

Mapping of the Gender Equality in
the Highway Engineering Sector
In collaboration with



Summary of Results

The results are based on 15 interviews and data from 20 different organizations in the highway engineering sector in academia and the industry.

Data from 14 academic institutes show that the percentage of women decreases higher up in the hierarchy in academia. The same holds true for the industry, the % of women decreases the higher up in the hierarchy on looks. Furthermore, the proportion of female Master or Ph.D. students is higher for institutions with female professors.

Being interviewed about the perceived proportion of women in their respective field, a large number of the interviewees have observed a slow increase in this number over the past ten years. The interviewees were aware of their unequal gender distribution, and almost every interviewee mentioned the importance of increasing the number of women.

The interviewees believe that the primary reason for women tending to disregard careers in the highway engineering sector are historical norms and beliefs. Factors such as a lack of role models and parental leave are mentioned more frequently by the interviewed women than the men.

Sammanfattning av Resultat

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Mapping of the Gender Equality in the Highway Engineering Sector

This study was performed on behalf of the competence center Road2Science at the Royal Institute of Technology, KTH, in Stockholm, Sweden. Read more about Road2Science in Appendix 1.

Purpose

The purpose of this study was to gain a deeper understanding of the current gender distribution at different hierarchical levels in the highway engineering sector in Europe and the USA, in both academia and the industry. The goal is to present a realistic representation of the current distribution of gender equality in the sector. This study does not aim to cover one hundred percent of the professionals in the highway engineering sector.

Gender Equality within the Construction Sector

According to the World Economic Forum Gender Gap Report from 2017¹, the Nordic countries constitute four of the five highest rated countries in the world when it comes to closing the gender gap. Nevertheless, we still don't succeed in all fields.

- In 2014, women represented 9% of the whole construction industry in Sweden, which is similar to the rest of the EU.²
- In the UK 2014, women made up 11% of the whole construction workforce, but only 1% of the workers on the sites.³
- Women constitute 26% of the tertiary education students (Bachelor, Masters, Ph.D.) in engineering, manufacturing, and construction within the EU. In comparison, women accounted for an estimated 54% of all tertiary students in the EU.⁴

Method

The method has been to collect quantitative data from organizations and perform interviews to gather qualitative data in the form of different views, experiences, and ideas from professionals

¹ World Economic Forum Gender Gap Report from 2017: http://www3.weforum.org/docs/WEF_GGGR_2017.pdf

² SCB: Registerbaserad arbetsmarknads- och lönesummestatistik 2014: http://www.scb.se/Statistik/AM/AM0207/2014A01/AM0207_2014A01_SM_AM30SM1501.pdf

³ Building the future: Women in construction: <http://www.smith-institute.org.uk/wp-content/uploads/2015/09/280214-Women-in-construction-v3.pdf>

⁴ Eurostat: http://ec.europa.eu/eurostat/statistics-explained/index.php/Tertiary_education_statistics#Fields_of_study

working in the sector. The data presents the distribution of women active in the European and American highway engineering academia and industry in Sweden.

All results are presented anonymously; the study is not focusing on specific links to organizations or individuals.

Semi Structured Interviews

The purpose of the interviews was to get the respondent's views of his or her reality in the highway engineering sector. The semi-structured interview method was chosen to encourage the respondents to speak freely. The same overall questions were asked to all interviewees, and the respondents were free to talk about the different topics to different extents.

A total of 15 Skype interviews were held from June to September of 2018. Eight of the interviews were conducted with professors at universities in Europe and the United States. Seven of the interviews were held with people working in the highway engineering sector (private and governmental) in Sweden.

Data

The data was gathered from organizations in academia and industry. 14 Academic institutions have contributed with data, which has been divided into three regions: the Nordics including Sweden, Norway, Denmark and Finland, the rest of Europe and USA. 6 organizations from the industry, which represent the Swedish highway engineering sector, have contributed with data.

As the collected data is limited, individual organizations might affect the result positively or negatively in an unfair way. However, we've found that the average gender ratios are similar for universities in the same region, and for the Swedish organizations.

Definitions and Delimitations

Highway Engineering

Highway engineering is defined as a sector within civil engineering which contains narrow topics: transportation infrastructure, road and pavement engineering and materials such as asphalt/bitumen. While collecting data, it has been difficult to separate statistics for this very specific area from the wider concept of construction engineering. Therefore, some of the numbers may include professionals working in areas related to or close to highway engineering.

