ONTARIO SOCIETY OF PROFESSIONAL ENGINEERS

Women in Engineering Advisory Committee

Professional Engineers Ontario

CWSE-ON

engineerscanada

Results of the 2010 Survey of Working Conditions for Engineers

Ontario Society of Professional Engineers: Women in Engineering Advisory Committee

PRISM ECONOMICS AND ANALYSIS

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TABLE OF CONTENTS

1: Introduction and Methodology

What are the obstacles to achieving greater diversity and greater equality of opportunity in the engineering profession? How prevalent is the perception of discrimination in engineering workplaces? How prevalent is the perception of bullying? Is there a 'career price' to be paid for taking leave? Should employers' policies on licensure concern professional associations? These and other questions motivated the *2010 Survey of Working Conditions for Engineers.* The findings point to several areas where the engineering profession will need to formulate new policies or develop new initiatives.

The *2010 Survey* was sponsored by:

- the Ontario Society of Professional Engineers (OSPE) through its Women in Engineering Advisory Committee (WEAC),
- Engineers Canada,
- Professional Engineers Ontario (PEO), and
- the Natural Science and Engineering Research Council / Research in Motion Chair for Women in Science and Engineering in Ontario (CWSE-ON).

More than a decade ago, Professional Engineers Ontario established the Women in Engineering Advisory Committee (WEAC) to identify ways of encouraging the full participation of women in engineering. Since then, WEAC has conducted research and studies the barriers facing women in engineering, both at universities and in the workplace. Today, WEAC participates in events and initiatives of wide-ranging interest to Ontario engineers, with the particular goal of developing a more balanced and inclusive engineering profession. In the spring of 2003, WEAC moved from PEO to OSPE.[1]

The *2010 Survey*, which is summarized in this report, follows an earlier survey that was undertaken in 1994. The results of the 1994 survey added significant momentum to wide-ranging policy reviews in the profession. These reviews led to important policy changes in the profession, including, for example, amendments to professional codes of ethics that categorized sexual harassment as an unprofessional act and various initiatives to encourage more women to enter engineering.

The *2010 Survey* revisited some of the themes addressed in the 1994 survey, but also explored important new topics. These included:

- the labour market experiences of international engineering graduates,
- the role of mentoring in the profession,
- the likelihood of continuing to work in engineering,
- the effects of the 'unwritten rules' of the workplace on the engineering careers of men and women,
- the availability, use and career impact of various types of leave, and

[1] Additional information on WEAC is available at www.ospe.on.ca/weac.html

- perceived experiences of discrimination.

Part 14 of this report compares some of the salient findings of the *1994 Survey* with the *2010 Survey*.

Methodology and Sample Characteristics

The *2010 Survey of Working Conditions for Engineers* was a web-based survey. The survey was administered between May and November of 2010. An email contact was sent to members of the participating professional associations by their association. This email contact explained the purpose of the survey and directed the members to the survey web-site. Some associations sent out more than one email contact requesting participation in the survey.

The survey was administered in both French and English. Participation in the survey was open to any persons who reported that they had a bachelor's degree in engineering or were otherwise qualified as a Professional Engineer (P.Eng./ing.). Additional questions in the survey inquired about licensure status and the nature of the respondents' employment. Virtually all survey respondents (98.8%) were either licensed professional engineers, engineers-in-training, holders of restricted licences, or persons with applications for licensure that were pending.

Valid Sample

A total of 2,849 persons participated in the survey. Of these the valid sample was 2,846 responses. Figure No. 1 summarizes total survey responses and the valid sample.

Figure No. 1
Survey Responses and Valid Sample
N=2849

Characteristics of Respondents	Number
Persons with an undergraduate degree in engineering	2,840
Persons without an undergraduate degree in engineering, but reporting a P.Eng /ing. licence	1
Persons not indicating whether they have an undergraduate degree in engineering, but reporting a P.Eng /ing. licence	5
Valid Sample	2,846
Responses deemed invalid, *i.e.*, respondent reported neither an undergraduate degree in engineering nor a P.Eng /ing. licence	3
Total Survey Response	2,849

Survey Completion

The survey was comparatively lengthy, requiring approximately 20-30 minutes to complete. An indicator of completion is the number of respondents who answered the questions in the last section of the survey. The answer rate to these questions indicates that approximately 88% of respondents completed, or substantially completed the survey. For some questions, however, completion rates were significantly lower. Tables in this report indicate the number of respondents on which the table is based (N=).

Gender

Men accounted for 73.3% of the valid sample; women represented 26.7%.

Regional Representation in Sample

Participation in the survey was skewed to Ontario (66.2%), Saskatchewan (14.2%) and Quebec (9.6%). Figure No. 2 summarizes the regional distribution of responses.

Figure No. 2
Regional Distribution of Respondents
N=2278

Province	Percent of Respondents
Newfoundland and Labrador	0.1%
Nova Scotia	0.4%
Prince Edward Island	0.2%
New Brunswick	0.2%
Quebec	9.6%
Ontario	66.2%
Manitoba	0.8%
Saskatchewan	14.2%
Alberta	4.8%
British Columbia	1.3%
Yukon Territory	0.8%
Northwest Territories	1.4%
Nunavut	0.1%
Total	100.0%

Age Distribution of Sample

The detailed age distribution of the respondents is summarized in Figure No. 3. It should be noted that the age distribution of the women who responded to the survey differed from that of the men in ways which affect the interpretation of some of the results. Approximately 51.2% of women who responded to the survey were under 35 years of age. For men, the comparable proportion was only 27.4%. Conversely, 38.7% of men in the survey were between 41 and 55

years of age, while 30.4% of women respondents belonged to this age group. The response rate for women over 56 years of age was quite small (2.1%), while 21.6% of men who responded were over 56 years of age.

Figure No. 3
Age and Gender Distribution of Respondents
N=2437

Age Group	Men	Women
Under 25	4.8%	8.1%
26-30	12.4%	23.2%
31-35	10.2%	19.9%
36-40	12.3%	16.2%
41-45	12.1%	12.5%
46-50	13.6%	9.8%
51-55	13.1%	8.1%
56-60	10.8%	1.8%
61-65	5.6%	0.3%
Over 65	5.2%	0.0%
Total	100%	100%

Employer Size:

Figure No. 4 shows that almost two-thirds (65.3%) of survey respondents who were working or were recently working, were employed by large companies or organizations, if their employer's total employment is used as the measure. If employment only at the work site is the measure, 45.9% were employed at locations where 100 or fewer persons worked.

Figure No. 4
Distribution of Respondents by Employer Size
N=2437

No. of Employees	Location	Company/ Organization
1-25	20.7%	10.8%
26-50	11.3%	5.0%
51-100	13.9%	4.0%
101-500	31.0%	14.9%
>501	23.2%	65.3%
Total	100.1%	100.0%

International Engineering Graduates

One respondent in six (16.6%) identified themselves as an international engineering graduate. That is to say, these participants in the survey obtained their professional degree outside of

Canada. This is a significant sample. As a result, this report provides new insight into the career and occupational patterns of international engineering graduates. Figure No. 5 shows that almost half of the international engineering graduates in the survey sample immigrated to Canada after 2000. Figure No. 5 also shows that only a minority of these international engineering graduates held a professional licence or certification prior to immigrating to Canada.

Figure No. 5
Year of Immigration to Canada of International Engineering Graduates
N=462

Decade of Immigration to Canada	Percent of Total Number of International Engineering Graduates in Survey Sample	Percent of Decennial Cohort who had a Non-Canadian Licence Prior to Immigrating
Prior to 1960	0.9%	0.0%
1960 – 1969	3.2%	7.1%
1970 – 1979	9.1%	29.2%
1980 – 1989	14.1%	33.9%
1990 – 1999	25.5%	35.0%
2000 – 2010	**47.2%**	**30.5%**
Total	100.0%	-

Only 18.7% of respondents to the survey who earned their professional degree outside of Canada were women. By comparison, 28.3% of Canadian engineering graduates in the survey were women.

Reliability of Findings

Conventional measures of survey reliability are predicated on a strictly random sample. To achieve strict randomness requires that the surveying body randomly select respondents from the universe of persons to be surveyed. Had strict randomness applied to survey participation, the survey's findings would be reliable approximately +/- 2.5%, 19 times out of 20. Strict randomness, of course, was not applied when administering this survey. Rather, the *2010 Survey*, like its predecessor, was a traditional membership survey in which all members were invited to participate. While no deliberate biases were introduced into the returns to this survey, the survey sample does reflect certain biases which readers should bear in mind. As noted above, the sample is strongly skewed to Ontario and Saskatchewan. The participation rate of women was moderately higher than the participation rate of men. There may also have been self-selection factors influencing participation, based on the survey's themes. Notwithstanding these limitations, the *2010 Survey* is a significant sampling of engineers and should be interpreted as a credible indication of trends in engineering workplaces.

Report Structure

This introduction is followed by:

- Part 2: Membership in Professional and Technical Associations
- Part 3: Licensure
- Part 4: Continuing Professional Development
- Part 5: Employment Patterns
- Part 6: Education
- Part 7: Finding an Engineering Job
- Part 8: Mentorship
- Part 9: Career Satisfaction
- Part 10: Career Implications of Family and Personal Obligations
- Part 11: Discrimination
- Part 12: Workplace Culture
- Part 13: Addressing Gender Imbalances
- Part 14: Comparison of *2010 Survey* with *1994 Survey*
- Part 15: Conclusions and Implications

- Appendix – 2010 Survey of Working Conditions for Engineers

2: Membership in Professional and Technical Associations

Not surprisingly, in light of the survey's distribution through professional associations, virtually all respondents (98.8%) indicated that they were members of a provincial or territorial professional association/ordre with responsibilities for professional licensure, that is to say they were either licensed, engineers-in-training, or had an application for licensure pending.

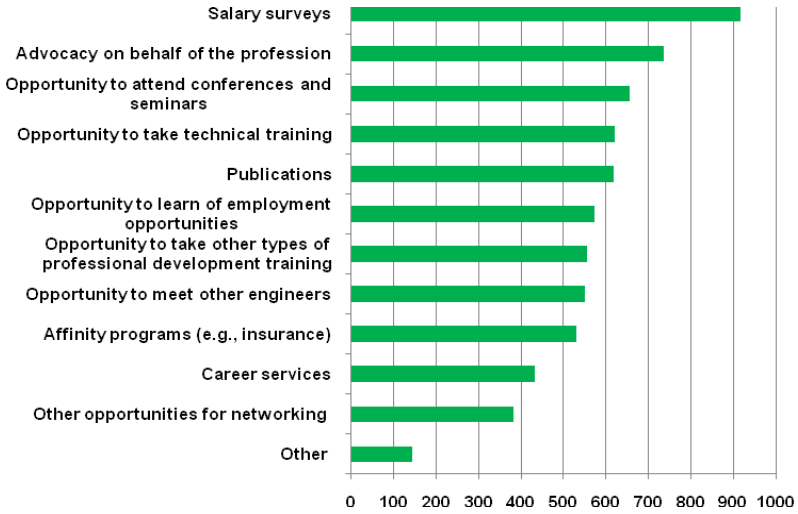
The majority of respondents to this survey (61.7%) also reported that they belonged to one or more technical associations. Of those who belonged to a technical association, more than half (53.3%) indicated that they belonged to more than one technical association.

> *"Publishing of the OPSE salary surveys is important to give women the support required to stand up to employers and demand more fair wages."*
>
> Survey Response

> *"Provincial associations need to work together across the country to raise awareness of Engineering and the importance of it."*
>
> Survey Response

Respondents were also asked to identify the most valuable benefits of membership in the Ontario Society of Professional Engineers (OSPE), Réseau des ingénieurs du Québec (RIQ), or a technical. Approximately 60% of survey participants answered this question, which is consistent with the proportion of survey respondents who are members of a technical association. Multiple answers were permitted. The leading benefits identified by respondents were: (1) salary surveys, (2) advocacy on behalf of the profession, (3) opportunity to attend conferences and seminars, (4) opportunity to take technical training at a reasonable cost, and (5) publications. The full range of benefits and evaluation of their importance is summarized in Figure No. 6.

Figure No. 6
Benefits of Membership in OSPE, RIQ, or Technical Associations: Number of Respondents Identifying a Particular Benefit (Multiple Answers Permitted) N=1690[2]



[2] In this table, N refers to the number of persons who identified at least one of the benefits.

In open-ended questions, survey participants remarked on a number of areas in which they would welcome improvements or value additional benefits. These included:

- More technical training,
- More support for mentoring programs,
- Publicizing success stories of members of minority groups,
- Advocacy for more family-friendly membership policies,
- More assistance to internationally educated engineering professionals to obtain licensure in Canada,
- More collaboration among the provincial associations to ensure that there is a unified voice for the profession,
- Advocating and promoting a working environment that allows for more work-life balance.

> *"… I'd like to see much better work-life balance. In the past few years many engineering departments are so under-staffed and over-worked that it is almost impossible to meet the high standards expected. To their own detriment employers are not receiving the quality of work they or their customers should be receiving because of an unrelenting focus on cutting, cutting, and cutting some more. The PEO should be monitoring this and acting aggressively to counteract it."*
>
> Survey Response

3: Licensure

In every province and territory in Canada, the practice of engineering is statutorily regulated. The regulated 'scope of practice' is similar across provinces and territories, though not identical. Every statute requires that a licensed engineer perform or take responsibility for all engineering work undertaken by an organization. Some jurisdictions, though not all, also require engineering firms to hold a certificate of authorization.

Until recently, Ontario's statute provided for an 'industrial exception'. The 'industrial exception' waived the requirement for a licensed engineer to perform or supervise engineering work pertaining to non-structural machinery and equipment "for use in the facilities of the person's employer in the production of products by the person's employer". Although this exception was narrowly constructed, some employers may have imputed a broader exception than was intended by the *Act*. In any event, the 'industrial exception' has since been removed from the *Act*, pending proclamation of amendments. Given the large proportion of respondents to the *2010 Survey* who are resident in Ontario (66.2%), it is important to bear in mind that some of the survey responses reflected this unique situation in Ontario.

It may also be useful to consider the responses to this survey in light of other surveys on licensure and certification, notably the study on trends in licensure and certification prepared for the Engineering and Technology Labour Market Study.[3]

Figure No. 7 summarizes the Canadian licensure status of survey respondents.

Figure No. 7
Licensure Status of Survey Respondents
N=2834

Canadian Licensure Status	Number	Percent
P.Eng/Ing	2,310	81.5%
Engineers-in-Training/Interns	436	15.4%
Licensure application pending or in process	45	1.6%
Restricted Licence	7	0.2%
Lapsed Licence	6	0.2%
Refused Licence or Abandoned Application	1	<0.1%
Never licensed / Never Applied	29	1.0%
Total	2,834	100.0%

Not surprisingly, 89.3% of survey respondents who were Engineers-in-Training were under the age of 35.

[3] For more information see the *Engineering and Technology Labour Market Study: Trends in Licensure and Certification*. Prepared by Prism Economics and Analysis for Engineers Canada and the Canadian Council of Technicians and Technologists. Available at: http://etlms.engineerscanada.ca/media/54879Trends%20in%20Licensure%20and%20Certification.pdf .

The majority of survey respondents with a P.Eng/ing obtained their licence soon after acquiring their undergraduate degree. *Over half the sample (approximately 53.7%) obtained their licence within three years of completing their undergraduate degree*. Another 31.4% obtained their licence 4-6 years after completing their undergraduate degree, while 9.0% obtained their licence 7-9 years after completing their undergraduate degree. Only 5.9% obtained their licence over 10 years after completing their undergraduate degree.

The survey revealed what may be regarded as a low incidence of employer support for compulsory licensure. Figure No. 8 shows the proportion of respondents by province or territory of current residence who indicated that *any* of their Canadian employers have required a professional licence for their job. It should be noted that some respondents may have been referring to employers in provinces or territories other than their province or territory of current residence. (In Figure No. 8, where sample sizes were too small, results were not reported).

Figure No. 8
Respondents indicating whether *Any* of their Employers required a Professional Licence
N=2454

Province	Sample	Percent
Newfoundland and Labrador	2	sample too small
Nova Scotia	9	sample too small
Prince Edward Island	6	sample too small
New Brunswick	5	sample too small
Quebec	235	61%
Ontario	1,626	50%
Manitoba	19	sample too small
Saskatchewan	351	54%
Alberta	118	58%
British Columbia	30	sample too small
Yukon Territory	19	sample too small
Northwest Territories	32	sample too small
Nunavut	2	sample too small
Total	2,454	**53%**

The policy profile of respondents' *current* employers is summarized in Figure No. 9.

Figure No. 9

Respondents Characterization of Current Employers' Policies on Professional Licensure
N=2447

Province	Requires P.Eng.	Requires eligibility for P. Eng.	Prefers P. Eng., but does not require	No requirement or preference	Don't know	Not working in an engineering job	Total
Alberta	38.7%	17.6%	21.0%	15.1%	2.5%	5.0%	100.0%
Saskatchewan	35.9%	25.6%	23.9%	10.9%	0.9%	2.9%	100.0%
Ontario	**29.8%**	9.2%	28.6%	**23.4%**	1.7%	7.3%	100.0%
Quebec	40.8%	11.3%	16.4%	16.8%	3.4%	11.3%	100.0%
British Columbia	Sample too small						
Manitoba							
New Brunswick							
Newfoundland and Labrador							
Prince Edward Island							
Nova Scotia							
Nunavut							
Northwest Territories							
Yukon Territory							

For those jurisdictions for which there is a sufficient sample, *the survey findings should be of concern to the profession*:

- In Quebec, only 40.8% of respondents report that their current employer requires a professional licence, though 11.3% indicate that their employer requires eligibility for a licence and 16.4% report that their employer prefers an individual in such a job to be licensed.

> *"…get rid of the industrial exemption for engineers in Ontario. The logic for this escapes me…"*
>
> Survey Response

- In Ontario, only 29.8% of respondents work for employers that require a licence, while 9.2% are employed by organizations that require eligibility for licensure, but not a licence *per se*. A further 28.6% prefer, but do not require licensure.

> *"All the enforcements published in the Gazette have to do with Construction and the Public Sector. Nothing on private industry, consumer electronics…."*
>
> Survey Response

- In Saskatchewan and Alberta, 35.9% and 38.7% respectively require licensure and a further 25.6% and 17.6% respectively require eligibility for licensure. A preference, but not a requirement, is reported by 23.9% in Saskatchewan and 21.0% in Alberta.

Employer policies towards licensure varied considerably depending on the industry of the survey respondents. The manufacturing industry accounts for 26% of engineering employment in

Canada. However, in this survey, *the manufacturing industry was among the least likely industries to require a licence*. This may reflect the greater concentration of this industry in Ontario and the province's history of an 'industrial exemption' to compulsory licensure. Only 17% of survey respondents who worked in manufacturing reported a policy of requiring licensure.

