



IGF

INTERGOVERNMENTAL FORUM
on Mining, Minerals, Metals and
Sustainable Development

WOMEN AND THE MINE OF THE FUTURE

A Gendered Analysis of Employment and Skills in the Large-Scale Mining Sector: Sweden

Kristina Johansson

March 2022



Secretariat
hosted by



Secretariat
funded by

Canada



Kingdom of the Netherlands



This report was produced as part of Women and the Mine of the Future, a project to increase understanding of the status quo for women in mining, so stakeholders can anticipate, assess, and address gendered impacts as mining evolves. The project is led by the Intergovernmental Forum on Mining, Minerals, Metal and Sustainable Development (IGF) and conducted with the following partners:

- Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) on behalf of the German Federal Ministry of Economic Cooperation and Development (BMZ)
- Environmental Governance Programme of the Swedish Environmental Protection Agency and the United Nations Development Programme
- International Labour Organization
- International Women in Mining

The opinions expressed in this report reflect only the author's views and do not represent those of IGF or other partner organizations.



© 2022 The International Institute for Sustainable Development
Published by the International Institute for Sustainable Development

This publication is licensed under a Creative Commons
Attribution-NonCommercialShareAlike 4.0 International License.

The International Institute for Sustainable Development (IISD) is an independent think tank championing sustainable solutions to 21st-century problems. Our mission is to promote human development and environmental sustainability. We do this through research, analysis, and knowledge products that support sound policy making. Our big-picture view allows us to address the root causes of some of the greatest challenges facing our planet today: ecological destruction, social exclusion, unfair laws and economic rules, a changing climate. IISD's staff of over 120 people, plus over 50 associates and 100 consultants, come from across the globe and from many disciplines. Our work affects lives in nearly 100 countries. Part scientist, part strategist—IISD delivers the knowledge to act.

IISD is registered as a charitable organization in Canada and has 501(c)(3) status in the United States. IISD receives core operating support from the Province of Manitoba and project funding from numerous governments inside and outside Canada, United Nations agencies, foundations, the private sector and individuals.

The Intergovernmental Forum on Mining, Minerals, Metals and Sustainable Development

The IGF supports more than 75 nations committed to leveraging mining for sustainable development to ensure negative impacts are limited and financial benefits are shared. It is devoted to optimizing the benefits of mining to achieve poverty reduction, inclusive growth, social development, and environmental stewardship. The International Institute for Sustainable Development has served as Secretariat for the IGF since October 2015. Core funding is provided by the governments of Canada and the Netherlands.

WOMEN AND THE MINE OF THE FUTURE A Gendered Analysis of Employment and Skills in the Large-Scale Mining Sector: Sweden

Kristina Johansson

March 2022

IISD HEAD OFFICE

111 Lombard Avenue
Suite 325
Winnipeg, Manitoba
Canada R3B 0T4

IISD.org

[@IISD_news](https://twitter.com/IISD_news)

IGF/IISD OTTAWA OFFICE

220 Laurier Ave W.
Suite 1100
Ottawa, Ontario
Canada R3B 0T4

IGFMining.org

[@IGFMining](https://twitter.com/IGFMining)





ACKNOWLEDGMENTS

Thanks to:

Wilhelm Tossier

For contributing to the preface and with insights on existing legislation that affect women miners

Eugenia Segerstedt

For processing occupational data on mining and quarrying provided by Statistics Sweden

Marie Engqvist Persson

For processing industry data provided by Statistics Sweden

Magnus Nygren and Joel Lööv

For contributing with expertise on health, safety, and technology development in the Swedish mining industry



PREFACE

Mining work is traditionally represented as dark, dirty, and dangerous, and the first Swedish miners worked the rock using hand-held tools. Rural working-class men constructed their identities as miners and men in relation to the practical knowledge, physical strength, risk taking, and endurance required by the dangerous and strenuous working conditions in the mines (Abrahamsson & Johansson 2006; Andersson 2012). However, the gendering of mine work as a business for “real men only,” is a relatively modern construction. During the pre-industrial period, women made up a significant number of the total workforce in the Swedish mining industry, and during the 1850s, women accounted for an estimated 15% to 55% of the workforce in mines around the country, depending on the mine (Ringblom & Abrahamsson, 2017). Underground and above, and at almost all stages of the production process, women workers performed strenuous and dangerous work as miners. In and around the mines, women and men worked side by side, often in work teams consisting of the family households, and received equal pay (Abrahamsson 2007).

With industrialisation, there was both a shift in the organisation of work and a more general ideological shift that affected the relationship between women and men, both in and outside the workplace. The more independently organised teams of workers based on households were no longer considered to function in the new organisation of production. In addition, a population increase during the 19th century forced many young men to leave agriculture and apply for work in the mines. This, in combination with an ideological shift that claimed that participating in mine work, mainly underground work, prevented women from fulfilling their (main) caring responsibilities as devoted wives and mothers, restricted women’s participation in mine work to lower-paid seasonal work above ground (Ringblom & Abrahamsson 2017).

Even though almost all women had stopped working in the mines in 1900, a law was introduced in Sweden that prohibited adult women from working underground. Underground mining was defined as dangerous, and women were therefore to be kept away, regardless of individual characteristics or skills and regardless of livelihood needs. However, Abrahamsson (2007) argues that, rather than the protection of women, the exclusion of women from underground mining foremost constitutes an anti-competitive measure and a way to consolidate a masculine miner identity.

During the 1960s, the statutory ban on women in underground work began to loosen. During this period, the mining companies could apply for an exemption to allow women to work underground. This meant that women who worked in the mining area with transport, medical care, and cleaning, among other things, could be given access to the mines underground. But despite the fact that the statutory ban began to loosen in the



1960s, it was not until 1978 that the law was completely repealed, 78 years after its introduction (Ringblom & Abrahamsson 2017).

The twentieth century saw increasing mechanisation and the presence of machinery. Today's mines are high-technological activities, characterised by automatisisation and digitalisation, which have considerably changed the miners' working conditions (Abrahamsson & Johansson 2006). New production technology has brought new demands and competencies that have changed workers' role in the production system, making it more about surveillance than manual labour (Löow 2021). Over time, mining machinery "has tended to become bigger and more technologically sophisticated," and "work processes have become automated, remotely controlled and dependent on the technologies and techniques of closed-circuit television, computers and advanced electronic measurement and calculation" (Abrahamsson & Johansson 2006: 699). This process of digitalisation is marked by a spatial redistribution and gradual distancing of the miner from the rock, symbolised not least by the establishment of remote operational control centres above ground. This spatial reconfiguration also brings changes to skills and knowledge, from bodily and tacit to abstract and theoretical (Löow et al. 2019). In these centres, the miners sit behind computers in office-like rooms, overlooking and operating the activities of machines underground.

What is the relevance of gender in such a context?



TABLE OF CONTENTS

1.0 Introduction	1
2.0 The Swedish Context.....	2
2.1 The Swedish Labour Market.....	2
2.2 The Swedish Education System	5
2.3 National Gender Equality Policies and Acts	10
3.0 Gender Profile of the Swedish Mining Industry	12
3.1 Mining Employment and Geographical Distribution	12
3.2 Occupational Levels	14
3.3 Age Distribution.....	17
4.0 Women’s Working Conditions and Current Situation	21
4.1 Health and Safety.....	21
4.2 Technology Development and Mining Workplace Culture.....	24
4.3 Gender Equality Actions in the Mining Industry.....	25
4.4 Research on Gender-Equality Actions in Swedish Mining Industry	27
5.0 Executive Summary and Future Recommendations.....	29
REFERENCES.....	31



1.0 INTRODUCTION

The IGF, in partnership with International Women in Mining, the International Labour Organization, and United Nations Development Programme Environment and Governance Program (UNDP EGP), is launching the Women and the Mine of the Future Project that aims to establish a baseline to uncover the existing profile of women employed in large-scale mining and its supply chain.

The project is conducted in three phases. First, baseline analyses will be conducted in a selected group of countries and will focus on the existing occupations and skills profiles of men and women in the large-scale mining sector. Given technological advances, the second phase will map the changes in occupational structures and skills requirements needed for future jobs in large-scale mining. To provide wider scope for women in the large-scale mining sector, the third phase will analyse the participation of women in mining supply chains. The analysis will take into account the changing nature of supply chains due to new mining technologies and the low-carbon and energy transition.

In the first phase, 11 countries were selected for baseline analysis. In each country, IGF recruited a local consultant to undertake the research and collect data for the baseline analysis. This report presents the results of the baseline analysis of the gender profile of the large-scale mining workforce in Sweden, carried out by Luleå University of Technology as a national consultant. Data presented in the report have been collected by Statistics Sweden.

Specific aims of the report are:

- To uncover the gender-disaggregated profile of the Swedish mining industry using occupational industry time series data.
- To explore women's working situation and current situation drawing on the literature on gender, work, and organisation in the Swedish mining industry.

The results are presented in two sections, one focusing on the gender profile of the Swedish mining industry and one on women's working conditions and current situation. The final section includes an executive summary and provides some future recommendations for the further promotion of gender equality in the Swedish mining industry. To contextualise the gender profile of the Swedish mining industry, the subsequent section gives a brief introduction to the Swedish labour market and education system, as well as national gender equality acts from a gender perspective.



