



August 15, 2017

Ministry Responsible for Early Years & Child Care/Ministry for the Status of Women
11th Floor, 80 Grosvenor Street
Toronto, Ontario
M7A 1E9

Re: OSPE Submission – Women’s Economic Empowerment Strategy

On behalf of the Ontario Society of Professional Engineers (OSPE), we are pleased to provide recommendations to support the province’s first Women’s Economic Empowerment Strategy that will create new possibilities for the future of women and girls in Ontario. The Society’s Women in Engineering Advocacy Committee (WEAC) completed the government’s survey from the perspective of professional engineers working in a variety of sectors. In addition, the committee developed responses to five open-ended questions contained in the survey.

This builds on OSPE’s 2016 submission to the Government of Ontario’s Gender Wage Gap Steering Committee by providing preliminary analysis of two new data sources. First, this submission includes data on the engineering gender wage gap courtesy of the 2014, 2015, and 2016 Mercer OSPE National Engineering Compensation Survey. Second, this submission draws on survey findings from a study of 600 engineers and engineering degree-holders that the University of Western Ontario and the University of Toronto’s Ontario Institute for Studies in Education (OISE) conducted in partnership with OSPE in 2016 and 2017. A complete report on the engineering labour market and compensation is expected in Fall 2017.

Also enclosed in this package is a report entitled *Opening Doors and Breaking Down Barriers*, which is referenced in this submission and provides highlights from OSPE’s Pilot Mentorship Program for women.

Finally, we hope Minister Naidoo-Harris will be able to deliver greetings at the 15th Annual Claudette MacKay-Lassonde Fall Forum on October 28, 2017. Given that October is Women’s History Month, it is a timely event that will showcase the contributions women in engineering make to our province’s growth and prosperity.

To arrange a meeting to discuss this submission or above event, please contact Catrina Kronfli, Policy and Government Relations Lead, at ckronfli@ospe.on.ca or 416-223-9961, ext. 243.

Sincerely,

A handwritten signature in black ink that reads 'Sandro Perruzza'.

Sandro Perruzza
Chief Executive Officer
Ontario Society of Professional Engineers

CC: The Honourable Naidoo-Harris (Halton), Minister of the Status of Women
The Honourable Kevin Flynn (Oakville), Minister of Labour
Emanuela Heyninck, Commissioner, Ontario Pay Equity Commission

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1. Do you think these are the right goals?

As the advocacy body for the province's professional engineers, engineering graduates, and students, WEAC is primarily focused on addressing the barriers that professional women in engineering face in the workplace.

WEAC members noted there are many post-secondary institutions and organizations currently involved in encouraging young women to enter Science, Technology, Engineering, and Math (STEM), such as the University of Toronto's Girls Jr. DEEP program and the Ontario Network of Women in Engineering's (ONWiE) Go Eng Girl and Go Code Girl. The committee noted that young women in STEM need support in the workplace to overcome issues and barriers. Some women find they have nowhere to turn for support, are turned-off by negative experiences, and choose to leave engineering to pursue other opportunities.

To address these concerns, in 2015 OSPE received funding from Status of Women Canada (SWC) to develop a two-year Pilot Mentorship Program for young women in the early stages of their engineering careers. Prior to the development of the mentorship program, OSPE conducted a needs assessment that included a literature review, interviews, and survey in which 1,566 individuals participated.¹ The survey confirmed that licensure is challenging for many women. Respondents were looking for supports to access information about career planning, licensure, and engineering practices; opportunities to make connections; and help formulating career advancement strategies.

The details of the program are outlined in Question 4. The mentorship program provided protégées with support navigating the licensure process, aimed to increase the percentage of women engineers, and address the retention of women in engineering. Research indicates that women's attrition rates are high in the process towards professional licensure, so early support to engage female engineers may be vital for their sustained commitment to the profession.

While OSPE supports the province's four goals, we encourage the Government of Ontario to also address the *retention* of women in STEM, in addition to encouraging young women to pursue non-traditional education and careers paths.

The Canada 150 STEM Challenge: Overcoming Systemic Barriers for Women Choosing STEM Careers

In August 2016, OSPE received new funding from SWC for a 36-month project that will address the barriers that contribute to the under-representation of women in STEM by working with students, educational institutions, employers, and governments. With the participation of many partners, OSPE will collect and analyze grassroots perspectives from young women in engineering and STEM women professionals. These narratives will, in turn, be used to develop and pilot strategies and technology-based tools to support girls and women in STEM, address systemic barriers, and increase the participation of women in

¹ Resources for Results, *Mentoring Women for Early Career Advancement in Engineering: Status of Women Canada Needs Assessment Paper for The Ontario Society of Professional Engineers*, (Resources for Results, 2015), 2.

STEM programs and careers.² The project is currently in its early stages, but plans are underway to hold workshops in the fall of 2017 with partners to gather grassroots perspectives.

2. Are there any other sectors or groups that we should be working with?

The Government of Ontario should continue to include engineers and engineering degree-holders in the policymaking process by engaging OSPE, the voice of the engineering profession in Ontario. Given the provincial and federal government's growing emphasis on the importance of supporting and encouraging young girls and women to enter STEM, OSPE's proven research capacity and extensive network of stakeholders presents a valuable resource for the province.

