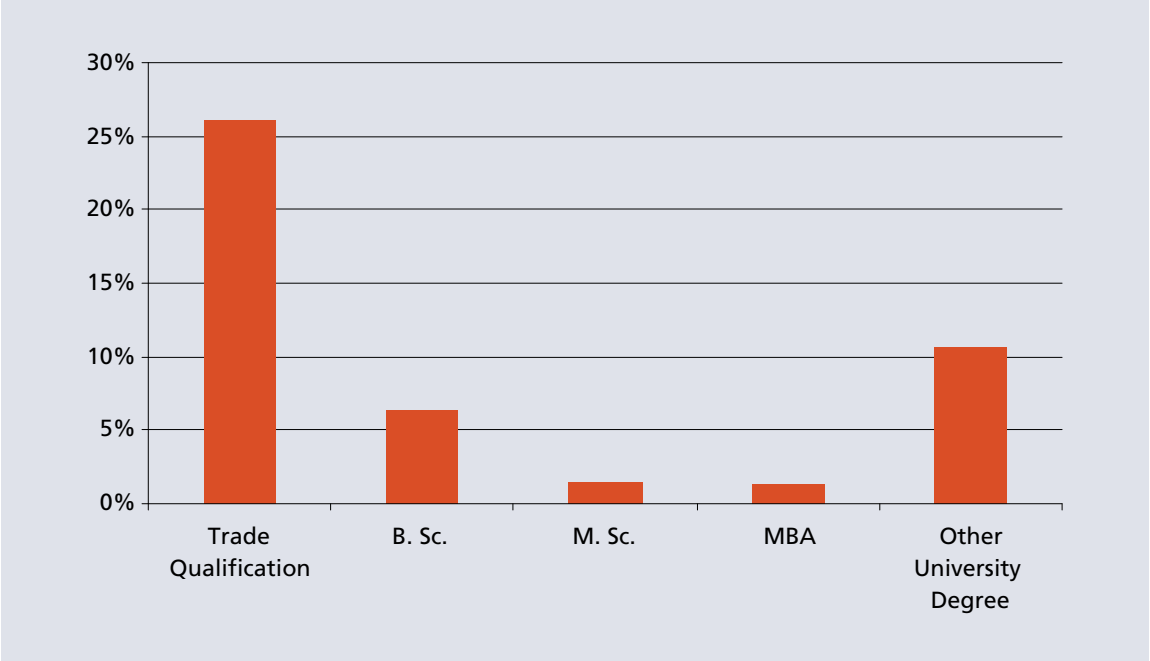
College Qualifications in Technology:

In this sample, *approximately 31% of respondents with a college qualification in technology also reported holding a university degree in engineering.* Of these, 76% describe their job as an engineering job, *6% report working in a technician or technologist job,* and 18% report working in another type of job. These results are similar to the *2006 Census*. The Census estimated that 10% of persons working in technology occupations held a university degree in engineering and that these were roughly evenly divided between those who obtained their engineering degree in Canada and those who held an international degree in engineering.

Figure No. 5 shows that roughly one-quarter of survey respondents with a college qualification in technology, but with no university degree in engineering, also reported having a trade qualification. The correlation is strongly related to age. Those respondents, age 46 and older are more likely to have a trade qualification than those age 45 or younger. This could imply either that holding a trade qualification and a technology qualification is a declining trend or that there is, and will continue to be, a significant number of tradespersons who obtain technology qualifications later in their career.

Approximately 6% report having a Bachelor's degree in science; 1% report also having a science degree at the Master's level. Some employers may regard these university qualifications in science as approximately equivalent to university training in engineering, especially when they are combined with a college qualification in technology. Overall in the sample, approximately 17% of respondents with a college technology qualification (but without a university degree in engineering) report holding some type of university degree. These data are summarized in Figure No. 5.

Figure No. 5
Percent of Survey Respondents with a College Qualification in Technology (but not a University Degree in Engineering) who report also having Another Academic or Vocational Qualification



The education trends that emerge from the survey (and which are consistent with the *Census*), suggest two conclusions. The first is that, in some regions, when labour market conditions for engineering graduates were weak, a number of these graduates took jobs as technicians or technologists. Second, *the proportion of technicians and technologists with university qualifications in engineering (10% in the Census, 6% in the survey) or with university qualifications in science (6% in the survey) contributes to occupational overlap between engineers and technicians/technologists*. These trends are discussed in another report.[1]

Figure No. 6 summarizes the distribution of survey respondents with a college qualification by the technical field in which they report being academically qualified. As with the engineering sample, civil technology is over-represented in the sample. Manufacturing-related qualifications appear to be under-represented.

Figure No. 6
Percent of Survey Respondents with a College Qualification in Technology (but not a University Degree in Engineering) by Field of Academic Qualification
(Multiple Responses Permitted)

Civil	22.2%	Bio-Science/Biological/Bio-Medical/ Bio-Chemical	1.5%
Mechanical	17.7%	Metallurgical	1.5%
Electrical	14.1%	Mineral Resources/Mining	1.3%
Electronics	11.6%	Agricultural/Bio-resource	<1.0%
Architectural/Building/Structural	7.3%	Forestry	<1.0%
Environmental	4.5%	Systems	<1.0%
Chemical	3.6%	Wood	<1.0%
Engineering Science/Engineering Physics	3.6%	Renewable Resources and Forestry	<1.0%
Survey/Geomatics	2.4%	Nuclear	<1.0%
Aerospace/Aeronautical	2.3%	Food	<1.0%
Petroleum and Gas	2.2%	Space	<1.0%
Geological and Related	1.5%		

1. Engineering and Technology Labour Market Study, Changing Roles in Engineering and Technology (September 2008)

3. Career and Employment

Key Findings:

1. Managerial roles are an important dimension of engineering and technology careers. Managerial roles are somewhat more evident for engineers than for technologists. Also males are somewhat more likely to be in managerial roles than women.

2. The overwhelming majority of managerial responsibilities are in 'engineering (*i.e.*, technical) management', not in general management or other types of management.

3. About half of all engineering and technology professionals work in more than one technical field over the course of their career. Roughly 60-65% of engineering and technology professionals work in more than one industry over their career.

4. Six industries – consulting, manufacturing, construction, government, utilities, and oil and gas – account for three-quarters of engineering and technology employment.

5. Technical and technical-related functions are overwhelmingly dominant in the work responsibilities of engineering and technology professionals. Other findings that emerge from the survey:

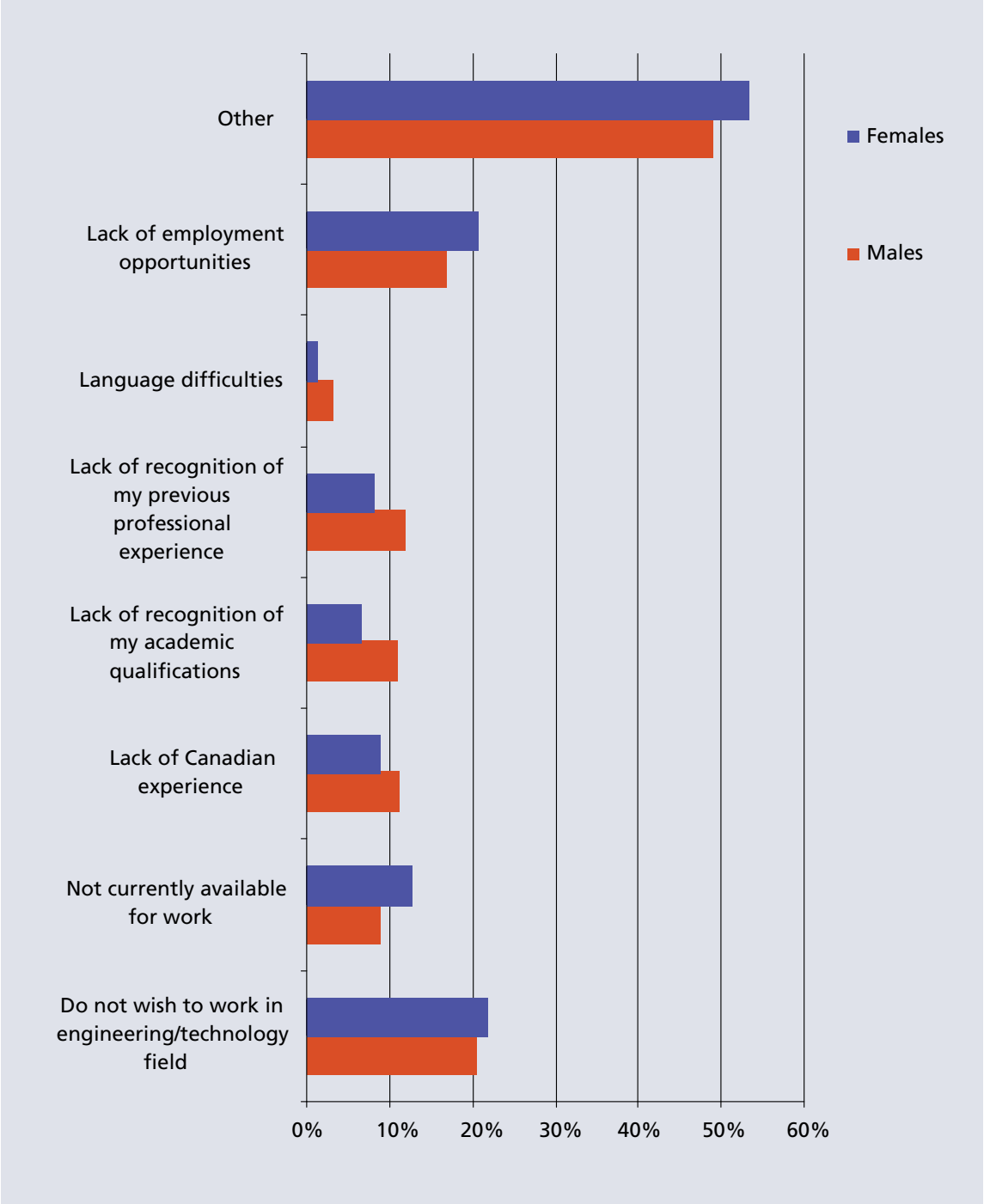
    - Project management is a key function, and by inference a key skill requirement.
    - Design may be regarded as the defining technical function of both engineers and technologists.
    - Contract administration is an important function in all three occupations. In light of trends to outsource many business inputs, the importance of this function, and the skills required, may increase.
    - Responsibility for computer operations is evidently an important employment function for technologists and technicians

Importance of Technical Roles:

Approximately 87% of survey respondents reported that they are 'currently working in engineering or technology'. This proportion is the same, regardless of whether respondents received their post-secondary education in engineering or in technology. The proportion is also the same for respondents who identify their current job as managerial or non-managerial. *This survey, therefore, is essentially a profile of practising engineers, technologists and technicians.*

Figure No. 7 summarizes the most important reasons for not working in engineering and technology, offered by those respondents who indicated that they are not working in engineering and technology. As can be seen, gender differences are relatively unimportant, although women were somewhat more likely to cite 'lack of employment opportunities.' Roughly 30% of those respondents who are not working in engineering and technology either prefer not to work in those fields or are unavailable for employment.

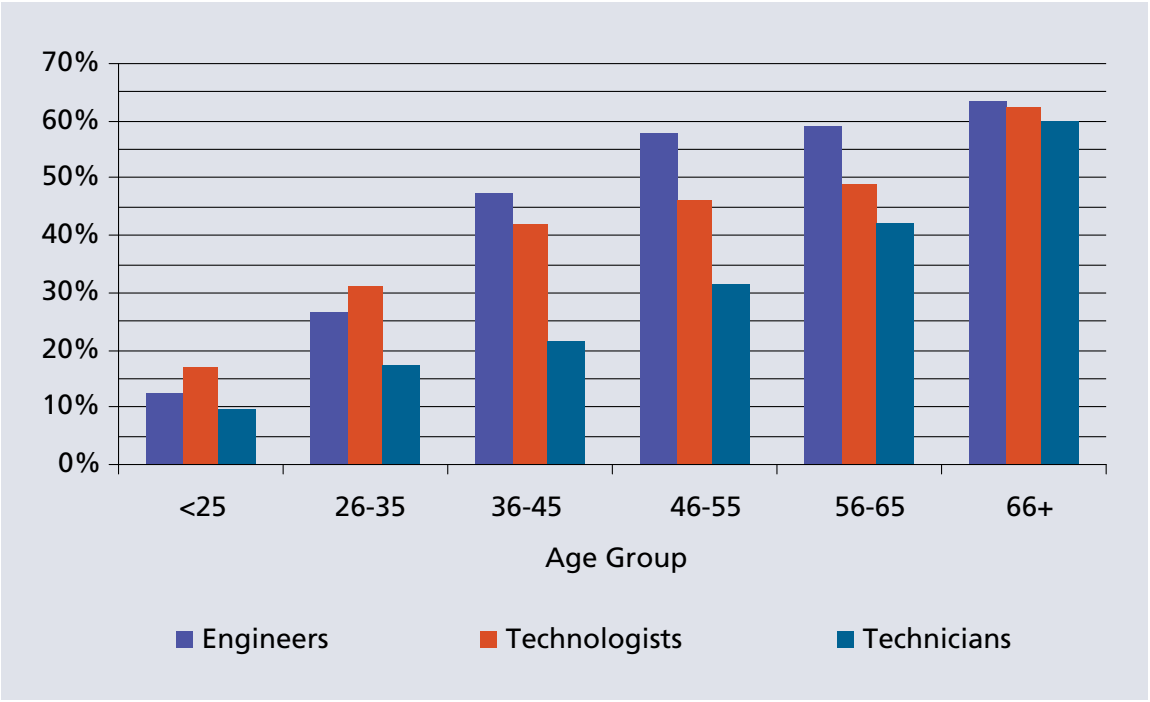
Figure No. 7
Principal Reason given For Not Currently Working in Engineering or Technology



Importance of Managerial Roles:

Managerial roles are an important dimension of engineering and technology careers. Figure No. 8 shows that a high proportion of survey respondents describe their current employment as managerial. It is possible that the managerial share is over-estimated. In the survey, approximately 91% of persons in engineering jobs are either licensed or are engineers-in-training. For technologists and technicians, approximately 80% of the sample are either certified or have an application pending. If the managerial share of employment is higher among persons who are licensed or certified, the sample will over-estimate this share.