> *"… I don't think getting P.Eng license is very important for the career I am in, which is in the Electronics Manufacturing Industry, there is no difference between P.Eng and non-P.Eng. I am even considering dropping my license because the membership fee doesn't give me any benefits."*
>
> Survey Response

Based on 2006 Census data, six sectors account for 86% of engineering employment. Figure No. 10 summarizes survey data on employer policies for these six sectors.

Figure No. 10
Reported Employer Policy regarding Licensure, by Industry
N=2443

Sector	Share of Total Engineering Employment (2006 Census)	Requires P.Eng.	Requires Eligibility for P. Eng.	Prefers P. Eng., but does not Require	No Requirement or Preference	Don't Know	Total
Consulting	37%	48.1%	12.6%	**25.9%**	11.3%	2.0%	100.0%
Manufacturing	26%	**16.6%**	6.8%	**33.1%**	41.3%	2.2%	100.0%
Government	7%	49.8%	**20.6%**	**17.7%**	10.8%	1.1%	100.0%
Oil and Gas	6%	38.8%	15.7%	**31.3%**	11.9%	2.2%	100.0%
Utilities	5%	33.3%	18.3%	**31.1%**	16.9%	0.5%	100.0%
Construction	5%	35.5%	16.8%	**32.9%**	12.9%	1.9%	100.0%
Total	86%	n/a	n/a	n/a	n/a	n/a	n/a

Trends which may be of concern, based on Figure No. 10, are:

- the low proportion of respondents working in the manufacturing sector who reported that their employer requires a P.Eng./ing. licence (16.6%);
- the high proportion of respondents working for government employers (20.6%) who report that the policy is to require 'eligibility' for professional licensure rather than a licence, *per se*;
- *the high proportion across all sectors that appear to have adopted a policy of 'preference' rather than a requirement for licensure*.

The survey questions on licensure in the *2010 Survey* break new ground. In the *1994 Survey*, respondents were not asked to characterize their employers' policies or attitudes

towards licensure. The *Engineering and Technology Labour Market Study* did examine trends in licensure and published a separate report on this topic in March 2009. The findings in this survey are broadly similar to the findings of the *Engineering and Technology Labour Market Study*.

We do not have comparable survey data for earlier periods. Therefore, *we cannot definitively measure the extent of change in employers' policies and attitudes. Nevertheless, there is a widespread perception that, at least in some industries and in some engineering fields, there has been a detrimental shift in employers' policies and attitudes*.

4: Continuing Professional Development

All provincial and territorial regulatory associations/ordre have continuing competence standards for their members. The majority of associations/ordre also have established minimum requirements for participation in continuing professional development.[4]

Only 29.0% of respondents in the 2010 Survey reported that their employers have a formal training and development plan for engineers. Larger firms were significantly more likely to have a formal training and development plan in place. Thus, 36.2% of survey respondents working for companies or organizations with more than 500 employees reported that they have a formal training and development plan. By contrast only 13.5% of survey participants working for companies or organizations with 25 or fewer employees reported having a formal plan.

Figure No. 11 below summarizes the reported incidence of formal training and development plans by employer size.

Figure No. 11
Percent of Survey Respondents reporting that their Employer has a Formal Training and Development Plan for Engineers, by No. of Employees at Location
N=2633

No. of Employees at Location	Percent reporting Employer has a Formal Training and Development Plan for Engineers
Over 501	31.0%
101-500	34.3%
51-100	13.0%
26-50	7.3%
Less than 25	14.4%
Total	100.0%

Survey data suggest considerable variation across industries in the prevalence of formal training and development plans for engineers. As can be seen in Figure No. 12, utilities were the most likely to have a formal training and development plan.

[4] Continuing competence requirements leave to the individual how that individual will maintain his or her continuing competence. Continuing Professional Development standards are prescriptive in that they require participation in professional development training and may specify the amount and nature of that training. Some professional associations maintain records on completion of professional development training.

Figure No. 12

Percent of Survey Respondents reporting that their Employer has a Formal Training and Development Plan for Engineers, By Industry
N=2641

Industry	Percent with an Employer Development Plan
Utilities	53.0%
Oil and Gas	40.7%
Military	40.0%
Mining	39.7%
Consulting - Professional, Scientific, Engineering and Technical Services	31.2%
Construction	28.5%
Government (Public Administration)	26.4%
Transportation and Warehousing	24.3%
Other	23.7%
Agriculture	20.0%
Management of Companies and Administrative and Other Support Services	20.0%
Other Services	17.6%
Manufacturing	17.3%
Education	15.3%
Finance, Insurance, Real Estate and Leasing	14.3%
Health Care and Social Assistance	14.3%
Information	10.0%
Wholesale or Retail Trade	7.1%
Forestry	0.0%
Culture and Recreation	0.0%
Accommodation and Food Services	0.0%

5: Employment Patterns

Virtually all survey participants had an employment background in engineering. Fully 98% of men and 99% of women who responded to the survey reported that they had worked in an 'engineering job' at some point in their career. 87% of both men and women in the survey described their current or most recent job as an 'engineering job'.

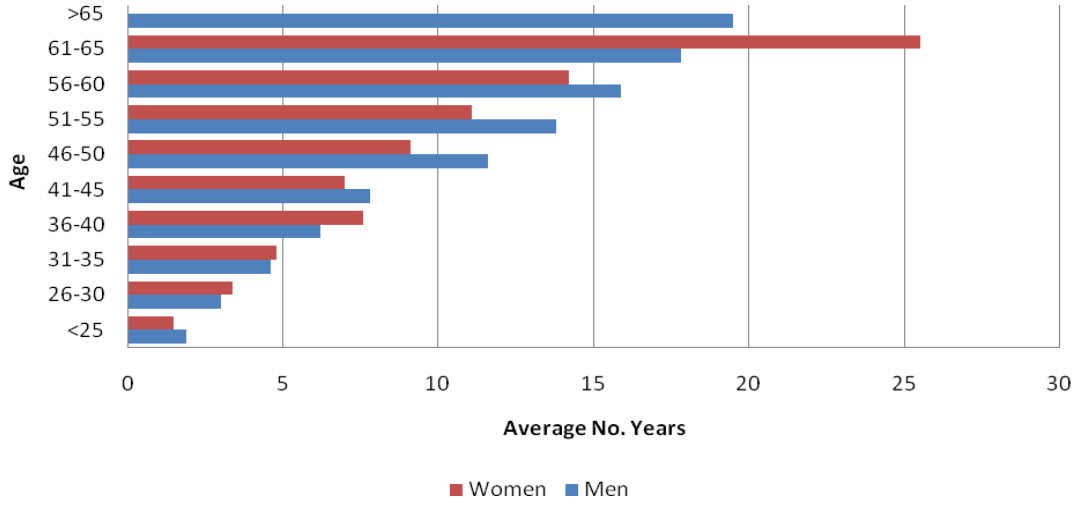
The employment status of survey respondents was:

Figure No. 13
Employment Status of Respondents
N=2649

Employment Status	Percent
Employed Full-Time	90.6%
Employed Part-Time	3.9%
Unemployed	2.7%
Retired	2.3%
On Leave	0.5%
Total	100.0%

The average duration of employment with the current employer was 9.7 years for men and 6.1 years for women. However, as noted earlier, women in this survey were, on average, younger then men. Figure No. 14 compares length of employment tenure by age group and gender.

Figure No. 14
Average Number of Years Working with Current Employer, by Age Group and Gender
N=2413



As can be seen from Figure No. 14, for survey respondents age 35 or younger, there is no gender difference in average job tenure. In the age group 36-40, women in the survey had longer average job tenure. In the age groups between 41 and 60, men in the survey had longer average job tenure. This may reflect a significant number of women dropping out of the labour force for a period of time (probably in their 30s) and then subsequently returning to employment. If this is a correct interpretation, the dropping out of the labour force may have been either a voluntary choice related to family considerations or the result of inadequate leave provisions which previously made temporarily dropping out of the labour force the only practical option for many women.

Figure No. 15 compares the distribution of survey respondents by engineering field.

Figure No. 15
Fields of Employment, By Percent Distribution of Respondents
N=2454

Field of Employment	Percent
Civil	16.1%
Mechanical	12.2%
Other	11.9%
Electrical	9.9%
Environmental	9.2%
Industrial / Manufacturing	7.7%
Transportation	4.0%
Petroleum and Gas	4.0%
Aerospace / Aeronautical / Space	3.8%
Mineral Resources / Mining	3.7%
Computer Engineering / Software Engineering	3.7%
Electronics	3.1%
Nuclear	2.9%
Chemical	2.7%
Bio-Science / Biological / Bio-Medical / Bio-Chemical Engineering	1.2%
Systems	1.0%
Metallurgical	0.9%
Geological and Related	0.9%
Materials	0.5%
Engineering Science / Engineering Physics	0.5%
Total	100.0%

Figure No. 16 shows that there are *significant differences in the fields of engineering employment by gender*.

Figure No. 16
Fields of Employment, Percent Distribution
N=2454

Field of Employment	Percent of Total	
	Women	Men
Civil	19.8%	14.7%
Environmental	16.7%	6.4%
Mechanical	8.2%	13.7%
Electrical	6.2%	11.2%
Industrial / Manufacturing	5.9%	8.4%
Petroleum and Gas	5.6%	3.4%
Transportation	4.1%	4.0%
Mineral Resources / Mining	4.1%	3.6%
Aerospace / Aeronautical / Space	2.7%	4.2%
Nuclear	2.4%	3.0%
Computer Engineering / Software Engineering	2.0%	4.4%
Bio-Science / Biological / Bio-Medical / Bio-Chemical Engineering	2.0%	0.9%
Chemical	1.8%	3.0%
Geological and Related	1.5%	0.6%
Electronics	0.9%	3.9%
Materials	0.8%	0.4%
Systems	0.6%	1.2%
Metallurgical	0.5%	1.1%
Engineering Science / Engineering Physics	0.5%	0.5%
Other	13.5%	11.4%
Total	100.0%	100.0%

Some notable contrasts in the survey results are:

- 16.7% of women respondents reported working in environmental engineering, compared to only 6.4% of men
- 13.7% of men reported working in mechanical engineering, compared to only 8.2% of women
- Similarly, 11.2% of men reported working in electrical engineering, compared to only 6.2% of women.

Figure Nos. 17a and 17b compares job functions by gender and by age group.

Figure No. 17a

Job Status, Percent Distribution by Gender, Age 40 or Younger
N=1143

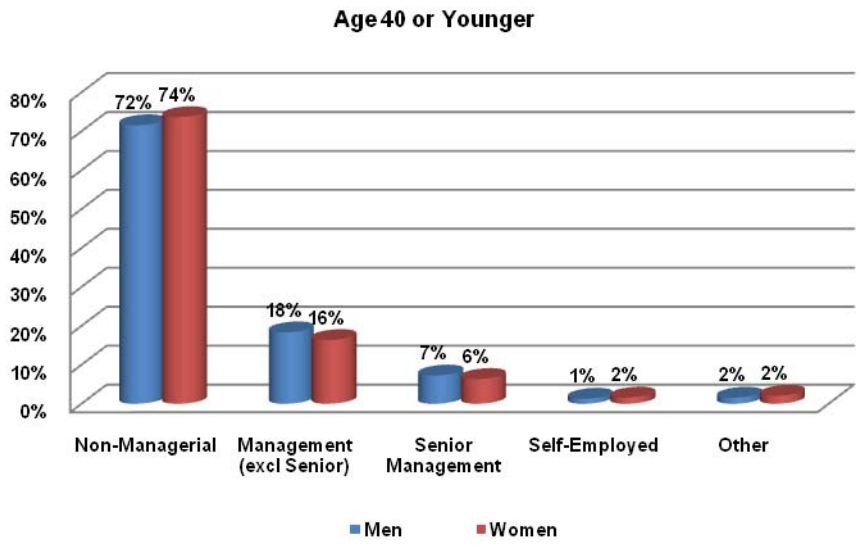
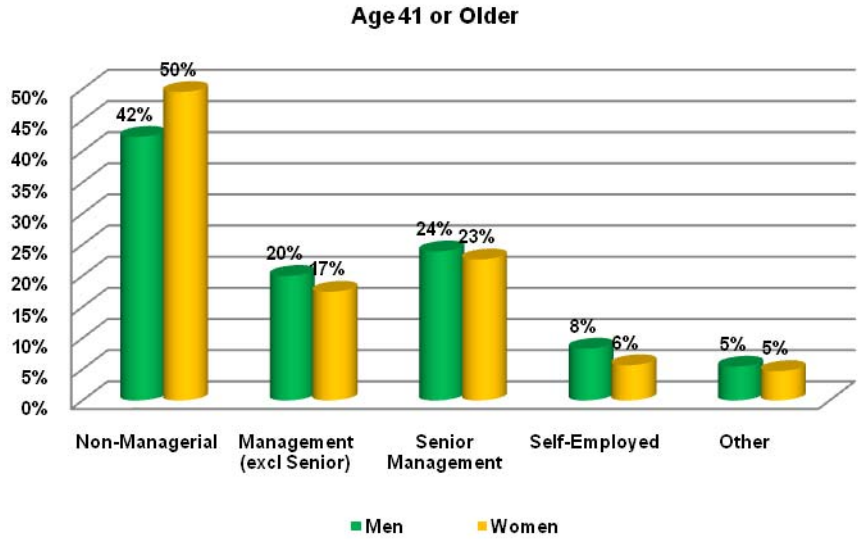


Figure No. 17b

Job Status, Percent Distribution by Gender, Age 41 or Older
N=1282



Both Figure No. 17a and No. 17b show *approximately similar distributions of job roles between men and women*. Separating out only the non-managerial segment of the survey responses shows that in both age groups, men were moderately more likely to be in senior engineering roles than women. Among those respondents age 40 or younger and in a non-managerial role, 21% of men compared to 15% of women described their role as 'a senior engineering job'. Among respondents age 41 or older and in a non-managerial role, the 66% of men described their current job as 'a senior engineering job' compared to 53% of women.

Figure No. 18 compares job functions of international graduates and domestic graduates. The survey data show a somewhat greater proportion of domestic graduates reach senior management ranks. However, the data do not point to systemic barriers against international graduates.

Figure No. 18
Job Status For Domestically and Internationally Trained Graduates
N=2618

Job Status	Domestic Graduates	International Graduates
Non-Managerial	57.4%	59.6%
Management (excl Senior)	18.1%	17.5%
Senior Management	16.5%	11.3%
Self-Employed	4.9%	4.7%
Other	3.1%	6.9%
Total	100.0%	100.0%

Figure No. 19 summarizes jobs functions by gender and also between domestic engineering graduates and international graduates.

Figure No. 19
Job Function, by Percent of Respondents
N= 2846

Job Function	Total Sample	Men	Women	Domestic Engineering Graduates	International Engineering Graduates
Computer Services/Systems	2.80	3.1%	2.0%	2.9%	2.2%
Design	**20.6%**	20.8%	18.5%	**19.2%**	**27.2%**
Management	**20.7%**	**22.2%**	**18.9%**	**21.8%**	**15.0%**
Marketing/Sales	1.7%	1.7%	1.8%	1.6%	1.8%
Non-Engineering	4.6%	4.1%	6.0%	5.0%	2.7%
Production Engineering	5.9%	5.5%	6.5%	5.6%	7.4%
Project Engineering	**29.6%**	**28.1%**	**34.2%**	30.1%	27.2%
Quality Control	3.6%	3.2%	3.8%	3.3%	4.7%
R&D	6.1%	6.8%	4.5%	5.8%	8.0%
Teaching	1.4%	1.4%	1.4%	1.4%	1.1%
Technical Customer Service	2.0%	2.0%	2.0%	2.0%	2.0%
Technical Sales	1.0%	1.2%	0.5%	1.1%	0.7%
Total	100%	100%	100%	100%	100%

Some notable patterns in the survey results are:

- For most functions, there is little or no difference between men and women. More men are in management than women (22.2% compared to 18.9%), but this is also reflective of differences in the age structure of men and women in the survey sample. Only in 'project engineering' is there are marked difference: 34.2% of women describe 'project engineering' as their major function, compared to 28.1% of men.
- Somewhat more men than women describe their principal function as 'R&D' (6.8% versus 4.5%) or 'design' (20.8% versus 18.5%), though these differences are within the margin of error.
- International engineering graduates are significantly more likely to work in 'design' than domestic engineering graduates (27.2% versus 19.2%) and somewhat more likely to work in 'R&D' (8.0% versus 5.8%).
- By contrast, a lower proportion of international engineering graduates describe their jobs as 'management' (15.0% versus 21.8% for domestic graduates).
- *Design, management and project engineering account for 70.9% of the work done by survey respondents.*

6: Education

The most reported undergraduate specializations of survey participants closely mirrored the disciplines that receive the greatest share of engineering enrolments in Canada. Respondents were most likely to have obtained an undergraduate degree in Mechanical Engineering (24 percent), Civil Engineering (21 percent), Electrical Engineering (14 percent), or Chemical Engineering (10 percent). Figure No. 20 summarizes the distribution of survey respondents by their undergraduate field of specialization.

Figure No. 20
Undergraduate Specialization, Percent Distribution of Respondents
N=2488

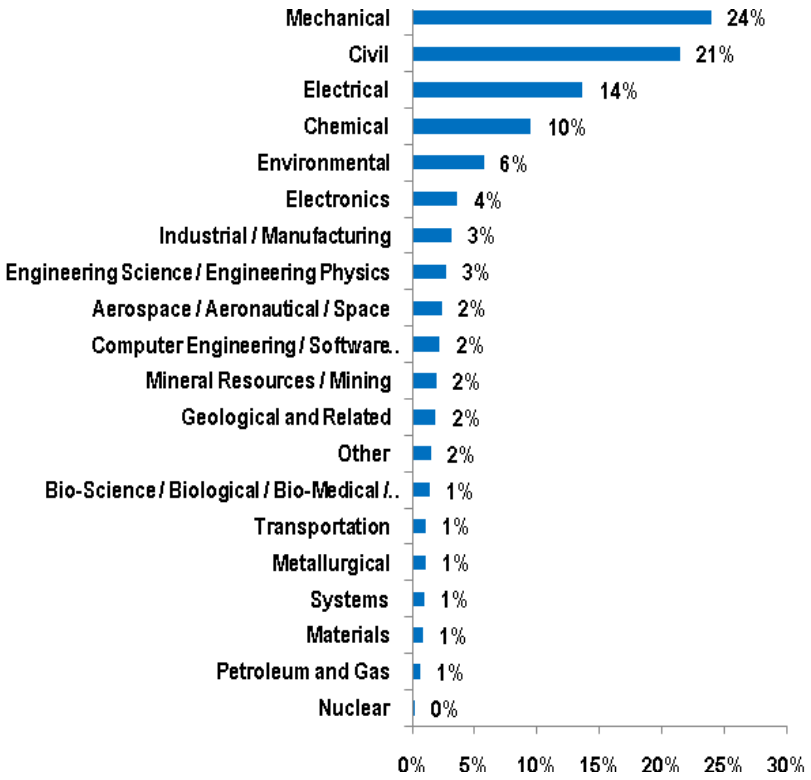


Figure No. 21 shows differences in undergraduate specialization by gender.