For instance, between October 2016 and February 2017, researchers at the University of Western Ontario and the University of Toronto partnered with OSPE to conduct a survey of Ontario's engineers and engineering degree-holders. More than 600 individuals, both OSPE members and non-members, completed the online survey on topics such as changes in the workplace, engineering education, and working conditions.³ **Appendix 1** provides preliminary analysis of labour market conditions facing women and men in engineering, which could assist the province in developing policies for its Women's Economic Empowerment Strategy.

In addition to answering the survey questions, respondents had the opportunity to provide a written response to the following open-ended question: "Are there additional issues facing your profession, or additional concerns you have about your profession, that you would like to tell us about?" Comments in the open-ended question centred on the gender wage gap, sexism or discrimination in the workplace, the lack of women in engineering or in senior levels, and challenges returning to work after maternity leave. Below are verbatim responses and concerns shared by respondents:

- "Sexism is a major problem in the civil engineering and construction field. In addition, there is a gender pay gap between men and women in this industry having the same skill level and contribution to the company. Laws should be put in place to ensure that women's rights are protected and that there is equal compensation between women and their male colleagues."
- "There are still issues in the workplace for safety, sexism, etc. The issue is being able to report it without causing issues at your current job. It just ends up not being worth it unless the issues are big enough."
- "Employment Equity – although there is a push to get this balanced, there seems to be great difficulty in achieving."
- "Old boys club attitude by the senior managers."
- "There is not enough representation of women in engineering, especially at the senior levels."

² For more information on this new initiative, please contact Tess O'Mara, Project Administrator, at 416-2239961 ext. 248 or tomara@ospe.on.ca.

³ Initial findings from the survey were identified in the June 2017 issue of OSPE's *The Voice* magazine. See pages 17-19: http://www.nxtbook.com/dawson/ospe/thevoice_June2017/

- “Discrimination against pregnant women engineers in consulting. Once your pregnancy is announced, you are treated as [if] you have quit. At 4 months, clients were taken from me and given to my male peers. These client relationships may take years to build. Then you are underutilized for months. This doesn’t provide incentive to return after maternity leave.”
- “I only graduated in 2015 and I’ve already had two aerospace field jobs that denied me because i am a woman. I find it really frustrating that I do not get the opportunities that others do to progress in their career because of something I cannot control. I hope maybe in the next few decades things like this won’t exist anymore.”
- “Women sometimes are [not] valued as they should, especially as they become mothers.”
- “As a female engineer, I completely understand why females leave the engineering [profession]. The pay does compensate for the added stress of being a working mom.”
- “Women are extremely underrepresented in [the] engineering profession, including in management and in professional societies... Unwanted sexual advances to women is commonplace in engineering. I have a number of classmates and friends who have had to deal with this kind of issue. There needs to be more done to protect women’s rights. Problems such as no female washrooms at [the] workplace, lower income than men for [the same] work, and lack of management understanding of issues facing women creates huge barriers to growth of women in engineering.”

In addition to working with OSPE, the province should liaise with PEO, the licensing and regulating body for professional engineers in Ontario, to determine what tools or resources PEO can develop to help women who face barriers obtaining their P.Eng. In addition, as engineers work closely with engineering technicians and technologists in the workplace, the province should engage the Ontario Association of Certified Technicians and Technologists (OACETT), which represents over 25,000 members.

3. What do you think are the biggest barriers to women assuming leadership roles in their communities and workplaces?

As noted in OSPE’s 2016 submission to the Gender Wage Gap Steering Committee, WEAC identified the following barriers women face in assuming leadership roles:

- A lack of role models (only 13% of Professional Engineers in Ontario are women);
- A lack of role models within the governance structure of the engineering profession (e.g., Professional Engineer’s Ontario’s 2016-2017 Council included only 3 women out of 28 Councillors);
- Gender bias, unequal evaluation criteria, and a lack of advancement opportunities in the workplace; and
- The need to normalize parental leave for both women and men as the engineering profession loses women at the mid-career stage, particularly when women face challenges after returning from maternity leave.

WEAC members added that OSPE’s Board reached gender parity because of proactive

steps past Board members have taken, namely by approaching qualified candidates, encouraging women engineers to run for the Board, and providing informal mentoring.

The low representation of women on Professional Engineers Ontario's (PEO) Council – the body that provides the overall direction for the organization and the engineering profession in Ontario – was concerning to OSPE. As noted above, PEO's 2016-2017 Council included only 3 women out of 28 Councillors. Given the strong business case for diverse boards, including access to more talent, improved governance, and innovation,⁴ OSPE shared its concerns with PEO through a formal letter in November 2016. OSPE believes that if the engineering profession is to remain strong, vibrant, and relevant, the governance of the profession must be reflective of the public that engineers serve.

To encourage and promote women in leadership, WEAC organized a strategic workshop for women P.Engs. running in PEO's 2017 Council Elections in December 2016. Five candidates attended this workshop, while an OSPE member who is a past President of PEO and a woman engineer delivered the training. Two OSPE members who currently or previously served on PEO Council also shared practical advice, including how candidates should prepare for the televised debate, craft their candidate's statement or website, invest in a professional headshot, attend engineering or community events to get their name out there, and engage their professional networks to vote in the election. Together, the three mentors outlined key dates and issues candidates should be familiar with for the election.

Following this workshop, OSPE distributed a survey to garner feedback from attendees. Respondents agreed this was an important initiative because it encouraged women to pursue leadership opportunities within the governance structure of the engineering profession and aimed to equip women candidates with helpful information for their campaigns. One respondent noted that "you may lose, but [winning] is not the goal. If you have the courage to put your name forward, you can influence the conversation during the election, and this is really why women should be running." Another respondent explained that "having this support network during [this] process was key for me." Several respondents also volunteered to help with future workshops by acting as mentors for other candidates.