Figure No. 8
Percent of Survey Respondents by Age Group and Occupation
Identifying their Current Job as Managerial

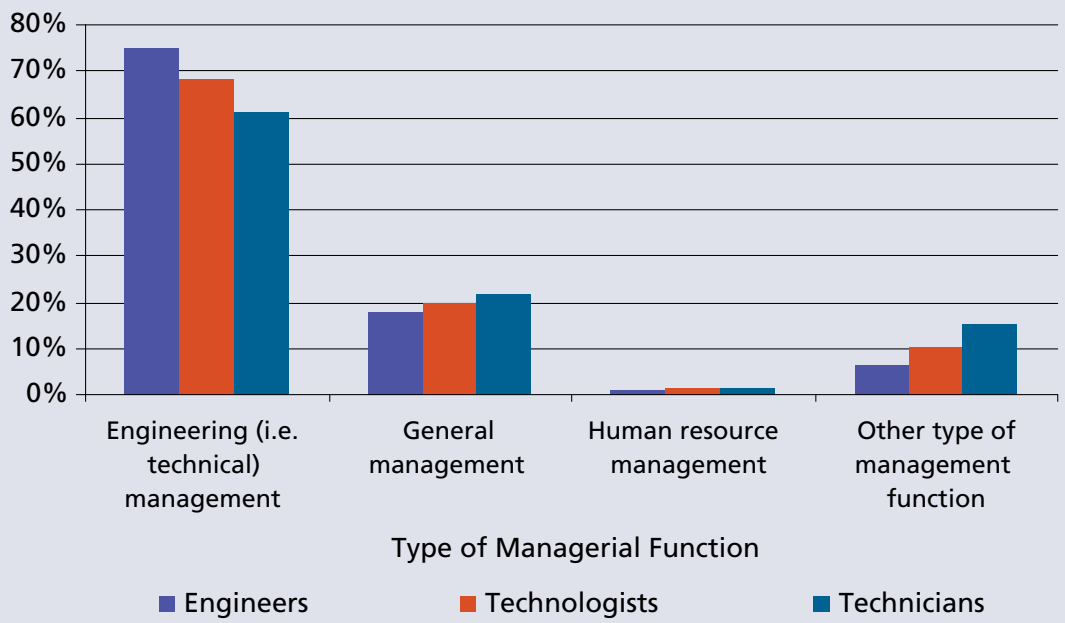


Notwithstanding that the survey may over-estimate the managerial share of employment among practising professionals, the conclusion should still be drawn that *managerial roles are an important stage in the career of many engineering and technology professionals.* Figure No. 8 also shows, as would be expected, that the likelihood of occupying a managerial job increases with age.

For males, the proportion reporting managerial jobs was 47%. For women, the proportion was 30%.

Figure No. 9 shows that most of those who describe their current job as managerial, also describe their job as 'engineering (i.e. technical) management.' The proportion is highest for engineers (75%) and lowest for technicians (61%). Female respondents in managerial jobs were as likely as male respondents to be involved in 'engineering (i.e. technical) management.' Clearly, *the type of managerial role that most engineering and technology professionals are likely to play is a technical management function.* In business schools, technical management is often not addressed to the same degree as other types of management. There is an implication, therefore, that professional development centres for the engineering and technology professions may need to fill this gap.

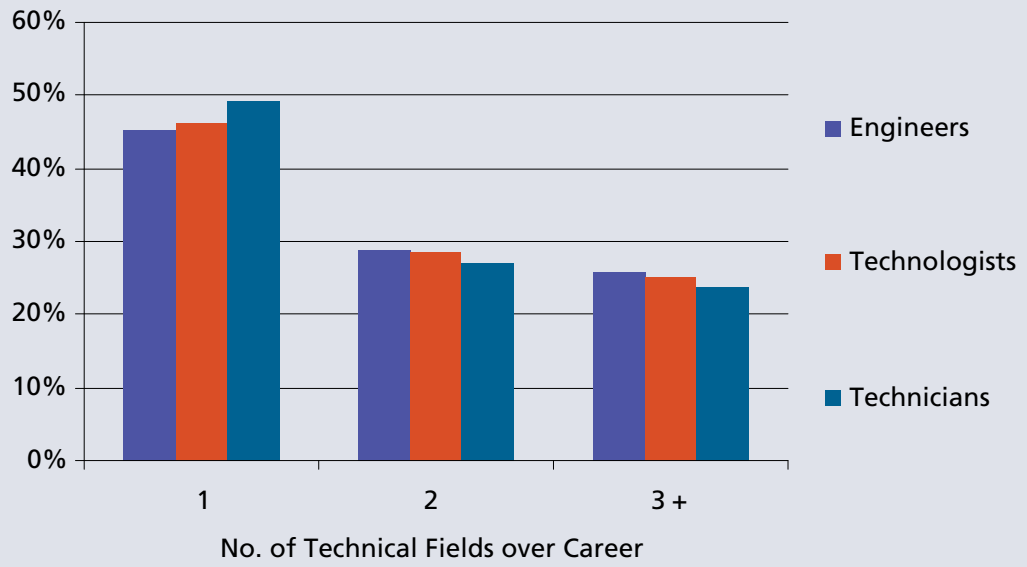
Figure No. 9
Percent of Survey Respondents in Each Age Group Identifying their Current Job as Managerial



Mobility Across Technical Fields:

While all engineering and technology professionals are academically trained in a particular field, the survey evidence suggests that about half work in more than one field over the course of their career. Figure No. 10 shows that this pattern is virtually the same across all three engineering and technology occupations.

Figure No. 10
No. of Technical Fields in which Respondents were Employed over their Careers



In some cases, the movement may be between closely allied fields. In other instances, the movement is clearly across distinct fields.

Figure No. 11 shows the distribution of career experience across different technical fields for the three largest engineering and technology specializations – civil, mechanical, and electrical and electronics. As would be expected, the overwhelming majority of practising engineering and technology professionals have career experience in the field for which they were academically prepared. However, Figure No. 11 also shows that working in another field – sometimes *not* closely related to the field of academic qualification – is an important reality of the engineering and technology labour market. For example, 16.9% of persons qualified in civil engineering or technology worked in environmental engineering/technology. Among mechanical engineering and technologists, 10.3% report working in electrical and electronics engineering/technology while 5.0% report working in environmental. Maore than one quarter (27.8%) of electrical and electronics engineers/technologists/technicians reported that they work in manufacturing or industrial engineering. The movement across technical fields is consistent with engineering licensure which qualifies an individual as an engineer, regardless of field and casts some doubt on the viability of certification schemes which would credential a technologist or technician for work in a specifically defined field. Neither technology, nor the labour market, recognize such barriers. Technology often crosses technical fields, as well as engineering and technology professionals. While it may be useful and appropriate to recognize specialized skills with a specialist certification, these labour market data suggest that basic professional competence should be recognized by a generic designation that is not restricted to practice in a particular field of engineering or technology.

Figure No. 11
Technical Fields in Which Respondents Academically Qualified in a Particular Engineering/Technology Field Report Career Experience

	Academic Qualification		
Employment Fields	Civil Engineering/ Technology	Mechanical Engineering/ Technology	Electrical & Electronic Engineering/ Technology
Aerospace Engineering	0.5%	10.6%	5.6%
Chemical Engineering	0.9%	3.8%	1.2%
Civil Engineering	**90.6%**	7.5%	3.7%
Computer Engineering	1.6%	3.4%	20.8%
Electrical & Electronics Engineering	2.8%	10.3%	**85.2%**
Environmental Engineering	16.9%	5.0%	2.4%
Geological Engineering	5.0%	0.3%	0.4%
Geomatics/Surveying	10.4%	1.1%	1.3%
Geo-science	2.4%	0.2%	0.5%
Manufacturing/Industrial Engineering	6.3%	**40.3%**	19.1%
Mechanical / Industrial Engineering	6.2%	**82.1%**	8.7%
Metallurgical and Materials Engineering	0.8%	6.7%	1.4%
Mining Engineering	3.7%	4.3%	2.3%
Petroleum Engineering	2.5%	6.9%	3.8%
Bio-systems Engineering	0.2%	0.8%	1.1%
Other Engineering Specialties	10.3%	15.4%	12.5%
Non-Engineering Occupations	7.2%	10.4%	9.3%
Teaching	7.5%	8.7%	10.8%

Mobility Across Industries:

Figure No. 12 shows that engineers, technologists and technicians typically work in more than one industry over their career.

Figure No. 12
No. of Industries in which Respondents were Employed over their Careers

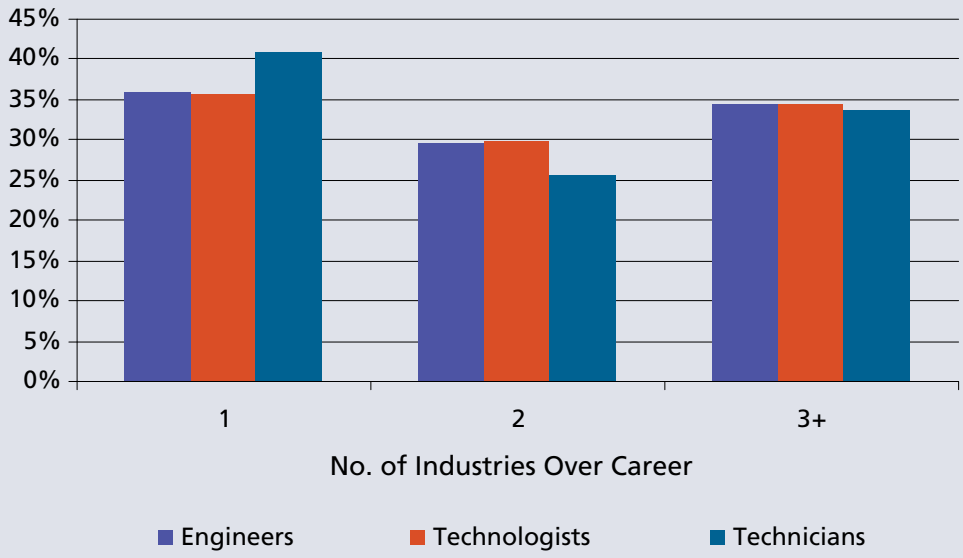


Figure No. 13 shows that six sectors account for three-quarters of engineering and technology employment. It is largely hiring requirements in these six industries that determine labour market conditions for engineering and technology professionals.

Figure No. 13
Employment by Industry – Current and Career

	Percent of Respondents Currently Working in this Industry	Percent of Respondents Who Worked in this Industry over Their Career*
Consulting	22.3%	46.1%
Manufacturing	15.4%	31.5%
Construction	10.3%	28.1%
Government	10.0%	16.7%
Utilities	9.2%	17.7%
Oil and Gas	7.5%	14.9%
Total	74.7%	n/a

* Respondents could select more than one industry

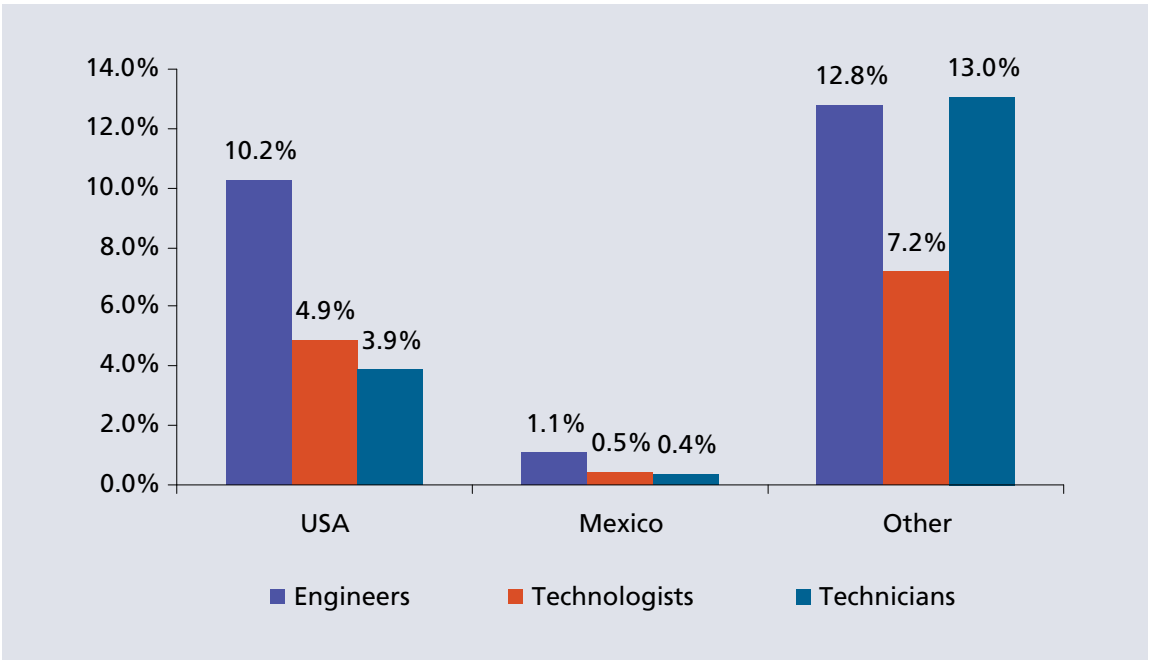
The concentration of employment across these industries is particularly important for the large majority of engineering and technology professionals. For more specialized fields such as mining and metallurgy or aeronautics, the industry profile of employment, of course, would be different. However, *it is employers' policies and practices in these six industries that shapes the way in which engineering and technology professionals acquire the practical skills that are subsequently allied to their theoretical, science-based skills*.