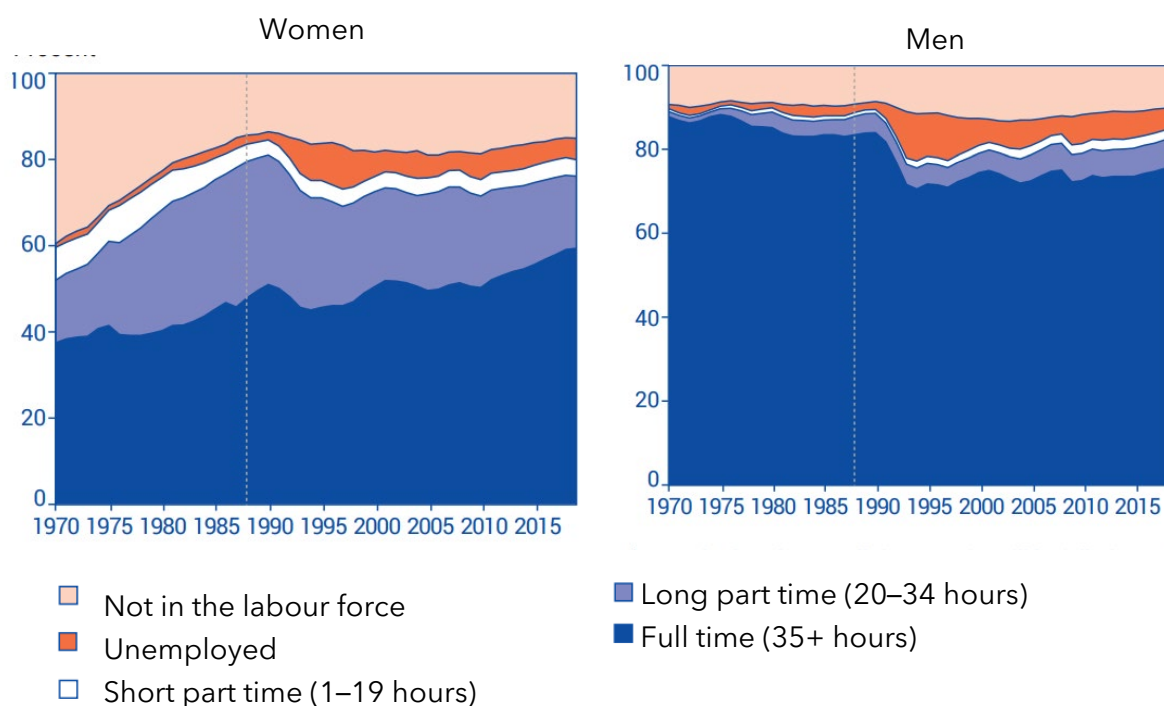
2.0 THE SWEDISH CONTEXT

To contextualise the gender profile of the Swedish mining industry described in the next chapter, this section gives a brief introduction to the Swedish labour market and education system, as well as national gender equality acts from a gender perspective.

2.1 The Swedish Labour Market

The Swedish labour market is characterised by high female labour participation on the one hand, and patterns of sex segregation across industries on the other.

Figure 1. Labour participation in Sweden. Labour force affiliation and typical working time by sex 1970-2019¹



Source: Statistics Sweden, Women and men in Sweden 2020.

¹ According to Swedish Statistics, *Not in the labour force* refers to people neither employed nor unemployed. *Unemployed* refers to people who have the capacity to work and who have applied for work but are not currently in employment.



Statistics Sweden annually publishes a compilation of statistics titled *Women and Men in Sweden: Facts and figures 2020*.² Figure 1, derived from this publication, illustrates the development of men and women's labour force affiliation and average working hours in Sweden from the 1970s until today. Women's participation in the workforce increased significantly during the 1970s and 1980s, mainly consisting of part-time work. During the recession in the 1990s, unemployment increased, which also resulted in a lower proportion of women in the labour market in the early 2000s than in the 1970s. Since the beginning of the 2000s, the proportion of full-time working women has again increased, whilst the proportion of part-time working women has decreased. At the same time, the proportion of part-time working women between the ages of 20 and 64 has decreased. Potential factors that explain this trend include the continued promotion of gender equality ideals and women's increased participation in industries traditionally dominated by men and full-time employment. During the same period, the proportion of employed men was almost constant. However, similar to the situation for working women, the 1990s meant increased unemployment among men, which did not reach the same level in the early 2000s despite a recovery from the decline of the 1990s. In recent decades, the proportion of men who work part-time has increased somewhat, potentially due to the expansion of the service sector, where full-time employment is less common.

Table 1 presents the representation of men and women employees by industries in 2020 based on statistical data from Statistics Sweden. Patterns of sex segregation are evident. Three industries are dominated by women:³ *Human health and social work activities* (79% women), *Education* (75% women), and *Other service activities* (65% women). 51% of all women employees and 15% of all men employees in Sweden work in industries dominated by women. Eight industries are dominated by men. *Construction* (90% men), *Transportation and Storage* (79% men), and *Water supply, sewerage, waste management and remediation activities* (78% men) are industries most dominated by men, followed by *Mining and quarrying* (77% men). Overall, 49% of all men employees and 15% of all women employees in Sweden are working in industries dominated by men. Eight industries are neither dominated by women nor men. Industries with the greatest gender balance are *Accommodation and food service activities* (49% women), *Arts, entertainment, and recreation* (50% women) and *Financial and insurance activities* (50% women). In all, 34% of all women and 37% of all men employees in Sweden work in industries that are not dominated by either women or men.

² The report is available for download at <https://www.scb.se/hitta-statistik/statistik-efter-amne/levnadsforhallanden/jamstalldhet/jamstalldhetsstatistik/pong/publikationer/pa-tal-om-kvinnor-och-man.-lathund-om-jamstalldhet-2020/>

³ "Industries dominated by women" refers to industries with more than 60% of women employees. "Industries dominated by men" refers to industries with more than 60% of men employees. "Industries neither dominated by men nor women" refers to industries where neither men nor women constitute more than 60% of the employees.



Table 1. The Swedish labour market (Employment by industry and sex 2020)

	Total	Women %	Men %
Industries dominated by women			
Human health and social work activities	809 146	79%	21%
Education	544 897	74%	26%
Other service activities	121 058	65%	35%
Industries not dominated by either women or men			
Activities of extraterritorial organisations and bodies	855	53%	47%
Arts, entertainment, and recreation	98 660	50%	50%
Financial and insurance activities	97 926	50%	50%
Accommodation and food service activities	159 284	49%	51%
Administrative and support service activities	277 179	45%	55%
Wholesale and retail trade; repair of motor vehicles and motorcycles	584 242	45%	55%
Professional, scientific, and technical activities	321 023	43%	57%
Real estate activities	86 673	40%	60%
Industries dominated by men			
Information and communication	218 416	29%	71%
Electricity, gas, steam, and air conditioning supply	29 579	28%	72%
Agriculture, forestry, and fishing	98 147	26%	74%
Manufacturing	525 598	24%	76%
Mining and quarrying	9 092	23%	77%
Water supply; sewerage, waste management and remediation activities	24 026	22%	78%
Transportation and storage	227 726	21%	79%
Construction	363 627	10%	90%

Source: Swedish Statistics, calculations and tables by the author

Overall, 77% of the employees in Mining and quarrying are men—the industry is thus part of the one third of the Swedish labour market made up of industries dominated by men.



2.2 The Swedish Education System

The Swedish school system is made up of 10 years of compulsory basic school, followed by 3 years of upper secondary school. Whilst upper secondary school is, in theory, voluntary, basically all pupils go on to study one of the educational programmes provided by upper secondary school. Currently, the Swedish Upper-secondary school consists of 20 national educational programmes, 13 vocational programs and seven higher educational preparatory programmes. Introductory programmes are for those students who lack the required merits to apply to a national program. Vocational programs and higher educational preparatory programs both make the students qualified to continue to higher education.⁴ Until 2011, Swedish higher education was completely free. Today, higher education is free for citizens of Sweden, the EU/EEA and Switzerland. Most higher education students in Sweden finance their studies with the help of financial support from the state to cover their living expenses.⁵ Another form of post-secondary level is higher vocational education. Higher vocational programmes, encompass 1 or 2 years of studies combining theory with practical learning in a workplace. Programmes are offered in sectors where there is a need for skilled labour, and the content varies according to labour market needs.

Table 2. Swedish Upper-secondary School (Enrolled students by sex and national program 2019/20)

	2019/20		
	Total	Women %	Men %
Upper-secondary school, all students	355 004	47%	53%
National programmes	310 127	48%	52%
Vocational programmes	102 191	39%	61%
Child and Recreation	10 213	62%	38%
Building and Construction	13 343	9%	91%
Electricity and Energy	15 067	3%	97%
Vehicle and Transport	11 814	18%	82%
Business and Administration	9 818	53%	47%
Handicraft	6 306	94%	6%
Hotel and Tourism	2 643	74%	26%
Industrial Technology	4 554	11%	89%

⁴ More details on the Swedish education system is available for download at <https://www.skolverket.se/download/18.6bfaca41169863e6a653b46/1553956926501/pdf685.pdf>

⁵ More details on Swedish higher education and research is available for download <https://english.uka.se/download/18.6b692de317a75d632f314a7c/1631105759132/An%20Overview%20of%20Swedish%20Higher%20Education%20and%20Research%202021.pdf>



Natural Recourse Use	9 150	68%	32%
Restaurant Management and Food	4 556	50%	50%
HVAC and Property Maintenance	3 593	3%	97%
Health and Social Care	10 268	75%	25%
National Recruiting Educational	866	14%	86%
Higher education preparatory programmes	207 936	52%	48%
Business Management and Economics	47 376	51%	49%
Arts	20 473	64%	36%
Humanities	2 099	81%	19%
Natural Science	45 420	55%	45%
Social Science	59 089	64%	36%
Technology Programme	30 264	18%	82
International Baccalaureate	3 215	57%	43%
Introductory Programmes	44 877	39%	61%

Source: Swedish Statistics, calculations and tables by the author

The representation of men and women among graduates from Swedish Higher Vocational Education is presented in Table 3. While the patterns are similar, the figure shows that higher vocational education in general is less sex-segregated compared to upper secondary programs. Women graduates predominate in the field of *Health and Welfare* (91%), and *Social Sciences, Business and Law* (77%). Men graduates predominate in two fields: *Science and Engineering, manufacturing, and construction*, but in both these fields, the share of women is increasing. In *Science*, the share of women has increased from 19% in 2010 to 27% in 2020. In *Engineering, Manufacturing, and construction*, the share of women increased from 23% in 2010 to 28% in 2020.