PEO's 2017-2018 Council consists of 7 women out of 25 Councillors and OSPE's 2017-2018 Board of Directors consists of 5 women and 7 men. The workshop highlighted the important role informal mentorship plays in helping women pursue leadership opportunities they might not have otherwise pursued due to a lack of confidence or role models.

4. Do you have any experience with initiatives or programs in your community that are working to change gender biases and break down barriers? If yes, can you provide some examples?

OSPE's Pilot Mentorship Program Funded by Status of Women Canada (SWC)

As mentioned in Question 1, OSPE received funding through SWC for the development of a

⁴ ONWiE, *The Business Case for Gender Diversity*, <http://www.onwie.ca/resources-tools/gender-diversity-101/ONWiE%20-%20Business%20Case%20for%20Gender%20Diversity.pdf>

Pilot Mentorship Program⁵ for recent female engineering graduates at the beginning of their professional careers. OSPE partnered with ONWiE, Professional Engineers Ontario's (PEO) York Chapter, and the Canadian Centre for Women in Science, Engineering, Trades and Technology (WinSETT).

Research indicates that the early career phase between graduation and licensure is a critical time for women in engineering. Mentorship is a valuable support mechanism for female engineering graduates as they move through the licensure process, adapt to the engineering work culture, develop their professional networks, and consider career advancement strategies.

As *Opening Doors and Breaking Down Barriers* explains, the pilot program ran for an 18-month period (November 2015 to January 2017) and resulted in the launch of 90 mentoring relationships in 23 communities across Ontario. The program included:

- 59 mentors, both men and women, Canadian and international engineering educates, with at least five years of experience as a Professional Engineer (P.Eng.); and
- 76 protégées, ranging from women about to graduate from an engineering program, recent graduates who were registered as Engineering Interns (EITs), recent graduates not registered as EITs, as well as new licence-holders in the early stages of their engineering careers.

The program's objectives directly aligned with three goals in the province's Women's Economic Empowerment Strategy: Empower Youth, Promote Economic Opportunities, and Encourage Leadership. The aim of OSPE's program was to increase the retention and advancement of female engineering professionals as women account for only 13% of license holders and remain underrepresented in the engineering profession.⁶

The project also directly supported Engineers Canada's 30 by 30 goal – a pan-Canadian initiative that OSPE, along with all the provincial and territorial regulatory bodies, as well as post-secondary institutions in which engineering is offered, have agreed to support.⁷ The 30 by 30 initiative aims to increase the percentage of newly licensed female engineers to 30% by the year 2030. As of December 2016, women comprise only 14.7% of newly licensed professional engineers in Ontario.⁸

As *Opening Doors and Breaking Down Barriers* explains, of the 76 protégées who participated in OSPE's Pilot Mentorship Program:

⁵ Additional information on OSPE's Pilot Mentorship Program is available on OSPE's website:

<https://www.ospe.on.ca/engineering-professional-success>

⁶ Based on data from the 2011 National Household Survey, OSPE's 2015 report, *Crisis in Ontario's Engineering Labour Market: Underemployment Among Ontario's Engineering-Degree Holders*, found that only 32% of Canadian-trained women with engineering degrees worked as engineers or engineering managers. Furthermore, only 14% of internationally-trained women with engineering degrees were in similar positions.

⁷ As Engineers Canada's website explains, 30% is universally held as the threshold for self-sustaining change that will increase the representation of women in engineering.

⁸ Engineers Canada, 30 by 30, <https://engineerscanada.ca/diversity/women-in-engineering/30-by-30>

- 97% of participants said the program met or exceeded their expectations;
- The program received a satisfaction rate of 88% and 84% from protégées and mentors respectively;
- 14 protégées found contract or permanent work in their field, which will provide vital experience needed to obtain a P.Eng.;
- 55% protégées made concrete progress towards professional licensure;
- 5 protégées become mentors to other women in engineering graduates; and
- One protégées started an informal meet-up with other female engineering graduates in her region.

Protégées reported feeling more confident, enhancing their engineering networks, having a clearer career plan, and making concrete progress towards licensure.⁹ Although SWC's funding has ended, OSPE is committed to continuing this highly successful and robust program, and is currently seeking external sponsorship to support the program.

Proactive Communications Pieces on Women in Engineering

In addition to this formal program, OSPE prepares proactive communications pieces that align directly with all four goals for the province's Women's Economic Empowerment Strategy by empowering young women to follow any educational or career path they choose; promoting female leaders to inspire other women in engineering; and tackling gender stereotypes and social attitudes about women in engineering.

More specifically, with the support of WEAC members, OSPE develops articles for its *Society Notes* blog that celebrate significant dates in the engineering community's calendar, such as International Women in Engineering Day¹⁰ and International Women's Day.¹¹ These articles address various topics, including the challenges women face during their engineering careers, strategies women can employ to overcome these barriers, the role mentors can play, and the importance of pursuing leadership opportunities and building one's professional networks for career advancement. In terms of reach, the blog was viewed over 5,000 times a month by over 2,600 unique visitors in 2016.