Mobility Across Provinces and Territories:

Over the past 12 months, 11.1% of engineers, 8.7% of technologists, and 6.2% of technicians reported working in more than one Canadian jurisdiction. Over the past 5 years, these proportions increased only moderately to 16.3% of engineers, 13.2% of technologists, and 8.9% of technicians. Broadly these trends suggest that approximately one professional engineer in six potentially benefits from regulatory provisions that remove barriers to inter-jurisdictional mobility.

Over the past five years, 10.4% of engineers report having worked in the United States, while the proportion who report having worked in Mexico is only 1.1%. However, 12.8% report having worked in countries outside the NAFTA region. For technologists and technicians, the proportions are lower. Figure No. 14 summarizes these results.

Figure No. 14
Proportion of Engineers, Technologists and Technicians who Reported Having Worked Outside Canada in the Past Five Years



The inference from these findings is that ensuring international mobility for Canadian engineering and technology professionals is important, and that this importance extends well beyond the NAFTA region. These findings are consistent with results that are reported in a companion study of the role and importance of international work to Canada's consulting engineering sector.

Responsibilities:

Survey participants were asked to identify up to four of the most import aspects of their current work responsibilities. Twenty-four options were provided, plus 'none of these.' Fewer than 2% of respondents indicated that none of the options corresponded to their most important responsibilities. The 24 responsibilities have been grouped into seven clusters. Six of these are technical or closely related to technical functions, while the last – 'other business functions' – is essentially non-technical.

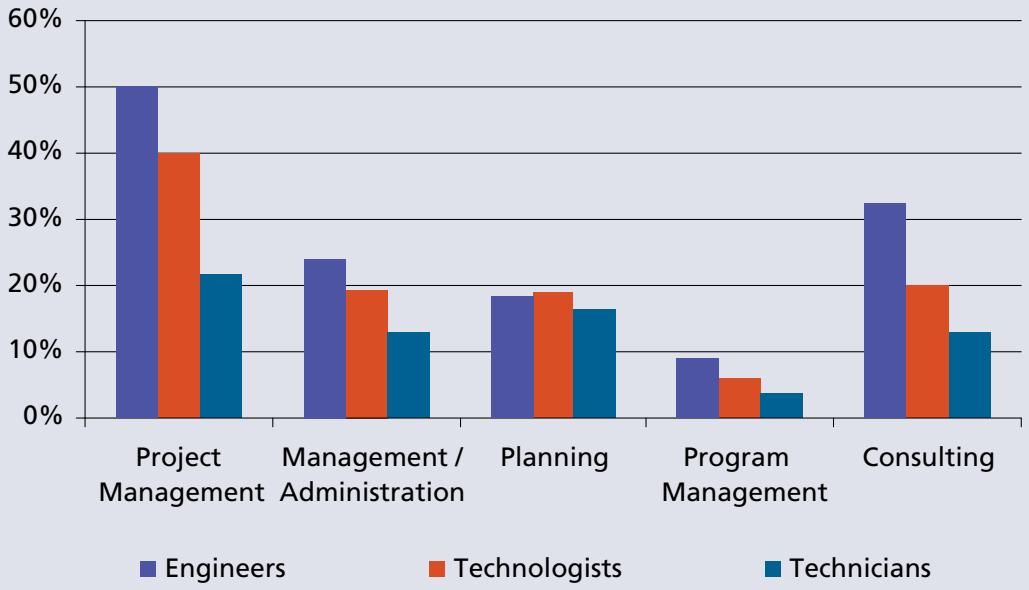
Figure No. 15
Work Responsibility Clusters

Consulting and Managements • Project Management • Management/Administration • Planning • Program Management • Consulting	Other Technical • Measurement and Analysis of Properties • Testing • Inspection • Installation / Maintenance • Exploration
Design and Research and Development • Design • Specification / Technical Writing • Research and Development	Technical Administration • Purchasing / Procurements / Contracts • Contract Administration
Production and Process Control • Operations / Production • Quality Assurance • Health and Safety	IT Related • Software Development • Computer Operations • Computer Systems Development
Other Business Functions • Accounts / Economics / Finance • Education / Training / Teaching • Marketing / Sales	

Consulting and Management Cluster:

Figure No. 16 shows the proportion of survey respondents that identified the five responsibilities in the Consulting and Management Cluster as among the four most important aspects of their current job. As can be seen from Figure No. 16, the Consulting and Management Cluster is important to all three occupations, but more so for engineers. Half of engineers identify 'project management' as one of their most important functions. For technologists and technicians, the proportions are 40% and 22%, respectively. *These findings underscore the importance of training and experience in 'project management' as a central non-technical skill that is applicable to a large proportion of practising professionals in engineering and technology jobs. Indeed, for engineers, 'project management' was the most frequently ranked function, exceeding even 'design.'*

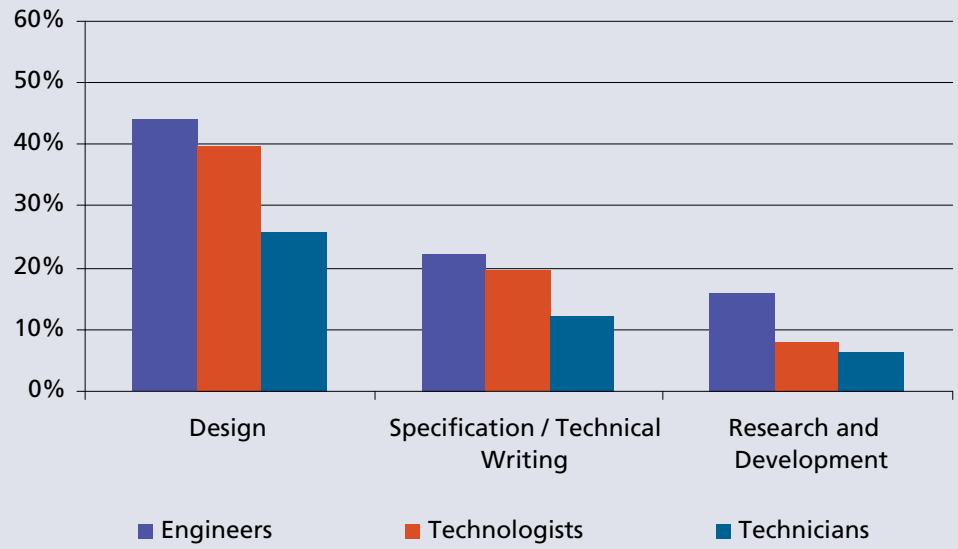
Figure No. 16
Consulting and Management Cluster
Percent of Respondents Identifying Functions as Among
the Four Most Important Aspects of their Current Work Responsibilities



Design and Research and Development Cluster:

Figure No. 17 shows responses for the three responsibilities in the Design and Research and Development Cluster. 'Design' functions rank high for both engineers (44%) and technologists (40%). *So significant is 'design,' that it may be regarded as the defining technical function of both engineers and technologists.* As would be expected, design functions are somewhat more important in the earlier stages of an engineering and technology career. For engineers and technologists, who are 35 years of age or younger, the proportions identifying 'design' as one of their four most important job responsibilities are 50% and 46% respectively. For those who are 55 or older, the proportion declines to 37% in both occupations.

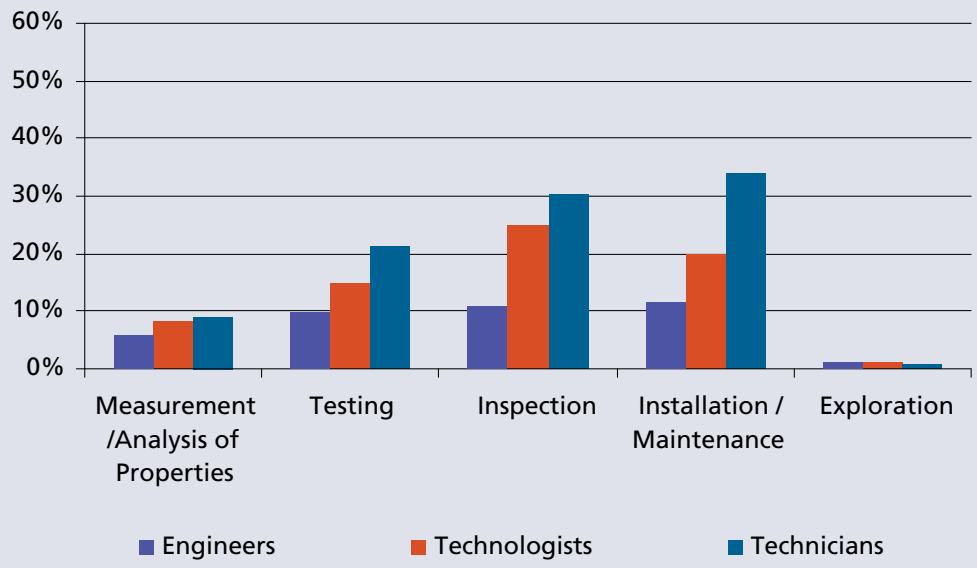
Figure No. 17
Design and Research and Development Cluster
Percent of Respondents Identifying Functions as Among
the Four Most Important Aspects of their Current Work Responsibilities



Other Technical Functions Cluster:

Figure No. 18 shows responses for five miscellaneous technical functions. *'Testing,' 'inspection,' and 'installation/maintenance' are notably more significant for technicians than for technologists.* As discussed in other reports, the occupational designations 'technologist' and 'technician' are not always used in a consistent manner across regions and industries. If terminology were more consistently used, it is possible that the differences between technicians and technologists would be even sharper than depicted in Figure No. 18. Although these functions are more strongly associated with technologists and technicians, *there are still around 10% of engineers who identify these functions as important job responsibilities.*

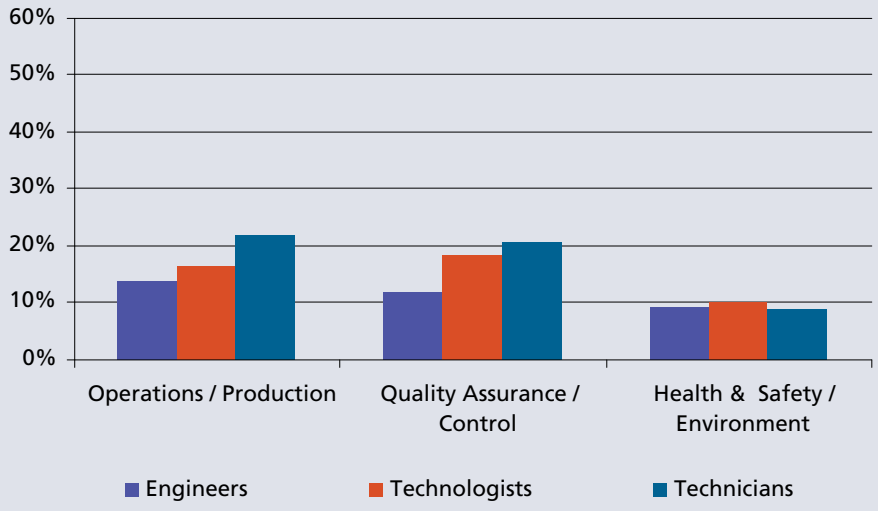
Figure No. 18
Other Technical Functions Cluster
Percent of Respondents Identifying Functions as Among the Four
Most Important Aspects of their Current Work Responsibilities



Production and Process Control Cluster:

Figure No. 19 shows responses for three functions related to production and process control, although one of these – 'health and safety' – extends beyond production and process management. In general, *these functions are of greater importance for technologists and technicians.* However, the survey results do not support suggestions that these functions have effectively migrated from engineers to technologists and technicians.

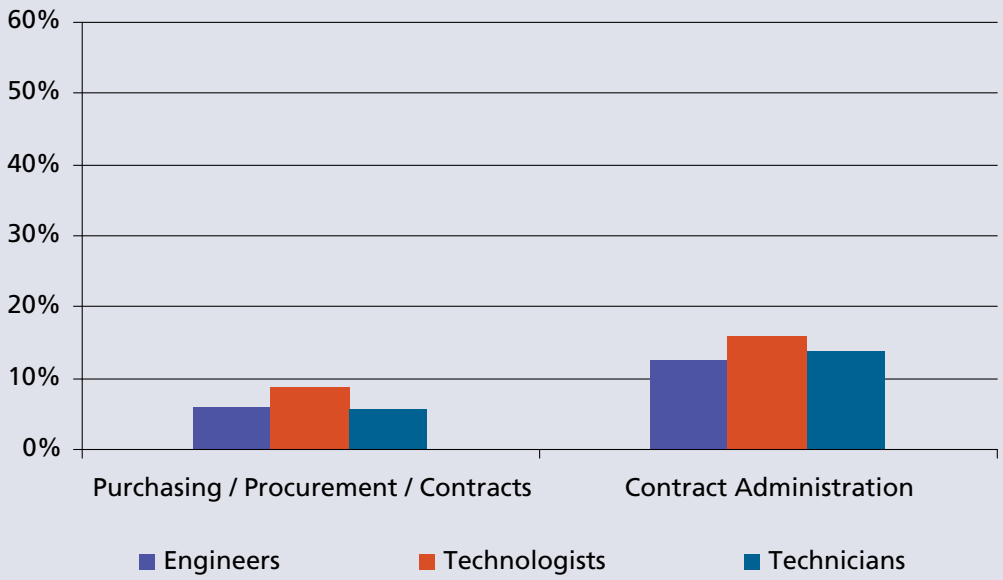
Figure No. 19
Production and Process Control Cluster
Percent of Respondents Identifying Functions as Among
the Four Most Important Aspects of their Current Work Responsibilities



Technical Administration Cluster:

Figure No. 20 shows responses for two technical administration functions - 'purchasing/ procurement/ contracts' and 'contract administration'. Purchasing functions are significant for only a small proportion of engineering and technology professionals. This is not surprising, since, in most organizations, purchasing is a specialized function and the role of an engineering or technology professional would be confined to preparing specifications. *'Contract administration', however, is a more important function in all three ETT occupations. In light of trends to outsource many business inputs, the importance of this function may increase.*