Figure No. 21
Percent Distribution by Field of Undergraduate Specialization For Men & Women
(Order as per Figure No. 20)
N=2488

Undergraduate Specialization	Men	Women
Mechanical	**27.4%**	**14.7%**
Civil	**19.7%**	**26.3%**
Electrical	**15.5%**	**8.7%**
Chemical	**7.8%**	**14.1%**
Environmental	**3.6%**	**11.7%**
Electronics	4.3%	1.8%
Industrial / Manufacturing	2.9%	4.1%
Engineering Science / Engineering Physics	3.1%	1.7%
Aerospace / Aeronautical / Space	2.6%	1.8%
Computer Engineering / Software Engineering	2.4%	1.7%
Mineral Resources / Mining	2.0%	1.8%
Geological and Related	1.3%	3.6%
Other	1.5%	1.5%
Bio-Science / Biological / Bio-Medical / Bio-Chemical Engineering	1.2%	2.0%
Transportation	1.0%	1.4%
Metallurgical	1.2%	0.8%
Systems	0.9%	1.1%
Materials	1.0%	0.5%
Petroleum and Gas	0.5%	0.9%
Nuclear	0.3%	0.0%
Total	100.0%	100.0%

In this survey, *civil engineering, chemical engineering, and environmental engineering were significantly more likely to be fields of specialization for women than men.* By contrast, *men were more likely to have selected mechanical engineering, electrical engineering or electronics engineering*.

Figure No. 22 shows that, in general, the specialization pattern of international engineering graduates replicated the pattern of domestic graduates, though a somewhat larger proportion of international graduates reported specialization in civil, electrical or electronics engineering compared to domestic graduates.

Figure No. 22

Percent Distribution by Field of Undergraduate Specialization For Domestic and International Graduates
(Order as per Figure No. 20)
N=2765

Field of Specialization	Undergraduate Engineering Degree	
	Canada	Outside Canada
Mechanical	23.7%	24.2%
Civil	**21.4%**	**25.7%**
Electrical	**13.4%**	**17.0%**
Chemical	9.7%	7.7%
Environmental	5.8%	3.3%
Electronics	**2.6%**	**7.9%**
Industrial / Manufacturing	3.6%	2.3%
Engineering Science / Engineering Physics	3.1%	0.8%
Aerospace / Aeronautical / Space	2.3%	2.1%
Computer Engineering / Software Engineering	2.7%	0.6%
Mineral Resources / Mining	2.1%	0.2%
Geological and Related	2.1%	0.4%
Other	1.7%	1.7%
Bio-Science / Biological / Bio-Medical / Bio-Chemical Engineering	1.4%	0.6%
Transportation	1.0%	1.0%
Metallurgical	0.8%	2.3%
Systems	1.1%	0.2%
Materials	0.9%	0.4%
Petroleum and Gas	0.5%	1.0%
Nuclear	0.2%	0.6%
Total	100.0%	100.0%

Survey data indicate that international engineering graduates were much more likely to have a post-graduate degree (92.1%) in comparison with domestic graduates (22.7%).

Survey data also show that all engineering graduates – both domestic and international – have considerable technical mobility. *That is to say, the field of undergraduate specialization influences, but does not determine an engineering graduate's subsequent employment path*. *Only 52.5% of participants in this survey were currently employed in the same field in which they specialized as an undergraduate*. There was no appreciable difference between men and women in this regard.

International engineering graduates were somewhat more likely to be working in their field of undergraduate specialization than domestic graduates (59% versus 51%). However, even international graduates showed significant technical mobility: 41% were working outside their field of specialization.

The likelihood of working in a field that corresponded to undergraduate specialization varied greatly depending on the field of study. Individuals with an undergraduate specialization in Nuclear Engineering were the most likely to report working in their field of study (85.7%), followed closely by those who specialized in Transportation Engineering (85.2%). By contrast, individuals with an undergraduate degree in Engineering Science / Engineering Physics were the least likely to report working in their field of study (9.6%), followed by those who specialized in Materials Engineering (17.4%).

Figure No. 23

Percent Currently Working in the Same Field as their Undergraduate Specialization
N=1444

Field of Specialization	Percent
Nuclear	85.7%
Transportation	85.2%
Mineral Resources / Mining	79.2%
Petroleum and Gas	76.5%
Aerospace / Aeronautical / Space	76.2%
Other	76.1%
Environmental	73.2%
Computer Engineering / Software Engineering	70.3%
Civil	67.4%
Electrical	56.5%
Metallurgical	53.3%
Electronics	46.4%
Industrial / Manufacturing	44.6%
Mechanical	43.5%
Geological and Related	38.0%
Bio-Science / Biological / Bio-Medical / Bio-Chemical Engineering	33.3%
Chemical	25.0%
Systems	24.0%
Materials	17.4%
Engineering Science / Engineering Physics	9.6%
Average	52.5%

7: Finding an Engineering Job

Canadian Engineering Graduates

Virtually all (94.9%) of survey respondents who were Canadian engineering graduates reported that they sought a full-time engineering job after graduation. However, survey data indicate that *a disturbingly large proportion of engineering graduates encountered significant difficulty in finding their first engineering job*.

In the first place, *of those who sought an engineering job after graduation, only around two-thirds (65.5%) were successful*. Many appear to have taken non-engineering jobs, though they subsequently moved into an engineering job.

Recent graduates, *i.e.*, survey participants aged 25 or less, reported average job search time for their initial engineering job of 3.6 months. The cohort that preceded them (aged 26-30) reported average search times of 6.1 months. For the sample as a whole (*i.e.*, all age groups), the average search time for the first engineering job was 6.9 months. *Almost half of survey respondents (44.5%) reported search times of more than six months*; 10.9% reported search periods longer than one year.

Figure No. 24 shows the relative importance of different channels that led to an initial engineering job.

Figure No. 24
Relative Importance of Different Channels used to Obtain First Engineering Job
N=2283

Different Channels Used in Obtaining a Job	Percent
Applied for an advertised vacancy	28.9%
Other	15.9%
Continued into permanent employment from a co-op placement or internship	12.7%
University career fair	11.8%
Personal or family connection to employer	9.7%
Continued into permanent employment from a summer job	8.5%
Referred to an employer by a non-family mentor	7.3%
Not relevant	1.8%
Placement firm (head hunter)	1.7%
Electronic Job Boards operated by a Professional or Technical Association	1.0%
Other career fair	0.8%
Total	100.0%

It is important to note that *the most traditional of all channels – applying for an advertised vacancy – was by far the most important channel*. Continuing into permanent employment from a co-op placement accounted for 12.7% of first engineering jobs. University career fairs (11.8%) were almost as important. Summer employment led to a permanent job for only 8.5% of respondents.

Personal or family connections to an employer accounted for 9.7% of first engineering jobs. A non-family mentor was cited by 7.3% of respondents. Taking these together, *roughly one graduate in six relied on personal or family connections.*

Job boards, 'head hunters' and non-university career fairs were relatively unimportant, accounting in total for only 3.5% of initial jobs.

It is also useful to consider channels to employment in terms of the length of time required to secure a first engineering job. Figure No. 25, on the next page, summarizes these data.

Figure No. 25

Length of Time Required to Find First Engineering Job
N=1009

Length of Time Required to Find Employment	Continued into permanent employment from a co-op placement or internship	Continued into permanent employment from a summer job	Personal or family connection to employer	Applied for an advertised vacancy	University career fair	Other career fair	Placement firm (head hunter)	Electronic Job Boards operated by a Professional Association or Technical Association	Referred to an employer by a non-family mentor	Other	Total
< 1 month	55.0%	42.0%	7.1%	4.3%	16.1%	8.3%	0.0%	0.0%	11.3%	9.0%	11.6%
1 to 2 months	18.3%	26.0%	17.3%	25.5%	42.9%	50.0%	7.4%	33.3%	25.0%	28.4%	25.6%
2.1 to 3 months	6.7%	10.0%	9.4%	14.9%	16.1%	0.0%	14.8%	11.1%	7.5%	10.9%	11.9%
3.1 to 6 months	8.3%	10.0%	29.9%	30.4%	14.3%	33.3%	44.4%	33.3%	31.3%	26.5%	26.9%
6.1 to 12 months	5.0%	8.0%	19.7%	13.6%	5.4%	0.0%	18.5%	11.1%	15.0%	15.2%	13.5%
> 1 Year	6.7%	4.0%	16.5%	11.1%	5.4%	8.3%	14.8%	11.1%	10.0%	10.0%	10.6%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

It is striking that, *in terms of search time, by far the most effective channel was proceeding to employment from a co-op placement or from a summer job. Almost three quarters (73%) of co-op placements transitioned into an engineering job within two months. The proportion is almost as high (68%) for graduates who transitioned from a summer job into permanent employment*.

Career fairs were also significantly helpful. Of those who found their first engineering job at a university career fair, 59% obtain that job in less than 2 months.

International Engineering Graduates

International engineering graduates who immigrated to Canada during the 1960s and 1970s came at a time of general economic prosperity. This contrasted with those who arrived in the early 1980s, during a recessionary period or the 1990s which was a period of prolonged slow growth. These *differences in prevailing economic conditions significantly affected how international graduates fared*.

Figure No. 26 shows that *60.0% of international graduates arriving in the 1960s had an engineering job lined up prior to immigrating to Canada. This contrasts with the 1990s, when only 10.2% of international graduates enjoyed this advantage*.

Figure No. 26

Job Status of Internationally Trained Undergraduates Prior to Immigrating
N= 350 to 461

Year of Immigration	An engineering job was lined up prior to Immigrating	Was able to find one - If no engineering job lined up prior to immigrating
Prior to 1960	25.0%	50.0%
1960-1969	60.0%	83.3%
1970-1979	33.3%	88.0%
1980-1989	16.9%	72.9%
1990-1999	10.2%	77.1%
2000-2010	18.4%	71.3%

Search times for international graduates were significantly longer than those reported by domestic graduates. Domestic graduates reported average search times for their first engineering job of approximately 5.2 months in the last decade (2000-2010). For international graduates, the average search time for their first Canadian engineering job (which for some was also their first engineering job) was 17.8 months.

8: Mentorship

Mentors provide career guidance and advice on qualifying for professional licensure. Mentorship has long been an informal feature of many professions. In some professions, a mentor is explicitly associated with the internship period. In Canada, a number of the professional and territorial associations/ordre are exploring ways of formalizing and strengthening mentorship.

The *2010 Survey of Working Conditions for Engineers* distinguished between formal and informal mentors.

For this survey, a formal mentor is defined as *an experienced professional engineer who was asked by an employer, a professional association, a university, or a community organization to provide career and professional guidance*.

An informal mentor is defined as *an experienced professional engineer to whom a survey respondent turned for career and professional guidance, but who was not formally asked to fulfill that role by a professional association, university, or community organization*.

Five trends emerge from the survey data:

First, mentorship (formal and informal combined) is widespread, though not universal;

Second, informal mentorship is by far the more important type of mentorship;

Third, domestic graduates are much more likely to have the advantage of a mentor than international graduates;

Fourth, gender differences are *not* significant in the experience of mentorship among domestic graduates; and

Fifth, there is relatively little difference in the type of advice and assistance provided by formal mentors in comparison with informal mentors.

Overall, 60.0% of domestic engineering graduates reported having either a formal or informal mentor, or both. For international graduates the comparable proportion was 47.1%.

Figure No. 27 shows the incidence of mentorship among domestic engineering graduates, by gender.

Figure No. 27

Incidence of Mentorship – Domestic Graduates, by Gender

	Men	Women	Total	N=
Formal Mentor	24.0%	22.5%	23.6%	2,045
Informal Mentor	44.9%	54.7%	47.6%	2,057

Note: includes persons who reported *both* a formal and an informal mentor

Figure No. 28 compares domestic and international graduates. The findings suggest that *while overall mentorship is somewhat less prominent in the careers of international engineering graduates, mentorship still plays an important role and presumably could play a more important role.*

Figure No. 28

Incidence of Mentorship – Domestic and International Graduates

	Domestic	International
Formal Mentor	23.6%	23.0%
Informal Mentor	47.6%	35.8%
N =	2,045 2,057	483

Figure No. 29 shows that *formal mentorship has increased in importance. Respondents under the age of 30 were substantially more likely to report having had both formal and informal mentors.* This may reflect recent initiatives by professional associations.

Figure No. 29

Incidence of Mentorship – Age Groups
N= 2043 / 2054

	Formal Mentor	Informal Mentor
<30	46.7%	56.3%
31-35	29.0%	35.5%
36-40	17.1%	37.1%
41-45	29.7%	44.0%
46-50	22.2%	40.7%
51-55	25.9%	33.9%
56-60	15.8%	23.1%
61-65	7.4%	31.0%
66+	8.3%	38.5%

Figure No. 30 shows the types of advice and assistance provided by mentors. There were no statistically significant differences in the types of advice offered to domestic and international graduates or to men and women. It is also notable in Figure No. 30 that informal mentors performed almost exactly the same role as formal mentors. An implication of this finding is that the formalization of mentorship may not change the nature of a mentor's role, since informal mentors already play essentially the same role as formal mentors. Formalization, however, may increase the proportion of graduates who benefit from mentorship.

Figure No. 30
Assistance provided by Mentors

Assistance Provided	Formal Mentors	Informal Mentors
Advice on Licensure	49.3%	42.7%
Assist in obtaining practical experience needed for licensure	82.7%	79.7%
Assist in identifying training	63.1%	61.4%
Career advice	69.6%	69.8%
N =	673	1,251

Respondents rated the importance of mentoring on a scale of 1-10 for three potential stages in their engineering career: (1) after graduation, (2) after immigration (where relevant), and (3) mid-career.

Figure No. 31 shows that most respondents attached moderate importance to mentorship in the early stages of their careers, *i.e*., after graduation or after immigrating to Canada. *Significantly, and perhaps unexpectedly, the importance of mentorship increases for mid-career professionals. There were no statistically significant differences between men and women in how they ranked the importance of mentorship. Nor were there any significant differences, based on the age of respondents.*

Figure No. 31
Perceived Importance of Mentoring, By Percent Distribution
N=2580 to 2706

	Low	Moderate	High
Commencing an Engineering Career after graduation	24.7%	65.5%	9.8%
Commencing an Engineering Career after immigrating	21.4%	71.1%	7.5%
As a mid-career professional with approx 10 years exp	26.5%	36.9%	36.6%

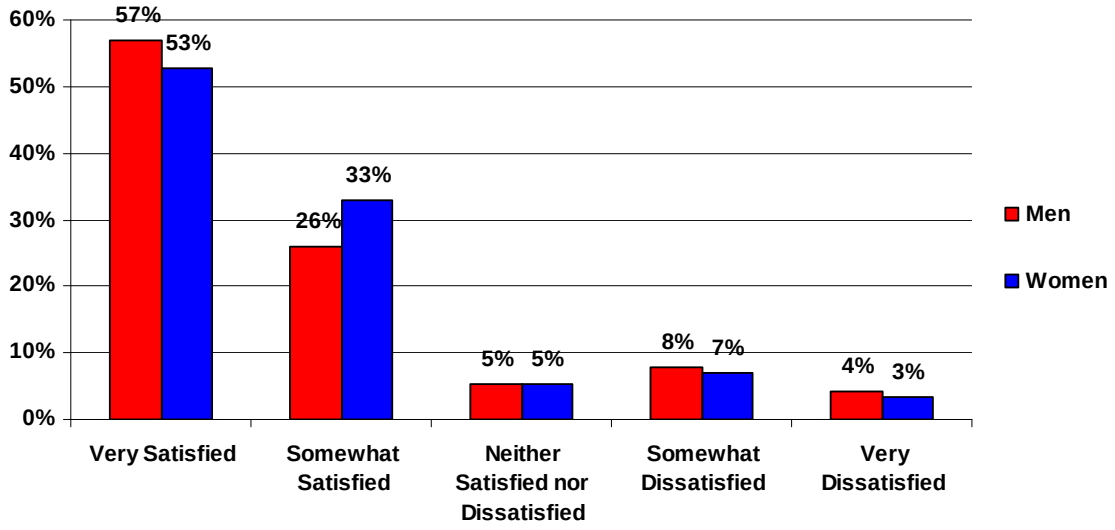
9: Career Satisfaction

The survey inquired about participants' satisfaction with engineering at three levels: as a career choice, their current job, and their career prospects.

Engineering as a Career Choice:

Figure No. 32 shows the degree of satisfaction reported by survey respondents with engineering as a career choice.

Figure No. 32
Reported Satisfaction with Engineering as a Career Choice, by Gender
N=2463

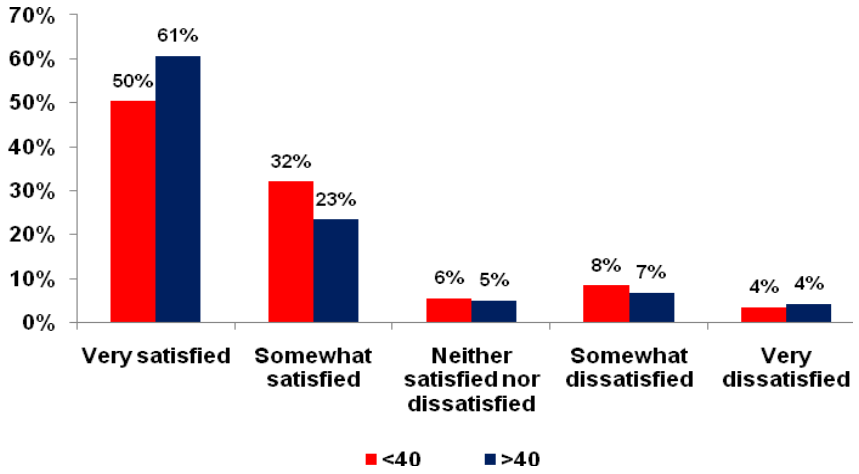


As can be seen from Figure No. 32, *levels of satisfaction with engineering as a career choice are comparatively high: 83% for men and 86% for women*.