OSPE also prepares articles for its quarterly magazine, *The Voice*, that showcases women engineers, including featuring women who received the province's prestigious *Leading Women, Building Communities Award* and *Leading Girls, Building Community Award* in recognition of their exemplary community leadership and commitment to breaking down professional barriers for women pursuing careers in engineering.^{12,13} The magazine reaches

⁹ Society Notes (2016), *Two sides to every good story: Mentorship from the perspective of mentees*, <https://blog.ospe.on.ca/career-services/two-sides-to-every-good-story-mentorship-from-the-perspective-of-mentees/>

¹⁰ Society Notes (2017), *OSPE celebrates International Women in Engineering Day #INWED2017*, <https://blog.ospe.on.ca/community/ospe-celebrates-international-women-engineering-day-inwed17/>

¹¹ Society Notes (2017), *OSPE Celebrates International Women's Day*, <https://blog.ospe.on.ca/community/ospe-celebrates-international-womens-day-2/>

¹² Society Notes (2017), *Three OSPE members receive "Leading Women Building Communities" Awards*, <https://blog.ospe.on.ca/membership/three-ospe-members-receive-leading-women-building-communities-awards/>

more than 20,000 people, including OSPE members, engineering companies, and government officials across the province.

As OSPE noted in its 2016 submission to the province's Gender Wage Gap Steering Committee, societal attitudes and stereotypes about engineering, women in engineering, and what engineers look like and do remain a barrier. Shifting social attitudes, as the province's fourth goal aims to do, will require concerted public awareness campaigns to educate the public about women in engineering and inspire young women to pursue non-traditional or male-dominated fields of study and careers.

The Annual Claudette MacKay-Lassonde Fall Forum

Every year, WEAC organizes a Fall Forum that brings together 60-100 engineers, as well as engineering students, interns, and graduates, to address a particular topic of interest to women in engineering. In 2015, the forum was held in partnership with the Lassonde School of Engineering at York University and addressed the importance of diverse boards. In 2016, the forum was held in partnership with the Toronto Rehabilitation Institute – University Health Network and showcased three women engineering graduates who have developed innovations in the biomedical/biotechnology sector.

The 2017 forum is entitled *Navigating the Glass Obstacle Course* and will focus on the unseen, implicit, and unanticipated barriers that women encounter throughout their engineering careers, as well as strategies to help women navigate these challenges in the workplace. Engineering Deans will discuss the initiatives post-secondary institutions have undertaken to support young women in engineering programs. Representatives from other professional associations, including architecture and accounting, will discuss best practices that the engineering field can emulate. Leaders from engineering companies will share innovative programs and initiatives they have developed. This annual event provides women (and men) with a valuable opportunity to hear from thought leaders, gather career advice, and build their professional networks.

5. Do you have any other suggestions, comments or concerns you'd like to share?

OSPE was pleased to provide the Gender Wage Gap Strategy Steering Committee with input, research, and recommendations from the perspective of women engineers.¹⁴ The province has taken steps to address the gender wage gap by implementing several recommendations that OSPE identified in its January 2016 submission, including increasing the minimum wage to \$15.00 per hour, ensuring part-time workers (two-thirds of whom are women) are paid the same hourly wage as full-time workers, and giving 100,000 more children aged four and under access to licensed child care spaces over the next five years.

An additional issue the province may want to examine for the Women's Economic Empowerment Strategy is maternity and paternal leave. *Results of the 2010 Survey of*

¹³ Society Notes (2016), *Five of OSPE's own recognized with the Ontario Women's Directorate Leading Women, Leading Girls, Building Communities Award*, <https://blog.ospe.on.ca/community/five-ospes-recognized-ontario-womens-directorate-leading-women-leading-girls-building-communities-award/>

¹⁴ Ontario Society of Professional Engineers (2016), OSPE Submission – Closing the Gender Wage Gap, <https://www.ospe.on.ca/public/documents/advocacy/submissions/2016-gender-wage-gap.pdf>

Working Conditions for Engineers revealed that 26% of women aged 40 or younger reported taking maternity or adoption leave, while only 1% of men in this age group took paternity or adoption leave. Moreover, 57% of women aged 41 or older took maternity or adoption leave, while only 1% of men in this age group took paternity or adoption leave. Thus, the vast majority of men reported that they have *never* taken leave of any type.¹⁵ Almost 2,850 engineering graduates and professional engineers participated in this national survey in partnership with several partners.

In addition, when asked about the perceived career impact of maternity, paternity, or adoption leave, almost 42% of women reported there was a career price for taking leave as they felt it had a somewhat negative or very negative impact on their career. In comparison, almost 22% of men reported the leave had a negative impact. Men were also more likely to report the leave had a “neutral” impact on their careers in comparison to women (65% versus 42%).

This finding echoes the concerns noted in OSPE’s 2016 submission, specifically around “getting mommy tracked” after maternity leave, being excluded from work opportunities during leave, and the impact leave (and multiple leaves) has on career advancement and compensation. Thus, OSPE believes the province’s fourth goal (Shifting Social Attitudes) should include initiatives to normalize parental leave for men, which will help address gender inequities in the home.

The Gender Wage Gap in Engineering

When compared with other fields of study, engineering graduates have been ranked by Adzunda.ca and TalentEgg.ca as top-paying disciplines.^{16,17} A recent Statistics Canada report notes that most post-secondary graduates in the top 1% studied either business, health, or engineering.¹⁸

Although the number of women in the engineering profession in Canada has steadily grown – from 12,740 in 2006 to 26,113 in 2016¹⁹ – and better labour market outcomes of STEM graduates is used to encourage students to pursue a STEM degree, the gender wage gap in engineering persists.