Gender Equality

Gender equality means that women and men, as well as boys and girls, are treated and prioritized the same, have equal opportunities, responsibilities, rights, resources, and protection.⁵ Gender equality does not imply that women and men should become the same.

Men and Women

This study has looked at men and women, meaning it did not focus on individuals who define themselves as gender queers.

Titles within Academia

Bachelor's student: a student who is conducting a three-year university education.

Master's student: a student who holds a Bachelor's degree and who has added two years of advanced education in a related field.

Ph.D. student: a person who holds a Master's degree and who are performing research in a specific field, generally during four to five years. Usually, PhD-students also teach.

Postdoc: a person who holds a Ph.D. degree and who continues to perform research.

Professor: a person who holds all degrees above and who continues to perform research and to teach within his/her field of expertise. The professor is considered the most senior position within the academia.

⁵ Gender mainstreaming: Strategy for promoting gender equality: <http://www.un.org/womenwatch/osagi/pdf/factsheet1.pdf>

Results

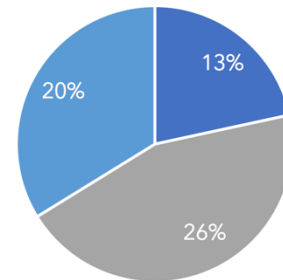
Data - Academia

All Regions

13% of the professors are women, which is lower compared to the 26 % of women who are Postdocs and the 20% female Ph.D. students.

The number of women decreases the higher up in the hierarchy you look: 45% of the Bachelor students, 35% of the Master students, and 13% of the professors are women.

% Women All



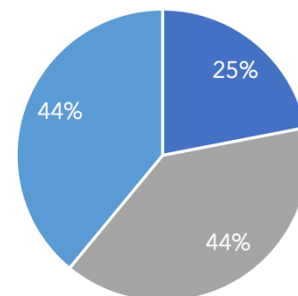
■ Professors ■ Post Docs ■ Ph.D. Students

Nordics

25% of the professors are women, and it is lower compared to the 44 % Postdocs and 44% of the Ph.D. students of who are women.

The number of Bachelor and Master students who are women is 25%, and the distribution of women is increasing at Ph.D. and Postdocs levels.

% Women Nordics



■ Professors ■ Post Docs ■ Ph.D. Students

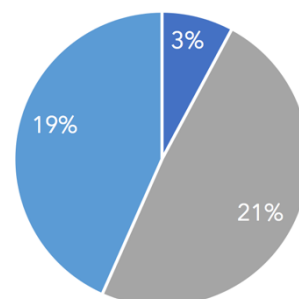
Rest of Europe

3% of the professors are women, compared to 21% of Postdocs and 19% of the Ph.D. students who are women.

The percentage of women increases slightly between Ph.D. students and Postdocs.

The number of women at Master and Bachelor levels are marginally higher compared to the Nordics, at 38% respectively 39%.

% Women Rest of Europe



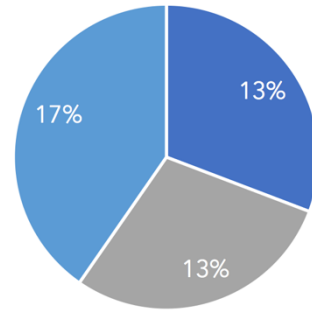
■ Professors ■ Post Docs ■ Ph.D. Students

USA

The US has the lowest percentage gap between Professors (13%), Postdocs (13%) and Ph.D. students (17%), but the lowest percentage of women at the Postdocs and Ph.D. student levels.

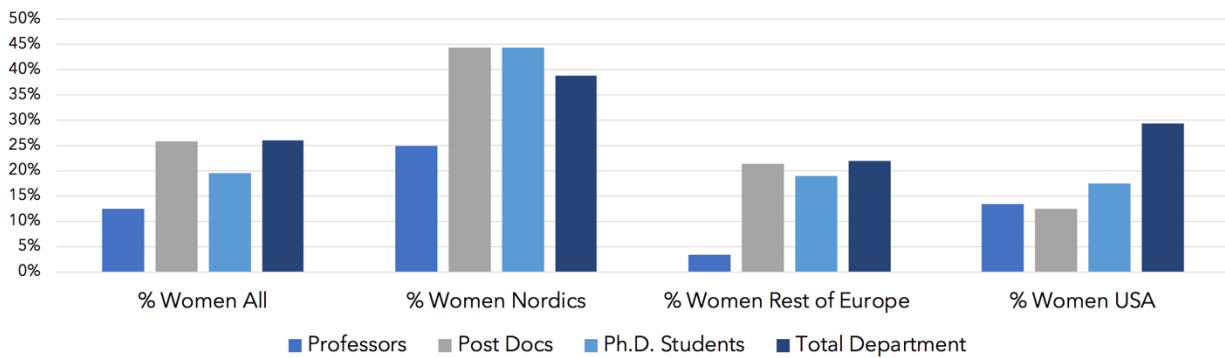
There is a decrease the higher up in the hierarchy one looks.