Table 3. Swedish Higher Vocational Education (Graduates by sex and field of education 2010 and 2020)

	2010			2020		
	Total	Women %	Men %	Total	Women %	Men %
Total	10 510	58%	0,42	17 050	60%	40%
Education	48	92%	0,08	443	65%	35%
Humanities and arts	817	51%	0,49	919	53%	47%
Social sciences, business and law	33 48	74%	0,26	5 057	77%	23%



Science	525	19%	0,81	1 495	27%	73%
Engineering, manufacturing, and construction	2 440	23%	0,77	3 992	28%	72%
Agriculture	369	64%	0,36	420	69%	31%
Health and welfare	1 253	89%	0,11	2 925	91%	9%
Services	1 710	67%	0,33	1 772	58%	42%
Not known or unspecified	..			27	52%	48%

Source: Swedish Statistics, calculations and tables by the author

Table 4, focusing on Swedish Higher Education, shows the number of qualifications awarded by field of education and sex representation of men and women 2000/01, 2010/11, and 2020/21. During these two decades, the number of graduates more than doubled, but women continue to predominate amongst the graduates. In 2020/21 women constituted 64% of the higher education graduates in Sweden. Patterns of sex segregation are evident across academic fields. However, compared to upper secondary education and higher vocational education, Swedish Higher Education is less sex segregated. In 2020/21, women particularly predominate among graduates in *Health and Welfare* (82%) and *Education science and Teacher training* (79%). Women also predominate among graduates related to *Social sciences, Law, and Business Administration* (63% women). The highest share of male graduates is found in *Engineering, manufacturing, and construction* (64%), followed by *Natural Sciences, Mathematics, and ICTs* (54%). Both men and women study *Natural Sciences, Mathematics, and ICTs*, but women predominate in study areas relating to *Biology and Environmental Sciences* (68% women) and men in *Mathematics and other Natural Sciences* (65% men). The time series data show that women graduates are increasing in traditionally male-dominated academic fields, particularly those related to engineering. In 1999/2000, women constituted 28% of graduates from *Engineering, manufacturing, and construction*; in 2020/21 36% of the qualifications were awarded to women. Among graduates from *Engineering and Engineering Industries*, the representation of women increased from 22% in 1999/2000 to 31% in 2019/20. However, signs of change are evident. In 1999/2000 women constituted 25% of graduates from *Engineering, manufacturing, and construction*, and 36% in 2019/20.



Table 4. Swedish Higher Education (Number of qualifications awarded by field of education and sex 2000/01, 2010/01 and 2020/01)

	2000/01			2010/11			2020/21		
	Total	Women %	Men %	Total	Women %	Men %	Total	Women %	Men %
All qualifications awarded	40516	61%	39%	71911	65%	35%	87101	64%	36%
Education science and Teacher training	6723	78%	22%	14739	79%	21%	12335	79%	21%
Education science and Teacher training	6723	78%	22%	14739	79%	21%	12335	79%	21%
Humanities and Arts	2563	65%	35%	3913	62%	38%	4521	62%	38%
Arts and Media	629	62%	38%	1468	59%	41%	1930	60%	40%
Humanities	1934	66%	34%	2445	64%	36%	2591	64%	36%
Social sciences, Law and Business Administration	9299	59%	41%	16391	61%	39%	22497	63%	37%
Social and Behavioural sciences	2771	65%	35%	6176	65%	35%	9531	66%	34%
Journalism and Information	559	77%	23%	1267	70%	30%	1906	74%	26%
Business and Administration	4433	54%	46%	7253	55%	45%	8900	57%	43%
Law and Jurisprudence	1536	58%	42%	1695	64%	36%	2160	64%	36%
Natural Sciences, Mathematics, and ICTs	3222	51%	49%	4318	44%	56%	6892	46%	54%
Biology and Environmental Sciences	916	69%	31%	1619	64%	36%	1774	68%	32%
Physics, Chemistry and Earth Sciences	679	49%	51%	683	52%	48%	789	49%	51%
Mathematics and other Natural Sciences	185	45%	55%	414	39%	61%	797	35%	65%



	2000/01			2010/11			2020/21		
	Total	Women %	Men %	Total	Women %	Men %	Total	Women %	Men %
ICTs	1442	41%	59%	1602	23%	77%	3532	37%	63%
Engineering, Manufacturing, and Construction	8510	28%	72%	11575	31%	69%	16368	36%	64%
Engineering and Engineering Industries	7059	26%	74%	8659	26%	74%	12643	32%	68%
Materials and Manufacturing	252	38%	62%	178	43%	57%	234	61%	39%
Architecture and Construction	1199	35%	65%	2738	45%	55%	3491	50%	50%
Agriculture and Forestry; Veterinary	436	58%	42%	518	62%	38%	590	72%	28%
Agriculture, Horticulture, Forestry and Fishery	357	54%	46%	403	55%	45%	420	64%	36%
Veterinary	79	78%	22%	115	86%	14%	170	91%	9%
Health and Welfare	9433	84%	16%	19680	85%	15%	22546	82%	18%
Healthcare and Nursing	7795	83%	17%	16465	84%	16%	19176	82%	18%
Social Work and Welfare	1638	87%	13%	3215	88%	12%	3370	84%	16%
Services	330	37%	63%	777	47%	53%	1352	50%	50%
Personal Services	157	74%	26%	394	68%	32%	817	64%	36%
Transport Services	170	2%	98%	207	20%	80%	61	5%	95%
Hygiene and Occupational Health Services	3	67%	33%	55	67%	33%	113	82%	18%
Security Services	-			121	14%	86%	361	17%	83%

Source: Swedish Statistics, calculations and tables by the author



2.3 National Gender Equality Policies and Acts

Gender equality has been a separate policy domain in Sweden since the early 1970s. The overarching goal of existing gender equality policy in Sweden “is that women and men are to have the same power to shape society and their own lives.” To promote the realisation of this goal, six sub-goals are specified:

- Gender equal division of power and influence. Women and men are to have the same rights and opportunities to be active citizens and to shape the conditions for decision making.
- Economic gender equality. Women and men must have the same opportunities and conditions as regards paid work, which gives economic independence throughout life.
- Gender equal education. Women and men, girls and boys must have the same opportunities and conditions with regard to education, study options, and personal development.
- Gender-equal distribution of unpaid housework and provision of care. Women and men must have the same responsibility for housework and have the opportunity to give and receive care on equal terms.
- Gender equal health. Women and men, girls and boys must have the same conditions for good health and be offered care on equal terms.
- Men’s violence against women must stop. Women and men, girls and boys must have the same right and access to physical integrity.⁶

Discrimination in working life is further prohibited by the Swedish Discrimination Act.⁷ The act combats discrimination and promotes equal rights and opportunities regardless of sex, transgender identity or expression, ethnicity, religion or other belief, disability, sexual orientation, or age.

The act stipulates that employers must continuously work on active measures aimed at preventing discrimination and promoting equal rights and opportunities in cooperation with the employees. Active measures should concern working conditions, provisions, and practices regarding pay and other terms of employment, recruitment and promotion, education and training, and conditions of work/life balance and parenthood.

Employers must investigate if there are any risks of discrimination, harassment, reprisals, or other obstacles to individuals’ equal rights in any one of these areas; including

⁶ More details about Swedish gender equality goals and policies can be found at <https://www.jamstalldhetsmyndigheten.se/en/about-gender-equality/swedens-gender-equality-policy>:

⁷ More details about the Swedish Discrimination Act can be found at <https://www.do.se/choose-language/english/what-is-discrimination/discrimination-in-working-life>



analysing the causes of any such risks and obstacles discovered; taking the prevention and promotion measures that can reasonably be demanded; and monitor and evaluate these measures. To discover, remedy and prevent unfair gender differences in pay and terms of employment, the employer must annually survey and analyse any pay differences between women and men performing the same or corresponding work. The act also stipulates that employers should promote gender balance in different types of work, categories of employees, and management positions, including taking appropriate measures and evaluating and monitoring their effectiveness. Employers with more than 25 employees must document their work on active measures each year, including accounts of the results of surveys and analyses made and the measures taken and planned, as well as an evaluation of the previous year's plan.



3.0 GENDER PROFILE OF THE SWEDISH MINING INDUSTRY

This chapter explores sex-disaggregated data relating to the Swedish mining industry. Employment data include data on industry level and the geographical distribution of the mining and quarrying industry and occupational data, by sex and by age group. Sex-disaggregated education data from the various educational levels that the mining industry is said to recruit from is also presented.

3.1 Mining Employment and Geographical Distribution

Sweden is a major producer of iron ore, accounting for more than 90% of total production of iron ore within the EU. After declining in 2015, ore production has since increased by 21%, which resulted in a record listing of 87.9 million tonnes in 2020 (Bergverksstatistik 2020). Table 5 demonstrates that mining of iron ore and non-ferrous metal ores dominates the Swedish mining and quarrying industry and represents almost all its employees. The third largest part of the industry is quarrying of stone, sand, and clay.