OSPE’s 2015 report noted that women uniformly earned less than men in the same job categories. Based on the 2011 National Household Survey, for civil, mechanical, electrical, and chemical engineers, women earned 16% less than their male counterparts (\$66,703

¹⁵ Ontario Society of Professional Engineers (2010). *Results of the 2010 Survey of Working Conditions for Engineers*, <https://www.ospe.on.ca/public/documents/advocacy/2010-survey-results-working-conditions.pdf>

¹⁶ Infantry, Ashante, “Engineering graduates make the most money, study finds.” *Toronto Star*, July 2, 2013, https://www.thestar.com/business/2013/07/02/engineering_graduates_make_the_most_money_study_finds.html

¹⁷ Manulife Financial, “Top 20 starting salaries.” *Globe and Mail*, August 24, 2012, <https://www.theglobeandmail.com/globe-investor/personal-finance/financial-road-map/advmanulife/advmanulifearchives/top-20-starting-salaries/article4505934/>

¹⁸ Statistics Canada (2016), “Education and occupation of high-income Canadians.” Retrieved July 13, 2017, http://www12.statcan.gc.ca/nhs-enm/2011/as-sa/99-014-x/99-014-x2011003_2-eng.cfm

¹⁹ Engineers Canada, Women in Engineering, <https://engineerscanada.ca/diversity/women-in-engineering>

versus \$79,540). For other types of engineers, earnings were 15% lower (\$67,284). For engineering managers, 17% lower (\$98,009 versus \$117,489).²⁰

Mercer OSPE National Engineering Compensation Survey

As OSPE noted in its 2016 submission to the province's Gender Wage Gap Strategy Steering Committee, the Mercer OSPE National Engineering Compensation Survey is a valuable resource for engineers and engineering interns who are preparing for reviews or salary negotiations with their employer.

In partnership with Mercer, OSPE is currently preparing a report that examines engineering salaries between 2014 and 2016. Anecdotally and in the OSPE-Western University survey, OSPE members expressed concerns that compensation is not increasing or commensurate to the compensation that other professionals earn.

OSPE's full report is expected to be published in the fall of 2017 and will explore these concerns, as well as identify trends, potential causes, and policy recommendations for employers and government. Below are preliminary findings from the analysis of Mercer data from 2014 and 2016 by gender.

Gender Salary Gaps

Table 1: Male/Female Base Salary 2016

2016 Job Level	Number of Engineers - Female	Number of Engineers - Male	Total per Level	Mean Base Salary - Female	Mean Base Salary - Male	Difference Female to Male	% Difference
Level A	352	1,147	1,499	\$ 65,521	\$ 65,050	471	1%
Level B	463	1,720	2,183	\$ 75,961	\$ 77,909	(1,948)	-3%
Level C	753	2,996	3,749	\$ 91,977	\$ 96,575	(4,598)	-5%
Level D	464	2,432	2,896	\$ 103,908	\$108,148	(4,240)	-4%
Level E	244	1,574	1,818	\$ 120,206	\$129,429	(9,223)	-7%
Level F	53	529	582	\$ 143,121	\$158,671	(15,550)	-10%
Total	2,329	10,398	12,727	\$ 100,116	\$105,964	(5,848)	-6%

Source: 2016 Mercer OSPE National Engineering Compensation Survey

²⁰ Ontario Society of Professional Engineers (2015). *Crisis in Ontario's Engineering Labour Market: Underemployment Among Ontario's Engineering-Degree Holders*.
<https://www.ospe.on.ca/public/documents/advocacy/2015-crisis-in-engineering-labour-market.pdf>

Table 2: Male/Female Base Salary 2015

2015 Job Level	Number of Engineers - Female	Number of Engineers - Male	Total per Level	Mean Base Salary - Female	Mean Base Salary - Male	Difference Female to Male	% Difference
Level A	330	1,176	1,506	\$ 63,872	\$ 64,240	(368)	-1%
Level B	463	1,673	2,136	\$ 74,803	\$ 76,313	(1,510)	-2%
Level C	740	3,044	3,784	\$ 90,564	\$ 95,170	(4,606)	-5%
Level D	431	2,373	2,804	\$ 103,668	\$ 107,843	(4,175)	-4%
Level E	204	1,452	1,656	\$ 119,515	\$ 126,474	(6,959)	-6%
Level F	42	550	592	\$ 134,265	\$ 151,203	(16,938)	-11%
Total	2,210	10,268	12,478	\$ 97,781	\$ 103,541	(5,759)	-6%

Source: 2015 Mercer OSPE National Engineering Compensation Survey

Table 3: Male/Female Base Salary 2014

2014 Job Level	Number of Engineers - Female	Number of Engineers - Male	Total per Level	Mean Base Salary - Female	Mean Base Salary - Male	Difference Female to Male	% Difference
Level A	431	1,372	1,803	\$ 63,702	\$ 64,646	(944)	-1%
Level B	435	1,385	1,820	\$ 73,617	\$ 73,592	25	0%
Level C	856	3,299	4,155	\$ 87,762	\$ 92,065	(4,303)	-5%
Level D	591	3,094	3,685	\$ 100,892	\$ 104,456	(3,564)	-3%
Level E	231	1,862	2,093	\$ 119,391	\$ 127,501	(8,110)	-6%
Level F	47	614	661	\$ 135,078	\$ 152,077	(16,999)	-11%
Total	2,591	11,626	14,217	\$ 96,740	\$ 102,390	(5,649)	-6%

Source: 2014 OSPE Employer Compensation Survey

The Mercer survey results indicate that from entry level (Level A) to having over eight year's experience (Level D), there is no more than a 5% difference in salaries between women and men. This is not considered significantly different. Indeed, for all years with available data (2014, 2015, 2016), there was only a 1% difference at Level A for all three years.

