

# Worldwide welder shortage and approaches to overcome the crisis

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## Abstract

The worldwide welder shortage is, since a couple of years, a well-known problem to industries, institutions and governments. The problems are well and often discussed but so far the turning point to overcome the crisis is not in sight.

In the 1980ies large companies began to focus their operations and eliminate all programs, that did not directly lead to a positive return on investment. Some of them were directly linked to a reduction in apprenticeship and educational programs. The status shows, that soon the baby boomers will retire and there aren't enough young workers to replace the leaving workforce.

Many statistics worldwide show a huge demand for skilled welders, so the problem has been well recognized. We also see, that some more or less successful efforts have been taken by states, institutions, corporations and companies. It seems that we are tilting at windmills...

Understanding the way how we got here and understanding the generation we would like to attract to the world of welding might be a way out of the crisis.

This paper describes research in this direction and provides suggestions and solutions as a contribution to joint efforts in solving this problem.

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## 1. Introduction

Labour markets face challenges of shortages of skilled workers with relevant qualifications or interest to take up certain occupations. In general, shortages occur when demand for a particular type of labour exceeds the available supply at the current wage and conditions of employment, and in particular location. Low level of attractiveness of specific jobs for skilled workers in addition to working conditions, image of the profession and salary are important drivers for shortages. Also, retiring Baby Boomers not being replaced by enough younger workers lead to great shortage. Last but not least, the negative view of skilled labour. The fact that many see these jobs as dirty, dangerous, and physically demanding has great impact. But it isn't just students who hold these false views either. Parents, and even educators, view

skilled work as a fall-back career - something undesirable for their kids to consider.

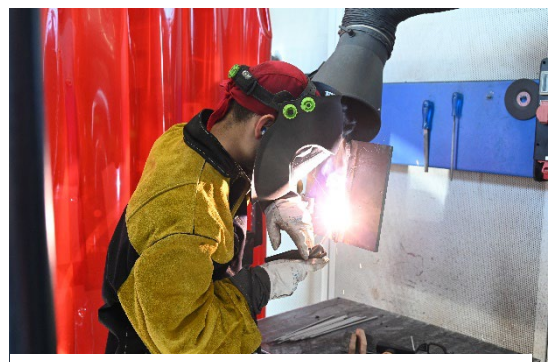


Figure 1 Candidate at SwissSkills 2020

The current situation is threatening to the whole industry. The AWS estimates, that until 2024 up to 400 000 skilled welders will be missing in the U.S. There are no concrete figures for Europe, but we found on the Europa Eures portal for job seekers that before the COVID-19 pandemic about 60,000 welders were missing in Europe. We think this number is increasing, and not all open job opportunities are reported to this portal.

If we do not react now, it might be too late in a couple of years. Some welding jobs can be carried out by robots, but the need for human welders will still be high, as also welding automation systems need to be programmed by welding professionals.

## 2. Effects of Labour Shortage focusing the welding industry

In some European countries, where welding has a big tradition, welding education and training is offered to numerous young professionals. As a consequence, even big industrial production companies, such as Stadler Rail, Mercedes, Audi, GE and so on, move their production facilities to countries, where there is enough workforce. However, slowly but surely these countries also face difficulties in finding well skilled welders, as these move to countries and companies, where they have better earning opportunities.

We have identified numerous effects of labour shortage. As, for example, the reduced production quality due to language and communication problems by the emigrated, expensive and time consuming on-the-job training of unskilled workforce, delay in production time, some traditional companies close as they have not enough personnel for production and, last but not least, industrial employers realise, that it is important to treat workforce well, and investing in further education, healthy environments, recognition of work, emphasize vocational education and training for young people, organising open days and raising salary.

## 3. Study regarding the motivation of young professionals for vocational education and training in the welding technology

Our first study targeted Vocational Education Schools, Training centres and industrial employers within Europe. Currently 8 out of 10 are experiencing difficulties in finding enough young people for training as metalworkers or further training with a background in welding technology. Main reasons mentioned were that young people don't know enough about the welding industry and what kind work they can do there; the profession welder does not have the best image; young people do not encounter metal in primary school, and salaries are not attractive enough.

We asked participants what were the factors that could motivate young people to choose vocational education in welding technology.