Table 5. Employment within the mining and quarrying industry by sex, 2020

	Total	Women %	Men %
Mining and quarrying industry	9 092	23%	77%
Mining of iron ores	3 781	26%	74%
Mining of non-ferrous metal ores	3 780	20%	80%
Quarrying of stone, sand and clay	1 856	15%	86%

Source: Swedish Statistics, calculations and tables by the author

Mineral resources in Sweden are spread throughout the country, with the ore districts of Norrbotten, Västerbotten, Örebro and Dalarna holding the largest reserves. According to *Statistics of the Swedish Mining Industry 2020* presented by Geological Survey Sweden, there were 168 current exploitation concessions in 2020, in addition to the 12 mines already opened in Sweden.⁸

Mining in Sweden takes place both above ground and underground. Ore mining above ground is done in open pits, where the ore is mined in descending levels by drilling and blasting. When the ore is unloaded, production moves gradually down to new levels. Underground mining, on the other hand, involves production processes at different levels

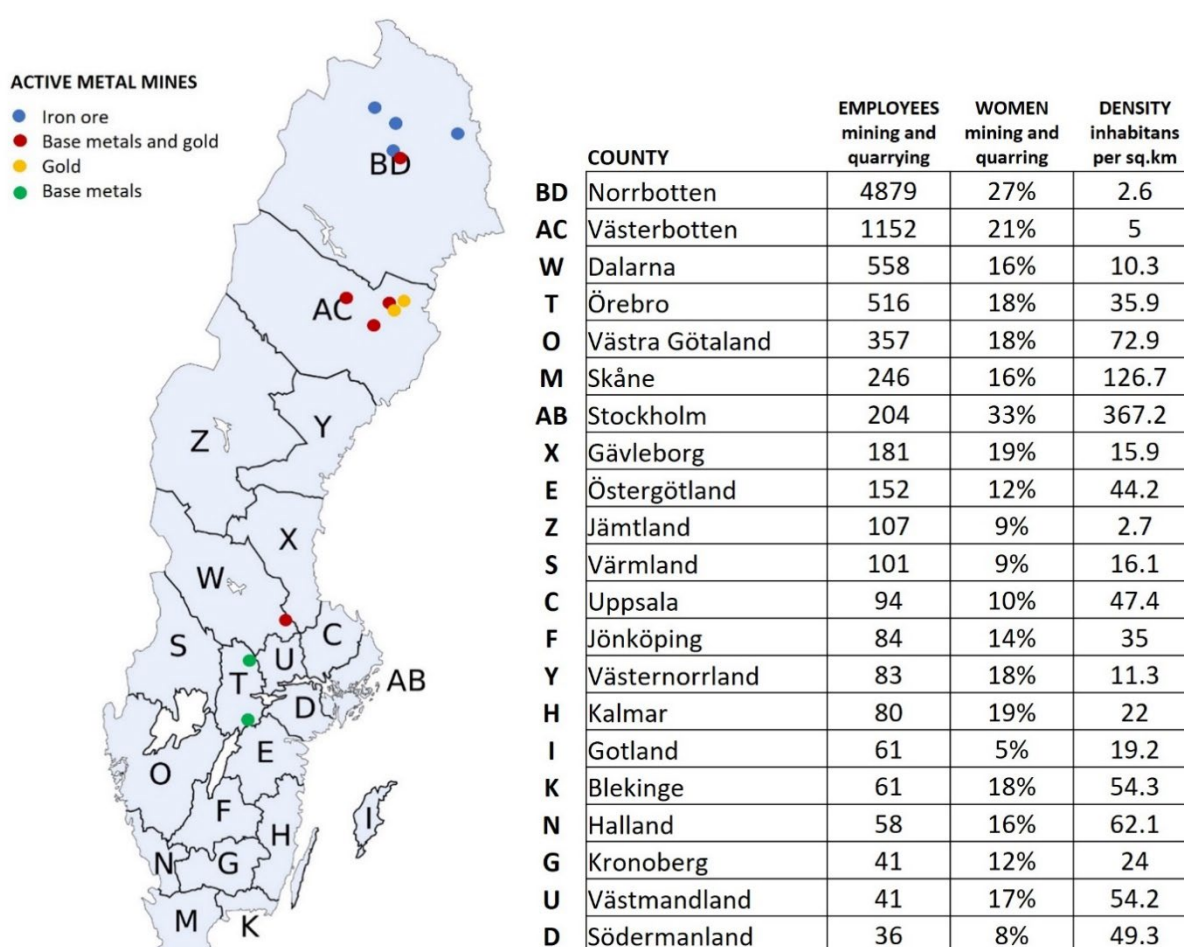
⁸ The report is available for download at <http://resource.sgu.se/bergsstaten/bergverksstatistik-2020.pdf>



with several different tasks inside the mine. The current mining level in Sweden's largest underground mine, the Kiruna mine, is 1,365 metres underground.

Figure 2 shows the geographical distribution of employees in the mining and quarrying industries in Sweden. Data is based on the employees' home addresses, not the addresses of their employers. The figure illustrates with dots where the 12 mineral mines in production 2020 are located. Overall, 67% of the 9,092 employees in the mining and quarrying industry, and nine of the twelve active mines are situated in the northernmost part of Sweden, in Norrbotten (BD) and Västerbotten (AC). These are both sparsely populated counties, with an average of 2,6 and 5 inhabitants per square kilometre.

Figure 2. Employment in the Swedish mining industry by county and sex, 2020



Source: Author's calculations

The counties of Dalarna (W) and Örebro (T) come in at third and fourth place in terms of number of employees in mining and quarrying, with 12% of the employees and 3 of the 12 active mines situated here. These counties, located further south in Sweden, are not as sparsely populated as Norrbotten and Västerbotten. Örebro has an average of 35.9 inhabitants per square kilometre, and Dalarna has 10.3 inhabitants per square kilometre.



The same figure also shows the share of women in the mining and quarrying industry living in each county, varying from 5% on the island of Gotland (I) to 33% in the capital area of Stockholm (AB). The high share of women employees in Stockholm might relate to the fact that company headquarters and other office-based activities tend to be located here. The relatively high share of women employed in the mining and quarrying industry in Norrbotten (27% women) and Västerbotten (21% women) potentially relates to the fact that it is here that the large mining workplaces are located. Large workplaces tend to require a larger share of administrative personnel, and as administrative work tends to be associated with women and female labour, this may be reflected in the share of women.

Swedish employment data segregated by county provide limited insights concerning the extent to which mining employment is made up of fly-in/fly-out personnel, as employees migrate within the same counties to a great extent. Employees, especially those working for contractors and typically living in the coastal area of Norrbotten and Västerbotten, come to work in the mines in the mountain areas for 1 week at a time. Further research is needed to tease out the scope and implications of the mining employees' migration patterns from a gender perspective.

3.2 Occupational Levels

The mining and quarrying industry is male dominated; in 2020, the share of men employees was 77%. To further nuance the gender profile of the Swedish mining and quarrying industry, potential sex segregation across occupational levels must also be considered.

The Swedish Association of Mines, Mineral and Metal Producers (Svemin) describes the mining and metal industry's current and future skills supply needs and a roadmap for how identified challenges should be addressed in a 2019 publication (in Swedish).⁹ According to the report, the majority of personnel hired to work in the mining and metal industry from 2016 to 2018 concerned workers with a diploma from 3 years of upper secondary school. Many of them were hired to work in production, but also in other areas, such as administration, machine operation, and janitorial services. Most people hired to work in the mining and metal industry immediately after graduating have studied vocational programs in upper secondary school. Although people with degrees from social and natural sciences programs are hired too, the most common fields are mechanics and transport, technology programme, electricity and energy, business and administration, and industrial technology. During 2016–2018, the recruitment of people with a degree from higher vocational education was relatively low in the Mining and Metal industry. The higher vocational education graduates commonly hold positions as operators, mining workers, supervisors, industrial electricians, and work environment engineers. Regarding recruitment of people with a university degree during 2016–2018, approximately 1,150

⁹ The report is available for download at <https://www.svemin.se/projekt-fardplan-kompetensforsorjning-for-gruv-och-stalindustrin/>



people were hired in the mining and metal industry, which amounts to about 3% of the total workforce. Of those being recruited by the mining and metal industry, many have studied technical education and hold positions higher up in the organisations, such as project manager, economist, engineer, system developer, and different managerial positions.

Table 6. The Swedish mining industry by level of occupation and sex, 2014 and 2019

	2014			2019		
	Total	Women %	Men %	Total	Women %	Men %
1. Managers	503	27%	73%	428	21%	79%
11 - Chief Executives, Senior Officials and Legislators	25	8%	92%	25	0%	25%
12 - Administrative and Commercial Managers	344	19%	81%	84	46%	54%
13 - Production and Specialised Services Managers	132	50%	50%	319	16%	84%
2. Professionals	701	40%	60%	793	51%	49%
21 - Science and Engineering Professionals	430	34%	66%	441	37%	63%
22 - Health Professionals	31	48%	52%			
23 - Teaching Professionals				114	100%	0%
24 - Business and Administration Professionals	180	49%	51%	224	64%	36%
25 - Information and Communications Technology Professionals	46	46%	54%	34	12%	88%
26 - Legal, Social and Cultural Professionals	14	79%	21%	10	60%	40%
3. Technicians and Associate Professionals	963	19%	81%	1333	28%	72%
31 - Science and Engineering Associate Professionals	479	23%	77%	945	23%	77%
32 - Health Associate Professionals				151	30%	70%
33 - Business and Administration Associate Professionals	462	17%	83%	168	58%	42%
35 - Information and Communications Technicians	21	0%	100%	69	13%	87%
4. Clerical Support Workers	217	82%	18%	299	73%	28%
41 - General and Keyboard Clerks	88	91%	9%	191	86%	14%
42 - Customer Services Clerks				16	87%	13%



43 - Numerical and Material Recording Clerks	10	70%	30%	92	41%	59%
44 - Other Clerical Support Workers	119	76%	24%			
5. Services and Sales Workers	99	37%	63%	31	42%	58%
51 - Personal Services Workers	94	39%	61%	15	40%	60%
52 - Sales Workers				16	44%	56%
54 - Protective Services Workers	5	0%	100%			
7. Craft and Related Trades Workers	1410	6%	94%	1379	8%	92%
71 - Building and Related Trades Workers (excluding Electricians)	106	15%	85%	30	0%	100%
72 - Metal, Machinery and Related Trades Workers	965	5%	95%	784	10%	90%
73 - Handicraft and Printing Workers				168	4%	96%
74 - Electrical and Electronic Trades Workers	338	8%	92%	397	8%	92%
8. Plant and Machine Operators and Assemblers	3271	13%	87%	3716	17%	83%
81 - Stationary Plant and Machine Operators	2331	14%	86%	2605	17%	83%
83 - Drivers and Mobile Plant Operators	939	9%	91%	1121	17%	83%
9. Elementary Occupations	318	34%	64%	186	4%	96%
91 - Cleaners and Helpers				23	26%	74%
93 - Labourers in Mining, Construction, Manufacturing and Transport	108	50%	50%	26	4%	96%
96 - Refuse Workers and Other Elementary Workers	210	26%	74%	137	0%	100%

Source: Swedish Statistics, calculations and tables by the author

Table 6 shows the representation of men and women employees in the mining and quarrying industry according to the International Standard Classification of Occupations. The table makes evident that men predominate on most occupational levels. The occupational levels with the highest share of women employees are Clerical and Support Workers (78% women). Men predominate among *Plant and Machine Operators and Assemblers* (83%), a category that represents the bulk of employees in the industry. However, women's representation has increased from 13% in 2014 to 17% in 2019. Men clearly dominate among *Craft and Related Workers* (92%) and *Technicians and Associated Professionals* (72%).