However, the longer one works in engineering, the wider the wage gap becomes between men and women. The largest discrepancies between salaries of women and men occur in the most senior level positions (Levels E and F). Both these levels entail highly responsible and complicated technical functions and/or a high level of administrative, management, and/or consulting work.

At Level E, salaries of women are consistently 6% or 7% lower than men. Women in this level were getting paid less than men in 2016, more so than in 2014. In monetary terms, women on average earned over \$9,000 less than men in comparable jobs.

By far, the widest gaps in compensation occurred in the highest level of responsibility (Level F). While 2016 demonstrates the gaps are lower than in 2014 and 2015, women salaries were still 10% lower in 2016 and 11% lower in 2014 and 2015. In monetary terms, women in 2016 earned on average over \$15,500 less than men in comparable positions.

As Mercer noted in a March 2017 article in OSPE's *The Voice* magazine, when assessing this data, it is important to consider other factors that contribute to setting pay levels (e.g., tenure, years of experience) prior to concluding that inherent bias exists. Organizations should review pay and performance ratings by gender to check for inequalities, and ensure disparities do not translate into opportunity differences.

Overall, women earned 6% less than men in all job levels. While there are indeed differences between salaries of women and men doing engineering work, the differences in the ratio of numbers between women and men are even more pronounced.

Ratio of Women to Men Working in Engineering

Table 4: Ratios between Women and Men Working in Engineering 2016

2016 Job Level	Number of Engineers - Female	Number of Engineers - Male	Total per Level	Overall % Female	Overall % Male	Within Level % Female	Within Level % Male	Within Level Ratio Male:Female	Within Level Xs Male:Female
Level A	352	1,147	1,499	2.8%	9.0%	23.5%	76.5%	326%	3.26
Level B	463	1,720	2,183	3.6%	13.5%	21.2%	78.8%	371%	3.71
Level C	753	2,996	3,749	5.9%	23.5%	20.1%	79.9%	398%	3.98
Level D	464	2,432	2,896	3.6%	19.1%	16.0%	84.0%	524%	5.24
Level E	244	1,574	1,818	1.9%	12.4%	13.4%	86.6%	645%	6.45
Level F	53	529	582	0.4%	4.2%	9.1%	90.9%	998%	9.98
Total	2,329	10,398	12,727	18.3%	81.7%	18.3%	81.7%	446%	4.46

Source: 2016 Mercer OSPE National Engineering Compensation Survey

Table 5: Ratios between Women and Men Working in Engineering 2015

2015 Job Level	Number of Engineers - Female	Number of Engineers - Male	Total per Level	Overall % Female	Overall % Male	Within Level % Female	Within Level % Male	Within Level Ratio Male:Female	Within Level Xs Male:Female
Level A	330	1,176	1,506	2.6%	9.4%	21.9%	78.1%	356%	3.56
Level B	463	1,673	2,136	3.7%	13.4%	21.7%	78.3%	361%	3.61
Level C	740	3,044	3,784	5.9%	24.4%	19.6%	80.4%	411%	4.11
Level D	431	2,373	2,804	3.5%	19.0%	15.4%	84.6%	551%	5.51
Level E	204	1,452	1,656	1.6%	11.6%	12.3%	87.7%	712%	7.12
Level F	42	550	592	0.3%	4.4%	7.1%	92.9%	1310%	13.10
Total	2,210	10,268	12,478	17.7%	82.3%	17.7%	82.3%	465%	4.65

Source: 2015 Mercer OSPE National Engineering Compensation Survey

Table 6: Ratios between Women and Men Working in Engineering 2014

2014 Job Level	Number of Engineers - Female	Number of Engineers - Male	Total per Level	Overall % Female	Overall % Male	Within Level % Female	Within Level % Male	Within Level Ratio Male:Female	Within Level Xs Male:Female
Level A	431	1,372	1,803	3.0%	9.7%	23.9%	76.1%	318%	3.18
Level B	435	1,385	1,820	3.1%	9.7%	23.9%	76.1%	318%	3.18
Level C	856	3,299	4,155	6.0%	23.2%	20.6%	79.4%	385%	3.85
Level D	591	3,094	3,685	4.2%	21.8%	16.0%	84.0%	524%	5.24
Level E	231	1,862	2,093	1.6%	13.1%	11.0%	89.0%	806%	8.06
Level F	47	614	661	0.3%	4.3%	7.1%	92.9%	1306%	13.06
Total	2,591	11,626	14,217	18.2%	81.8%	18.2%	81.8%	449%	4.49

Source: 2014 OSPE Employer Compensation Survey

Overall percentage ratios are those that compare the number of women and men in each job level to the total number of women and men tallied. There were 14,217 individual engineers

whose salaries were reported in the 2014 Mercer OSPE Salary Survey. Overall, 18.2% of these engineers were women. That is roughly equivalent to the overall percentages of women graduating in engineering in Canada in 2015, which was 19% (Engineers Canada).

The general trend for overall percentages in terms of job level is that for both women and men, most are working in Level C, which is roughly five to six years of work experience. Proportions of women and men then go steadily down, with the fewest number of engineers in the upper levels of responsibility. While purely speculative, this could indicate that either both genders stay in a Level C job for the remainder of their careers or that they leave the profession altogether, especially those retiring. This observation is supported in so far as there are fewer numbers of women and men in Level D in 2016 than there were in 2014.