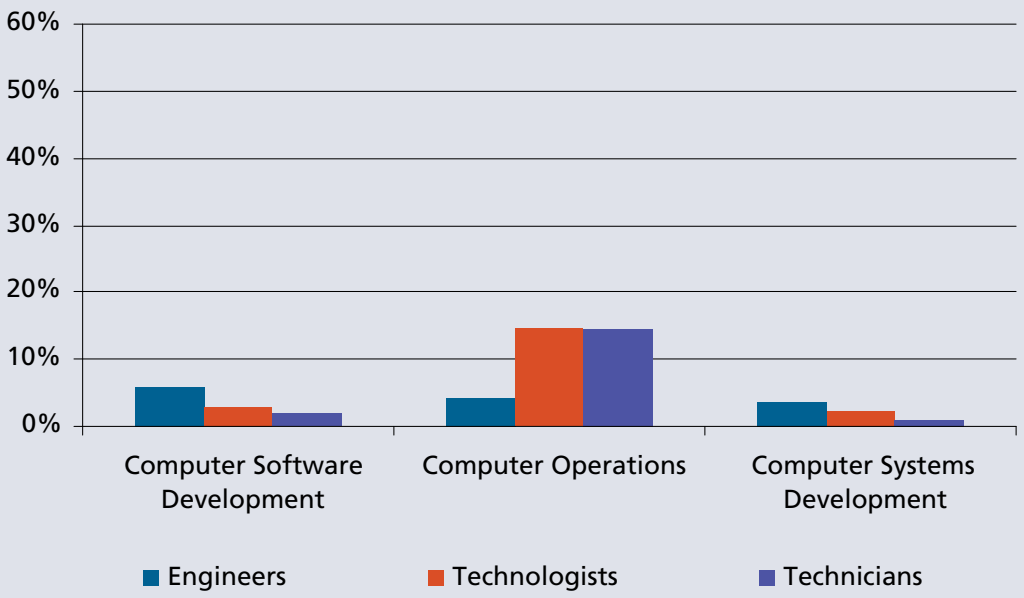
Figure No. 20
Production and Process Control Cluster
Percent of Respondents Identifying Functions as Among
the Four Most Important Aspects of their Current Work Responsibilities



IT-Related Cluster:

Figure No. 21 shows the importance of IT-related functions. Responsibility for *'computer operations' is evidently an important employment function for technologists and technicians*, with 15% in each occupation identifying this function as one of their four most important job responsibilities.

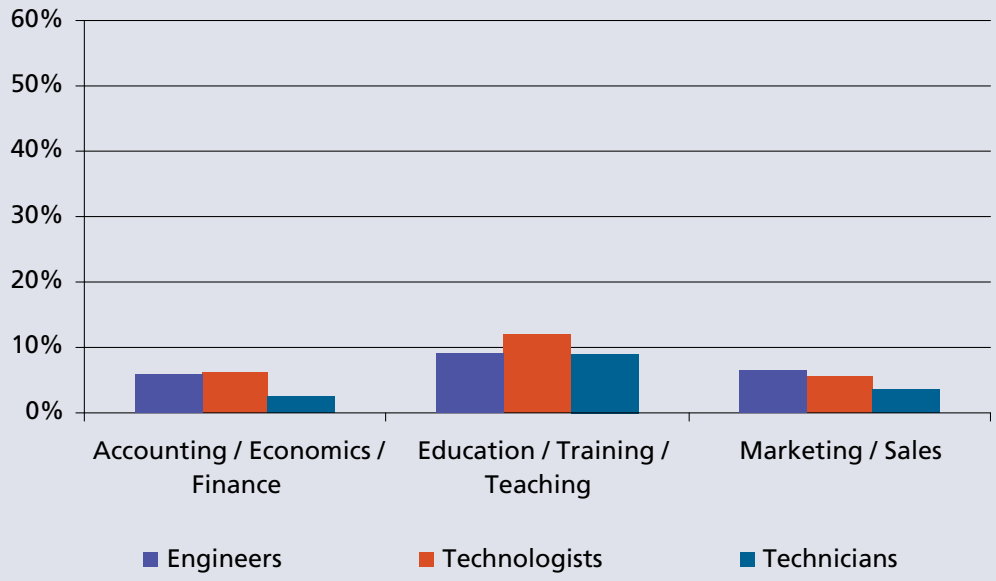
Figure No. 21
IT-Related Cluster
Percent of Respondents Identifying Functions as Among
the Four Most Important Aspects of their Current Work Responsibilities



Other Business Functions Cluster:

Figure No. 22 shows the responses for three job responsibilities that are essentially non-technical – accounting/economics/finance, education/training/teaching, and marketing/sales. While these are important job functions for around 5% of engineering and technology employees, *it is significant that the proportions are so low.* (The 'education/training/teaching' function would also capture survey respondents who are full-time technical instructors or who hold academic appointments). *The implication is that technical responsibilities – broadly defined – describe the responsibilities of the overwhelming majority of practising engineering and technology professionals and that their career progression and employment prospects reflect this.*

Figure No. 22
Other Business Functions Cluster
Percent of Respondents Identifying Functions as Among
the Four Most Important Aspects of their Current Work Responsibilities



Occupational Overlap:

The survey data also portray similar, although not identical, profiles for engineers and technologists. For the most part, responsibilities which are important in one occupation are also important in the other. Within these responsibilities, e.g., 'design,' there are undoubtedly differentiations that are not captured by the survey. Design functions cover a range of tasks, from the highly complex to the relatively straight forward. Different levels of science training are required for different types of design tasks. Nevertheless, the survey data underscore the potential for occupational overlap and are consistent with findings from both the *Engineering and Technology Employer Survey* and the study on *Changing Roles in Engineering and Technology*.

In a number of clusters, the survey data also shows considerable similarity between technologists and technicians. As noted earlier, there are inconsistencies in the way in which different jurisdictions and different industries use the terms technologist and technician. It is therefore unclear whether the statistical similarities between the two occupations reflect genuine commonalities or whether the apparent similarities arise from inconsistent use of the terms technologist and technician.

4. Licensure and Certification

Key Findings:

1. *There is a modest, but noteworthy, overlap between the system of licensure for professional engineers and the system of certification of technologists and technicians*. Survey data suggest that around 2% of licensed professional engineers also hold a technologist or technician certification. The survey data also suggest that there are a number of persons who are working as engineers, but whose professional certification is as a technologist or technician. This is consistent with Census data.

2. Barely half of certified technicians report that they are working as technicians.

3. *Employer policy is an important factor in both licensure and certification*.

4. *A large majority of engineering and technology employers have policies that support the systems of professional licensure and professional certification*, though many of these employers do not provide financial support for annual licensure or certification fees. Employer support for licensure of engineers is stronger than support for certification of technologists and technicians.

5. *Licensed engineers strongly associate their licence with professionalism, client expectations, better career options, increased employability, and increased earnings*. *Persons who are working as engineers, but who are not licensed, largely share these perceptions*, *although a significant number attach less importance to client expectations.*

6. *Among technologists and technicians, there is a similar association of certification with professionalism, client expectations, better career options, increased employability, and increased earnings*.

Engineers:

The survey data enable us to look at licensure from two perspectives. The first is licensure patterns among persons who describe their occupation as 'engineers'. The second perspective is to look at licensure patterns among persons who have an undergraduate degree in engineering.

Persons whose Occupation is Self-Described as 'Engineer':

Figure No. 23 shows, as would be expected, given the role of professional associations in promoting the survey, that the overwhelming majority (92%) of persons who are working as 'engineers' are licensed as professional engineers or enrolled with their professional association as Engineers-in-Training (EIT), or the equivalent. However, Figure No. 23 also shows that there is some degree of overlap with technologist/technician certifications. That is to say, about 2% of respondents are licensed as professional engineers and *also* hold a certification as a technician or technologist. Around 8% of respondents to this survey report that they are working as 'engineers', but are neither licensed as professional engineers nor enrolled as engineers-in-training (EIT). This may or may not indicate non-compliance. First, the self-description of the respondent's occupation as 'engineer' could be incorrect. Second, the self-description as an 'engineer' could be correct, but the work may fall outside the ambit of regulatory legislation.

Figure No. 23
Licensure and Certification Status of Survey Respondents who Describe their Occupation as 'Engineer'

Licensure / Certification Status	Percent
Engineering Licence or Enrolment as EIT	91.5%
Engineering Licence or Enrolment as EIT and Technician/Technologist Certification	2.1%
Technician/Technologist Certification Only	3.8%
No Licence or Certification	2.4%
	100.0%

Persons with an Undergraduate Degree in Engineering:

Figure No. 24 summarizes licensure rates (including enrolment as an EIT) for domestic engineering graduates and international graduates. As can be seen, in this survey, over 90% of Canadian engineering graduates also hold a professional licence or are enrolled as an EIT. For international graduates, the proportion is approximately 63%.

Figure No. 24
Licensure and Certification Status of Survey Respondents who have an Undergraduate Degree in Engineering

	Canadian Engineering Degree	International Engineering Degree
Engineering Licence or Enrolment as EIT	93.5%	63.2%
No Licence or Enrolment as EIT	6.5%	36.8%
	100.0%	100.0%

The survey results indicate that, 79.7% of those who are licensed as professional engineers or enrolled as EITS are employed as 'engineers,' while 1.6% are employed as technologists or technicians. Roughly 18.7% of those who hold an engineering designation, report that they are *not* employed in an engineering or technology occupation. In some instances, this would be a general management position or a teaching position.

Technologists and Technicians:

Persons whose Occupation is Self-Described as 'Technologist' or 'Technician':

In this survey, 73.9% of respondents who reported that they were working as 'technologists' held a technologist certification of some type. Among persons working as 'technicians,' 52.1% of respondents held a technician certification of some type. A further 16.6% reported holding a technologist certification. As noted in Chapter One, the channels through which the survey was promoted were primarily professional and technical associations. Hence, certified respondents are expected to dominate the sample. Figure No. 25 summarizes these data.

Figure No. 25
Certification Status of Survey Respondents
who Describe their Occupation as 'Technologist' or 'Technician'

	Working as:	
	Technologists	Technicians
Licensed as Engineers	2.3%	5.5%
Certified as Technologists	73.9%%	16.6%
Certified as Technicians	8.6%	52.1%
Not Certified	15.2%	25.8%
	100.0%	100.0%

Persons with a Technologist or Technician Certification:

Figure No. 26 shows the share of the various technologist and technician designations in the survey sample.

Figure No. 26
Share of Various Technologist and Technician Designations in Survey Sample

Working as Technologists*			Working as Technicians*	
AScT	25.6%		CET	15.7%
RET	3.1%		CTech	39.1%
RPT (Eng)	0.5%			
CCIT	0.1%			
CET	38.5%			
Ptech	3.3%			
TP	4.6%			
	100%			100%

*Some individuals may hold more than one certification.

Figure No. 27 shows the employment pattern of persons with a technologist or technician certification. As can be seen in Figure No. 27, the association between the 'technician' occupation and the 'technician certification' is comparatively weak. Only 37.3% of those survey respondents who are certified as technicians report that they are working as technicians. A sizeable minority (36.8%) report that they are working as technologists. In other studies, we reported that there is no consistency across regions or industries in how the terms 'technologist' and 'technician' are used. These survey results reinforce those findings and may call into question the long-term viability of a separate technician designation.

Figure No. 27

Occupation of Persons in Survey Sample who have a Certification as a Technologist or Technician

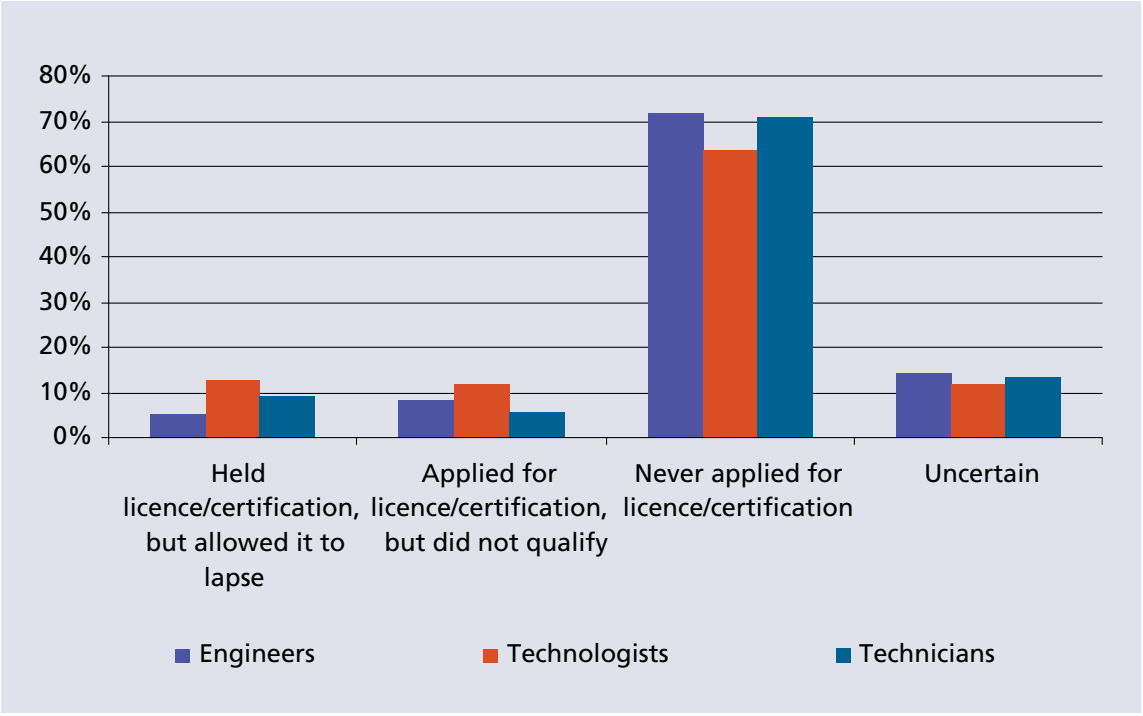
	Certified as a Technologist	Certified as a Technician
Employed as a Technologist	73.4%	36.8%
Employed as a Technician	3.1%	37.3%
Employed as an Engineer	8.8%	7.3%
Other Employment	14.6%	18.6%
	100%	100%

Persons who are Not Licensed/Certified:

Figure No. 28 shows that in this sample, the vast majority (68.4%) of persons without a licence or certification, report that they never made an application. Much smaller proportions either allowed a licence or certification to lapse or had their application rejected.