% Women USA



Professors Post Docs Ph.D. Students

All Regions



Please see the Appendix 2 for detailed data in table format, including the % of Master and Bachelor students

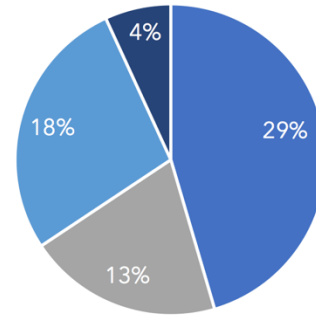
Data – The Industry

Overall the number of women in the organizations is low, on average 17%.

Only 4% of blue-collar workers are women.

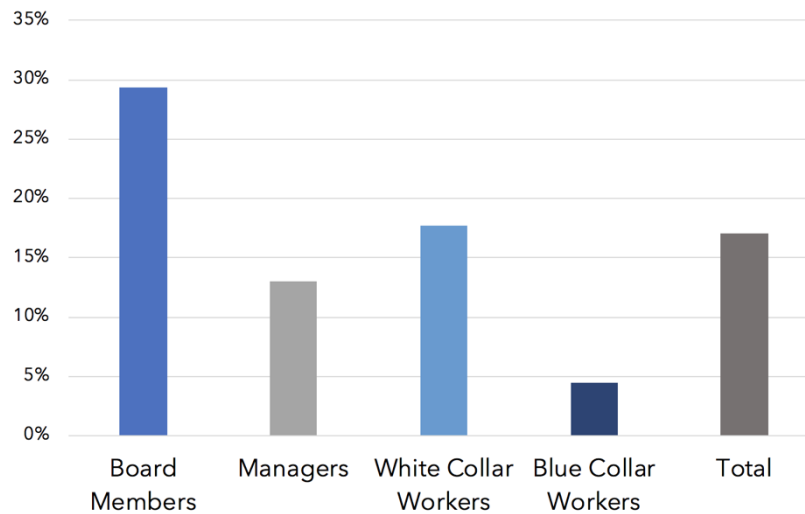
The number of women decreases between white-collar workers (18%) and managers (13%).

% Women in the Swedish Industry



■ Board Members ■ Managers
■ White Collar Workers ■ Blue Collar Workers

% Women in the Swedish Industry



Comparison between Academia and the Industry

In total higher % women in academia in the Nordics (39%) than the industry (17%).

Key Takeaways from Interviews

The most important takeaways from the interviews are described below.

The industry is well aware of the status of their gender distribution, and almost every interviewee mentioned the importance of increasing the number of women.

A lack of gender equality is intuitively felt by women in all organizations in the highway engineering sector. For men, it is however not expressed as clearly.

The interviewees believe that the reason why women tend not to choose to work in this sector is based on historical norms and beliefs. It is believed to be a heavy and seasonal job that leads to much time away from home and family.

Role models and parental leave are mentioned more frequently by the interviewed women than the men.

A large number of the interviewees have seen a slow increase in the number of women over the past ten years.

When a university has a female professor in this field, seemingly the number of female students (Master as well as Ph.D.) is increasing. Women mention role models as a key factor for change more often than men do.

After completed Masters and Ph.D., individuals are in their late 20's or early 30's and many are ready to have children. It is believed that around these ages, women's priorities often shift from career to family. This could be one reason why the number of female professors is lower compared to the number of Ph.D. students who are women.

It's a common view among the interviewees that women choose to stay within academia or start working for consultancy firms rather than contractors. Men tend to prefer the opposite.

Finally, education and work titles which include the word "environment" (or similar) are believed to attract women more than men, both in academia and the industry. More "technical" topics such as mechanical engineering or structural mechanics are believed to attract men more than women.