Figure No. 33 shows that younger engineers were somewhat less likely to describe themselves as 'very satisfied' with engineering as a career choice and somewhat more likely to describe themselves as 'somewhat satisfied'. Nevertheless, *the data do not show any significant differences in satisfaction levels by age. Indeed, on the whole, the participants in this survey appear to have been broadly satisfied with engineering as their career choice*.

Figure No. 33

Reported Satisfaction with Engineering as a Career Choice, by Age Group
N=2441



There were some differences in satisfaction with engineering as a career choice across fields of engineering employment. Figure No. 34 shows that the combined total of those who described themselves as 'very satisfied' or 'somewhat satisfied' ranged from 93% in Engineering Science / Engineering Physics to 75% in Transportation Engineering.

Figure No. 34

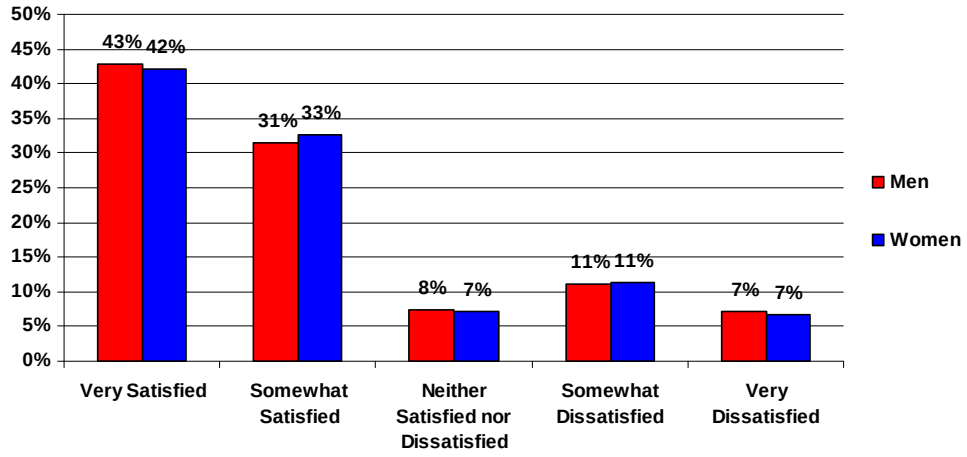
Reported Satisfaction ('Very Satisfied' + 'Somewhat Satisfied') with Engineering as a Career Choice, by Field of Specialization
N=2647

Engineering Science / Engineering Physics	93%
Geological and Related	91%
Chemical	89%
Mineral Resources / Mining	87%
Nuclear	87%
Petroleum and Gas	86%
Systems	86%
Civil	86%
Environmental	85%
Materials	85%
Computer Engineering / Software Engineering	83%
Bio-Science / Biological / Bio-Medical / Bio-Chemical Engineering	83%
Mechanical	83%
Industrial / Manufacturing	82%
Electrical	80%
Other	79%
Metallurgical	79%
Electronics	78%
Aerospace / Aeronautical / Space	76%
Transportation	75%

Current Job:

Satisfaction levels diminish somewhat when survey participants are asked about their current job as opposed to their choice of engineering as a career. Figure No. 35 summarizes these results.

Figure No. 35
Reported Satisfaction with Current Job
N=2436

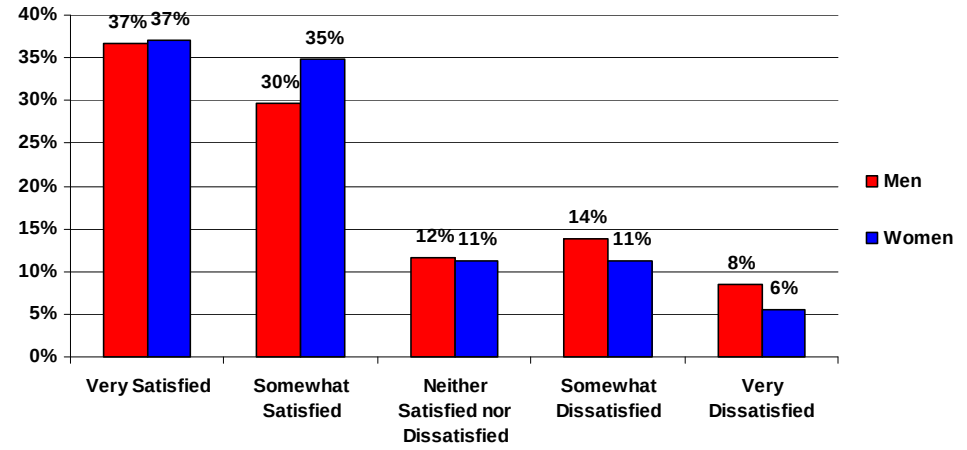


There is no statistically significant difference between the satisfaction or dissatisfaction levels reported by men and women. Overall, 18% of survey respondents were dissatisfied with their current job. This compares with 11.5% who were dissatisfied with engineering as a career choice, *per se*. There was no significant difference in current job satisfaction related to employer size.

Career Prospects:

Figure No. 36 shows survey participants' satisfaction with their career prospects.

Figure No. 36
Reported Satisfaction with Career Prospects
N=2372



Moderately more women (72%) described themselves as 'very satisfied' or 'somewhat satisfied' with their career prospects than men (67%), though this difference may not be statistically significant. At the other end of the spectrum, *roughly one survey respondent in five reported that they were dissatisfied with their career prospects.*

Continuing in Engineering:

Reflecting their general satisfaction with engineering as a career choice, a significant majority of both men and women report that they are likely to continue working in engineering over the next five or ten years. The higher expected exit rate from engineering for men reflects the greater share of older workers in the sample of male engineers.

Figure No. 37
Likelihood of Remaining in an Engineering Job by Gender
N=2450-2461

Expected Years in Engineering	Definitely Not or Unlikely to be in an Engineering Job		Definitely or Likely to be in an Engineering Job	
	Men	Women	Men	Women
Next Year	10.8%	10.0%	80.3%	81.1%
Approx 5 Years from now	17.3%	11.6%	65.1%	72.6%
Approx 10 Years from now	32.1%	20.2%	45.1%	53.6%

Survey participants were asked to gauge the likelihood of their being in an engineering job five years in the future. A ten-point scale was used where 1 was "Definitely will Not be in an Engineering Job in Five Years" and 10 was "Definitely will be in an Engineering Job in Five Years". We interpret those who ranked between 1 and 3 their likelihood of *not* being in an engineering job five years in the future as likely to exit engineering. Individuals could exit engineering for a number of reasons. These include, wanting to change the focus of their career, planning to retire or otherwise leave the labour force, or expecting to be promoted into the ranks of general management. It is not surprising that the anticipated exit rate increases with age. *In Figure No. 38, the sharpness of the inflexion in the late 40s is striking.*

Figure No. 38

Likelihood of <u>Not</u> being in an Engineering Job in Five Years (1-3 scoring) where '1= Definitely Not' and '10 = Definitely', by Age Group
N=2460

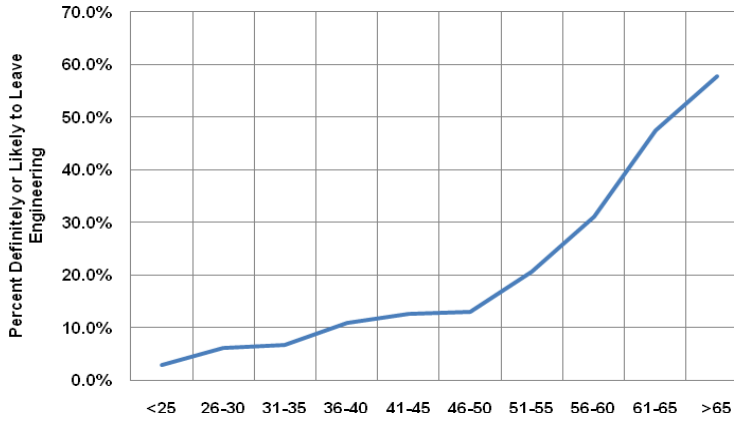


Figure No. 38 suggests that *projections of the supply of experienced engineers needs to take account of the marked change in expected career paths that occurs in the late 40s. The expected exit rate rises sharply after age 45.*

10: Career Implications of Family and Personal Obligations

Figure No. 39 shows the proportion of respondents by gender and by major age group who reported having taken a leave of absence from employment. *The vast majority of men (>80%) reported that they have never taken leave of any type. Seventy percent of women age 41 or older reported taking leave.* Maternity and parental leave are the predominant types of leave for women.

Figure No. 39
Reported Reasons for Taking Employment Leave
N= 2437

	Age 40 or Younger		Age 41 or Older	
	Men	Women	Men	Women
Never taken Leave	86%	66%	80%	30%
Leave of some type taken (by inference)	14%	34%	20%	70%
Total	100%	100%	100%	100%
Maternity Leave / Paternity Leave / Adoption Leave	1%	26%	1%	57%
Parental Leave beyond Maternity or Adoption Leave	4%	8%	2%	10%
Leave for Educational Purposes	1%	2%	4%	6%
Leave to do Community Work, Seek Political Office, etc.	0%	1%	1%	0%
Leave related to Personal Illness (excluding stress)	1%	3%	5%	8%
Leave related to Personal Stress	1%	2%	2%	7%
Leave related to Illness of a Partner, Family Member, or Parent	1%	0%	1%	0%
Leave for Other Reasons	3%	2%	5%	10%

Generally, individuals did not engage in employment activities while on leave, though this depended, to some degree, on the type of leave. However, as can be seen from Figure No. 40, *women were more likely to work while on leave*. For some types of leave (*e.g.*, educational leave or community work), the gender difference is significant, although the sample size is quite small and therefore subject to sampling error.

Figure No. 40
Percent of Respondents who did <u>not</u> work while on Leave, by Type of Leave and by Gender
N=42 to 284 depending on Type of Leave

	Men	Women
Maternity Leave / Paternity Leave / Adoption Leave	82.2%	70.7%
Parental Leave beyond Maternity or Adoption Leave	73.6%	74.3%
Leave for Educational Purposes	57.4%	82.6%
Leave to do Community Work, Seek Political Office, etc.	64.5%	90.9%
Leave related to Personal Illness (excluding stress)	51.2%	61.8%
Leave related to Personal Stress	80.4%	84.4%
Leave related to Illness of a Partner, Family Member, or Parent	69.4%	72.7%
Leave for Other Reasons	70.2%	87.1%

Figure No. 41 below summarizes the perceived career impact of different types of leave.

Figure No. 41
Impact of Taking Leave on Career
N=49 to 305 depending on type of leave

Type of Leave of Absence	Very Positive & Somewhat Positive Impact		Neutral		Somewhat Negative & Very Negative Impact	
	Men	Women	Men	Women	Men	Women
Maternity Leave / Paternity Leave / Adoption Leave	13.0%	16.7%	65.2%	41.7%	21.7%	41.7%
Parental Leave beyond Maternity or Adoption Leave	23.6%	17.9%	56.9%	41.0%	19.4%	41.0%
Leave for Educational Purposes	68.3%	50.0%	27.0%	35.7%	4.8%	14.3%
Leave to do Community Work, Seek Political Office, etc.	44.8%	38.5%	41.4%	61.5%	13.8%	0.0%
Leave related to Personal Illness (excluding stress)	23.3%	12.5%	58.1%	45.0%	18.6%	42.5%
Leave related to Personal Stress	16.7%	9.1%	38.1%	36.4%	45.2%	54.5%
Leave related to Illness of a Partner, Family Member, or Parent	20.6%	0.0%	61.8%	58.3%	17.6%	41.7%
Leave for Other Reasons	47.6%	28.1%	39.0%	46.9%	13.4%	25.0%

A substantially greater proportion of women reported that leaves of absence had a negative impact on their career[5];

- 41.7% of women, in contrast to 21.7% of men, reported that maternity or paternity leave negatively affected their career. (Note, however, that the number of men reporting that they took paternity leave is exceedingly small);
- 41.0% of women, in contrast to 19.4%, of men reported that parental leave had a negative impact. (Note, however, that the number of men reporting that they took parental leave is exceedingly small); and
- 41.7% of women, in contrast to 17.6% of men, reported that leaving to attend to a family illness negatively affected their career.

In contrast, leaves of absence because of personal stress were perceived as detrimental to the careers of both men and women, although more so for women: 54.5% of women and 45.2% of men indicated that this type of leave negatively affected their career.

[5] Respondents located their views on 5 point scale, from "Very Positive" to "Very Negative".

In this survey, *4.1% of men and 5.8% of women believed that they had been terminated from a job because they took leave*.

These findings suggest that many engineers – and especially women engineers – believe that they pay a 'career price' for utilizing leave to which they are entitled either by statutory right or by the terms of their employment.

11: Discrimination

Work-related discrimination arises when the treatment of an individual is based on extrinsic characteristics (ethnicity, gender, age, physical ability or sexual orientation) that are not germane to their capacity to perform their job duties or the duties of job that they seek. Discrimination can be either positive (*i.e.*, favourable) or negative (*i.e.*, adverse). However, the term is almost invariably used to connote negative or adverse discrimination. Discrimination can pertain to a range of work-related matters including, but not limited to: initial hiring, terminations or lay-offs, salary progression, bonus awards, promotions, access to training, access to leave, and the quality or desirability of work assignments. More difficult to define, but equally important is the ambience or culture of the workplace which may deliberately or without intent make some individuals feel unwelcome. It is important, therefore, to emphasize that in the *2010 Survey*, discrimination was used in a broad sense, rather than in the narrow sense of whether an employer had objectively violated the anti-discrimination provisions of either human rights codes or professional policies.

Discrimination is often subtle. Both the perception of discrimination and its effects can be long-lasting. The perception of discrimination and the justifiable resentment of discrimination may be the result of incidents which occurred in the past, rather than actual discrimination which is currently occurring. Conversely, some individuals may be in work situations where discrimination is a current reality. Equally important, discrimination may or may not be a problem which an employer is trying to address. Moreover, even if an employer is addressing real or perceived discrimination, those efforts may or may not be sufficient. It is to be stressed that the questions in the *2010 Survey* deal with perceptions of discrimination, not with proven instances of discrimination. However, this in no way discounts the importance of the findings. Indeed, some of the findings should be unsettling to the profession.

Promotion

Figure No. 42 summarizes the proportion of respondents to the 2010 Survey by gender and major age group who believe that they have been passed over for a promotion on discriminatory grounds.

Figure No. 42

Percentage of Survey Respondents reporting that "In [their] opinion [they] had been passed over for a promotion" on Discriminatory Grounds, by Gender
N=2490

	Age 40 or Younger		Age 41 or Older	
	Men	Women	Men	Women
Not Relevant	83%	72%	73%	47%
Relevant (by inference)	17%	28%	27%	53%
Total	100%	100%	100%	100%
Basis of Perceived Discrimination:				
• Gender	2%	21%	4%	43%
• Race or Ethnic Background	5%	2%	9%	8%
• Non-Canadian Qualifications	3%	1%	4%	3%
• Non-Canadian Experience	5%	1%	3%	3%
• Sexual Orientation	0%	0%	0%	0%
• Age	7%	11%	10%	12%
• Disability	0%	0%	1%	2%

A number of points from the data presented in Figure No. 42:

- *Overall,* 37% *of women reported that they have experienced some type of discrimination in the awarding of promotions. For men, the comparable percentage is 24%. For women age 40 or younger, the proportion is 28%; for women age 41 or older, the proportion is 53%.*
- *An exceedingly high proportion of women age 41 or older report being passed over in promotions by reason of their gender (43%). For women age 40 or younger the proportion is approximately half of this, but still quite high (21%*).
- *Age discrimination also emerges from the survey results as a potentially important challenge for the engineering profession*: 10% of men and 12% of women age 41 or older believe they have been passed over for a promotion by reason of their age.
- *Discrimination on the basis of race or ethnicity also emerges as a continuing workplace problem for both men and women.*

Figure No. 43 reports the same survey results contrasting the experience of domestic graduates with that of international graduates.

Figure No. 43

Percentage of Survey Respondents reporting that "In [their] opinion [they] had been passed over for a promotion" on Discriminatory Grounds, Domestic compared to International Graduates
N=2683

Discriminatory Grounds	Domestic Graduates	International Graduates
Not Relevant	76%	55%
Relevant (by inference)	24%	45%
Total	100%	100%
Basis of Perceived Discrimination:		
• Gender	10%	7%
• Race or Ethnic Background	4%	22%
• Non-Canadian Qualifications	>1%	19%
• Non-Canadian Experience	>1%	20%
• Sexual Orientation	>1%	0%
• Age	10%	8%
• Disability	>1%	>1%

Figure No. 43 shows *that a high proportion (45%) of international engineering graduates believe that they have been passed over for a promotion on discriminatory grounds*. The most commonly cited grounds are racial or ethnic background (22%), non-Canadian qualifications (19%) and non-Canadian experience (20%).

Workplace Matters other than Promotions

Figure No. 44 summarizes the proportion of survey respondents who perceived that they had been discriminated against in work-related matters other than promotions.

Figure No. 44

Percentage of Survey Respondents reporting that "In [their] opinion [they] had experienced other types of discrimination (i.e., not promotion-related)", by Gender
N=2490

Discriminatory Grounds	Men	Women
Not Relevant	73%	42%
Relevant (by inference)	27%	58%
Total	100%	100%
Basis of Perceived Discrimination:		
• Gender	3%	49%
• Race or Ethnic Background	11%	6%
• Non-Canadian Qualifications	4%	3%
• Non-Canadian Experience	4%	3%
• Sexual Orientation	>1%	>1%
• Age	8%	19%
• Disability	1%	1%

In Figure No. 44, *the majority (58%) of women in the survey report that they have experienced discrimination in a work-related matter other than promotion. For men, the proportion is also high: 27%.* In the case of women, gender (49%) and age (19%) were the dominant factors. For men, racial or ethnic background (11%) and age (8%) predominate.

Figure No. 45 summarizes the same data comparing domestic engineering graduates and international graduates.

Figure No. 45

Percentage of Survey Respondents reporting that "In [their] opinion [they] had experienced other types of discrimination (i.e., not promotion-related)",
Domestic compared to International Graduates
N=2683

Discriminatory Grounds	Domestic Graduates	International Graduates
Not Relevant	68%	46%
Relevant (by inference)	32%	55%
Total	100%	100%
Basis of Perceived Discrimination:	17%	9%
• Gender	7%	28%
• Race or Ethnic Background	>1%	22%
• Non-Canadian Qualifications	>1%	22%
• Non-Canadian Experience	>1%	0%
• Sexual Orientation	12%	8%
• Age	1%	2%

As in Figure No. 44, the reported experience of discrimination rises, across the board, when the survey question is not confined to promotions. Almost a third of domestic graduates (32%) report that they have experienced discrimination. For international graduates, the proportion is 55%. Again, for international graduates, the principal factors are racial or ethnic background (28%), non-Canadian qualifications (22%) and non-Canadian experience (22%). Age discrimination is an important issue for both domestic and international graduates, but more so for domestic graduates (12% versus 8%).