Men continue to dominate at the highest managerial level of the industry. In 2019, men constituted 79% of all *Managers*. In 2014, 73% of the *Managers* were men, which means that the share of women in this part of the industry is decreasing. Additional gender



segregation is evident within different fields of management. Men particularly dominate among *Chief Executive, Senior Officials and Legislators* (100% men), and *Production and Specialised managers* (84% men), whilst the representation of men and women is balanced among *Administrative and Commercial Managers*.

Professionals is an occupational level neither dominated by men nor women in the mining and quarrying industry. However, patterns of gender segregation exist between different professional fields. *Science and Engineering Professionals* is the largest field, and among them, 63% are men. *Business and Administration Professionals* are the second largest field, and among them, 64% are women. Women also predominate among *Legal, Social and Cultural Professionals*.

3.3 Age Distribution

Figure 3 shows the distribution of men and women in different age groups in the mining and quarrying industry, based on occupational data from 2014 and 2019. Men aged 45–65 were the largest group of employees in both years, although the group had increased its share by 3% in 2019. The share of women aged 30–44 and 45–64 increased in 2019, while the share of younger women remained the same.

Figure 3. The Swedish mining industry by level of occupation, sex, and age (2014)

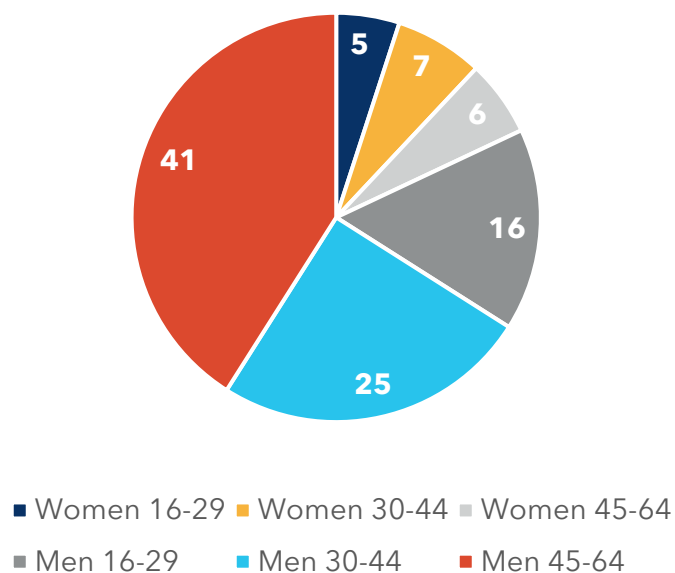




Figure 4. The Swedish mining industry by level of occupation, sex, and age (2019)

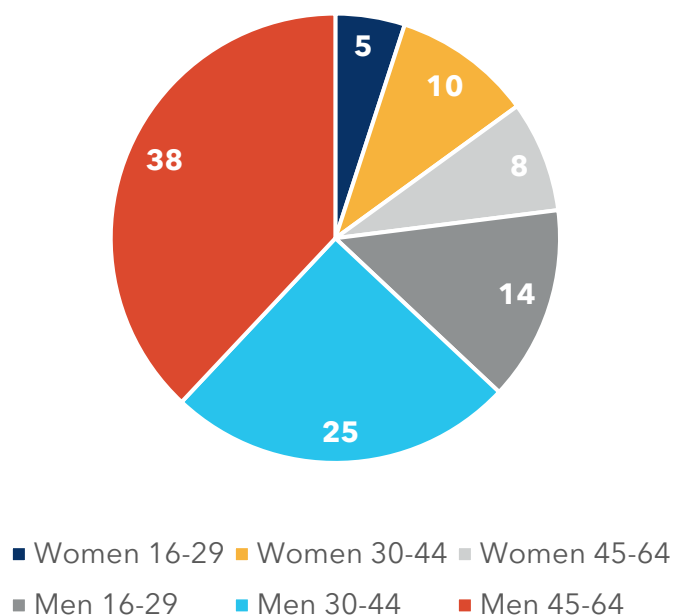


Figure 4 describes the age distribution of men and women employed at different occupational levels in the mining and quarrying industry. When men and women are divided into three age categories (16–29, 30–44, and 45–64), it becomes evident that the industry is particularly dominated by older men. Also evident is that most women employees are found in the 30–44 age category.

Men aged 45 to 64 predominate in seven of the eight occupational levels, especially the managerial level. Men aged 16 to 29 are a minority among men on all occupational levels, with the highest proportion among Craft and Related Trades Workers.

Women aged 45–64 predominate among women at the managerial level and among women employed on the level of Clerical Support Workers. In the remaining six occupational levels in the mining and quarrying industry, 30–44 is the dominant age group among women. Women aged 16–29 are mainly represented among Craft and Related Trades Workers, Plant and Machine Operators, and Elementary Occupations.



Figure 5. The Swedish mining industry by level of occupation, sex, and age, 2019

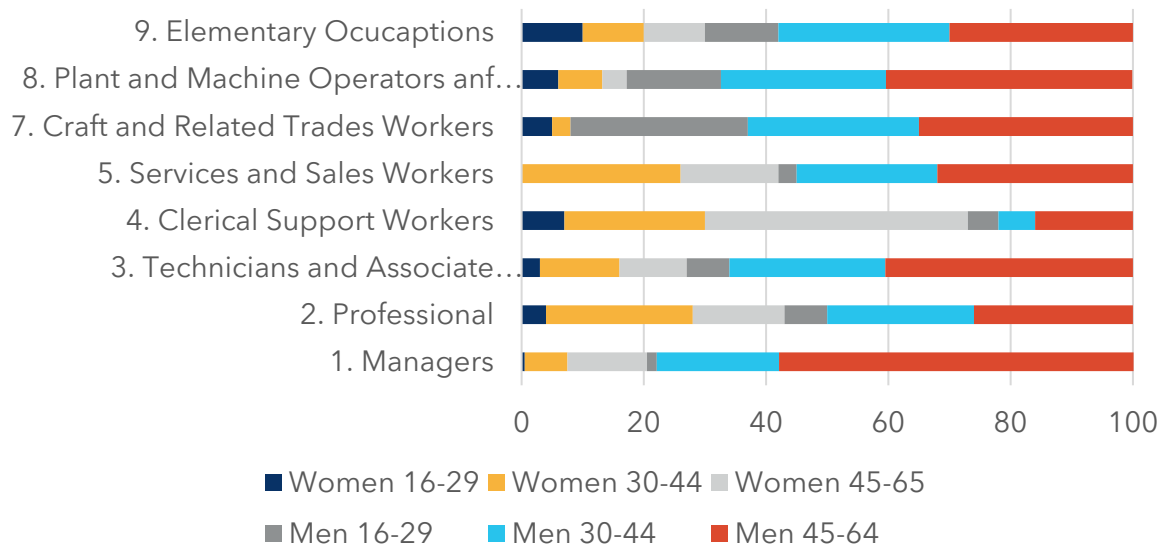


Figure 6. The Swedish mining industry by level of occupation and age for women, 2019

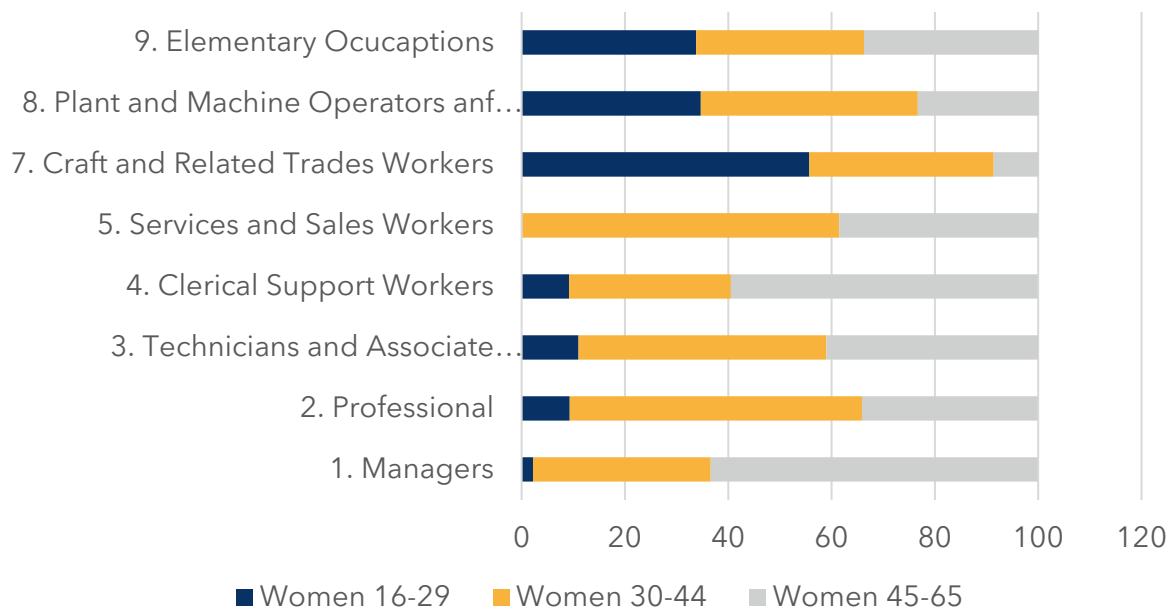
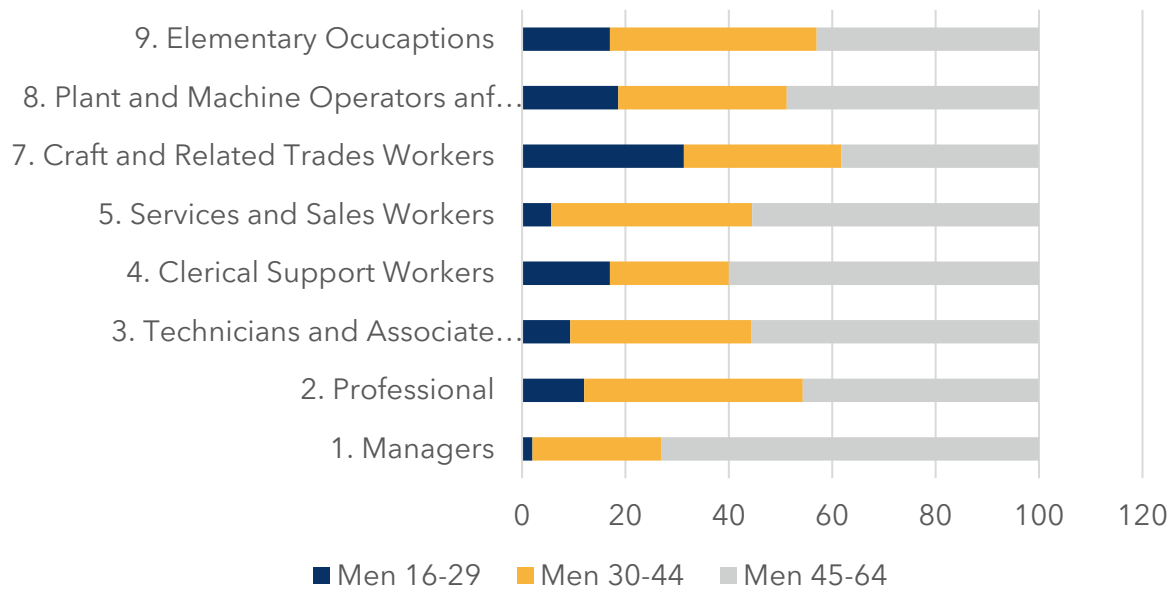