What is not speculative, however, is the extremely low percentage of women in Level F positions. While 2016 shows slightly more women in high level, executive/management positions which Level F indicates, they represent only 0.4% of the total number of women and men that the statistics represent.

Analysis of gender ratios within job levels further suggests that there are fewer women engineers the higher the level. On a positive note, there is a higher percentage of women in the first three levels of job than the percentage of graduates from engineering programs. In 2016, for example, 23.5% of employees in Level A were women, with 19% the Canadian average of women graduates, according to Engineers Canada. For Levels B and C, similarly there are higher proportions of women employees than graduates at 21.2% and 20.1%, respectively. That is where the positive news ends.

In all years studied, the proportion of women working in engineering steadily declines after Level A, in 2016, from 23.5% to 9.1% in Level F. Accordingly, the proportion of men in each level rises from 76.5% in Level A to 90.9% in Level F. In Level A in 2016, there are 3.26 times as many men as women, rising to almost 10 times as many men in Level F. This seems to further indicate that women progressively leave the profession.

Summary

Overall, for the first eight plus years of working in engineering, women are paid similarly to men and they are represented in the workforce at a higher percentage than women graduating from Canadian universities.

However, after eight plus years, indicators are not as favourable. Pay inequity rises and proportions of women in engineering decreases. Once the most senior level of work responsibility is reached, pay inequity and a disproportionately low representation of women is readily apparent.

Notes

The 2016 Mercer OSPE National Engineering Compensation Survey drew on data from 180 organizations that employed over 13,000 Ontario engineers across all major industry groups in both the private and public sectors.

The 2015 Mercer OSPE National Engineering Compensation Survey drew on data from 180 organizations that employed over 12,500 Ontario engineers across all major industry groups in



both the private and public sectors.

The 2014 OSPE Employer Compensation Survey drew on data from 210 organizations that employed over 14,000 Ontario engineers across all major industry groups in both the private and public sectors.

Appendix 1: Female/Male Characteristics and Differences in Workplace Conditions

Table 1: Engineering Disciplines of Survey Respondents

Discipline	Female	%	Male	%
Civil	40	31%	120	21%
Mechanical	19	15%	128	22%
Electrical/ Electronic	11	8%	113	20%
Industrial and Manufacturing	4	3%	24	4%
Metallurgical and materials	4	3%	13	2%
Mining, Geological	2	2%	15	3%
Petroleum	0	0%	1	0%
Aerospace	3	2%	11	2%
Computer	0	0%	24	4%
Chemical	19	15%	53	9%
Other	29	22%	75	13%
Total	131	100%	577	100%

While statistically different ($\alpha = .000$)²¹ between genders, women tend to choose the traditionally common disciplines of civil, chemical, and mechanical engineering. One difference, however, is that a greater proportion of women choose a less common field of study (Other). Anecdotally this follows what OSPE has observed – more women seem to choose disciplines such as bio-medical, environmental, or other emerging engineering disciplines.

One way of encouraging more women to enroll in engineering program may be to encourage more ‘niche’ disciplines to expand or be marketed directly to young women to open their options for less traditional career paths.

Table 2: Survey Respondents with a P.Eng. Licence

Do you have a P.Eng.?	Female	%	Male	%
Yes	61	49%	377	71%
No	64	51%	151	29%
Total	125	100%	528	100%

Clear differences exist between women and men having a P.Eng. ($\alpha = .000$). By far, more men are licensed than women. Since a P.Eng. leads to higher levels of responsibility, job position, and salary, women should be encouraged to pursue licensure. The regulatory body, Professional Engineers Ontario, as well as OSPE, should continue and expand their efforts to encourage more women along this path. Perhaps the Ontario Fairness Commissioner may

²¹ Note: Unless otherwise noted, statistical inferences are based on Chi-Square.

want to consider efforts by PEO and other regulatory bodies to attract women into their programs and whether barriers exist that discourage women from obtaining their licence.

Table 3: Job Satisfaction of Survey Respondents

How Satisfied are you with your job?	Female	%	Male	%
Very Satisfied	30	25%	174	34%
Somewhat Satisfied	54	45%	205	40%
Neither Satisfied or Dissatisfied	8	7%	51	10%
Somewhat Dissatisfied	12	10%	52	10%
Very Dissatisfied	15	13%	25	5%
Total	119	100%	507	100%

While not readily apparent from reviewing respondent answers, job satisfaction responses are statistically different between women and men ($\alpha = .011$). Slightly fewer women are somewhat or very satisfied with their job (70%) than men (74%), although there are more women somewhat or very dissatisfied (23%) than men (15%). More study is necessary to determine reasons for job dissatisfaction. There are many factors that could contribute to this, from lower salary and lack of career advancement opportunities, to discrimination.

Table 4: Perspectives on Compensation

Compared to the value you produce at your workplace, do you think your compensation is fair for what you deserve?	Female	%	Male	%
Much Less than Deserved	24	22%	77	16%
Somewhat Less	43	40%	170	35%
About Right	37	35%	226	46%
Somewhat More	2	2%	13	3%
Much More than Deserved	1	1%	6	1%
Total	107	100%	492	100%

While more women think their compensation is somewhat or much less than they deserve (62%) than men (51%), there is no statistical difference between perceptions of women and men ($\alpha = .197$).