Perceptions of Access to Opportunities

Figure No. 46 on the following page summarizes how men and women in the survey perceived access for men and women across a range of workplace opportunities. The data shows the following:

- across-the-board, *women in the survey perceived men to have better access to every type of workplace opportunity, without exception*. In some instances, the perceived difference in access was dramatic.
- *men also see themselves as having better access to some workplace opportunities, though they believe women have better access in others*.
- most striking among the perceptions of men in the survey is that they perceive men to have significantly more access to field assignments (18.6%) and to promotion to executive ranks (19.5%). However, perceptions appear to be divided on access to networking with influential people, being recognized as having high potential value, and being promoted into middle management. Indeed, somewhat more men see women as being favoured for promotion into middle management than they do men.
- for women the perceived greater access to opportunities for men is sometimes quite significant. For example, *a third of women believe that men have more access to field assignments, high profile assignments, internal networking with influential people, recognition as having a high value, and being promoted into middle management. Half of women perceive men as having more access to promotion into executive management*.

The only conclusion that can be drawn from these data is that, in this survey, roughly a third of women perceived a significant and systemic gender bias in the workplace and that as many as half of women perceived gender bias on factors such as access to promotion into executive management.

A second inference that emerges from the data is that somewhere between 5% and 10% of men perceive reverse discrimination, *i.e.*, they perceive that women have better access across a range of workplace opportunities.

Figure No. 46

Perceptions of Men's and Women's Access to Various Types of Opportunity, by Gender
Men: N=1781 to 1803 depending on Factor
Women: N=656 to 661 depending on Factor

Men's Perceptions	Better Access for Men	Better Access for Women	Equal Access	Not Relevant	Total
a) Entry level engineering jobs	5.8%	**9.9%**	75.4%	8.9%	100.0%
b) Field assignments	**18.6%**	2.4%	63.3%	15.7%	100.0%
c) High profile assignments	**9.8%**	**7.9%**	70.1%	12.2%	100.0%
d) Lateral transfers	3.5%	6.4%	74.8%	15.3%	100.0%
e) Training	1.7%	4.3%	82.5%	11.5%	100.0%
f) Information about internal job openings	1.7%	2.8%	83.4%	12.1%	100.0%
g) Internal networking with influential people	8.2%	10.1%	69.9%	11.8%	100.0%
h) Being recognized as having high potential value	7.3%	9.2%	73.8%	9.7%	100.0%
i) Promotion into middle management ranks	**9.4%**	**11.5%**	66.9%	12.2%	100.0%
j) Promotion into executive management ranks	**19.5%**	**7.7%**	58.9%	14.0%	100.0%
k) Being mentored or sponsored by a more senior engineer or manager	4.5%	9.1%	70.1%	16.4%	100.0%
l) Contact with clients or customers	4.2%	5.0%	80.0%	10.8%	100.0%

Women's Perceptions	Better Access for Men	Better Access for Women	Equal Access	Not Relevant	Total
a) Entry level engineering jobs	**7.1%**	5.0%	82.1%	5.7%	100.0%
b) Field assignments	**33.7%**	0.9%	52.6%	12.8%	100.0%
c) High profile assignments	**34.4%**	1.4%	56.5%	7.8%	100.0%
d) Lateral transfers	**12.1%**	2.1%	73.0%	12.7%	100.0%
e) Training	**7.6%**	1.1%	85.7%	5.6%	100.0%
f) Information about internal job openings	**8.2%**	1.1%	79.3%	11.4%	100.0%
g) Internal networking with influential people	**36.9%**	2.6%	54.1%	6.4%	100.0%
h) Being recognized as having high potential value	**33.2%**	2.4%	59.0%	5.3%	100.0%
i) Promotion into middle management ranks	**33.9%**	2.6%	54.6%	9.0%	100.0%
j) Promotion into executive management ranks	**50.5%**	1.4%	37.7%	10.5%	100.0%
k) Being mentored or sponsored by a more senior engineer or manager	**20.2%**	2.9%	61.9%	15.0%	100.0%
l) Contact with clients or customers	**16.3%**	2.6%	74.1%	7.0%	100.0%

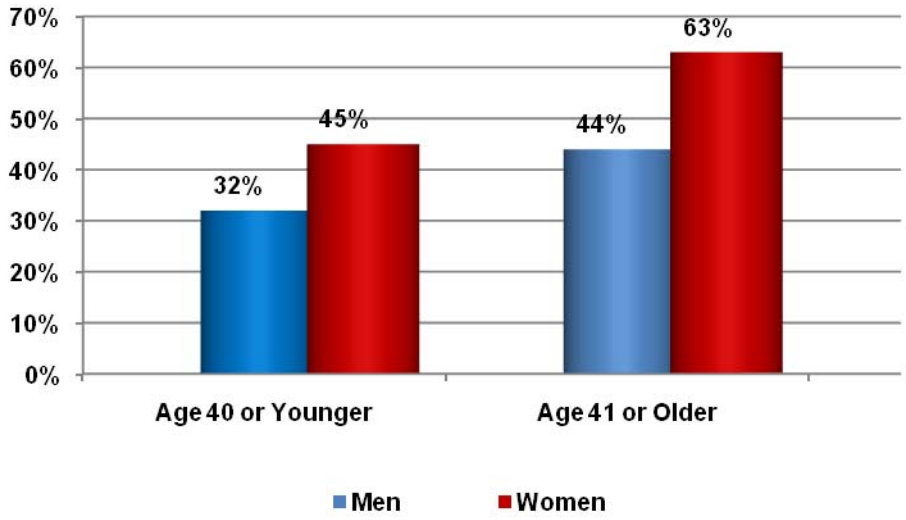
Bullying

The Canadian Centre for Occupational Health and Safety defines bullying as:

> "acts or verbal comments that could mentally hurt or isolate a person in the workplace. Sometimes, bullying can involve negative physical contact as well. Bullying usually involves repeated incidents or a pattern of behaviour that is intended to intimidate, offend, degrade or humiliate a particular person or group of people. It has also been described as the assertion of power through aggression."[6]

Figure No. 47 shows the incidence of bullying as reported by survey participants, broken out by gender and major age group.

Figure No. 47
Incidence of Experience of Bullying, by Gender
N=2433



In the first place, it is striking that *the reported experience of bullying is quite high for both men and women: 39.4% for men and 50.9% for women.* The high proportion of both men and women who report that they experienced bullying is consistent with the high proportion of both men and women who report some experience of discrimination in the workplace. *Based on this survey, bullying is clearly not confined to 'blue collar' workers, nor is it strictly speaking a gender issue, although more women than men report experiencing bullying.*

> *"...I am currently unemployed. I was bullied out of my past job…I was the first woman ever employed there…My new manager bullied me and my employer would not support me…I have 2 dependent children and have been surviving on EI for awhile."*
> Survey Response

[6] More information is available at www.ccohs.ca.

There was no significant difference in the reported incidence of bullying among international graduates and domestic graduates: 42.9% of domestic graduates reported being bullied, while for the international graduates, the comparable proportion was 42.1%.

> *"Recognize bullying in the workplace. It affects everyone. But women in particular are seen as easier targets. Sometimes bullying behaviour is perpetrated by other women in higher positions."*
>
> Survey Response

It should be noted that the survey data did not explore the patterns of bullying, *i.e.*, the degree to which bullying was gender-based (*e.g.*, men against women), authority-based (managers against subordinates), or ethnically based.

Perceptions of Reverse Discrimination

Roughly 70% of survey respondents reported that their workplace had an employment equity policy in place. Approximately one male in eight in the survey (12.6%) indicated that these policies had negatively affected their careers. (A small proportion of women - 2.4% - also indicated that these policies had adversely affected their careers)

Employment equity literature often identifies the need for role models to encourage members of minorities to aspire to greater opportunities. In this survey, 8.9% of men reported that fostering role models had adversely affected their careers. These data are consistent with Figure No. 46 which suggested that around 7-8% of men, depending on the issue, perceived that women have more access than men to various types of workplace opportunity.

> *"Elimination of the reverse discrimination against white men who earned their engineering credentials in Canada ... I am tired of being told that I cannot be hired because (as a white man who earned his engineering credentials in Canada) I cannot contribute to increasing the diversity of the workplace."*
>
> Survey response

12: Workplace Culture

Working Hours

Figure No. 48 shows that, on average, men in the survey reported working an average of 42.5 hours per week and women reported working an average of 41.0. A greater proportion of men than women reported working 50 or more hours per week.

Figure No. 48
Hours Worked per Week, by Gender
N=2452

	Mean Average Hours per Week	Percent Working 50 or More Hours per Week
Men	42.5	23.5%
Women	41.0	15.1%
Total	42.1	21.2%

The higher average hours reported by men appear to reflect the greater proportion of men in the survey who were in managerial positions. Figure No. 49 shows average hours per week by job status

Figure No. 49
Hours Worked per Week by Job Status
N=2605

Job Status	Mean Average Hours per Week
Non-Managerial	41.3
Management (excl Senior)	44.4
Senior Management	47.6
Self-Employed	37.2

Figure No. 50 shows that there are significant differences in the proportion of survey respondents reporting long hours across industries.

Figure No. 50

Percent of Respondents in an Industry reporting that They Work 50 or More Hours per Week

Industry	Percent of Respondents Reporting Average Weekly Hours of 50 or More	Number of Respondents
Wholesale or Retail Trade	50.0%	14
Management of Companies, Administrative and Other Support Services	43.8%	16
Education	41.8%	55
Construction	**35.8%**	**162**
Culture and Recreation	33.3%	3
Finance, Insurance, Real Estate and Leasing	30.8%	13
Mining	28.3%	145
Information	24.1%	29
Manufacturing	**23.8%**	**470**
Oil and Gas	23.8%	143
Other	22.7%	174
Health Care and Social Assistance	21.4%	14
Agriculture	21.1%	19
Utilities	**18.8%**	**234**
Consulting	**17.0%**	**710**
Transportation and Warehousing	16.2%	37
Other Services	14.7%	34
Forestry	12.5%	8
Military	8.3%	24
Government (Public Administration)	**8.3%**	**303**
Average for Total Survey Sample irrespective of Industry	20.9%	2607

The survey data do not point to systemically high hours across the profession. However, it is evident from Figure No. 48, that a significant proportion of engineers do work long hours. Figure No. 50 shows that long hours are more common in some industries than in others. Among the industries that account for a large proportion of total employment, high hours are clearly a factor in construction and in manufacturing, but less so in utilities, consulting and government.

> *"[omitted] has not served the interest of its members by not coming forward and taking action against unpaid work that corporations continue to extract from their employees."*
>
> Survey Response

Roughly one male engineer in eight (12.4%) and approximately one female engineer in five (18.4%) reported that dissatisfaction with long hours was a reason for leaving an engineering job in the past five years.

Reasons for Leaving an Engineering Job

Figure No. 51 shows that a high proportion of engineers left an engineering job in the past five years.

Figure No. 51
Percent of Respondents who Reported Leaving an Engineering Job in the Past Five Years N=2479 by Gender; N= 2658 by Domestic-International Graduate Status

	Percent who Left an Engineering Job in the Past Five Years
Men	71.6%
Women	63.6%
Domestic Graduates	67.8%
International Graduates	77.1%

Of those who provided a reason for leaving a previous job, just under half (47.7%) reported leaving because they were dissatisfied with some characteristic of the job or the workplace. Figure No. 52 summarizes responses to this question. (Note that fewer than half of the survey respondents who reported leaving an engineering job in the past five years provided a reason.)

Figure No. 52
Reasons for Leaving an Engineering Job in the Past Five Years N=768

Reasons for Leaving	Men	Women
Promoted out of engineering work	5.0%	3.7%
Received a better job offer for an engineering job with a different employer	39.5%	40.2%
Received a better job offer for a non-engineering job with a different employer	4.2%	3.7%
Relocated for reasons unrelated to my employer	9.7%	11.5%
Dissatisfied with type of job duties	17.2%	23.8%
Dissatisfied with travel requirements	7.1%	10.2%
Dissatisfied with long hours	12.4%	18.4%
Dissatisfied with management	26.7%	32.8%
Dissatisfied with work environment	16.8%	25.8%
Dissatisfied with limited opportunities for skill development	13.7%	19.3%
Dissatisfied with limited opportunities for advancement	21.8%	25.4%
Employer downsized	18.9%	11.5%
Other	11.8%	10.7%

In general, women were more likely to cite dissatisfaction as a reason for leaving an engineering job than men. Downsizing was more likely to have affected men than women. This may reflect the concentration of downsizing in manufacturing where engineering employment is more skewed to men than in some other sectors.

Written Company Policies

Workplace policies that assist in balancing family obligations with work requirements include flexible hours, access to unpaid leave, employee assistance programs (EAPs), formal work/family balance policies, and supplements to Employment Insurance benefits for maternity and parental leave. Policies that seek to redress actual or perceived discrimination include training and awareness programs for supervisors, employment equity policies, and role models.

Figure No. 53 shows the incidence of these policies and their perceived impact.

Figure No. 53
Reported Impact of Workplace Policies on Women and Men
N= 1319 to 2150 depending on Policy

Workplace Policy	Impact on Women			Impact on Men			No Policy
	Positive	Neutral	Negative	Positive	Neutral	Negative	
Flexible Hours	**78.2%**	20.3%	1.5%	71.0%	26.0%	3.0%	36.5%
Policy against Sexual Harassment	**68.0%**	30.8%	1.2%	50.7%	46.0%	3.3%	14.4%
Employment Equity Policy	**57.0%**	40.6%	2.4%	43.7%	43.7%	**12.6%**	30.3%
Training or Awareness for Supervisors	**58.1%**	39.6%	2.3%	51.3%	42.7%	6.0%	56.0%
Training or Awareness for Non-supervisors	**56.8%**	41.0%	2.3%	51.0%	43.0%	6.0%	64.8%
Employee Assistance Program (EAP)	**62.7%**	36.4%	0.8%	59.4%	39.2%	1.3%	30.0%
Work / Family Balance Policy	**58.0%**	38.3%	3.7%	52.9%	42.3%	4.8%	82.1%
Supplement EI for Maternity Leave	**76.7%**	20.2%	3.1%	51.3%	42.7%	6.0%	69.6%
Supplement to EI for Parental Leave	**69.7%**	27.3%	3.0%	62.0%	31.4%	6.6%	82.8%
Unpaid Leave	**49.6%**	46.6%	3.8%	47.4%	47.3%	5.3%	36.4%

Across the board, all of these policies are viewed as having a positive impact on women's careers by both men and women. A minority of respondents (12.6% of men and 2.4% of women) see employment equity policies having negative implications for men.

Unwritten Company Policies

Unwritten rules are a reality of every workplace. These unwritten rules are often central to workplace culture. Working long hours, travelling extensively, or being available for early morning or late evening meetings may be unstated expectations of engineers in some workplaces.

Figure No. 54 shows the perceived incidence of various unwritten rules or expectations. There was virtually no difference between men and women on their perception of these unwritten rules or expectations.

Figure No. 54
Reported Incidence of Unwritten Rules or Expectations
N= 2578 to 2613 depending on Factor

Unwritten Rules and Expectations	Percentage of Respondents Identifying the Degree to which Unwritten Rules Apply in Their Workplace (Scale 1-10)			
Unwritten Rule or Expectation	Low (1-3)	Moderate (4-7)	High (8-10)	Total
Working long hours	19.9%	42.8%	**37.3%**	100.0%
Engaging in non-engineering work tasks	17.2%	45.5%	**37.3%**	100.0%
Having field experience	17.1%	49.2%	**33.6%**	100.0%
Travelling extensively	42.0%	41.7%	16.3%	100.0%
Being available for early morning or late evening meetings	33.2%	37.8%	**29.0%**	100.0%
Taking external courses	42.6%	45.6%	11.7%	100.0%
Being a sponsor or mentor to junior engineers	45.5%	41.7%	12.9%	100.0%
Pursuing additional degrees	69.8%	26.4%	3.7%	100.0%
Establishing good client relationships	9.9%	29.4%	**60.7%**	100.0%
Having a partner or spouse	78.4%	17.2%	4.4%	100.0%
Having a family	77.3%	17.9%	4.8%	100.0%
Putting career first	33.3%	45.3%	21.4%	100.0%
Having a consensus-building style	22.3%	50.3%	27.3%	100.0%

Figure No. 54 should be read in conjunction with Figure No. 55. Figure No. 55 reports survey participants' response to a question which asked for a self-evaluation of how respondents had met the expectations for success in their organization. These 'expectations for success' include both formal and informal expectations. Survey participants ranked themselves on a scale of 1-10. The mean score for men was marginally higher than for women (7.5 versus 7.2). Figure No. 55 shows that this difference is explained by the somewhat larger proportion of men who self-evaluated themselves as high achievers.

Figure No. 55
Respondents' Self-Assessment of
How Well They Had Met their Organization's Expectations for Success (Scale 1-10)
N= 2467

	Men	Women
Low (1-3)	3.4%	3.3%
Moderate (4-7)	39.7%	46.1%
High (8-10)	56.8%	50.6%
Total	100.0%	100.0%
Mean Average Score	7.5	7.2

Comparing Figures No. 54 and No. 55 suggest that the gender difference in the proportion of high achievers may be explained (wholly or partially) by the differential impact of unwritten rules and expectations. *An organization's unwritten rules may have different effects on men and women. Long hours, extensive travel, and early morning or late evening meetings may conflict with family obligations when those obligations are shared disproportionately by women*. As well, a third of survey respondents reported that having field experience was an unwritten expectation in their workplace. Figure No. 46 in the previous chapter showed that both men and women perceived that men had greater access to field assignments.

13: Addressing Gender Imbalances

There is a growing literature that explores gender imbalances in the engineering profession.[7] Explanations have variously focused on allegedly innate biological differences with respect to an aptitude for mathematics and science, socialization factors at the level of the family, expectations that are communicated by the education system, peer pressure on young women, perceptions and mis-perceptions of engineering and science careers, system biases in the workplace, *etc*.

This survey covered (almost exclusively) practising engineers. Therefore, women who have abandoned engineering as a profession were unlikely to participate in the survey. And, of course, only graduates of an engineering program were invited to participate. Consequently, young women who had consciously chosen not to pursue engineering studies at the undergraduate level were not included in the survey sample. This survey, therefore, cannot explain why so many young women chose not to study engineering. However, the survey did ask respondents why they believe there is such a low proportion of women in the engineering profession and how they evaluated various actions intended to redress the imbalance. Some of these opinions may be based on personal experience. Others may be based on second-hand information. The information that individuals relied on to shape their opinions may be current or may be dated.