References

1. World Economic Forum Gender Gap Report from 2017:
http://www3.weforum.org/docs/WEF_GGGR_2017.pdf
2. SCB: Registerbaserad arbetsmarknads- och lönesummestatistik 2014:
http://www.scb.se/Statistik/AM/AM0207/2014A01/AM0207_2014A01_SM_AM30SM1501.pdf
3. Building the future: Women in construction: <http://www.smith-institute.org.uk/wp-content/uploads/2015/09/280214-Women-in-construction-v3.pdf>
4. Eurostat: http://ec.europa.eu/eurostat/statistics-explained/index.php/Tertiary_education_statistics#Fields_of_study
5. Gender mainstreaming: Strategy for promoting gender equality: <http://www.un.org/womenwatch/osagi/pdf/factsheet1.pdf>

Appendix 1 - Information about Road2Science

Road2Science

Road2Science is a Competence Center at KTH Royal Institute of Technology, in Stockholm. The center focuses on building bridges between industry and academia to raise the innovation capacity of the transportation infrastructure sector. The Center founded in 2012 and three years later it managed to, together with its industry partners, initiate a long-term National Innovation Program called InfraSweden2030. The program is financially supported by the Swedish government and stakeholders from the academia and the industry.

In 2018 Road2Science sharpened its aim towards improving the recruitment issues that the sector is facing, for instance by actively integrating its activities with the needs of students at technical universities and recent recruits in the sector. From a series of interviews with its partner organizations, the Center concluded that part of the sector's recruitment and reputation issues might be coupled to gender balance issues. To align the activities with the actual challenges at hand, Road2Science decided to perform an independent and extensive mapping of the current gender equality status of this sector in Europe.

Appendix 2 - Detailed data

| Academia | | | | | | | | | | | | | | | | |
|------------------|-------|-------|---------|-----|-------|----------------|---------|---------|-------|-------|---------|----------------|-------|-------|---------|-----|
| ALL | | | Nordics | | | Rest of Europe | | | USA | | | | | | | |
| Titles | Total | Women | % Women | All | Total | Women | % Women | Nordics | Total | Women | % Women | Rest of Europe | Total | Women | % Women | USA |
| Professors | 64 | 8 | 13% | 20 | 5 | 25% | 29 | 1 | 3% | 15 | 2 | 13% | 15 | 2 | 13% | |
| Post Docs | 62 | 16 | 26% | 18 | 8 | 44% | 28 | 6 | 21% | 16 | 2 | 13% | 16 | 2 | 13% | |
| Ph.D. Students | 133 | 26 | 20% | 9 | 4 | 44% | 21 | 4 | 19% | 103 | 18 | 17% | 103 | 18 | 17% | |
| Total Department | 314 | 82 | 26% | 49 | 19 | 39% | 132 | 29 | 22% | 133 | 34 | 29% | 133 | 34 | 29% | |
| Masters | 210 | 73 | 35% | 66 | 17 | 25% | 25 | 7 | 38% | 119 | 49 | 36% | 119 | 49 | 36% | |
| Bachelors | 552 | 246 | 45% | 208 | 98 | 25% | 5 | 2 | 39% | 339 | 146 | 35% | 339 | 146 | 35% | |

| The Industry in Sweden | |
|------------------------|---------------------------------|
| Titles | % Women in the Swedish Industry |
| Board Members | 29% |
| Managers | 13% |
| White Collar Workers | 18% |
| Blue Collar Workers | 4% |
| Total | 17% |

Appendix 3 – Interviewees

| Academia | Gender | Title/Role |
|----------------|--------|---------------------------|
| Interviewee 1 | Man | Professor |
| Interviewee 2 | Woman | Professor |
| Interviewee 3 | Man | Professor |
| Interviewee 4 | Woman | Senior Researcher |
| Interviewee 5 | Man | Professor |
| Interviewee 6 | Man | Professor |
| Interviewee 7 | Man | Professor |
| Interviewee 8 | Woman | Professor |
| Industry | | |
| Interviewee 9 | Man | Business Unit Manager |
| Interviewee 10 | Woman | HR Manager |
| Interviewee 11 | Man | Technical Manager |
| Interviewee 12 | Man | Technical Project Manager |
| Interviewee 13 | Man | Technical Manager |
| Interviewee 14 | Woman | Technical Manager |
| Interviewee 15 | Woman | Senior Researcher |