Figure No. 28

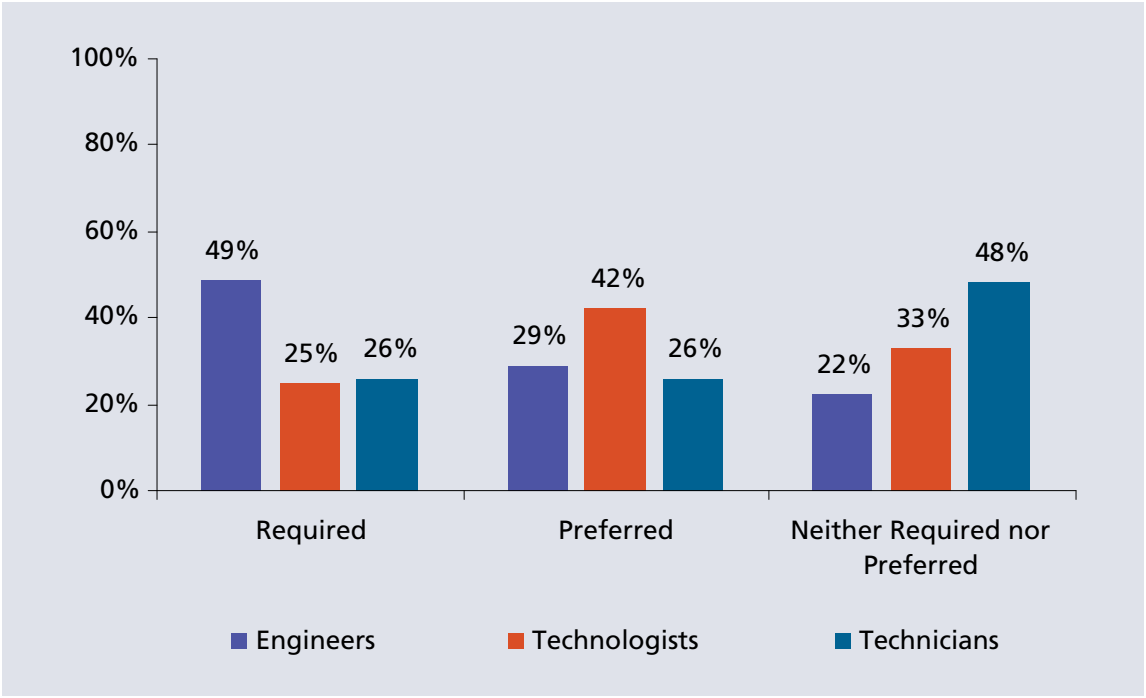
Reasons for Not Holding Licence or Certification



Employer Policy on Licensure and Certification:

Figure No. 29 shows how survey respondents understand their employers' policies on licensure and certification of engineering and technology professionals.

Figure No. 29
Survey Respondents' Understanding of Their Employer's Policy on Licensure and Certification



It is useful to compare these findings to the *Survey of Engineering and Technology Employers*. In making the comparison, however, four caveats should be borne in mind. First, approximately half of the respondents to the employer survey declined to answer questions on licensure and certification policy. Second, the employer survey results are not weighted by employer size, whereas the employee survey results are implicitly skewed towards employers with larger number of engineering and technology employees. Third, the employer survey sample was deliberately skewed to industries that have a larger share of engineers and technologists in their work force. This bias may be implicit in the employee survey, but no explicit attempt was made to skew the sample in this way. Fourth, the employee survey is biased to engineering and technology professionals who are licensed or certified, because the survey was promoted mainly through professional associations.

Figure No. 30
Comparing Survey Results on Employer Policy on Licensure and Certification
Survey of Engineering and Technology Employers
Survey of Engineers, Technologists and Technicians

	Engineers	Technologists	Technicians
Employee Survey			
Required	49%	25%	26%
Preferred	29%	42%	26%
Neither required nor preferred	22%	33%	48%
Employer Survey (including non-responses)			
Required	17%	8 %	6%
Preferred	20%	19%	13%
Require or prefer for some, but not all	11%	3%	2%
No policy	6%	16%	17%
No response	46%	54%	62%
Employer Survey (non-responses omitted)			
Required	31%	17%	16%
Preferred	37%	41%	34%
Require or prefer for some, but not all	20%	7%	5%
No policy	11%	35%	45%

Figure No. 30 shows that 22% of engineers who responded to the employee survey were employed by organizations that have *no* policy on licensure. By contrast, the employer survey suggests that only 6%-11% of engineering and technology employers have no policy. However, a further 11%-20% have a policy of requiring or preferring licensure for some engineers but not for others.

In the case of technologists, Figure No. 30 shows that 33% of technologists who responded to the employee survey were employed by organizations that have *no* policy on certification. The employer survey suggests that 16%-35% of employers have no policy. These findings are broadly consistent. In the case of technicians, 48% in the employee survey say that their employer has no policy. This compares with 17%-45% in the employer survey.

Among those persons who report that they are working as engineers and are not licensed (or enrolled as Engineers-in-Training or equivalent), approximately one-quarter have an application that is in process. The remainder are employed chiefly by employers whom the survey respondents describe as not having a policy that requires licensure.

Among survey respondents who are working as uncertified technologists, approximately half have an application in process. Among respondents working as uncertified technicians, only 5% have an application in process. Significantly, those respondents to the survey who are neither certified nor seeking certification predominantly are working for employers that do not have a policy on certification.

Perceived Advantages of Licensure and Certification:

Figure No. 31 shows how persons in engineering, technologist and technician occupations perceive the value of licensure or certification. The table distinguishes between those who hold a licence or certification and those who do not.

- As would be expected, those who are licensed or certified are more likely to associate licensure and certification positively with professional recognition, client expectations, career options, employability, and earnings. The difference is most evident with engineers.
- It is striking, however, that, in general, the differences in perception are not radically different between those who are licensed or certified and those who are not.
- The sharpest difference in perception is among persons working as engineers and their perception of clients' preferences or expectations: 71% of those who are licensed believe that licensure 'meets clients expectations or preferences' while, among those who are not licensed, the proportion is only 50%.

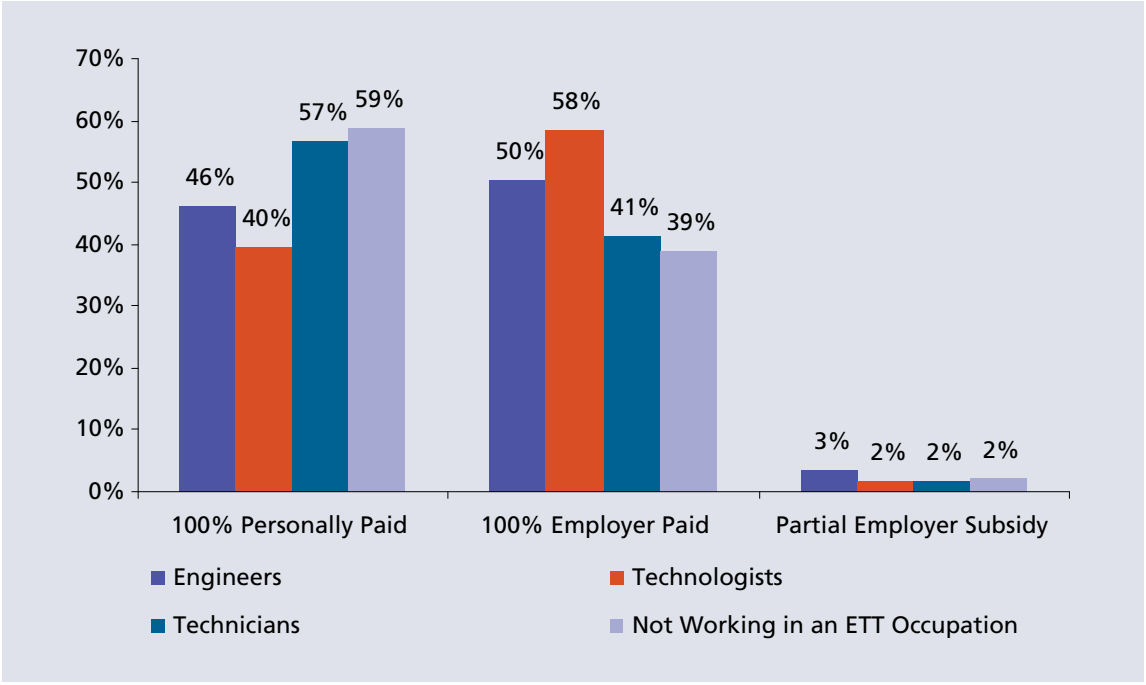
Figure No. 31
Percent of Respondents associating Licensure or Certification Positively
with Professional Recognition, Clients' Expectations, Career Options, Employability and Earnings

Percent agreeing that a Licence or Certification:	Not Licensed or Certified	Licensed or Certified
Provides Professional Recognition		
Engineers	80%	88%
Technologists	72%	85%
Technicians	75%	79%
Meets Clients' Expectations or Preferences		
Engineers	59%	70%
Technologists	53%	62%
Technicians	59%	61%
Broadens Career Options		
Engineers	77%	83%
Technologists	73%	77%
Technicians	78%	77%
Increases Employability		
Engineers	79%	87%
Technologists	75%	82%
Technicians	82%	78%
Leads to a Likely Increase in Earnings		
Engineers	64%	62%
Technologists	52%	56%
Technicians	57%	55%

Annual Cost of Licensure and Certification:

Figure No. 32 shows that 53% of engineers receive a partial or complete employer subsidy for the cost of their annual licensure fees. For technologists, the proportion is somewhat higher – 60%, while for technicians, the percent reporting employer support is somewhat lower – 43%. A full subsidy is the norm among employers providing support for licensure or certification costs. Among those professionals who are not working as engineers, technologists, or technicians, employer support for annual licensure or registration fees is still quite high – 41%.

Figure No. 32
Employer Financial Support for Annual Licensure or Certification Fees



The relationship between employer financial support for annual fees and employer policies on licensure and registration is not as straightforward as might be expected. For engineers, 49% of respondents report that their employers require licensure and 29% report that they prefer licensure. (See Figure No. 29.) However, only 54% of respondents report that their employers subsidize those fees. Similarly 67% of technologists and 52% of technicians report that their employers require or prefer certification; they report that 60% and 43% respectively subsidize annual fees.

5. Continuing Professional Development

Key Findings:

1. *Participation in Continuing Professional Development is exceedingly high among engineering and technology professionals:*

   - 17% of respondents are *currently* taking courses that will lead to further academic qualifications.
   - over the past three years, 84% of survey respondents report having taken Continuing Professional Development training over the past three years. The average amount of Continuing Professional Development training was around 4 days per year.

2. The majority of respondents took both technical and non-technical Continuing Professional Development training.

3. The most commonly taken non-technical Continuing Professional Development training was in *project management.* This confirms other research which has found that project management is a core function in many engineering and technology careers.

4. Only 11% of survey participants reported that their employers offered no support for their Continuing Professional Development training.

5. The overwhelming majority of survey participants (89%) reported that they found their Continuing Professional Development training useful.

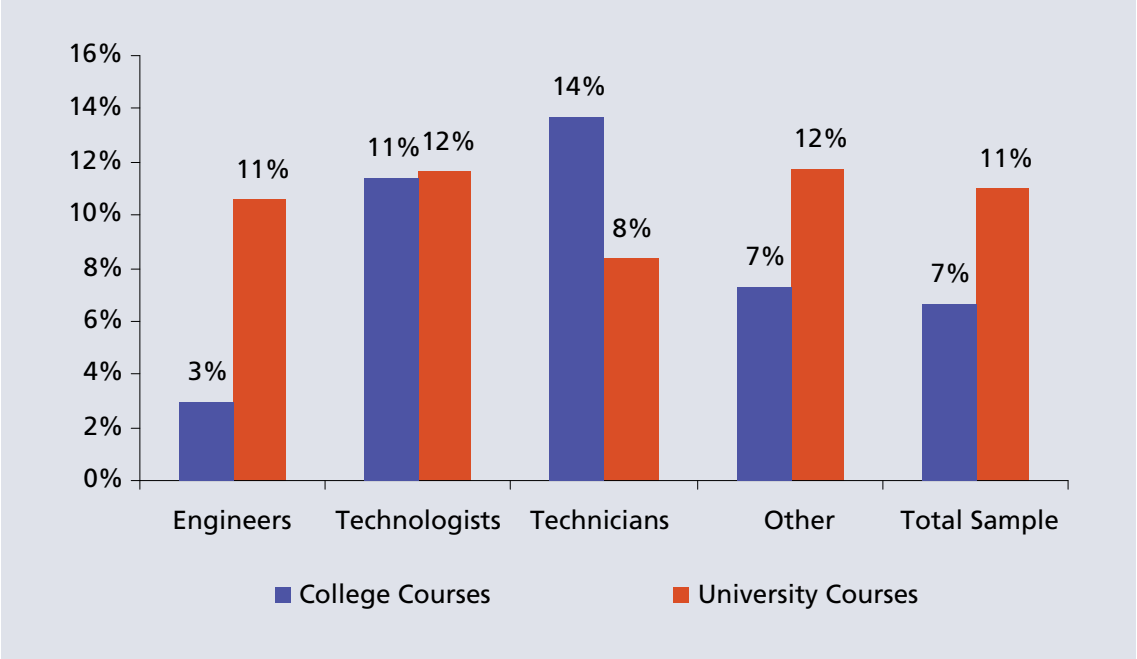
6. 67% reported that their Continuing Professional Development training was completely voluntary; 25% reported that the training was required by their employer. Compliance with professional association requirements was cited by 7% of engineers, 3% of technologists and 6% of technicians.