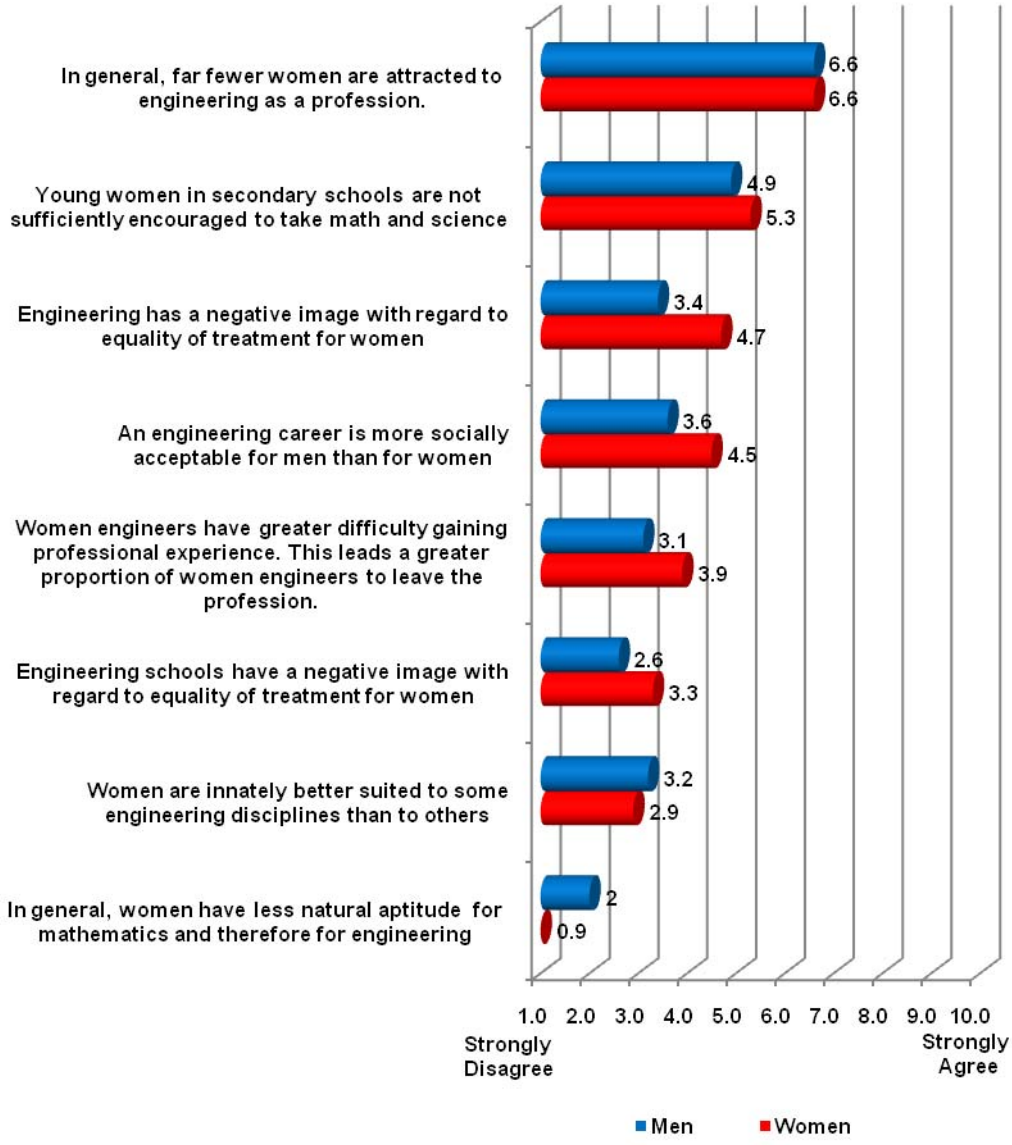
Why are there So Few Women in Engineering?

The survey asked respondents to rank on a scale of 1-10 how valid they considered a particular explanation to be for the low representation of women in engineering. Figure No. 56 on the following page summarizes the mean scores by gender.

[7] For more information, see *Engineering and Technology Labour Market Study: Right for Me? A Study of Factors that Shape the Attitudes of Young Women towards Mathematics and Science and towards Careers in Engineering and Technology*, prepared by Prism Economics and Analysis for Engineers Canada and the Canadian Council of Technicians and Technologists, March 2009. Available at: http://etlms.engineerscanada.ca/media/Young%20Women-%20Factors%20shaping%20attitudes%20towards%20mathematics,%20science,%20engineering%20and%20technology%20careers1.pdf.

Figure No. 56

Respondents' Assessment of the Validity of Suggested Reasons Why There Are More Men in Engineering than Women, Mean Score on a Scale of 1-10[8]
N= 1786 to 1801 depending on Factor



It is noteworthy in Figure No. 56 that *while there are moderate differences in the understanding of men and women on what causes the gender imbalance in engineering, the differences are generally not dramatic*. This is a positive indication on the prospects for achieving a measure of consensus in the profession. On the other hand, there are no suggested explanatory factors for the profession's gender imbalance that attract strong support.

[8] To conform to common practice, data are graphically presented as the inverse of survey results, such that in Figure No. 56, Strongly Disagree = 1 and Strong Agree = 10. In the survey, Strongly Disagree was 10 and Strongly Agree was 1.

In this survey, large numbers of both men and women, rejected a biological explanation, namely that 'in general, women have less natural aptitude for mathematics and therefore for engineering.' This view commands almost no support among women and only limited support among men.

In the main, both men and women discounted as an explanation for gender imbalance the suggestion that 'engineering schools have a negative image with regard to their treatment of women'. This suggests that most engineering schools have made considerable progress in countering what may have been negative images for women considering engineering. Mean scores on this factor were 2.6 (men) and 3.3 (women) where 1.0 represents 'strongly disagree' and 10.0 represents 'strongly agree'.

Similarly, both men and women discount the view that 'women have more difficulty gaining professional experience' and therefore qualifying as professional engineers. Mean scores on this factor were 3.1 (men) and 3.9 (women).

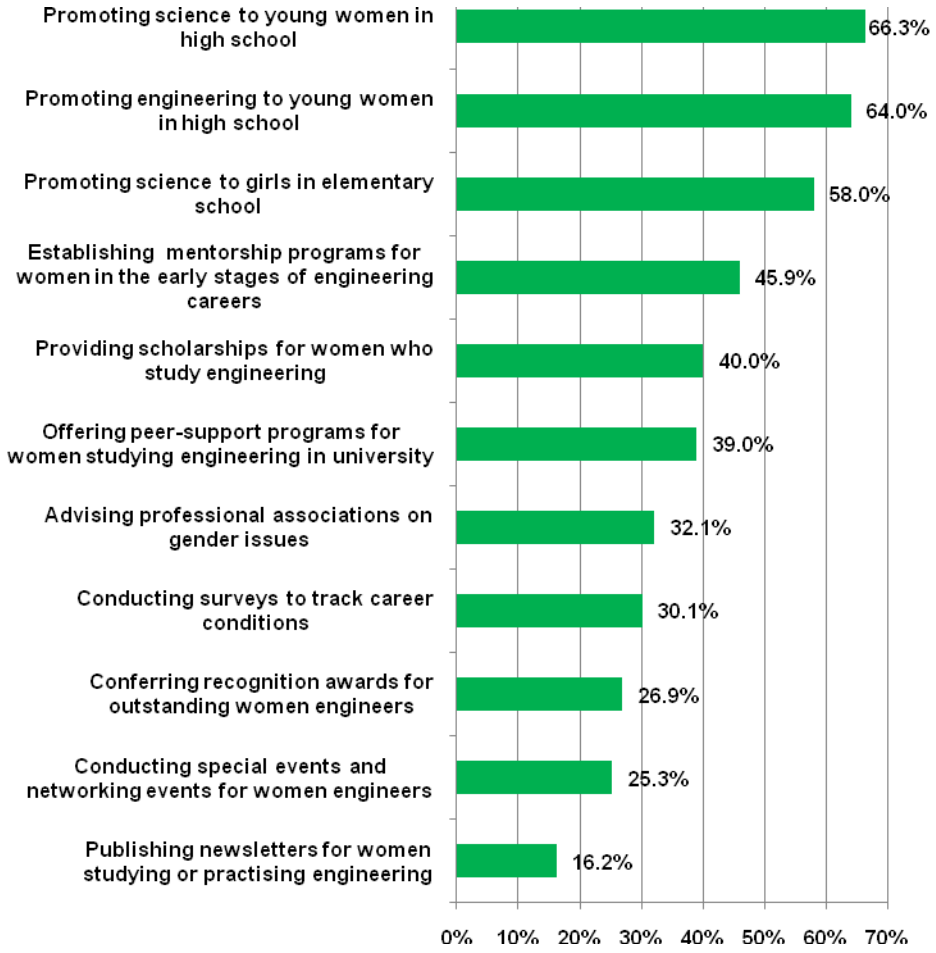
There is moderate support, but still not broad support, for the view that 'young women in secondary schools are not sufficiently encouraged to take math and science'. Mean scores on this factor were 4.7 (men) and 5.1 (women).

Measures to Address the Gender Imbalance

Survey participants were canvassed on how important they regarded various measures to address the gender imbalance in engineering and how they evaluated those efforts. Figure No. 57 shows the proportion of respondents who identified specific measures to address gender imbalance in as 'very important'.

Figure No. 57

Percent of Respondents Identifying Specific Measures to Address the Gender Imbalance in Engineering as "Very Important"
N= 2293 to 2349 depending on Specific Measure



It is noteworthy that the *survey participants assigned the highest importance to those measures that focus on young women in high school and elementary school.*

Survey participants were also asked how they perceived the quality of the current effort in each of the areas cited. It should be noted that 40-60% of respondents reported that they did not know about the quality of efforts being made. Figure No. 58 shows the proportion of respondents who ranked the current quality of effort as "good to excellent".

Figure No. 58

Percent of Respondents Evaluating the Current Quality of Efforts on Specific Measures to Address the Gender Imbalance in Engineering as "Good to Excellent"
(N= 1195 to 1225 and 717 to 735 depending on Specific Measure

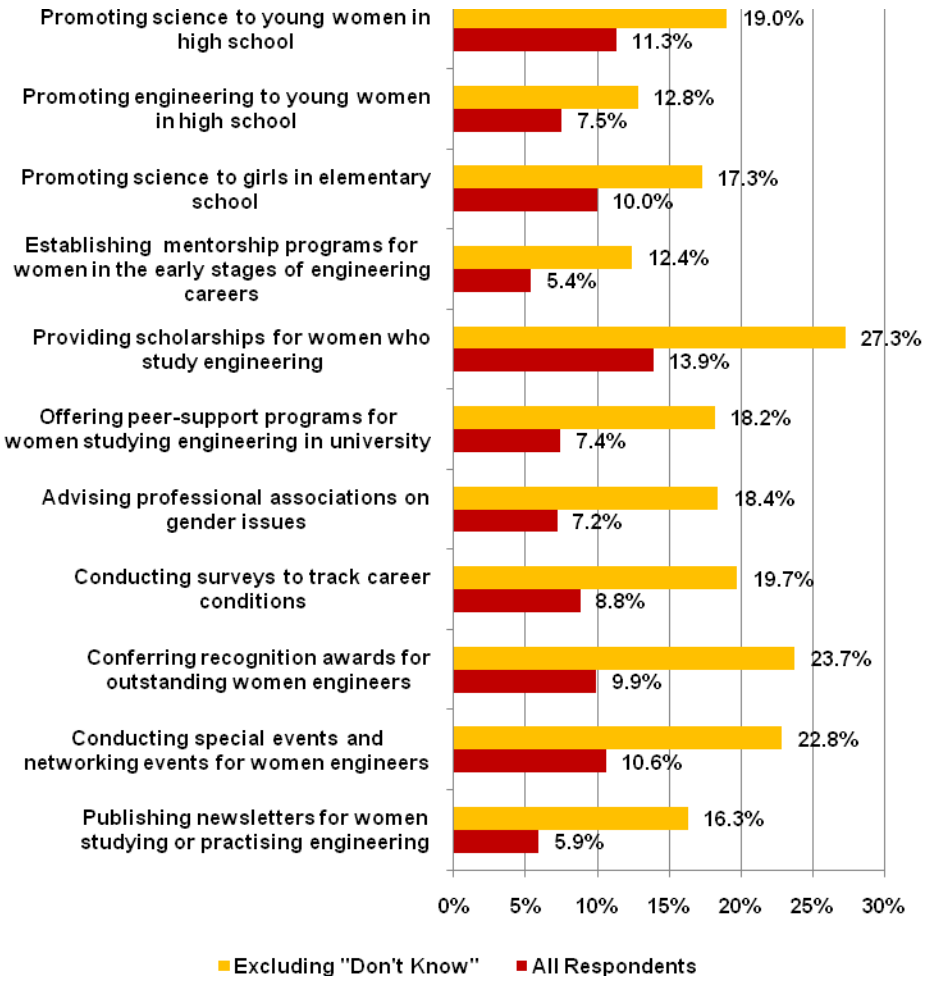


Figure No. 58 shows that, when respondents indicating that they "don't know' are excluded, only a quarter or fewer of survey participants evaluated the current efforts as "good to excellent". The clear message from the survey is that there is substantial room for improvement on all measures. For example, two thirds of respondents judged "promoting science to young women in high school" to be "very important". However, of those who felt that they knew enough about these efforts to form an opinion, only 19.0% assessed them as being "good to excellent".

14: Comparing the *2010 Survey* to the *1994 Survey*

The *1994 Survey* was a traditional pen-and-paper survey that was mailed to members. Completed surveys were received from 3,084 persons. This compares to 2,846 valid responses to the *2010 Survey* which was administered over the web at a much lower cost per completed survey.

The *2010 Survey* was longer than the *1994 Survey* and addressed a number of themes not covered in the *1994 Survey*, including licensure policies of employers, continuing professional development, finding an engineering job, and the role of mentorship. The *2010 Survey* also examined the experience of international engineering graduates who have become a much more significant component of the engineering work force since 1994.

The two surveys had a number of common themes. These included: gender patterns in engineering disciplines, job and career satisfaction, the career impact of taking a leave-of-absence, the incidence of discrimination, perceptions of opportunity and equal (or unequal) treatment, and how more women can be encouraged to enter the engineering profession. In the *2010 Survey*, some of these issues were examined in more detail. There were also changes to question design and the phrasing of questions. For these reasons, the results of the two surveys are not strictly commensurate with one another. However, comparing the results from the surveys does indicate areas where positive change has occurred and other areas where it is much more difficult to discern significant progress. It should also be borne in mind, that since 1994 there have also been changes in the legal and human resources management environment. Employment equity plans are now much more common. Employers are more cognizant of their liabilities arising from harassment. In some jurisdictions, there have been statutory changes dealing with harassment in the work place. Parental leave was comparatively new in 1994, whereas today, the statutory entitlement and related EI benefits have been in place for almost twenty years.

Engineering Disciplines:
The gender patterns in fields of specialization that were evident in 1994 continue to be evident in 2010. The major change from 1994 is the emergence of Environment Engineering as a significant field of specialization. In the *2010 Survey*, 3.6% of men and 11.7% of women identified Environmental Engineering as their field of specialization.

Job and Career Satisfaction:
Respondents to both the 1994 and the 2010 surveys reported high levels of satisfaction with engineering as a career choice and with their current engineering job. The *1994 Survey* asked respondents to evaluate their "advancement prospects": 55% of men and 53% of women judged their prospects to be favourable. The *2010 Survey* asked respondents to report their satisfaction with their "career prospects": 67% of men and 72% of women reported that they were "very satisfied" or "somewhat satisfied" with their "career prospects". This may indicate an improvement. If so, it could reflect positively on changes that have taken place in undergraduate engineering education and in patterns of post-graduate qualification among professional engineers. Alternatively, the difference in the *2010 Survey* could reflect the change of wording.

Differences in economic conditions may also be relevant, although the economic environment was problematic in both 1994 and 2010.

Career Impact of Leaves-of-Absence:
The 1994 Survey found that 38% of women and 23% of men reported a negative impact on their career from taking a leave-of-absence. The *2010 Survey* asked a similar question, but distinguished across different types of leave. Nevertheless, it is difficult to read the *2010 Survey* results as showing any significant change in the perceived negative impact of taking a leave-of-absence.

Perceptions of Differences in Opportunity:
A central finding of the *1994 Survey* was that for certain types of opportunity there was a perception among women of significantly less access. A significant minority of men in the *1994 Survey* agreed with this perception of unequal access. The *2010 Survey* asked many of the same questions. As can be seen from Figure No. 59, *a comparison of the two surveys suggests that on some factors (e.g., field assignments, being recognized as having high potential value, and promotion into middle management) perceptions of unequal access are substantially the same. On other factors (e.g., high profile assignments, internal networking, mentoring, and promotion into executive management) there is still a significant perception of unequal access, but there appears to have been notable progress*.

Figure No. 59
Percent of Women Perceiving Better Access for Men to Certain Workplace Opportunities: 1994 Survey compared to 2010 Survey

	1994	2010
Field assignments	37%	34%
High profile assignments	40%	34%
Internal networking with influential people	54%	37%
Being recognized as having high potential value	37%	33%
Promotion into middle management ranks	37%	34%
Being mentored or sponsored by a more senior engineer or manager	43%	20%
Promotion into executive management ranks	66%	51%

These results suggest two messages. The first is a positive reflection on the efforts of professional associations and organizations, such as WEAC, that advocate the need for positive measures to narrow the opportunity gap and thereby increase diversity in the workplace. The second message is that there is still a considerable amount of work to do to achieve a perception of equal access and, by implication, greater diversity in the engineering workplace.

Discrimination:
Both the *1994 Survey* and the *2010 Survey* asked participants about their experience of discrimination. In the *1994 Survey*, only gender-based discrimination was surveyed. The questions in the two surveys differed. Figure No. 60 compares results to approximately comparable questions.

Figure No. 60
Percent of Women Perceiving Workplace Discrimination:
1994 Survey compared to 2010 Survey

1994 Survey Women Respondents				2010 Survey Women Respondents		
	Women's Perceived Extent of Gender-based Barriers / Discrimination					
	Great	Moderate	Total		All Grounds	Gender
Past Personal Experience	20%	52%	72%	Passed over for Promotion	37%	28%
Current Experience	10%	46%	56%	Other Types of Discrimination	55%	45%

Comparing the two surveys, however, suggests that there has been progress in reducing perceived discrimination on the basis of gender. However, the *2010 Survey* results show that perceived discrimination is still a serious problem in the workplace.

Employment Equity:
In the *1994 Survey*, half to three-quarters of respondents indicated that their workplace had an employment equity program and that its impact on women was positive. In the *2010 Survey*, 70% of respondents reported that there is an employment equity policy or strategy in their workplace; 57% of women respondents indicated that this policy or strategy as providing a positive benefit for women.