Figure 7. The Swedish mining industry by level of occupation and age for men, 2019





4.0 WOMEN'S WORKING CONDITIONS AND CURRENT SITUATION

This section continues the investigation of women's working conditions and current situation. Drawing on existing studies researching the Swedish Mine Industry from a gender perspective, the chapter focus on health and safety, technology and workplace culture and gender equality measurements. It also provides an account of previous and existing legislation that affects women mine workers.

4.1 Health and Safety

According to Löow and Nygren (2019), the lost time injury frequency rate (LTIFR) in the Swedish mining industry decreased from approximately 50 accidents per one million working hours to 7, between the 1980s and 2010s. Although the industry-wide LTIFR is not the only relevant indicator for occupational safety, the sharp decline over the decades is noticeable and has occurred in parallel with a number of safety-related organisational and technological developments in the industry as a whole. To further understand this development, Löow and Nygren (2019) explore safety developments in the Swedish mining industry between the 1980s and the 2010s based on interviews with mining company representatives. The results suggest that the reduced LTIFR and overall safety improvement relate to broader changes in the mining industry, concerning 1) technological developments that have reduced strenuous work tasks and improved the physical work environment, 2) changes in formal health and safety management (new rules and procedures), 3) new safety management strategies (including programs focusing on developing a safety culture and changing prevalent masculinity norms), and 4) increased focus on safety throughout the contracting chain.

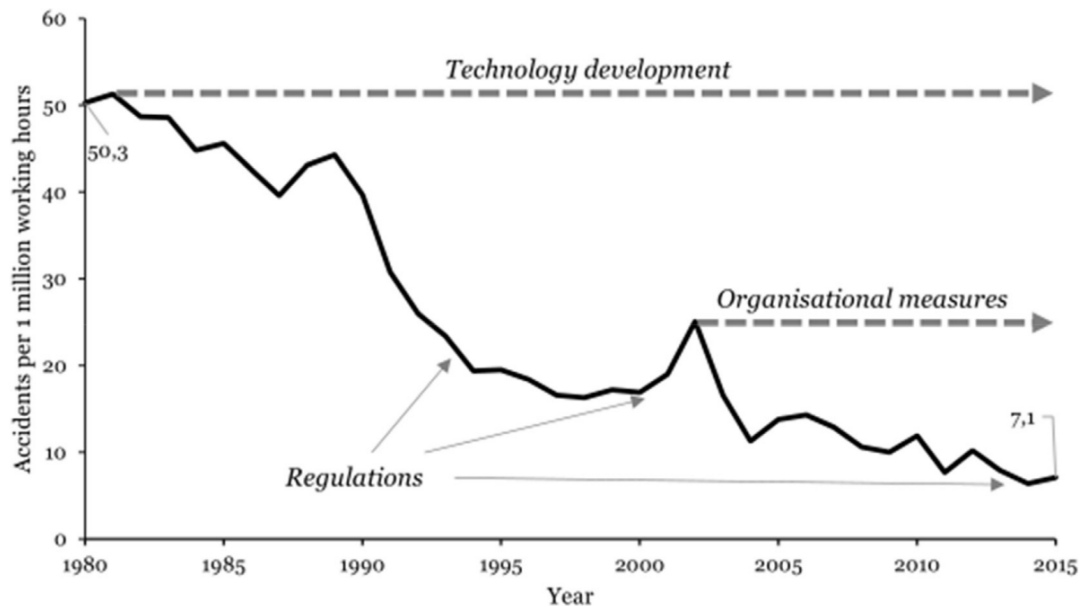
Figure 8, retrieved from Löow and Nygren (2019), illustrates the development of reduced LTIFR in relation to a rough summary of safety initiatives implemented in the Swedish mining industry from 1980 to 2015.

The development of health and safety in the Swedish mining during the last decades is illustrated in Figure 9, retrieved from the *Statistics of the Swedish Mining Industry 2020* presented by Geological Survey Sweden.¹⁰

¹⁰ The report is available for download at <http://resource.sgu.se/bergsstaten/bergverksstatistik-2020.pdf>

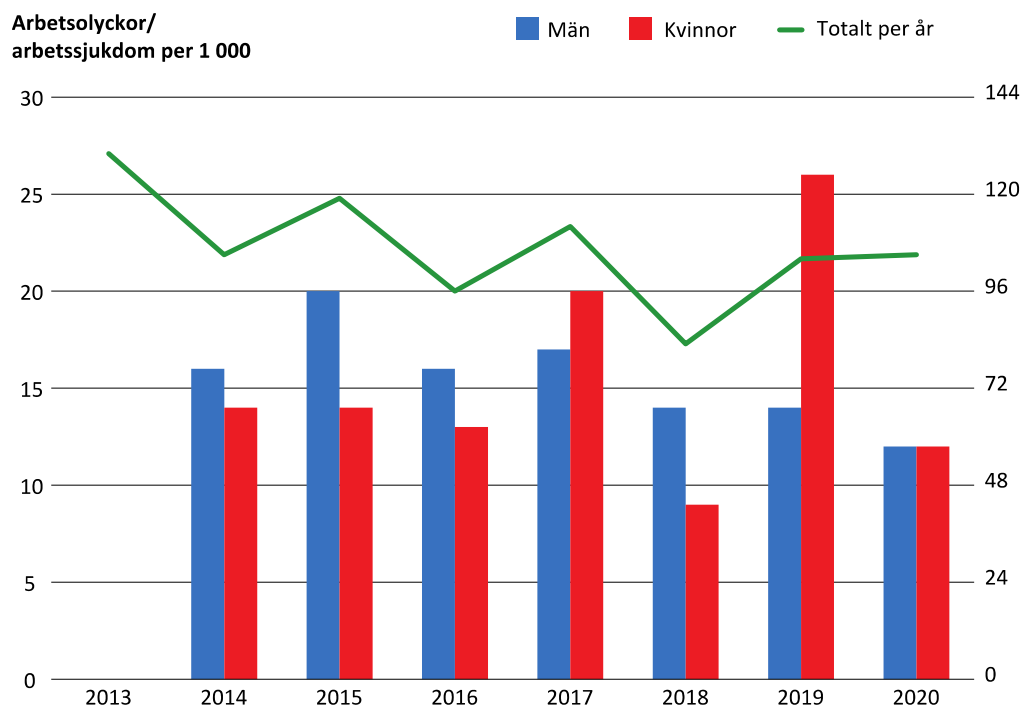


Figure 8. A rough summary of safety initiatives in the Swedish mining industry in relation to the LTIFR.



Source: Lööv and Nygren, 2019

Figure 9. Frequency and total number of work-related illnesses and accidents with associated lost work time in the metal mining sector 2014–2020



Source: Sveriges geologiska undersökning, 2021

The figure illustrates the frequency and total number of work-related illnesses and accidents with associated lost work time in the metal mining sector 2014–2020



disaggregated by sex. The table shows a slight decline in the frequency and number of work-related illnesses and accidents between 2014 and 2020, except for 2019, where the number of work-related illnesses and accidents among women increased significantly. In 2017, the number of illnesses and accidents among women rose, while in 2020 there was an equal number of illnesses and accidents between women and men. During four of the six years accounted for, the number of work-related illnesses and accidents is higher among men. Unfortunately, the report does not describe any potential reasons for this increase in women's illnesses and accidents and, to our knowledge, no further gender analysis of illness and accidents in the Swedish mining industry has been published.

When health and safety in the Swedish mining industry have been explored from a gender perspective, the focus has been on the involvement of gender norms and notions, researching risk and safety as something inherently mediated by gender (Stergiou-Kita et al. 2015). Andersson's (2012) thesis on the construction of masculinities in LKAB, found complex and contradicting relations between risk, safety and gender. On the one hand, many of the interviewed men perceived risk taking as a vital part of the job—to do mine work underground was to take risks. While this may not have been appreciated, it was made part of the macho masculine, strenuous, "real" mine worker ideal. On the other hand, alongside the preserving of traditional ideals was the emergence of a more "reflective" form of masculinity that critically engaged with issues concerning peer pressure, unnecessary risk taking, loneliness, or sexist behaviour that potentially redefine mining masculinities. According to Andersson, it was the increased focus on safety and gender equality, in combination with internal pressures, that seemed to create these openings for change.