7. Overall, 34% of engineers, 22% of technologists, and 19% of technicians reported that they are members of technical associations.

Participation in Continuing Professional Development:

At the time of the survey, 17.4% of respondents reported that they were *currently* taking courses or doing research that will lead to further academic qualifications. This is an exceptionally high level of participation in formal Continuing Professional Development. Figure No. 33 summarizes these data. Engineers and persons employed outside of engineering and technology occupations (e.g., managers) were more likely to be taking university courses. For technologists, the balance was approximately even between university and college courses, while technicians were more likely to be taking college courses. The incidence of formal college or university studies was higher for technologists (23%) and technicians (22%), than for engineers (14%).

Figure No. 33
Percent of Survey Respondents Currently
taking Courses that lead to Further Academic Qualifications



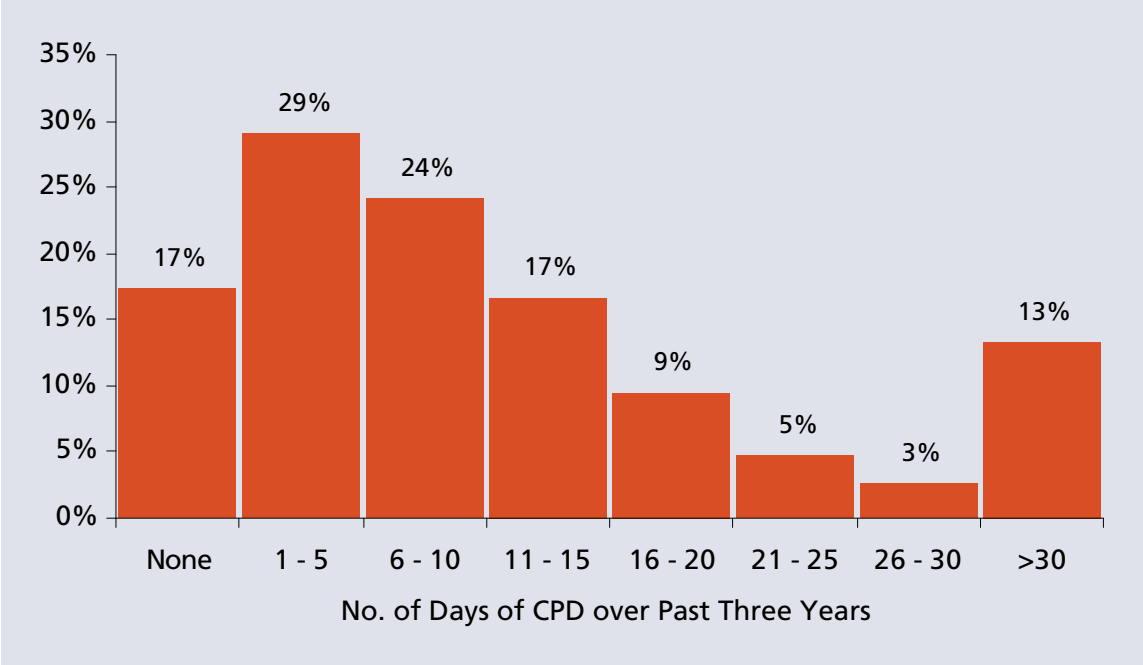
A current snapshot underestimates the importance of Continuing Professional Development in engineering and technology professions. Figure No. 34 shows the incidence of participation in Continuing Professional Development *over the past three years*. As can be seen, 84% of survey respondents reported having taken Continuing Professional Development training over the past three years. However, 9% of survey participants did not answer this question. It is possible that non-responders were also disproportionately non-participants in Continuing Professional Development. Thus, the actual proportion of the sample that did not take any Continuing Professional Development courses may have been higher than 16%. Even with this qualification, the overall level of participation in Continuing Professional Development is still high.

Figure No. 34
Percent of Survey Respondents
that took Continuing Professional Development Training
over the Past Three Years

	Percent
Engineers	87%
Technologists	88%
Technicians	80%
Other Occupations	78%
Total Sample	84%

There was little variation in the duration of Continuing Professional Development training across engineering and technology occupations. On average, over the past three years, survey participants report that they took around 11.7 days of Continuing Professional Development or approximately 4 days per year. In payroll terms, this equals approximately 2% of salary, if course time is paid. Figure No. 35 shows the distribution pattern of the amount Continuing Professional Development training received by survey participants over the last *three* years. (Note this is three-year total, not an annualized estimate).

Figure No. 35
Amount of Continuing Professional Development Training taken by Survey Respondents over the Past Three Years (Cumulative Total)



Fields of Study:

Technical training predominated in the Continuing Professional Development taken by engineering and technology professionals, but there was still significant participation in non-technical courses. Figure No. 36 shows the types of courses taken by survey participants:

Figure No. 36
Percent of Survey Respondents that took Technical and Non-Technical Continuing Professional Development Training over the Past Three Years

	Percent
Technical Courses Only	12.2%
Non-Technical Courses Only	9.9%
Technical and Non-Technical Courses	54.7%
No Courses	23.2%
Total	100.0%

Figure No. 37 shows the types of technical training that predominated. The high incidence of training in regulations and codes is noteworthy, especially from the perspective of licensing and certification bodies that are charged with maintaining high levels of technical competence.

Figure No. 37
Percent of Survey Respondents that took
Particular Types of Technical Continuing Professional
Development Training over the Past Three Years

Engineering or technology training, not related to a Supplier	37%
Regulations and codes	28%
Supplier-related engineering or technology training	27%
Engineering or technology software, including CAD	26%
Other technical training	25%
Quality control	14%
Asset management, preventive maintenance	12%

Figure No. 38 summarizes the types of non-technical training. It is noteworthy that 'project management' predominates. This confirms other research work that found that project management is a core function of a large proportion of engineering and technology professionals. The importance of 'teamwork' training is also noteworthy.

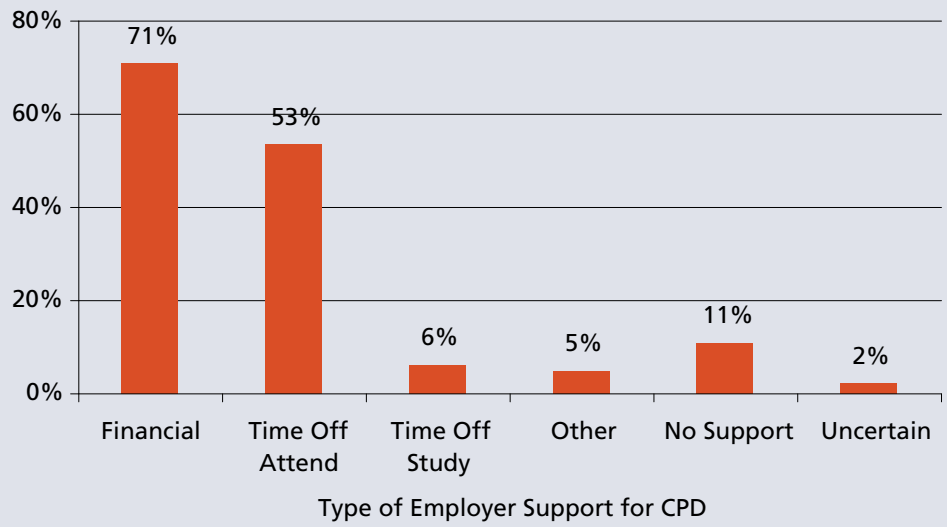
Figure No. 38
Percent of Survey Respondents that took
Particular Types of Non-Technical Continuing Professional
Development Training over the Past Three Years

Project management	27%
Teamwork	21%
Other non-technical training	16%
Personnel management	16%
Office software products, excluding engineering or technology software	16%
Problem-solving skills	13%
Negotiation skills	11%
Written communication	11%
Presentation skills	11%
Contract development and administration	11%
Oral communication	10%
Financial analysis	10%
Working with other non-technical people	8%
English or French language upgrade	8%
Cross-cultural Skills	6%
Additional language other than French or English	4%

Employer Support for Continuing Professional Development:

Figure No. 39 shows that only 11% of survey participants reported that their employers offered no support for the Continuing Professional Development training that they took over the past three years. Roughly 71% of employers provided financial support for tuition, books, travel, etc. A further 53% provided paid time off to attend courses.

Figure No. 39
Types of Employer Support for Continuing Professional Development



Reasons for Taking Continuing Professional Development:

The overwhelming majority of survey participants (89%) reported that they found their Continuing Professional Development training useful. Only 3% were negative about their training, while 8% were uncertain of its value. These proportions were virtually the same across all three engineering and technology occupations. Similarly two-thirds (67%) reported that the Continuing Professional Development training they took was completely voluntary. One quarter (25%) reported that the training was required by their employer. Compliance with professional association requirements was cited by 7% of engineers, 3% of technologists and 6% of technicians. Figure No. 40 shows differences across jurisdictions in the proportion of survey respondents who indicated that they took Continuing Professional Development training to comply with their professional association's requirements.

Figure No. 40
Percent of Survey Respondents who took Continuing Professional Development Training to Comply with Professional Association Requirements

	Engineers	Technologists	Technicians
Newfoundland & Labrador	15%	1%	0%
Nova Scotia	10%	0%	0%
Prince Edward Island	**20%**	0%	0%
New Brunswick	11%	1%	0%
Quebec	1%	3%	7%
Ontario	2%	3%	5%
Manitoba	13%	1%	3%
Saskatchewan	9%	3%	11%
Alberta	**21%**	2%	5%
British Columbia	13%	2%	2%
Yukon	6%	3%	**25%**

One fifth of survey respondents (21%) reported that they are taking more Continuing Professional Development now than they did in the previous 3-5 years; 31% reported that they were taking less Continuing Professional Development now. The remainder were uncertain or believed that their participation in Continuing Professional Development was unchanged compared to 3-5 years ago.

Technical Associations:

Overall, 29% of survey respondents indicated that they were members of technical associations, such as IEEE-Canada, the Canadian Society for Civil Engineers, Canadian Society for Mechanical Engineering, etc. As Figure No. 40 shows, membership rates are higher among engineers. Approximately half of survey respondents reported that their employer pays some or all of their annual membership fees for technical associations.

Figure No. 41
Percent of Survey Respondents who
are Members of Technical Associations

Engineers	34%
Technologists	22%
Technicians	19%
Other Occupations	27%
Total Sample	29%

6. International Engineering and Technology Graduates

This chapter first reports data on International Engineering Graduates and then on International Technology Graduates. International Engineering Graduates are persons who obtained a university degree in engineering outside Canada. International Technology Graduates are persons who obtained a college-level or equivalent qualification in technology outside Canada. Immigration of engineering and technology professionals has been strongly biased to university qualified persons. Consequently, in this survey, the sample of International Engineering Graduates is much larger and therefore permits a more detailed analysis.

Key Findings:

International Engineering Graduate:

1. 9.3% of International Engineering Graduates reported that they were either unemployed or working part-time, but seeking full-time employment. For domestic graduates, the proportion was 2.4%.

2. 55% of International Engineering Graduates cited lack of recognition of experience or qualifications, or lack of Canadian experience as their most important reason for not working in engineering or technology. However, 45% cited other reasons, suggesting that, while qualifications and experience factors are important, there are other obstacles to integration that cannot be discounted, including a lack of available work.

3. In general, International Engineering Graduates showed *stronger* support for the system of professional licensure than domestic engineering graduates.

4. Prior to immigrating to Canada, only 53% of International Engineering Graduates held either a voluntary or compulsory licence in another country. Of those who held a licence, 23% reported that it was helpful in securing a licence in Canada. Significantly, two-thirds of these individuals immigrated from 'Washington Accord' jurisdictions, suggesting that recognition of educational qualifications is a key barrier to professional integration.

5. There are no strong patterns in the country-of-origin of International Engineering Graduates. Only 9% of International Engineering Graduates immigrated from 'Washington Accord' jurisdictions. This implies that for over 90% of International Engineering Graduates, there are complex qualification reviews involved in assessing their eligibility for licensure.

International Technology Graduates:

1. 9.2% of International Technology Graduates reported that they were either unemployed or working part-time, but seeking full-time employment. For Domestic Technology Graduates, the proportion was 2.2%.

2. Only 43% of International Technology Graduates cited lack of recognition of experience or qualifications, or lack of Canadian experience as their most important reason for not working in engineering or technology. This is lower than for International Engineering Graduates.

3. In general, International Technology Graduates showed *significantly* weaker support for the system of professional certification than domestic technology graduates. This contrasts sharply with International Engineering Graduates and should be of concern to professional associations in the technology field.

4. Consistent with the lower support for professional certification, International Technology Graduates were also notably *less* likely to take up certification than domestic graduates, although this conclusion may be affected by sampling biases.

Profile of International Engineering Graduates in the Sample:

In this survey, 1,610 respondents reported that they received their professional degree in engineering outside Canada. This is 10.3% of the sample. Owing to the survey's reliance on professional associations, the sample is biased towards those International Engineering Graduates who are employed in engineering and technology and who have obtained or are in the process of obtaining a Canadian professional qualification.

Overall, 89% of International Engineering Graduates in the sample were male. For domestic engineering graduates, the proportion of males in the sample was 83%. Among domestic graduates the average age was 42.1. Among International Engineering Graduates, the average age was 46.4.

Approximately 52% of International Engineering Graduates in the sample reported that they studied engineering in English, while 7% reported French as their language of instruction.

The regional distribution of International Engineering Graduates was skewed to Ontario, although this is consistent with the Census.

Figure No. 42
Provincial / Territorial Distribution of
International Engineering Graduates in Survey

Province / Territory	Percent
Newfoundland & Labrador	0.5%
Prince Edward Island	0.0%
Nova Scotia	0.6%
New Brunswick	0.7%
Quebec	13.0%
Ontario	54.4%
Manitoba	3.0%
Saskatchewan	1.3%
Alberta	11.41%
British Columbia	13.2%
Yukon Territory/Northwest Territories/Nunavut	0.3%
	100.0%

It is noteworthy that *a significantly greater proportion of International Engineering Graduates reported an unfavourable employment situation*. In the survey, only 2.4% of domestic engineering graduates reported that they are either unemployed or working part-time, but seeking full-time employment. For International Engineering Graduates, the proportion was 9.3%. Similarly, 88% of domestic graduates reported that they were working in engineering or technology, compared to 74% of International Engineering Graduates.