Why So Few Women become Engineers:
The share of women in engineering occupations has increased moderately, based on the 1996 and 2006 Census. In 1996, women represented 8.8% of engineers. By 2006, that proportion had increased to 12.2%. Perhaps more importantly, women accounted for 24% of the increase in the number of engineers between 1996 and 2006. Change is slow, but it is occurring.

In both the *1994 Survey* and the *2010 Survey*, participants were asked why there were so few women in engineering and what steps could be taken to address the imbalance. Both surveys identified similar factors discouraging women from entering the profession. In the *2010 Survey* somewhat less importance was attached to the negative image among women of engineering schools and the profession. This may reflect differences in the way the questions were designed or the impact of various outreach programs that have been initiated by engineering schools and by

many professional associations. Respondents to the *2010 Surv*ey appear to put more emphasis on the career choices and subject choices made by young women while they are in high school and on outreach programs intended to influence these choices.

15: Conclusions and Implications

Profile of Engineering Work

Design, management, and project engineering account for 70% of the work done by engineers, based on the *2010 Survey of Working Conditions for Engineers*. This is equally true for men and women and for domestic and international engineering graduates. Six industries account for more than 85% of engineering employment: consulting, manufacturing, government, oil and gas, utilities, and construction. Human resources management policies and workplace culture in these industries are the principal determinants of career opportunities and working conditions for the vast majority of engineers.

For survey respondents age 35 or younger, there was no difference between men and women in average job tenure. In the age group 36-40, women reported longer average job tenure. Men reported longer average job tenure in the age group 41-60. For both men and women, the expected exit rate from engineering increases sharply in the mid-to-late 40s and continues to rise thereafter.

There are differences between men and women in their undergraduate specialization preferences and the fields in which they are more likely to be employed. In the *2010 Survey*, 16.7% of women reported that they worked in environmental engineering, compared to only 6.4% of men. Conversely there were higher proportions of men working in mechanical, electrical and industrial engineering (33.3% vs. 20.3%). More women, however, reported working in civil engineering (19.8% vs. 14.7%).

The 2010 Survey confirms other surveys that show considerable technical mobility on the part of engineers. On average, just under half of survey respondents (47.5%) were working in a field that is different from their undergraduate specialization.

Among respondents age 40 or younger, more men than women described their jobs as managerial (25% vs. 22%). Among all survey participants who described their jobs as non-managerial, 21% of men compared to 15% of women worked in a (self-described) 'senior engineering job'. In the age group 41 or older, 44% of men were in managerial jobs compared to 40% of women. These data suggest that women engineers have made considerable progress in closing the opportunity gap with men, but that a gap still remains.

Approximately 21% of survey respondents report working more than 50 hours per week. In some industries (e.g., construction), the incidence of long hours is markedly higher.

Licensure

Owing to a lack of comparable survey data for earlier periods, it cannot be definitively concluded that employers' policies on licensure have weakened. However, the data in the *2010 Survey* support other survey findings which indicate that a large proportion of employers have policies which provide weak or no support to the system of professional licensure. This is especially the

case in the manufacturing sector where survey data indicate that only 23.4% of engineers working in that industry interpreted their employer as requiring a P.Eng/ing licence or requiring eligibility for licensure. More than 40% of survey participants working in manufacturing described their employer as having no preference or policy on licensure. The survey data suggest that there may have been a shift over time from policies that required a P.Eng/ing licence to policies that require eligibility for licensure or simply prefer, but do not require, a licence. In any event, these survey results should be cause for concern in professional associations.

Continuing Professional Development

The majority of respondents to this survey (61.7%) belong to one or more technical associations. Only 29.0% reported that their employers have a formal training and development plan for engineers. Larger firms were significantly more likely to have such plan. The survey data show considerable variation across industries in the prevalence of formal training and development plans for engineers. Engineers in the utilities sector were most likely to have such a plan (53%). In the consulting industry, the proportion falls to 31%. In manufacturing, the proportion of respondents with formal training and development plans is only 17%.

Finding an Initial Engineering Job

Virtually all (94.9%) of survey respondents who were Canadian engineering graduates reported that they sought a full-time engineering job after graduation. However, survey data indicate that of those who sought an engineering job after graduation, only 65.5% were successful. Many survey respondents appear to have taken non-engineering jobs, though they subsequently moved into an engineering job and thereby entered the licensure eligibility stream. We cannot derive from this survey an estimate of the number of engineering graduates who were unable to find an engineering job and never subsequently entered the licensure stream.

The *2010 Survey* supports the view that there is a shortage – possibly a growing shortage – of entry-level engineering jobs. Almost half of survey respondents (44.5%) reported search times of more than six months; 10.9% reported search periods longer than one year. Roughly 17% of graduates relied on personal or family connections to obtain an engineering job. If the shortage of entry-level jobs becomes more acute, the role of personal or family connections could become more prominent with potentially adverse implications for diversity and for ensuring equal opportunity for all who are qualified and talented.

Career and Job Satisfaction

The *2010 Survey* canvassed views on job satisfaction along three dimensions: satisfaction with engineering as a career choice, satisfaction with current job, and satisfaction with career prospects.

Satisfaction with engineering as a career choice is comparatively high: 83% for men and 86% for women. Engineers age 40 or younger are more likely to describe themselves as 'somewhat satisfied' rather than 'very satisfied'.

Three-quarters of survey respondents reported that they are satisfied with their current job as opposed to 18% who are not. There is no difference in the survey results between men and women.

More women (72%) described themselves as 'very satisfied' or 'somewhat satisfied' with their career prospects than men (67%). At the other end of the spectrum, roughly one survey respondent in five reported that they were dissatisfied with their career prospects.

Discrimination at Work

A striking finding of the *2010 Survey* is the widespread perception that discrimination is a serious problem in the workplace. More than a third of women (37%) report that they have experienced some type of discrimination in the awarding of promotions. For men, the comparable percentage is 24%. For women over the age of 40, the proportion that report they experienced discrimination in the awarding of promotions rises to 53%.

The majority of women (58%) also report that they have experienced discrimination in a work-related matter other than promotion. For men, the proportion is also high: 27%. In the case of women, gender (49%) and age (19%) were the dominant factors. For men, racial or ethnic background (11%) and age (8%) predominate.

Age discrimination emerges from the survey as a potentially important challenge for the engineering profession: 10% of men and 12% of women age 41 or older believe they have been passed over for a promotion by reason of their age.

The reported experience of bullying is also quite high for both men and women: 39.4% for men and 50.9% for women.

Perceived discrimination is a serious issue for international engineering graduates: 45% believe that they have been passed over for a promotion on discriminatory grounds. The most commonly cited grounds are racial or ethnic background (22%), non-Canadian qualifications (19%) and non-Canadian experience (20%).

It is clear from these survey results that the perception of discrimination in the workplace is a serious problem and may hamper efforts to broaden diversity in the engineering workplace.

Perceptions of Access to Opportunities

Women perceived men to have better access to every type of workplace opportunity, without exception. In some instances, the perceived difference in access was dramatic. A third of women see men as having better access to field assignments or high profile assignments; half of women

see men as having better access to promotion into executive management. Roughly one fifth of men agree with these perceptions.

Conversely, somewhere between 5% and 10% of men perceive reverse discrimination, i.e., they perceive that women have better access across a range of workplace opportunities.

Workplace Culture

Unwritten rules are a reality of every workplace. These unwritten rules are often central to workplace culture. Survey data show that many respondents see working long hours (37%), travelling extensively (34%), being available for early morning or late evening meetings (29%), or putting career first (21%) as unstated expectations of engineers. These unwritten rules may have different effects on men and women. Long hours, extensive travel, and early morning or late evening meetings, and putting career first may conflict with family obligations, especially if those obligations are shared disproportionately by women or if a woman is also a single parent. As well, a third of survey respondents reported that having field experience was an unwritten expectation in their workplace. As noted earlier, the survey data also showed that a third of women and a fifth of men see men as having greater access to field assignments.

Leave

Leaves-of-absence are intended to accommodate various needs. These include family-related obligations, personal illness and educational advancement, among others. The *2010 Survey*, however, confirms that many engineers believe that they pay a 'career price' for taking leave to which they are entitled either by statutory right or by virtue of employer policy. This is particularly important in terms of achieving equal opportunity in the engineering workplace. Among respondents over the age of 40, only 20% of men reported taking a leave-of-absence, compared with 70% of women. Maternity leave, of course, was the most significant contributor to the difference.

A significant number of women believe that they paid a 'career price' for taking leave: more than 40% of women reported that maternity leave, parental leave, or leave to attend to a family illness had negatively affected their career.

A large proportion of both men and women reported that taking stress leave had negatively affected their career. This suggests that there is a major job to be done in removing the stigma associated with stress leave.

Mentorship

Survey data show that mentorship is an important component of the engineering culture. Overall, 60.0% of domestic engineering graduates reported having either a formal or informal mentor, or both. For international graduates the comparable proportion was 47.1%. Respondents under the

age of 30 were substantially more likely to report having had both formal and informal mentors. Significantly, and perhaps unexpectedly, the importance of mentorship increases for mid-career professionals. Gender differences are not significant in the experience of mentorship or in the evaluation of its importance.

Addressing the Gender Imbalance

While there are moderate differences in the understanding of men and women on what causes the gender imbalance in engineering, the differences are generally not dramatic. Large numbers of both men and women, reject a biological explanation. In the main, both men and women also discount as an explanation for gender imbalance the suggestion that 'engineering schools have a negative image with regard to their treatment of women'. There is moderate support for the view that 'young women in secondary schools are not sufficiently encouraged to take math and science'.

Survey participants assigned the highest importance to measures that focus on young women in high school and elementary school. Two thirds of respondents judged 'promoting science to young women in high school' to be 'very important'. However, only 19.0% assessed these efforts as being "good to excellent". The clear conclusion from the survey is that there is a broad consensus that expanding and improving these outreach efforts should be a high priority for the profession.

Comparing the 1994 Survey to the 2010 Survey

The most striking conclusions that emerge from comparing the *1994 Survey* to the *2010 Survey* is the continuing perception of women of systemic inequality in access to opportunity. Perceived discrimination in the workplace continues to be significant, though there is evidence that its severity may have diminished since the *1994 Survey*. Similarly, there is evidence that suggests some narrowing of the opportunity gap between men and women, though the gap itself remains very much in evidence. The 'negative image' of engineering schools and the engineering profession is less of a concern in 2010. This may reflect the success of outreach efforts. Respondents to the *2010 Survey* appears to put even greater emphasis on outreach to young women in elementary and secondary school and to improving the quality of those efforts.

Appendix

2010 Survey of Working Conditions for Engineers

Women in Engineering Advisory Committee

Chair for Women in Science and Engineering - Ontario

Survey of Workplace Conditions for Engineers: An Initiative of the Women in Engineering Advisory Committee

Engineers Canada
Ontario Society of Professional Engineers - Women in Engineering Advisory Committee
Professional Engineers Ontario
Chair for Women in Science and Engineering - Ontario

No individuals will be identifiable through this survey.

You may save your survey results anytime and return to complete the survey at a later date.

To be able to return to your survey, click on this check box ☐

Then enter a user name and a password of your choice in the spaces below:

User name (up to eight characters): _____

Password (up to eight characters): _____

A. Your Education and Professional Qualifications

1. Do you have a Bachelor's degree in Engineering/Applied Science? ○ Yes ○ No

2. In what year did you receive your Bachelor's degree in Engineering or Applied Science? _____

3. Have you ever worked in an engineering job? ○ Yes ○ No

4. Would you describe your current job as an engineering job? (If you are not currently working, please provide information on your most recent job.) ○ Yes ○ No

5. What is your Canadian licensure status?
   - ○ P. Eng. / ing.
   - ○ Engineer-in-Training / Intern
   - ○ P. Eng. application pending or in process
   - ○ Restricted licence
   - ○ Lapsed licence (i.e., former P. Eng.)
   - ○ Application for P. Eng. refused or abandoned
   - ○ Never licensed. Never applied.

6. In what year did you receive your licence? _____

7. Are you a member of:
   - ○ A professional engineering licensing body
   - ○ A technician/technologist certifying body
   - ○ Ontario Society of Professional Engineers (Ontario Only)
   - ○ Réseau des ingénieurs du Québec

8. How many technical associations do you belong to? (If none, enter a zero) _____

9. If you are a member of OSPE, RIQ or a technical association, what benefits of membership are most important to you?
   - ☐ Opportunity to take technical training
   - ☐ Opportunity to take other types of professional development training
   - ☐ Opportunity to meet other engineers
   - ☐ Opportunity to attend conferences and seminars
   - ☐ Opportunity to learn of employment opportunities
   - ☐ Publications
   - ☐ Salary surveys
   - ☐ Career services
   - ☐ Affinity programs (e.g., insurance)
   - ☐ Advocacy on behalf of the profession
   - ☐ Other opportunities for networking
   - ☐ Other

10. If you are working in an engineering job, what is your current employer's policy on professional licensure for your job? (If you are not currently employed, please indicate your most recent employer's policy.)

- ○ Requires P.Eng.
- ○ Requires eligibility for P. Eng.
- ○ Prefers P. Eng., but does not require
- ○ No requirement or preference
- ○ Don't know
- ○ Not working in an engineering job

11. Have any of your Canadian employers required a P.Eng. for the job you performed? ○ Yes ○ No

12. Please indicate your educational qualifications:

- ☐ Bachelor of Engineering or Applied Science
- ☐ Master of Engineering or Applied Science
- ☐ PhD in Engineering or Applied Science
- ☐ MBA
- ☐ Other University Degree
- ☐ College / CEGEP Certificate

13. Please indicate the discipline which most closely describes the field in which you earned your undergraduate degree in engineering:

- ○ Aerospace / Aeronautical / Space
- ○ Bio-Science / Biological / Bio-Medical / Bio-Chemical Engineering
- ○ Chemical
- ○ Civil
- ○ Computer Engineering / Software Engineering
- ○ Electrical
- ○ Electronics
- ○ Engineering Science / Engineering Physics
- ○ Environmental
- ○ Geological and Related
- ○ Industrial / Manufacturing
- ○ Materials
- ○ Mechanical
- ○ Metallurgical
- ○ Mineral Resources / Mining
- ○ Nanotechnology
- ○ Nuclear
- ○ Petroleum and Gas
- ○ Systems
- ○ Transportation
- ○ Other

14. Please indicate the field in which you currently work

- ○ Aerospace / Aeronautical / Space
- ○ Bio-Science / Biological / Bio-Medical / Bio-Chemical Engineering
- ○ Chemical
- ○ Civil
- ○ Computer Engineering / Software Engineering
- ○ Electrical
- ○ Electronics
- ○ Engineering Science / Engineering Physics
- ○ Environmental
- ○ Geological and Related
- ○ Industrial / Manufacturing
- ○ Materials
- ○ Mechanical
- ○ Metallurgical
- ○ Mineral Resources / Mining
- ○ Nanotechnology
- ○ Nuclear
- ○ Petroleum and Gas
- ○ Systems
- ○ Transportation
- ○ Other

B. Starting a Career in Engineering in Canada

15. Did you earn your Bachelor's degree in Engineering/Applied Science in Canada? ○ Yes ○ No

** * You have completed 15% of the survey * **

For Graduates from Canadian Universities:

16. Did you seek an engineering job after you graduated? ○ Yes ○ No

17. If so, how long did it take you to find an engineering job after you graduated and commenced your job search?

Not applicable ○
Immediately ○
No. of months job searching _____

18. How did you find your first engineering job?

- ○ Continued into permanent employment from a co-op placement or internship
- ○ Continued into permanent employment from a summer job
- ○ Personal or family connection to employer
- ○ Applied for an advertised vacancy
- ○ University career fair
- ○ Other career fair
- ○ Placement firm ('head hunter')
- ○ Electronic Job Boards operated by a Professional Association or Technical Association
- ○ Referred to an employer by a non-family mentor
- ○ Other
- ○ Not relevant

19. In the early stages of your engineering career, was there a professional engineer who was formally identified as your mentor? **A formal mentor is an experienced professional engineer who was asked by your employer, a professional association, your university, or a community organization to provide you with career and professional guidance.** ○ Yes ○ No

20. Did your formal mentor provide you with advice on the licensure process? ○ Yes ○ No

21. Did your formal mentor assist you in obtaining the practical experience needed to qualify for professional licensure? ○ Yes ○ No

22. Did your formal mentor assist you in identifying training that would be helpful to your engineering career? ○ Yes ○ No

23. Did your formal mentor provide you with career advice? ○ Yes ○ No

** * You have completed 20% of the survey * **

24. In the early stages of your engineering career was there a professional engineer who was informally identified as your mentor? **An informal mentor is an experienced professional engineer to whom you turned for career and professional guidance, but who was not asked to fulfill that role by a professional association, your university, or a community organization.** ○ Yes ○ No

25. Did your informal mentor provide you with helpful advice on the licensure process? ○ Yes ○ No

26. Did your informal mentor assist you in obtaining the practical experience needed to qualify for professional licensure? ○ Yes ○ No

27. Did your informal mentor assist you in identifying training that would be helpful to your engineering career? ○ Yes ○ No

28. Did your informal mentor provide you with career advice? ○ Yes ○ No

** * You have completed 25% of the survey * **

For graduates from non-Canadian Universities:

29. In what year did you immigrate to Canada? _____

30. Did you hold a non-Canadian licence or certification as an engineer from a professional body prior to immigrating to Canada? ○ Yes ○ No

31. Did you have an engineering job lined up in Canada prior to immigrating to Canada? ○ Yes ○ No

32. If you did not have an engineering job lined up, were you able to find an engineering job after you immigrated to Canada? ○ Yes ○ No ○ N/A

33. If you found an engineering job in Canada, how many months did it take? _____ ○ N/A

34. Did you obtain additional educational qualifications in Canada, following your immigration to Canada?

- ☐ Graduate degree in engineering
- ☐ Other graduate degree
- ☐ College certification as technologist
- ☐ Additional college or university courses
- ☐ Professional licensure courses
- ☐ Other

35. In the early stages of your engineering career in Canada, was there a professional engineer who was formally identified as your mentor? **A formal mentor is an experienced professional engineer who was asked by your employer, a professional association, a university, or a community organization to provide you with career and professional guidance.** ○ Yes ○ No

36. Did your formal mentor provide you with advice on the licensure process? ○ Yes ○ No

37. Did your formal mentor assist you in obtaining the practical experience needed to qualify for professional licensure? ○ Yes ○ No

38. Did your formal mentor assist you in identifying training that would be helpful to your engineering career? ○ Yes ○ No