Some health and safety measures particularly affect women mine workers. The Swedish Work Environment Authority stipulates that when an employee working underground notifies the employer that she is pregnant or breastfeeding, the employer must do a risk assessment of the current work situation. If the risk assessment finds that the work may involve a risk of harm for the pregnancy, breastfeeding, or other ill health effects, the employee must be allocated to other work tasks below ground. Mining involves an increased risk of exposure to radon, a gas which emits ionised radiation. Mine work is also partly subject to the Swedish Radiation Protection Act (2018:396), which also affects pregnant and breastfeeding mine workers. The Act states that employers who employ a pregnant woman in an activity with ionizing radiation must ensure that tasks are such that the equivalent dose to the fetus for the duration of the pregnancy is as small as possible and is not expected to exceed 1 millisievert. The same law stipulates that it is prohibited to employ a pregnant worker to perform activities in a radiological emergency. Regarding breastfeeding, the Radiation Protection Act stipulates that the employer who employs someone in an activity with ionizing radiation must plan work tasks, so that breastfeeding workers do not risk ingesting or being contaminated with radioactive substances that cause the child to be exposed to ionizing radiation and receive a radiation dose that exceeds a dose limit applicable to persons in general).



4.2 Technology Development and Mining Workplace Culture

The reduction of strenuous, physically demanding work tasks has had complex and contradictory effects on the gendering of mining work and related identities. Technology tends to be strongly associated with men and masculinity (Wajcman 1991), and the technology of mine work has also been found to play a part in the industry's masculine connotations (Mayes & Pini 2010), as in the exclusion of women in a North American setting (Tallichet 2000). However, in Abrahamsson and Johansson's (2006) study, the miners working underground tended instead to perceive the introduction of new technology and new skills requirements as a threat and in conflict with the manual labour that constituted the core of their identities as both men and miners. Their resistance to new technology was demonstrated in their description of the mine work that had been transformed to the remote operational control centres above ground as "soft work," contrasted with the "real" mining work still performed underground by men. Although strenuous and hazardous work tasks have been reduced, men who embodied a type of macho masculinity built on risk taking and physical strength continued to be celebrated as "real" mine workers, while men (and women) who expressed other identities were subordinated and positioned as weak, "girly," or simply incompetent and disloyal to the workers' collective (Andersson 2012).

In a study drawing on interviews with men and women miners, Ringblom (2019) found that the increase in women miners made sense primarily in relation to the improved working environment and the new technology. The reduction of physically strenuous work tasks had altered the demands on miners and challenged dominant ideas of who could do mine work. At the same time, aligned with previous studies, idealised images of masculinity continued to be constructed in relation not to modern technology, but to traditional tools, work methods, and manual labour. Furthermore, while the gender divide described by Abrahamsson and Johansson (2006) worked to construct real mining work as undertaken by men underground, in contrast to the work mediated by modern technology above ground, Ringblom (2019) also found indications of divisions of work along gender lines underground. According to this interpretation, mine work still had a more manual character associated with men, while mine work carried out with technical aids and large machinery was associated with both men and women. Work tasks that required less muscle strength were perceived as non-bodily, and therefore "simple," "easy," and something "almost anybody could do." This suggests that, despite the transformation of mining work, perceptions of men as "big," "strong," and "brave" still form part of the dominant narrative of mining work and its essence among miners themselves.

Ringblom (2021), drawing on the same interview study with men and women mine workers, analyses informal interaction in general—and banter in particular—in relation to the gendered processes of mining organisations. Ringblom found that banter functions as



both an inclusive and exclusive practice, that simultaneously works to maintain and challenge existing gender relations in the mine. Banter functions inclusively in the sense that both men and women interviewed tended to describe it as a specific cultural marker for underground workplaces and as something positive; it was put in relation to collegiality and a part of an enjoyable work setting. Banter was also interpreted as an expression of solidarity and care for other workers in the strenuous and potentially risk-filled mining work environment. However, at the same time, the form of cohesiveness created by banter could also function in an excluding manner, in so far as it maintains the existing order and pressures peers to conform.

Based on their many years of studying large-scale industries in Sweden and elsewhere, Abrahamsson and Johansson (2021) discuss how processes of gender, technology and change are interlinked in mining organisations. Their main observation is that the gendered content and character of traditional workplace culture, mine work, and mine workers are gradually changing and being made obsolete due to the digitalised technology, new qualification demands, and new organisational forms. At the same time, inside the mining organisation, these changes “meet a reluctant context”—resistance to new technology, safety, and gender equality—and a workplace culture “lagging behind.” The resistance constitutes a response to the fact that the new technology and interconnected changes constitute a break from the traditional masculine mining identity.

4.3 Gender Equality Actions in the Mining Industry

The Swedish mining industry, especially the largest mining companies, has advocated for increased gender equality in various ways during the last decades. Gender equality is mainly put in relation to the unbalanced representation of men and women in the industry and the need to increase the number of women employees. This section provides some illustration of how gender equality is currently framed and promoted in the Swedish mining industry.

The *Strategic Research and Innovation Roadmap for the Swedish Mining, Mineral and Metal Producing Industry* aims to jointly define relevant challenges, objectives, and activities for research and innovation.¹¹ The agenda covers measures and activities in research and innovation, broken down into nine areas that address challenges associated with technological development, social benefits, and qualified personnel. *Gender and diversity* is the ninth research and innovation area, defined thusly:

The mining industry has traditionally been a strongly male-dominated industry, but global competition, new technology and the demands for efficient and safe production mean that the mining industry must attract more people from a broader recruitment base to ensure a more innovative environment. Issues of gender equality and diversity must also be addressed if the mining communities are to

¹¹ The agenda are available for download at <https://www.swedishmininginnovation.se/roadmap/>



avoid a divided labour market. The migration of women from these communities today is high, which makes the communities vulnerable. One challenge is to attract a diverse group of young people to begin studies that can lead to jobs in the industry.

An overall objective for this thematic area is that the Swedish mining industry should be world-class when it comes to mining ore and changing gender and diversity patterns. (p. 36)

In the agenda gender equality and diversity are mainly emphasised in relation to the challenge of “unexploited competencies – utilise.”

LKAB and Boliden, the two largest companies in the Swedish mining industry, both include descriptions of gender equality on their web pages. Under the headline “Diversity and equal treatment,” LKAB states that:

LKAB endeavours to reflect society’s diversity at all levels in the organisation. Our managers must promote an inclusive culture that helps each individual to achieve their full potential.

With their various skills, characteristics, conditions, and backgrounds, each and every employee contributes to the diversity within LKAB. By valuing and encouraging an inclusive organisational culture, we can work together to generate more innovative solutions and better products. Having employees of different ages, genders, ethnicities and backgrounds—combined with an inclusive culture—means that we can supply the best solutions for our customers.

We believe that diversity and equality help to increase the operation’s profitability and standing as an attractive employer. This should permeate both our working methods and our recruitment process. Equality and diversity are consequently a strategically important area.¹²

Under the headline “Equal treatment,” LKAB expands on how discrimination is viewed at the company:

We do not tolerate discrimination in our workplaces on the grounds of age, gender, gender identity or expression, religion or other faith, ethnicity, sexual orientation or disability. Neither do we permit any form of abuse, persecution or victimisation, and we work actively to counter direct, indirect and unconscious discrimination.

In order to recruit and retain staff, it is important for our workplaces to be

¹² Information retrieved from <https://www.lkab.com/en/sustainability/social-responsibility/diversity-and-equal-treatment/>:



characterised by a positive view of parenthood. It must be possible to combine becoming and being a parent with a career at LKAB.

Similar phrasing can be found on the webpage of Boliden, as well as the annual sustainability report. In the report, following the headline “Diversity of governance bodies and employees,” the company’s position is described:

Diversity contributes to sustainability, dynamics, creativity and better results. Boliden strives to attract employees with different backgrounds, age and experience. One challenge is to attract female employees into a traditionally male-dominated industry.¹³

Boliden further expands on its stance against discrimination in the subsequent section, “Incidents of discrimination and corrective actions taken”:

Boliden’s Diversity Policy states that if an incident of discrimination should occur, the employee affected shall initially raise the matter with their manager and then with the company’s HR function, or through the whistleblower reporting system (accessible via the intranet and Boliden’s external website).

One incident of discrimination was reported through the whistleblower channel and three incidents were reported through other formal grievance mechanisms during 2020. All four incidents were resolved during the reporting period, and three of the incidents resulted in corrective actions during the reporting period.¹⁴

4.4 Research on Gender-Equality Actions in Swedish Mining Industry

Norborg and Fältholm (2018, 2020) analyse discursive representation of women in web material texts produced by actors in the international mining arena (hence, not just Sweden). They found that women’s roles were constructed in a way that reinforced notions of men and women as inherently different, with traits and associations seen as feminine being made subordinated. According to their analysis, the global mining industry tends to construct women as an important need that the mining industry is currently missing, and that increasing women’s representation is a means of improving the working environment. At the same time, women’s roles in mining were also constructed as problematic for the industry, as it was assumed that their responsibilities, traits and interests were perceived as incompatible with a job in the mining industry.

Based on interviews with eight HR representatives from Swedish mining and forestry companies, Johansson and Ringblom (2017) argue that pursuing gender equality has

¹³ Information retrieved from <http://reports.boliden.com/social/>

¹⁴ Information retrieved from <http://reports.boliden.com/social/>



become a way for the companies to present themselves as modern, competitive organisations. Framing the business case for gender equality has further been found to both enable and restrain the possibilities of challenging the masculine structures and cultures of the industries. On the one hand, gender equality as a business case assumed to benefit both the organisation and its members facilitates the companies' general engagement in the matter. On the other hand, it does not seem to enable, but rather prevent, the promotion of certain gender equality measurements such as those addressing conflicting interests and power relations.