Factors that could motivate young people to choose a vocational education in welding technology

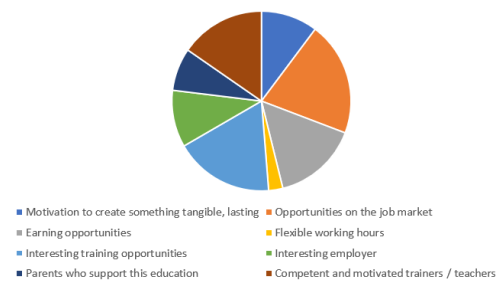


Figure 2 Main factors for motivating the young generation according to instructors and employers

Main factors mentioned were the opportunities on the job market, interesting training opportunities, earning opportunities and competent and motivated trainers and teachers.

The participants were asked which measures were taken to attract young people to their company or training centre. Some of the measures mentioned were roadshows in schools targeting 10-18 year old pupils; participating at job fairs with welding simulators, visiting SwissSkills with entire classes, trial apprenticeships for a couple of days, presenting the future perspectives and showing possibilities for further education in the welding industry and advertising on social media.



Figure 3 CERN open days 2019

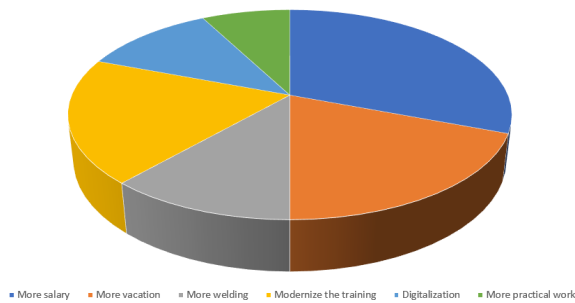
The second study targeted the young generation currently learning a profession in the welding industry. We asked the trainees why they chose to train in welding technology. Main answers were that they like to work with metal through a trial apprenticeship and because they had relatives or friends working in this field.

With regards to their professional objectives, 40% stated that they would like to continue their education in the field of welding, 30% would like to work in the current profession, 17% would like to use the training for gaining international experience and 13% would like to do a

vocational baccalaureate and then go to higher vocational school. The careers that were mostly mentioned were:

- International Welding Specialist (IWS)
- Metal work designer
- Shop floor manager
- Welding engineer
- Instructor
- Project manager

We asked them, what could be improved in general in their current training. The highest answer to this question was



**Figure 2 Ideas for improvement in the current training**

raising the salary, followed by more vacation, modernizing the training (theoretical and practical), digitalization and more practical welding lessons.

With regards to potential improvement of the training company, most of the participants were satisfied. Improvements that were mentioned were amongst others: more welding, higher salary, better communication and more productive work.

Improvements for the vocational school mentioned were more welding, better explanation of the topics, more digitalization, modernizing teaching materials, infrastructure, presentations by people from companies who have interesting projects and show which exciting projects are realized in the profession. What was repeatedly mentioned was the lack of motivated and socially competent teachers.



**Figure 3 Teaching at the Zurich Vocational School for the Construction Industry BBZ 2022**

We also asked the participants, what we can do to make the profession and the training more attractive? Some of the answers were as follows:

- More advertising (social media, job fairs, etc.)
- Higher salary
- Project work
- Apprentice excursions (to various companies)
- More women welders

Finally we asked the apprentices, how we can attract young people. Answers given were amongst others, organising information evenings with a welding simulator; YouTube channel from apprentices, integrating more metal in the handicraft lessons; show projects of apprentices; lectures in schools and present the profession; show parents that there is a future in the profession and not only when their child goes to college; telling about all the interesting things you can do in this profession and what kind of further education you could do.

#### 4. Conclusion

Main potential solutions in our opinion are:

1. Improve existing education by implementing modern teaching methods, digital education of both theoretical and practical welding training through digital training solutions, well trained teachers that are also trained in soft skills and can motivate young professionals to grow to their excellence
2. Improve the image of welding, through social media and young ambassadors by showing opportunities: no risk of unemployment, possibility to work abroad, be proud to be a welder and to reach out also to parents
3. Attract women to welding
4. Implement practical work with metal already in primary and secondary school
5. Build social recognition for practical workforce
6. Improve earning opportunities and conditions of employment (for example flexible work time, balance between family and profession/work, ...)