39. Did your formal mentor provide you with career advice? ○ Yes ○ No

** * You have completed 30% of the survey * **

40. In the early stages of your engineering career in Canada was there a professional engineer who was informally identified as your mentor? **An informal mentor is an experienced professional engineer to whom you turned for career and professional guidance, but who was not asked to fulfill that role by a professional association, your university, or a community organization.** ○ Yes ○ No

41. Did your informal mentor provide you with helpful advice on the licensure process? ○ Yes ○ No

42. Did your informal mentor assist you in obtaining the practical experience needed to qualify for professional licensure? ○ Yes ○ No

43. Did your informal mentor assist you in identifying training that would be helpful to your engineering career? ○ Yes ○ No

44. Did your informal mentor provide you with career advice? ○ Yes ○ No

** * You have completed 35% of the survey * **

45. On a scale of 1-10, how important do you think it is to have a professional mentor?

	1 Not Important	2	3	4	5	6	7	8	9	10 Very Important
a) Commencing an engineering career after graduation	○	○	○	○	○	○	○	○	○	○
b) Commencing an engineering career after immigrating to Canada with non-Canadian qualifications and experience	○	○	○	○	○	○	○	○	○	○
c) As a mid-career professional with approximately 10 years experience	○	○	○	○	○	○	○	○	○	○

** * You have completed 40% of the survey * **

C. Issues affecting Career Satisfaction

Career Satisfaction

	Not Relevant	1 Very Satisfied	2 Somewhat Satisfied	3 Neither Satisfied Nor Dissatisfied	4 Somewhat Dissatisfied	5 Very Dissatisfied
46. How satisfied are you with engineering as your choice of profession?	○	○	○	○	○	○
47. How satisfied are you with your current job?	○	○	○	○	○	○
48. How satisfied are you with your current career prospects?	○	○	○	○	○	○

49. On a scale of 1-10, how likely do you think it is that you will be in an engineering job in the future?

	1 Definitely Not in an Engineering Job	2	3	4	5	6	7	8	9	10 Definitely in an Engineering Job
a) Next year	○	○	○	○	○	○	○	○	○	○
b) Approximately five years from now	○	○	○	○	○	○	○	○	○	○
c) Approximately ten years from now	○	○	○	○	○	○	○	○	○	○

50. In your opinion, have you been passed over for a promotion because of your:

- ☐ Not Relevant: Have not been passed over for promotion
- ☐ Gender
- ☐ Race or ethnic background
- ☐ Non-Canadian qualifications
- ☐ Non-Canadian experience
- ☐ Sexual orientation
- ☐ Age
- ☐ Disability

51. In your opinion, have you experienced other types of discrimination pertinent to your career because of your:

- ☐ Not Relevant: Have not experienced discrimination
- ☐ Gender
- ☐ Race or ethnic background
- ☐ Non-Canadian qualifications
- ☐ Non-Canadian experience
- ☐ Sexual orientation
- ☐ Age
- ☐ Disability

52. In the past five years, have you left an engineering job? ○ Yes ○ No

** * You have completed 45% of the survey * **

53. If you left an engineering job in the **past five years**, please indicate what most closely reflected your reasons:

- ☐ Promoted out of engineering work
- ☐ Received a better job offer for an engineering job with a different employer
- ☐ Received a better job offer for a non-engineering job with a different employer
- ☐ Dissatisfied with type of job duties
- ☐ Dissatisfied with travel requirements
- ☐ Dissatisfied with long hours
- ☐ Dissatisfied with management
- ☐ Dissatisfied with work environment
- ☐ Dissatisfied with limited opportunities for skill development
- ☐ Dissatisfied with limited opportunities for advancement
- ☐ Relocated for reasons unrelated to my employer
- ☐ Employer downsized
- ☐ Other

54. Have you ever taken any of the following types of leave from employment for a period of 8 weeks or more (check all that apply)?

- ☐ Never taken leave of any type
- ☐ Maternity leave / pregnancy leave / adoption leave
- ☐ Parental leave beyond maternity / pregnancy or adoption leave
- ☐ Leave for educational purposes
- ☐ Leave to do community work, seek political office, etc.
- ☐ Leave related to personal illness (excluding stress)
- ☐ Leave related to personal stress
- ☐ Leave related to illness of a partner, family member, or parent
- ☐ Leave for other reasons

** * You have completed 55% of the survey * **

55. On how many separate occasions over your career have you taken leave from employment for a period longer than 8 weeks? _____

56. Excluding vacation entitlement and overtime taken as time off, what is the approximate total amount of leave from employment that you have taken over the course of your career? Please consider: educational leave, pregnancy leave, adoption leave, maternity leave, parental leave, leave for community work or political candidacy, leave related to personal illness or family illness, or other times of leave. _____ weeks

57. In your opinion, were you ever terminated because you took leave? ○ Yes ○ No ○ N/A

58. Overall what was the effect of your leave on your professional career? If you took one type of leave on more than one occasion**,** please provide information on your <u>most recent</u> experience. Please indicate the year in which you took this leave (i.e., when the leave period began).

	Very Positive	Somewhat Positive	Neutral	Somewhat Negative	Very Negative	Year Leave Taken
a) Maternity leave / pregnancy leave / adoption leave	○	○	○	○	○	_____
b) Parental leave beyond maternity / pregnancy or adoption leave	○	○	○	○	○	_____
c) Leave for educational purposes	○	○	○	○	○	_____
d) Leave to do community work, seek political office, etc.	○	○	○	○	○	_____
e) Leave related to personal illness (excluding stress)	○	○	○	○	○	_____
f) Leave related to personal stress	○	○	○	○	○	_____
g) Leave related to illness of a partner, family member, or parent	○	○	○	○	○	_____
h) Leave for other reasons	○	○	○	○	○	_____

59. When you took leave, on average how much work did you continue to do during your period of leave? If you took one type of leave on more than one occasion, please provide information on your most recent experience.

	None	<1 day per week	1 day per week	2 days per week	>2 days per week
a) Maternity leave / pregnancy leave / adoption leave	○	○	○	○	○
b) Parental leave beyond maternity / pregnancy or adoption leave	○	○	○	○	○
c) Leave for educational purposes	○	○	○	○	○
d) Leave to do community work, seek political office, etc.	○	○	○	○	○
e) Leave related to personal illness (excluding stress)	○	○	○	○	○
f) Leave related to personal stress	○	○	○	○	○
g) Leave related to illness of a partner, family member, or parent	○	○	○	○	○
h) Leave for other reasons	○	○	○	○	○

** * You have completed 60% of the survey * **

60. After you returned from leave, did your job responsibilities change? If you took one type of leave on more than one occasion, please provide information on your most recent experience.

	Significant Decrease in Responsibilities	Moderate Decrease in Responsibilities	No Change	Moderate Increase in Responsibilities	Significant Increase in Responsibilities
a) Maternity leave / pregnancy leave / adoption leave	○	○	○	○	○
b) Parental leave beyond maternity / pregnancy or adoption leave	○	○	○	○	○
c) Leave for educational purposes	○	○	○	○	○
d) Leave to do community work, seek political office, etc.	○	○	○	○	○
e) Leave related to personal illness (excluding stress)	○	○	○	○	○
f) Leave related to personal stress	○	○	○	○	○
g) Leave related to illness of a partner, family member, or parent	○	○	○	○	○
h) Leave for other reasons	○	○	○	○	○

61. During your leave period, did you receive any financial support from your employer or from a benefit plan, excluding Employment Insurance or Workers Compensation benefits? If you took one type of leave on more than one occasion**,** please provide information on your most recent experience.

	Received Additional Financial Support from Employer or a Benefit Plan	Did not Receive Additional Financial Support	Not Relevant
a) Maternity leave / pregnancy leave / adoption leave	○	○	○
b) Parental leave beyond maternity / pregnancy or adoption leave	○	○	○
c) Leave for educational purposes	○	○	○
d) Leave to do community work, seek political office, etc.	○	○	○
e) Leave related to personal illness (excluding stress)	○	○	○
f) Leave related to personal stress	○	○	○
g) Leave related to illness of a partner, family member, or parent	○	○	○
h) Leave for other reasons	○	○	○

** * You have completed 65% of the survey * **

D. Your Current or Most Recent Job and Employer

62. What is your current employment status?

- ○ Employed Full-time
- ○ Employed Part-time
- ○ Unemployed
- ○ Retired
- ○ On Leave

63. Approximately how long have you been with your current employer? _____ years

64. Which of the following categories most closely describes the industry in which you currently or most recently worked?

- ○ 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

65. Approximately how many persons work for your employer *at your location*?

- ○ 1-25
- ○ 26-50
- ○ 51-100
- ○ 101-500
- ○ >501

66. Approximately how many persons work for your employer *at all locations*?

- ○ 1-25
- ○ 26-50
- ○ 51-100
- ○ 101-500
- ○ >501

67. Does your employer have a formal training and development plan for engineers? ○ Yes ○ No

** You have completed 70% of the survey **

68. How would you describe your current job. If you are on leave, please describe the job from which you are on leave?

Non-Managerial Jobs (excluding Self-Employment):

- ○ an engineering job (other than a senior engineering job), i.e., a job for which a degree in engineering is usually the minimum requirement
- ○ a senior engineering job, i.e., a job for which a degree in engineering and approximately 10 years of experience is usually the minimum requirement
- ○ a technical job, i.e., a job for which science or college technology training is usually the minimum requirement
- ○ other type of non-managerial job

Managerial Jobs (other than Senior Management):

- ○ engineering management, i.e., a job supervising engineering or other technical employees
- ○ general management, i.e., a job supervising predominantly non-engineering and non-technical employees

Senior Management:

- ○ Senior engineering management, i.e., a job managing other engineering and technical employees and making strategic decisions on technology development and technology acquisition
- ○ Senior general management, i.e., a job in which you are responsible for a range of planning, budgeting, and operational decisions that extend beyond engineering management

Self-Employed:

- ○ Self-employed - engineering
- ○ Self-employed - non-engineering

Other Status:

- ○ Unemployed, seeking employment
- ○ Retired
- ○ Not working, not seeking employment
- ○ Other

69. Approximately how many hours per week do your work? _____

70. What is your principle job function?

- ○ Computer Services/Systems
- ○ Design
- ○ Management
- ○ Marketing/Sales
- ○ Non-Engineering
- ○ Production Engineering
- ○ Project Engineering
- ○ Quality Control
- ○ R&D
- ○ Teaching
- ○ Technical Customer Service
- ○ Technical Sales

71. In your current workplace, how would you evaluate the access of women and men engineers to the following opportunities?

	Better Access for Men	Better Access for Women	Equal Access	Not Relevant
a) Entry level engineering jobs	○	○	○	○
b) Field assignments	○	○	○	○
c) High profile assignments	○	○	○	○
d) Lateral transfers	○	○	○	○
e) Training	○	○	○	○
f) Information about internal job openings	○	○	○	○
g) Internal networking with influential people	○	○	○	○
h) Being recognized as having high potential value	○	○	○	○
i) Promotion into middle management ranks	○	○	○	○
j) Promotion into executive management ranks	○	○	○	○
k) Being mentored or sponsored by a more senior engineer or manager	○	○	○	○
l) Contact with clients or customers	○	○	○	○

** * You have completed 75% of the survey * **

72. Have you faced bullying behaviour or intimidation in your career? ○ Yes ○ No

73. Every organization has unwritten expectations for professionals. On a scale of 1 to 10, please indicate to what extent these expectations apply in your organization, where 1 is not at all and 10 is to a very great degree.

	1 Not at all	2	3	4	5	6	7	8	9	10 To a very great degree
a) Working long hours	○	○	○	○	○	○	○	○	○	○
b) Engaging in non-engineering work tasks	○	○	○	○	○	○	○	○	○	○
c) Having field experience	○	○	○	○	○	○	○	○	○	○
d) Traveling extensively	○	○	○	○	○	○	○	○	○	○
e) Being available for early morning or late evening meetings	○	○	○	○	○	○	○	○	○	○
f) Taking external courses	○	○	○	○	○	○	○	○	○	○
g) Being a sponsor or mentor to junior engineers	○	○	○	○	○	○	○	○	○	○
h) Pursuing additional degrees	○	○	○	○	○	○	○	○	○	○
i) Establishing good client relationships	○	○	○	○	○	○	○	○	○	○
j) Having a partner or spouse	○	○	○	○	○	○	○	○	○	○
k) Having a family	○	○	○	○	○	○	○	○	○	○
l) Putting career first	○	○	○	○	○	○	○	○	○	○
m) Having a consensus-building style	○	○	○	○	○	○	○	○	○	○
n) To what extent have you personally been able to meet the expectations for success in your organization?	○	○	○	○	○	○	○	○	○	○

** * You have completed 80% of the survey * **

74. Some employers have implemented policies and programs which are designed to ensure equality of opportunity for men and women in the workplace. For each of the following policies/programs which your employer may have implemented, first please indicate whether it has had a positive or negative overall impact for women in your workplace. Secondly, indicate the overall effect on men in your workplace. (If your employer does not have such a policy/program, please indicate.)

	Impact on Female Engineers in Workplace			Impact on Male Engineers in Workplace			
	Positive	Neutral	Negative	Positive	Neutral	Negative	No program/ policy
a) Flexible working hours	☐	☐	☐	☐	☐	☐	☐
b) Policy against sexual harassment	☐	☐	☐	☐	☐	☐	☐
c) Employment equity policy to ensure fair representation and equal treatment of women, aboriginals, visible minorities, persons with disabilities, and sexual orientation	☐	☐	☐	☐	☐	☐	☐
d) Training or awareness sessions for supervisors to ensure equal treatment of employees regardless of gender, First Nations or visible minority background, disabilities, or sexual orientation	☐	☐	☐	☐	☐	☐	☐
e) Training or awareness sessions for non-supervisory employees to ensure equal treatment of employees regardless of gender, First Nations or visible minority background, disabilities, or sexual orientation	☐	☐	☐	☐	☐	☐	☐
f) Employee Assistance Program (confidential counselling service for work or personal problems)	☐	☐	☐	☐	☐	☐	☐
g) Program or policy to encourage employees to balance work and family or home life	☐	☐	☐	☐	☐	☐	☐
h) Supplement to EI Benefits for maternity or adoption leave	☐	☐	☐	☐	☐	☐	☐
i) Supplement to EI Benefits for parental leave	☐	☐	☐	☐	☐	☐	☐
j) Unpaid leave	☐	☐	☐	☐	☐	☐	☐
k) Presence of positive senior role models for women, aboriginals, visible minorities, persons with disabilities, and sexual orientation	☐	☐	☐	☐	☐	☐	☐

** You have completed 85% of the survey **

E. Women in Engineering

75. There are significantly more men than women in engineering. On a scale of 1-10, please indicate to what extent you agree or disagree with each of the following statements.

	1 Strongly Agree	2	3	4	5	6	7	8	9	10 Strongly Disagree
a) In general, far fewer women are attracted to engineering as a profession.	○	○	○	○	○	○	○	○	○	○
b) An engineering career is more socially acceptable for men than for women	○	○	○	○	○	○	○	○	○	○
c) In general, women have less natural aptitude for mathematics and therefore for engineering	○	○	○	○	○	○	○	○	○	○
d) Women engineers have greater difficulty gaining professional experience. This leads a greater proportion of women engineers to leave the profession.	○	○	○	○	○	○	○	○	○	○
e) Engineering has a negative image with regard to equality of treatment for women	○	○	○	○	○	○	○	○	○	○
f) Engineering schools have a negative image with regard to equality of treatment for women	○	○	○	○	○	○	○	○	○	○
g) Women are innately better suited to some engineering disciplines than to others	○	○	○	○	○	○	○	○	○	○
h) Young women in secondary schools are not sufficiently encouraged to take math and science	○	○	○	○	○	○	○	○	○	○

76. Please indicate how important you believe the following types of programs are in promoting women in engineering. Please rate the quality of the actual efforts in each of these programs.

	Importance			Rating of Quality of Current Efforts			
	Very Important	Somewhat Important	Not Important	Good to Excellent	Fair to Moderate	Poor	Don't Know
a) Promoting science to girls in elementary school	○	○	○	○	○	○	○
b) Promoting science to young women in high school	○	○	○	○	○	○	○
c) Promoting engineering to young women in high school	○	○	○	○	○	○	○
d) Providing scholarships for women who study engineering	○	○	○	○	○	○	○
e) Offering peer-support programs for women studying engineering in university	○	○	○	○	○	○	○
f) Conducting special events and networking events for women engineers	○	○	○	○	○	○	○
g) Publishing newsletters for women studying or practising engineering	○	○	○	○	○	○	○
h) Conducting surveys to track career conditions	○	○	○	○	○	○	○
i) Conferring recognition awards for outstanding women engineers	○	○	○	○	○	○	○
j) Advising professional associations on gender issues	○	○	○	○	○	○	○
k) Establishing mentorship programs for women in the early stages of engineering careers	○	○	○	○	○	○	○

77. What future initiatives or changes would improve the workplace for professional engineers? Please indicate if there are specific initiatives or changes that would be especially relevant to women engineers, members of visible minorities, or engineers who received their professional training outside Canada. (enter up to 750 characters)

_____
_____
_____
_____
_____
_____
_____
_____

** You have completed 90% of the survey **

F. Background and Personal Profile

The following questions will help us understand how different backgrounds affect people's views and experiences and will give us a profile of people responding to this survey. All individual responses will be kept confidential.

78. Age _____

79. In which province or territory do you currently reside?
- ○ Newfoundland and Labrador
- ○ Nova Scotia
- ○ Prince Edward Island
- ○ New Brunswick
- ○ Quebec
- ○ Ontario
- ○ Manitoba
- ○ Saskatchewan
- ○ Alberta
- ○ British Columbia
- ○ Yukon Territory
- ○ Northwest Territories
- ○ Nunavut

80. Gender ○ Male ○ Female

81. What is your current marital status?
- ○ Married or common law
- ○ Single, widowed, separated, or divorced

82. Do you currently have children or other dependents living with you? ○ Yes ○ No

83. If so, how many children do you currently have living with you?
Age 5 or under _____
Age 6-11 _____
Age 12-17 _____

84. How many dependent parents or relatives do you have living with you? _____

85. On a scale of 1-10, please indicate to what degree, if any, family obligations limited your engineering career?

1 Family Obligations Did Not Limit My Engineering Career at All	2	3	4	5	6	7	8	9	10 Family Obligations Very Greatly Limited My Engineering Career	Not Relevant
○	○	○	○	○	○	○	○	○	○	○

86. What is the approximate population of the city or town in which you are employed?

- ○ <50,000
- ○ 50,000 to 100,000
- ○ 100,000 to 250,000
- ○ 250,000 to 500,000
- ○ 500,000 to 1,000,000
- ○ >1,000,000

Thank you for your participation.