Ringblom and Johansson (2020) analyse four research and development projects related to gender equality in the forest and mining industry. They show that when mining and forest companies "do" gender equality, they simultaneously do "gender" in particular ways. If men were the focal point, the problem of gender equality tended to be attributed to a certain group of men—blue-collar workers in rural areas—within these organisations. Hence, rather than organisational processes or practices, or men in general, or white-collar men in urban headquarters, it was this group of men that was cast as most problematic. According to Ringblom and Johansson, placing the blame on specific groups of men—as opposed to organisational patterns, structures, and cultures—is not enough to challenge patterns of inequality in these organisations.

Johansson and Ringblom (2021) add further insights to the analyses of the mining industry's promotion of gender equality by exploring various meanings of organisational peripheries in the existing literature on Swedish mining companies from an intersectional perspective. Two empirical examples are used. The first example explores inequalities at the centre of mining work and major mining companies where the predominating focus has been on recruiting more women as mine workers. The second investigates inequalities at the margins of mining work and scrutinises the mine as a "multi-employer worksite" in relation to contractor relations, issues that have not been included in the major mining company's gender equality measurements. Johansson and Ringblom conclude that going to the "margins" of mine work helps to nuance understanding of the processes and practices that produce inequalities at both the centre and margins of large industrial mining organisations.



5.0 EXECUTIVE SUMMARY AND FUTURE RECOMMENDATIONS

This report presents sex-disaggregated data that describes the Swedish mining and quarrying industry from the perspective of the industry, occupational levels and education. Its findings show that Swedish mining and quarrying is dominated by men in all these instances, but that important variations in gender patterns exist.

Men constituted 77% of the Swedish mining and quarrying industry's 9,092 employees in 2020. This means that the industry represents 0.2% of all employees in Sweden. The industry is part of male-dominated industries that employ one third of the Swedish workforce. In 2020, mining and quarrying was the fourth most male-dominated industry in Sweden. The mining and quarrying industry is predominately located in the northernmost part of Sweden. Overall, 67% of the employees in the industry live in the counties of Norrbotten and Västerbotten, which are both sparsely populated, with an average of 2.6 and 5 inhabitants per square kilometre. Mining of iron ore and non-ferrous metal ores dominates the Swedish mining and quarrying industry and represent almost all employees.

Sex-disaggregated data on occupational levels from 2014 and 2019 shows that men dominate on most occupational levels in mining and quarrying, with Craft and related workers (92% men), Plant and Machine Operators and Assemblers (83% men), and Management (79% men) being the most male dominated. From 2014 to 2019, the representation of women increased among Plant and Machine Operators and Assemblers from 13% women to 17% women, and decreased among top managers, from 27% women to 21% women. Men and women work to almost the same extent as Professionals, but patterns of gender segregation are evident between different professional fields. Women predominate among Business and Administration Professionals (63%), and men predominate among Science and Engineering Professionals (63%). The only occupational level dominated by women in mining and quarrying is Clerical and support workers (78% women). Occupational data stratified by sex and age show that older men dominate the industry, especially in Management. Women working as Plant and Machine Operators and Assemblers are generally younger compared to men at the same level, whilst older women predominate among women working as Managers and Clerical and support workers.

Educational data of relevance to the Swedish mining and quarrying industry show that men clearly dominate the vocational programs at the Upper Secondary-school level that the industry recruits most of its employees from. This also illustrates the challenges involved in increasing the number of women among Craft and related workers. Data on graduates from a selection of higher educational degrees of relevance to the mining and metal industry show that women's representation among graduates related to Science



and Engineering, manufacturing, and construction is increasing. Among graduates from Engineering and Engineering Trades, the representation of women increased from 22% in 1999/2000 to 31% in 2019/20. Also evident is that women predominate among the graduates in Social Science, Business, and Law (64% men), something which is reflected in employment data on the professional data from the mining and quarrying industry.

The situation analysis of women and women's current situation in the Swedish mining industry suggest that technological development has changed the work processes and work environment of mining workplaces in ways that make it possible for both men and women to do mine work. Findings from existing workplace studies show that despite these changes, traces of a workplace culture that still emphasises "real" mine work as a business for strong and brave men underground remains in parts of the organisations. Such interpretations seem to create hierarchies between different types of mine work and mine workers that subordinates women and men mine workers involved in mine work that takes place above ground and/or with a high involvement of technology. This form of mining macho masculinity is increasingly beginning to be perceived as a problem by mining industry companies that are now advocating for increased gender equality to promote themselves as modern and competitive. Formulated as a business case, gender equality in the industry is primarily articulated in relation to recruitment strategies and challenges associated with finding competent personnel, focusing on increasing the number of women employees, especially among workers. These efforts have resulted in an important increase of women workers. However, at the same time, women's representation at the management level is decreasing, and gender segregation between different professional fields is evident. Considering also that the available gender research on the Swedish mining industry has focused on the occupational levels of workers, more research and gender analyses of mining professionals and managers are called for. Such analyses of gender structures and cultures across different occupational levels in the mining industry would make an important contribution to theories of mining masculinities that heretofore have focused on blue-collar men. Such broader analyses of masculinity also have the potential to nuance the understanding of mining masculinity in ways that prevent policy-makers from allocating the "problems of mining masculinity" to certain groups of individual blue-collar men rather than organisational processes and practices of organisations. Another issue in need of more attention by researchers and policy-makers relates to the contractor chains and the fact that most mining workplaces today are multi-employer worksites. Whilst initiatives aiming to improve health and safety in mining have gradually included contractor relations, similar analyses and policy attention from a gender perspective remain scarce.



REFERENCES

- Abrahamsson, Lena. 2007. Gruvarbetets historia ur ett genusperspektiv: hur gruvarbetet blev och förblev manligt. In: Doktare, Helene (Ed). *Oplogat: spår av kvinnors liv och arbete i Norrbotten* (pp. 130-158), Oplogat produktion,.
- Abrahamsson, Lena and Johansson, Jan. 2006. From grounded skills to sky qualifications: A study of workers creating and recreating qualifications, identity and gender at an underground iron ore mine in Sweden. *Journal of Industrial Relations* 48(5), pp. 657-676.
- Abrahamsson, Lena and Johansson, Jan. 2021. Can new technology challenge macho-masculinities? The case of the mining industry. *Mineral Economics*, 34(2), pp. 263-275.
- Andersson, Eira. 2012. *Malmens manliga mysterium: En interaktiv studie om kön och tradition i modernt gruvarbete*. Doctoral dissertation, Luleå tekniska universitet.
- Fältholm, Ylva and Norberg, Cathrine. 2017. Gender diversity and innovation in mining. A corpus-based discourse analysis. *International Journal of Gender and Entrepreneurship*, 9(4), pp. 359-376
- Johansson, Maria and Ringblom, Lisa. 2017. The business case of gender equality in Swedish forestry and mining-restricting or enabling organizational change. *Gender, Work & Organization*, 24(6), pp. 628-642.
- Johansson, Kristina and Ringblom, Lisa, 2021. On the Margins of Mine Work: Organizational Peripheries in a Globalized World of Work. In Sjöstedt, Angelica, Giritli Nygren, Katarina and Fotaki, Mariana (eds.). *Working Life and Gender Inequality. Intersectional Perspectives and the Spatial Practices of Peripheralization*. (pp. 194-210). Routledge.
- Lööw, Joel. 2021. Understanding technology in mining and its effect on the work environment. *Mineral Economics*, pp.1-12.
- Lööw, Joel and Nygren, Magnus. 2019. "Initiatives for increased safety in the Swedish mining industry: Studying 30 years of improved accident rates." *Safety Science* 117, pp. 437-446.
- Lööw, Joel, Abrahamsson, Lena and Johansson, Jan. 2019. Mining 4.0—The impact of new technology from a work place perspective. *Mining, Metallurgy & Exploration*, 36(4), pp.701-707.
- Mayes, Robyn and Pini, Barbara. (2010). The 'feminine revolution in mining': A critique. *Australian Geographer*, 41(2), pp. 233-245.
- Norberg, Cathrine and Fältholm, Ylva. 2018. "'Learn to blend in!' A corpus-based analysis of the representation of women in mining." *Equality, Diversity and Inclusion: An International Journal* 37(7), pp. 698-712.



- Ringblom, Lisa and Johansson, Maria. 2020. Who needs to be "more equal" and why? Doing gender equality in male-dominated industries. *Equality, Diversity and Inclusion: An International Journal*.
- Ringblom, Lisa. 2019. *Utmanad ordning? En studie av kön och jämställdhetsarbete i den svenska gruvindustrins arbetsorganisationer*. Doctoral dissertation, Luleå tekniska universitet.
- Ringblom, Lisa. 2021. "It is Just a Joke!" Informal Interaction and Gendered Processes Underground. *NORA-Nordic Journal of Feminist and Gender Research*, pp. 1-14.
- Ringblom, Lisa and Abrahamsson, Lena. 2017. "Omförhandling i gruvan? Om kön, arbete och förändring i den mansdominerade gruvnäringen." *Tidskrift för Genusvetenskap* 38(1-2), pp. 33-54.
- Statistics Sweden. 2020. Women and men in Sweden 2020 Facts and figures.
- Sveriges geologiska undersökning. 2021. Statistics of the Swedish Mining Industry 2020.
- Stergiou-Kita, Mary, Elizabeth Mansfield, Randy Bezo et al (2015). "Danger zone: Men, masculinity and occupational health and safety in high risk occupations." *Safety science*, 80, pp. 213-220.
- Tallichet, Suzanne E. 2000. "Barriers to women's advancement in underground coal mining." *Rural Sociology* 65(2), pp. 234-252.
- Wajcman, Judy. 1991. *Feminism confronts technology*. Cambridge: Polity Press



IGF

INTERGOVERNMENTAL FORUM
on Mining, Minerals, Metals and
Sustainable Development