Among those International Engineering Graduates who are *not* working in engineering or technology, the most important reasons cited for working outside engineering or technology pertained to lack of Canadian experience (24%), lack of recognition of prior experience (17%)

and lack of recognition of academic qualifications (14%). These findings confirm other research, though they paint a more complex picture than is sometimes presented. Fully 45% of International Engineering Graduates who are not working in technology cited other reasons for their situation, including an absence of employment opportunities.

Figure No. 43
Most Important Reason for not Working in Engineering or Technology
(International Engineering Graduates in Survey)

Do not wish to work in engineering/technology field	6%
Not currently available for work	5%
Lack of Canadian experience	24%
Lack of recognition of my academic qualifications	14%
Lack of recognition of my previous professional experience	17%
Language difficulties	5%
Lack of employment opportunities	13%
Other	16%
	100%

International Technology Graduates in this survey generally had more experience prior to immigrating to Canada than International Engineering Graduates. The average International Technology Graduate in this survey had 8.6 years of experience whereas the average International Engineering Graduate had 6.5 years of experience.

Approximately 60% of International Engineering Graduates in the survey reported that they obtained their first Canadian job in engineering or technology within six months of arriving. On the other hand, 25% required 1 year or more to find an engineering or technology job.

Figure No. 44
Time Required for International Engineering Graduates to Secure Their First Canadian Job in Engineering or Technology

Time Required	Percent
Hired Immediately	13.1%
<6 Months	46.8%
6-12 Months	14.4%
1-2 Years	11.7%
More than 2 Years	14.1%
Total	100.0%

Figure No. 45 compares the current self-described occupation of domestic graduates and International Engineering Graduates. As can be seen, just under two-thirds of International Engineering Graduates in the sample were employed as engineers, compared to somewhat more than four-fifths of domestic engineering graduates. Subject to the sampling bias noted earlier (which may be extremely important), these data indicate a significant degree of integration into the Canadian labour market, especially when it is noted that 23% of International Engineering Graduates in the sample have been in Canada for five years or less.

Figure No. 45
Self-Described Occupation
of Domestic Engineering Graduates and
International Engineering Graduates in Survey

Occupation	IEGs	Domestic Graduates
Engineer	63.2%	81.8%
Technologist	10.9%	1.2%
Technician	5.9%	0.4%
Other	20.0%	16.6%
Total	100.0%	100.0%

A significant proportion of both domestic engineering graduates and International Engineering Graduates reported that they are currently working in a managerial position, though the proportion was higher among domestic graduates. Among domestic graduates, 46% reported that their current job is managerial; among International Engineering Graduates, the proportion was 33%. In both groups, 'engineering (i.e., technical) management' predominated.

Figure No. 46 shows the rate of licensure and certification among International Engineering Graduates in the survey sample. As can be seen, 78% of respondents report that they have some type of professional qualification. Almost two-thirds of this sample (64%) reported holding an engineering qualification. Subject to the sampling bias (which may be extremely important), these data indicate a significant degree of integration into the profession among survey respondents.

Figure No. 46
Licensure or Certification Status of
International Engineering Graduates in Survey

Occupation	Percent
P. Eng. / ing.	52%
EIT	11%
Restricted, Provisional, etc.	1%
Technologist / Technician	14%
No Engineering Licence of any type	22%
Total	100%

In general, *International Engineering Graduates showed stronger support for the system of professional licensure than domestic engineering graduations*. Figure No. 47 compares attributes associated with professional licensure.

Figure No. 47
Significance of Licensure

	International Engineering Graduates	Domestic Graduates
Provides professional recognition	86%	80%
Meets clients' expectations or preferences	69%	59%
Broadens career options	81%	73%
Increases employability	82%	77%
Leads to a likely increase in earnings	63%	52%

Prior to immigrating to Canada, 53% of International Engineering Graduates in the survey report that they held either a voluntary or compulsory licence in another country. Of those who held a licence, 23% reported that it was helpful in securing a licence in Canada. Overall, only 9% of International Engineering Graduates immigrated from 'Washington Accord' jurisdictions which provide mutual recognition to educational qualifications in engineering. Significantly, two-thirds of the individuals who immigrated from 'Washington Accord' jurisdictions reported that holding a licence in their country of origin was helpful in qualifying for a Canadian licence. This suggests that recognition of educational qualifications may be a more significant barrier than recognition of non-Canadian engineering experience.

There is no strong pattern in country-of-origin among International Engineering Graduates. In the sample, 86 different countries-of-origin were reported. India accounted for the largest share, but represented only 12% of the sample.

There was little difference in the pattern of Continuing Professional Development training of International Engineering Graduates and domestic engineering graduates. International Engineering Graduates, as might be expected, were more likely to take English or French language upgrade training and somewhat more likely to take 'written communications' training. Otherwise the patterns of Continuing Professional Development training were virtually the same.

Profile of International Technology Graduates in the Sample:

In this survey, 756 respondents reported that they received a college qualification in technology outside Canada. However, 16% of these individuals also obtained a college qualification in Canada.

Men accounted for 93% of International Technology Graduates in the sample. Their average age was 48.5. Approximately 67% completed their non-Canadian technology studies in English, while 9% completed their studies in French.

The regional distribution of International Technology Graduates was skewed to Ontario, but somewhat less so than for International Engineering Graduates.

Figure No. 48
Provincial / Territorial Distribution of
International Technology Graduates in Survey

Province / Territory	Percent
Newfoundland & Labrador	0.4%
Nova Scotia	0.9%
Prince Edward Island	0.0%
New Brunswick	0.5%
Quebec	13.1%
Ontario	49.7%
Manitoba	3.4%
Saskatchewan	1.8%
Alberta	12.2%
British Columbia	17.9%
Yukon Territory/Northwest Territories/Nunavut	1.1%
	100.0%

A significantly greater proportion of International Technology Graduates reported an unfavourable employment situation. In the survey, 9.2% of International Technology Graduates reported that they are either unemployed or working part-time, but seeking full-time employment. For domestic technology graduates, the proportion was 2.2%. Similarly, 90% of domestic graduates reported that they were working in engineering or technology, compared to 77% of International Technology Graduates.

Among those International Technology Graduates who are *not* working in engineering or technology, the most important reasons cited for working outside engineering or technology pertained to lack of Canadian experience (17%), lack of recognition of prior experience (15%) and lack of recognition of academic qualifications (11%). These findings are broadly similar to those for International Engineering Graduates. Fifty-seven percent of International Technology Graduates who are not working in technology cited other reasons for their situation, compared to 45% of International Engineering Graduates.

International Technology Graduates in this survey generally had more experience prior to immigrating to Canada than International Engineering Graduates. The average International Technology Graduate in this survey had 8.6 years of experience whereas the average International Engineering Graduate had 6.5 years of experience.

Approximately 65% of International Technology Graduates in the survey reported that they obtained their first Canadian job in engineering or technology within six months of arriving. On the other hand, 24% required 1 year or more to find an engineering or technology job. This pattern is similar to the first job experience of International Engineering Graduates.

Figure No. 49
Time Required for International Technology Graduates to Secure Their First Canadian Job in Engineering or Technology

Time Required	Percent
Hired Immediately	14%
<6 Months	51%
6-12 Months	12%
1-2 Years	11%

Figure No. 50 compares the current self-described occupation of domestic graduates and International Engineering Graduates. As can be seen, the largest proportion (38%) of International Technology Graduates describe their current occupation as 'engineers'. This may over-state the proportion of International Technology Graduates working as 'engineers'. Some respondents may be mis-describing their jobs. On the other hand, some may be in engineering jobs that are exempt from licensure requirements under 'industrial exemption' provisions or other provisions.

Subject to the sampling bias noted earlier (which may be extremely important), these data also indicate a significant degree of integration into the Canadian labour market.

Figure No. 50
Self-Described Occupation
International Technology Graduates

Occupation	International Technology Graduates
Engineer	38%
Technologist	27%
Technician	11%
Other	24%
Total	100%

The proportion of respondents that identified their job as managerial was similar: 37% for International Technology Graduates and 41% for Domestic Technology Graduates.

Figure No. 51 shows that *International Technology Graduates were less likely in this sample to take up certification than domestic technology graduates*. This may reflect sampling bias.

Figure No. 51
Proportion of Technology Graduates in Sample who Hold a Certification as a Technologist or Technician

	International Technology Graduates	Domestic Graduates
Technologist Certification	33%	48%
Technician Certification	18%	11%
No Certification	49%	41%
	100%	100%

Figure No. 52 shows that International Technology Graduates generally attach approximately the same value to certification as the Domestic Technology Graduates in the survey sample.

Figure No. 52
Significance of Licensure

	International Technology Graduates		Domestic Technology Graduates	
	Technologist Certification	Technician Certification	Technologist Certification	Technician Certification
Provides professional recognition	75%	65%	80%	66%
Meets clients' expectations or preferences	61%	52%	58%	50%
Broadens career options	74%	64%	74%	65%
Increases employability	76%	69%	78%	67%
Leads to a likely increase in earnings	59%	49%	53%	47%

Appendix A: Survey of Engineers and Engineering Technologists and Technicians

Survey of Engineers and
Engineering Technicians and Technologists

A Joint Undertaking of
Engineers Canada
and
Canadian Council of Technicians and Technologists

With financial support from
Human Resources and Social Development Canada

Thank you for participating in this survey. The survey takes approximately 20 minutes to complete.

The survey is jointly sponsored by Engineers Canada (www.engineerscanada.ca) and the Canadian Council of Technicians and Technologists (www.cctt.ca).

At various points in the survey, should you wish, you can save your answers and return to complete the survey at a later time. To use the "Save and Resume" option, enter a user name of your choice here (you may use any characters) _____and a password of your choice here (you may use any characters) _____. If you wish to use the "Save and Resume" option, simply click the "Save & Quit" button at the bottom of the survey page. When you return, enter your name and password here at the start page. You will automatically be taken to where you left off.

Proceed to the Survey

Engineering Labour Force Survey

A Survey of Engineers and Engineering Technicians and Technologists

sponsored by
Engineers Canada
and
Canadian Council of Technicians and Technologists

No individuals will be identifiable through this survey.

Only consolidated results will be published.

No individual responses will be released.

Themes

A. Education and Background

B. Career and Employment

C. Licensure and Certification

D. Continuing Professional Development

E. Special Section for Internationally Trained Professionals

A. Education and Background

1. Please indicate how many years of academic training you had, following completion of high school:

____ years

2. Academic Qualifications:

(a) Please indicate which of the following academic qualifications you hold and where you obtained them.

Please check all that apply. If your qualification is other than one of the indicated qualifications, please check the one that, in your opinion, is the closest. (Press the 'Ctrl' key to select multiple options.)

	In Canada	Outside Canada
Trade Qualification		
Certificate of Qualification in a Trade		
Other		
College Qualification		
One Year Certificate or Diploma		
Two Years Certificate or Diploma		
Three Years Certificate or Diploma		
Four Year Certificate or Diploma		
Associate Degree		
University		
Bachelor's Degree in Engineering or Applied Science		
Bachelor's Degree in Science or Technology		
Master's Degree in Engineering or Applied Science		
Master's Degree in Science or Technology		
Master's Degree in Business Administration (MBA)		
PhD in Engineering or Applied Science		
Law Degree		
Other		

(b) Please indicate in what discipline(s) or technical field(s) you obtained your academic qualification(s).

Please select the field(s) that is/are closest to the field(s) in which you obtained your professional qualification(s).

Program	
Aerospace / Aeronautical	
Agricultural / Bio-resource	
Architectural / Building / Structural	
Bio-Science / Biological / Bio-Medical / Bio-Chemical Engineering	
Chemical	
Civil	
Electrical	
Electronics	
Engineering Science / Engineering Physics	
Environmental	

Food	
Forestry	
Geological and Related	
Industrial / Manufacturing	
Information Technology / Computer / Software	
Instrumentation / Control Systems	
Marine / Naval	
Materials	
Mechanical	
Metallurgical	
Mineral Resources / Mining	
Nuclear	
Petroleum and Gas	
Renewable Resources and Forestry	
Space	
Systems	
Survey / Geomatics	
Wood	

3. In what year were you born: 19____

4. Approximately when to you expect to or plan to retire: 20__

5. What is your gender:

Male	
Female	

6. In what province or territory are you currently residing ?

Newfoundland and Labrador	
Nova Scotia	
P.E.I.	
New Brunswick	
Quebec	
Ontario	
Manitoba	
Saskatchewan	
Alberta	
British Columbia	
Yukon	
North-West Territories	
Nunavut	

B. Career and Employment

7. Are you currently:

Employed Full-Time	
Employed Part-Time, but seeking Full-time	
Employed Part-Time and not seeking Full-time	
Self-Employed	
Retired	
On leave from employment (disability, parental, studying, work break)	
Unemployed, but seeking employment	

8. Are you currently working in engineering or technology?

Yes	
No	
Don't Know	
Not Applicable	

9. If you are employed, how would you describe your current job:

Engineer / Engineer-in-training / Engineer Intern	
Technologist / Technologist-in-Training	
Technician / Technician-in-Training	
None of the Above	

10. If you are *not* currently working in engineering or technology, what do you consider the most important reasons?

	Check All the Apply	Check the Single Most Important
Do not wish to work in an engineering or technology field		
Not currently available for work		
Lack of Canadian experience		
Lack of recognition of my academic qualifications		
Lack of recognition of my previous professional experience		
Language difficulties		
Lack of employment opportunities		
Other		