Table 5: Work-Family Balance

Work-family Balance is Difficult to Achieve in the Engineering Field	Female	%	Male	%
Strongly Disagree	0	0%	14	3%
Disagree	20	19%	122	24%
Neither Agree nor Disagree	21	19%	114	23%
Agree	43	40%	175	35%
Strongly Agree	24	22%	73	15%
Total	108	100%	498	100%

A larger proportion of women (62%) agree or strongly agree that achieving a work-family balance is difficult to achieve than men (50%). It must be noted that the question seeks perceptions of the engineering field, not necessarily their own workplace. One can assume that respondents base their opinion on personal workplace experience, however. Furthermore, 50% of men disagree or neither agree nor disagree that it is difficult to achieve work-life balance, clearly more than women (38%). While close, these observations are not at the .05 level of significance ($\alpha = .073$).

Table 6: Perceptions of Gender Contributions and Skills

At my Workplace, Men get More Credit for their Contributions and Skills than Women do.	Female	%	Male	%
Strongly Disagree	8	8%	105	23%
Disagree	17	16%	196	43%
Neither Agree nor Disagree	9	8%	99	22%
Agree	39	37%	42	9%
Strongly Agree	33	31%	14	3%
Total	106	100%	456	100%

Not surprisingly, there is clear statistical differences between the perceptions of women and men to this question ($\alpha = .000$). There is an almost even split with 68% of women agreeing or strongly agreeing that men get more credit, and 66% of men disagreeing or strongly disagreeing

that they do. It can be speculated that this may indicate that employers need to be conscious of these perceptions as they may influence job satisfaction, productivity, and retention of women in engineering.

Table 7: Perception of Gender Pay Equity

Men in Engineering Make More Money than Women do, even when Completing Similar Work.	Female	%	Male	%
Strongly Disagree	3	3%	73	14%
Disagree	9	8%	123	24%
Neither Agree nor Disagree	6	5%	93	18%
Agree	44	38%	80	16%
Strongly Agree	37	32%	8	2%
I Don't Know	16	14%	130	26%
Total	115	100%	507	100%

There is a clear statistical difference between men and women's perceptions of gender pay equity ($\alpha = .000$). Women are much more likely than men to agree or strongly agree with the statement "Men in engineering make more money than women do, even when completing similar work" (81% versus 18%), while men are more likely to disagree or strongly disagree with this statement (38% versus 11%). Reference to discussion on the OSPE/Mercer salary survey is useful in this regard.

Table 8: Company Policies for Child and Elder Care

Does your Employer have Work-life Balance Policies that Provide Flexibility when Dealing with for Childcare or Eldercare Responsibilities?	Female	%	Male	%
Yes	37	33%	182	33%
No	25	22%	110	22%
To a Limited Extent Only	33	29%	142	28%
I Don't Know	18	16%	71	14%
Total	113	100%	505	100%

There is no statistical difference in answers to this question ($\alpha = .908$) and almost complete agreement between women and men. Although one third of respondents' employers provide flexible policies for childcare and eldercare, as indicated in Tables 5 and 11, women engage in more unpaid housework and childcare than men and, as a result, are more likely to indicate they feel the pressures associated with juggling both work and family.

Table 9: Workload during Past Five Years

Has the Workload in your Job Increased, Decreased, or Stayed the Same Over the Past 5 Year?	Female	%	Male	%
Increased Greatly	23	28%	102	24%
Increased Somewhat	35	43%	178	41%
Stayed the Same	16	20%	119	27%
Decreased Somewhat	5	6%	30	7%
Decreased Greatly	2	2%	5	1%
Total	81	100%	434	100%

Women and men who participated in the survey appear to be in agreement regarding their workload during the past five years ($\alpha = .523$). This indicates in terms of workload there is gender equity.

Table 10: Discrimination in the Workplace

In the Last Year, at Work, have You Been Discriminated Against, in Any Way by Anyone You've had Contact with?	Female	%	Male	%
Yes	45	51%	53	12%
No	42	47%	385	85%
I Don't Know	2	2%	14	3%
Total	89	100%	452	100%

Table 10 indicates significant differences exist between women and men when it comes to discrimination in the workplace ($\alpha = .000$). Over half of women (51%) have reported being

discriminated against in their workplace. A large majority of men (85%) report having no discrimination directed towards them. This disturbing observation strongly indicates measures need to be taken to eliminate negative workplace cultures.

Table 11: Hours of Weekly Activities

	How many Hours do You Usually Work [FOR PAY] at Your Job/Jobs [or Business] in a Normal Week?	In a TYPICAL Week, how many Hours do You Spend Doing UNPAID Housework Activities?	In a TYPICAL Week, how many Hours do You Spend Looking after Children WITHOUT Pay?	In a TYPICAL Week, how many Hours do You Spend in UNPAID Volunteer Work in any Organization or Group?	How many Minutes Per DAY do you Normally Spend Travelling from Home to Your Job and Back?
Female Mean	34.53	17.21	41.64	2.66	5.18
Male Mean	38.6	12.96	16.81	2.02	5.63
Total Mean	37.84	13.70	21.21	2.13	5.555

The data indicate that women work fewer hours per week at their job. With this said, it is counterbalanced by women spending many more hours than men conducting unpaid housework and childcare. When converted to daily hours, and factoring in housework and childcare are based on seven days while working at a paid job is based on five days, women spend 16.73 hours per weekday at paid/unpaid work and commuting, while men spend 13.97 hours.