11. In total, how many years have you worked in engineering or technology?

_____ years

12. If you are currently working in engineering or technology? Which field best describes your current work?

Aerospace engineering
Chemical engineering

Civil engineering
Computer engineering
Electrical and electronics engineering
Environmental engineering
Geological engineering
Geomatics/surveying
Geoscience
Manufacturing/industrial engineering
Mechanical engineering
Metallurgical and materials engineering
Mining engineering
Petroleum engineering
Biosystems engineering
Other engineering specialties
Non-engineering occupations
Teaching
Other occupations
Don't know/No answer

Aerospace Engineering

In the previous question, you indicated that your current field of occupation is Aerospace Engineering. Please select the option that best describes your specific area of work:

Avionics
Mechanical systems
Space systems
Aerodynamics/flight test engineering
Propulsion
Structures
Teaching
Engineering management
Other

If you selected "other", please specify:

Chemical Engineering

In the previous question, you indicated that your current field of occupation is Chemical Engineering. Please select the option that best describes your specific area of work:

Chemical/biochemical
Advanced materials & polymers
Process design or control
Environmental
Teaching
Engineering management
Other

Civil Engineering

In the previous question, you indicated that your current field of occupation is Civil Engineering. Please select the option that best describes your specific area of work:

Construction
Environmental
Geotechnical
Structural
Transportation
Geomatics
Municipal/urban
Water resources
Survey
Teaching
Engineering management
Other

Computer Engineering

In the previous question, you indicated that your current field of occupation is Computer Engineering. Please select the option that best describes your specific area of work:

Hardware design/architecture
Software design
System integration
Information systems/data processing
Teaching
Engineering management
Other

Electrical & Electronics Engineering

In the previous question, you indicated that your current field of occupation is Electrical and Electronics Engineering. Please select the option that best describes your specific area of work:

Electrical
Control systems
Telecommunication
Electronics
Environmental
Power generation/transmission/distribution
Teaching
Engineering management
Other

Environmental Engineering

In the previous question, you indicated that your current field of occupation is Environmental Engineering. Please select the option that best describes your specific area of work:

Teaching
Engineering management
Other

Geological Engineering

In the previous question, you indicated that your current field of occupation is Geological Engineering. Please select the option that best describes your specific area of work:

Geophysics
Geology
Mining/rock mechanics
Geotechnical
Geochemistry
Hydrogeology
Teaching
Engineering management
Other

Geomatics/Surveying

In the previous question, you indicated that your current field of occupation is Geomatics/Surveying. Please select the option that best describes your specific area of work:

Teaching
Engineering management
Other

Geoscience

In the previous question, you indicated that your current field of occupation is Geoscience. Please select the option that best describes your specific area of work:

Teaching
Engineering management
Other

Manufacturing/Industrial Engineering

In the previous question, you indicated that your current field of occupation is Manufacturing/ Industrial Engineering. Please select the option that best describes your specific area of work:

Industrial
Production systems
Quality assurance/quality control/safety
Manufacturing processes
Teaching
Engineering management
Other

Mechanical Engineering

In the previous question, you indicated that your current field of occupation is Mechanical Engineering. Please select the option that best describes your specific area of work:

Mechanical systems
Solid mechanics/materials/stress analysis
Thermodynamics/fluids
Controls/robotics
Heating/ventilation/air conditioning
Environmental
Teaching
Engineering management
Other

Metallurgical and Materials Engineering

In the previous question, you indicated that your current field of occupation is Metallurgical and Materials Engineering. Please select the option that best describes your specific area of work:

Metallurgy
Mineral processing
Materials
Teaching
Engineering management
Other

Mining Engineering

In the previous question, you indicated that your current field of occupation is Mining Engineering. Please select the option that best describes your specific area of work:

Mining
Mineral processing
Exploration
Teaching
Engineering management
Other

Petroleum Engineering

In the previous question, you indicated that your current field of occupation is Petroleum Engineering. Please select the option that best describes your specific area of work:

Operations
Refinery
Exploration
Teaching
Engineering management
Other

Biosystems Engineering

In the previous question, you indicated that your current field of occupation is Biosystems Engineering. Please select the option that best describes your specific area of work:

Agricultural
Fisheries/aquaculture
Biotechnology
Forestry
Food processing
Teaching
Engineering management
Other

Other Engineering Specialties

In the previous question, you indicated that your current field of occupation is Other Engineering Specialities. Please select the option that best describes your specific area of work:

Biomedical engineering
Naval architecture/marine engineering
Engineering physics/science/math
Nuclear
Teaching
Engineer management
Other

Non-Engineering Occupations

In the previous question, you indicated that your current field of occupation is Non-Engineering Occupations. Please select the option that best describes your specific area of work:

Geophysics
Geology
Geochemistry
Hydrogeology
Teaching
Engineering management
Other

Other Occupations

In the previous question, you indicated that your current field of occupation is Other. Please specify:

13. What are the functions that account for at least 25% of your current work responsibilities? Check up to 4 categories. Please use the category or categories that correspond most closely to your current employment.

Accounting / Economics / Finance	
Computer Operations	
Computer Software Development	
Computer Systems Development	

Consulting	
Contract Administration	
Design	
Education / Training / Teaching	
Exploration	
Health & Safety / Environment	
Inspection	
Installation / Maintenance	
Management / Administration	
Marketing / Sales	
Measurement /Analysis of Physical, Chemical, Biological or Electrical Properties	
Operations / Production	
Planning	
Program Management	
Project Management	
Purchasing / Procurement / Contracts	
Quality Assurance / Control	
Research and Development	
Specification / Technical Writing	
Testing	
None of these	

14. Which of these categories most closely represents the industry of your current employment. Please check one only.

Agriculture	
Forestry	
Fishing	
Mining	
Oil and Gas	
Utilities	
Construction	
Manufacturing	
Wholesale or Retail Trade	
Transportation and Warehousing	
Finance, Insurance, Real Estate and Leasing	
Consulting – Professional, Scientific, Engineering and Technical Services	
Management of Companies and Administrative and Other Support Services	
Education	
Health Care and Social Assistance	
Information	
Culture and Recreation	

Accommodation and Food Services	
Other Services	
Government (Public Administration)	
Military	
Other	

15. Where did you do your engineering or technology work in the past 12 months? (Check all that apply.)

Newfoundland and Labrador	
Nova Scotia	
P.E.I.	
New Brunswick	
Quebec	
Ontario	
Manitoba	
Saskatchewan	
Alberta	
British Columbia	
Yukon	
North-West Territories	
Nunavut	
USA	
Mexico	
Outside Canada, other than USA or Mexico	
Not Applicable	

16. Where did you do engineering or technology work in the 5 years before this year? (Check all that apply.)

Newfoundland and Labrador	
Nova Scotia	
P.E.I.	
New Brunswick	
Quebec	
Ontario	
Manitoba	
Saskatchewan	
Alberta	
British Columbia	
Yukon	
North-West Territories	
Nunavut	

United States	
Mexico	
Outside Canada, other than USA or Mexico	
Not Applicable	

C. Licensure and Certification

17. Which of the following Canadian professional certifications or licenses do you hold?

Engineering	
P.Eng. / Ing / Eng.	
Engineer in Training / Engineer Intern / Junior Engineer	
Limited, temporary, restricted, or provisional licence	
Engineering Technologist	
AScT	
RET	
RPT (Eng.)	
CCIT	
CET	
PTech	
TP	
Engineering Technician	
CTech	
CET	
Other, None	
None of the above licenses or certifications	
Uncertain	

18. Please indicate your licensure or certification status. Select Engineer, Technologist or Technician, as appropriate to your academic qualifications.

	Hold a Current Licence or Certification	Application for Licence or Certification is in Process	Held a Licence or Certification, but Allowed it to Lapse	Applied for a Licence or Certification, but Did Not Qualify	Never Applied for a Licence or Certification	Uncertain	Not Applicable
Engineer							
Technologist							
Technician							

19. Please indicate what career significance you attach to licensure or registration as a Professional Engineer or certification as a Technician or Technologist. Please respond to the questions in the column that is relevant to your academic qualifications.

	Engineer	Technician	Technologists
	Licensure or Registration as a Professional Engineer	Certification as a Technician	Certification as a Technologist
Required by my employer	Yes No Uncertain		
Preferred by my employer			
Provides professional recognition			
Meets clients' expectations or preferences			
Broadens Career Options			
Increases Employability			
Leads to a likely increase in earnings			

20. Who pays your annual registration or membership fees to your provincial or territorial professional association?

All fees, etc. are paid personally by me, without subsidy	
My employer reimburses me 100% for my membership fees	
My employer partially reimburses me for my membership fees	
Uncertain	
Not Applicable	

D. Continuing Professional Development Training

21. Are you currently taking courses or doing research that will lead to a further academic qualification?

College courses	
University courses or related research	
Not Applicable	

22. In the past three years, approximately how many days of professional development training did you take where a day consists of approximately 7-8 hours of classroom or seminar training?

None	
1 to 5 days	
6 to 10 days	
11 to 15 days	
16 to 20 days	
21 to 25 days	

26 to 30 days	
More than 30 days	

23. Did your employer support any of the continuing professional development training that you took in the past three years (check any that apply):

Financially (tuition, books, travel, etc,)	
Paid time off for attendance	
Paid time off for study	
Other	
Did not support	
Uncertain	
Not Applicable	

24. In what field did you take professional development training (check any that apply).

	Employer Supported	No Employer Support
Engineering or Technology Training		
Engineering or technology training, not related to a Supplier		
Supplier-related engineering or technology training		
Engineering or technology software, including CAD		
Quality control		
Regulations and codes		
Asset management, preventive maintenance		
Other technical training		
Non-Technical Training		
English or French language upgrade		
Additional language other than French or English		
Office software products, excluding engineering or technology software		
Contract development and administration		
Financial analysis		
Teamwork		
Working with other non-technical people		
Written communication		
Oral communication		
Problem-solving skills		
Project management		
Personnel management		
Negotiation skills		
Presentation skills		
Cross-cultural Skills		
Other non-technical training		

Uncertain		
Not Applicable		

25. Compared to the last 3-5 years, are you doing more or less continuing professional development training?

More	
Less	
About the Same	
Uncertain	
Not Applicable	

26. Was the continuing professional education or professional development training you took in the past three years voluntary or compulsory?

Completely voluntary	
Required by my employer	
Required by my professional association	
Uncertain	
Not Applicable	

27. Has your continuing professional development training been useful to you?

Yes
No
Uncertain
Not Applicable

28. Are you a member of a technical association, such IEEE-Canada, Canadian Society for Civil Engineers, Canadian Society for Chemical Engineers, Canadian Society for Mechanical Engineering, etc?

Yes	
No	
Uncertain	
Not Applicable	

29. If you are a member of a technical association, who pays your annual membership fees?

All fees, etc. are paid personally by me, without subsidy	
My employer reimburses me 100% for my membership fees	
My employer partially reimburses me for my membership fees	
Uncertain	
Not Applicable	

E. Special Section for Internationally Trained Professionals

This section of the survey is ONLY for persons who received their first professional certificate, diploma or degree outside Canada.

30. When did you immigrate to Canada: _____

31. In what country did you obtain your non-Canadian academic qualification in engineering or technology?

32. Before immigrating to Canada, did you hold a non-Canadian professional license or certification as an engineer, technician or technologist, in addition to your academic qualification?

33. Before immigrating to Canada, how long were you employed as an engineer, technician or technologist?

	I held a Compulsory Professional License	I held a Voluntary Professional Certification
Yes		
No		
Don't Know		
Not Applicable		

As an engineer	____ years
As a technician	____ years
As a technologist	____ years

34. What was the most recent year that you worked as an engineer, technologist or technician before immigrating to Canada?

35. In what language did you do your academic studies in engineering or technology?

English	
French	
Other	

36. Please indicate the type of work you are doing in relation to your academic training:

	Trained as an Engineer	Trained as a Technician	Trained as a Technologist
Working as an Engineer			
Working as a Technician			
Working as a Technologist			
Not working in Engineering or Technology			

37. If you are NOT currently working in an engineering or technology field, what do you consider the most important reasons?

	Check All the Apply	Check the Single Most Important
Do not wish to work in an engineering or technology field		
Not currently available for work		
Lack of Canadian experience		
Lack of recognition of my educational qualifications		
Lack of recognition of my previous professional experience		
Language difficulties		
Lack of employment opportunities		
Other		

Thank you.

Appendix B:
Members of Steering Committee

Kim Allen
Professional Engineers Ontario

Jean Luc Archambault
Order des Technologues Professionels du Quebec

Michelle Branigan
Electricity Sector Council

David Chalcroft
Association of Professional Engineers, Geologists and Geophysicists of Alberta

Samantha Colasante
Engineers Canada

Manjeet Dhiman
ACCES Employment Services

Brian George
Northwest Territories and Nunavut Association of Professional Engineers, Geoscientists

Stephen Gould
Canadian Council of Technicians and Technologists

Kevin Hodgins
Northwest Territories and Nunavut Association of Professional Engineers, Geoscientists

Cheryl Jensen
Mohawk College

Ellie Khaksar
Diversity Integration and Retention Services Inc.

Lise Lauzon
Réseau des ingénieurs du Québec

Edward Leslie
New Brunswick Society of Certified Engineering Technicians and Technologists

Andrew McLeod
Engineers and Geoscientists New Brunswick

Perry Nelson
The Association of Science and Engineering Technology Professionals of Alberta

Robert Okabe
City of Winnipeg

D'Arcy Phillips
Manitoba Aerospace

Pat Quinn
Professional Engineers Ontario

Colette Rivet
BioTalent Canada

Tom Roemer
Camosun College

Kyle Ruttan
Canadian Federation of Engineering Students

Deborah Shaman
Human Resources and Skills Development Canada

Len Shrimpton
Association of Professional Engineers, Geologists and Geophysicists of Alberta

Andrew Steeves
ADI Ltd.

Al Stewart
Royal Military College of Canada

Richard Tachuk
Electric Strategies Inc.

Jean-Pierre Trudeau
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Gina van den Burg
Ontario Society of Professional Engineers

Deborah Wolfe
Engineers Canada

Bruce Wornell
Engineers Nova Scotia

Yaroslav Zajac
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