



Metal & machinery workers: skills opportunities and challenges (2016)


12/2016  [Construction](#), [Manufacturing](#), [Energy supply services](#), [Mining & quarrying](#), [Metal & machinery workers](#), [EU](#), [Skills opportunities and challenges in occupations](#)

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Summary

Metal & machinery workers are engaged in a range of skilled activities, which involve: working with metal, such as welding and forging; setting-up machines for operators to use; tool-setting; and repairing machines, including vehicles and engines

Key facts

- They are engaged in a range of skilled activities, which involve: working with metal, such as welding and forging; setting-up machines for operators to use; tool-setting; and repairing machines, including vehicles and engines

- The five key skills required for these workers are job-specific skills, problem solving, teamwork, learning and communication.
 - Metal machinery workers are found across a range of sectors, but work predominantly in manufacturing and construction: wholesale and retail employs around one third of metal machinery workers, and the basic metals and metal products sector employs roughly one fifth.
 - They are highly needed in nine EU Member States while other four EU countries report a [surplus](#) in this occupation.
 - Employment levels fell by 10% between 2005 and 2015 and are projected to continue doing so by the same rate over the next decade.
 - The decline in employment levels of metal, machinery and related trades workers can be attributed to a range of inter-related factors that will continue to affect employment developments and skill needs
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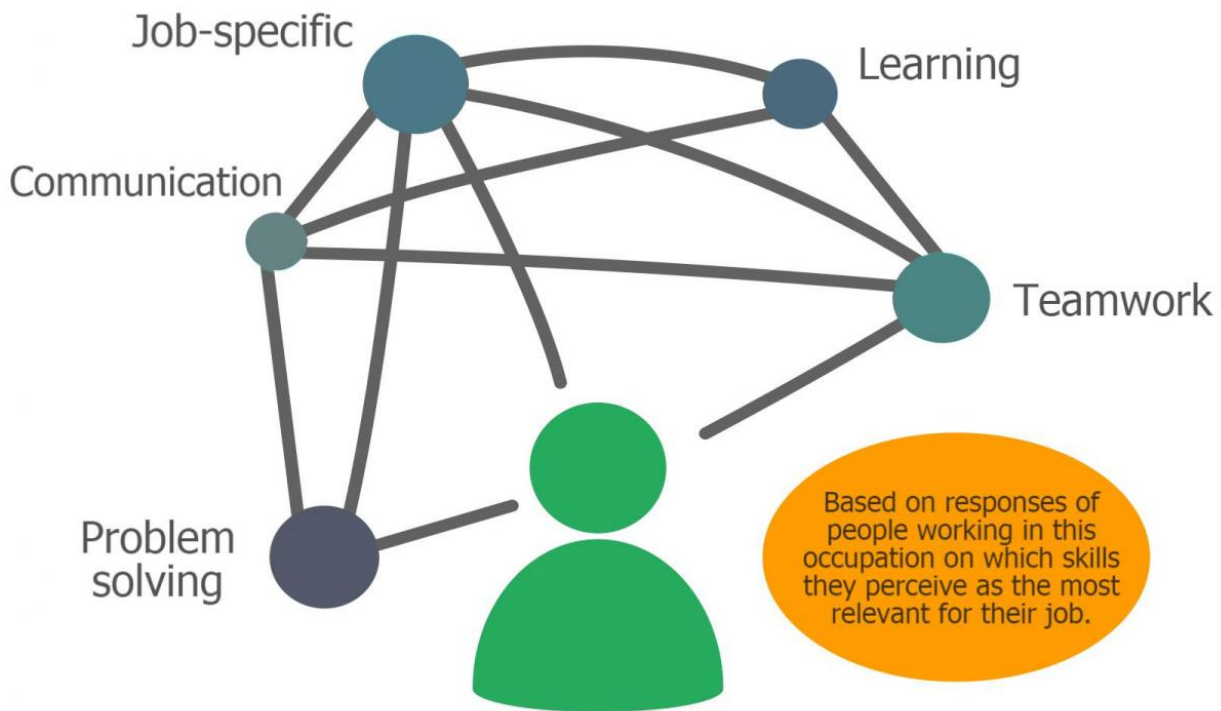
Who are they?

Metal, machinery and related trades workers^[1] are engaged in a range of skilled activities, which involve: working with metal, such as welding and forging; setting-up machines for operators to use; tool-setting; and repairing machines, including vehicles and engines. The types of jobs undertaken by people in this occupation include: structural metal workers, moulders and welders; blacksmiths and toolmakers; and machinery mechanics and repairers. Metal, machinery and related trades workers need to have an understanding of work organisation, and the specialist materials and tools to be used in their jobs, as well as of the nature and purpose of the final product they are engaged in making.

What skills do they need?

According to Cedefop's [European skills and jobs survey \(ESJS\)](#), the key 5 skills for metal, machinery and related trades workers are **job-specific skills, problem solving, teamwork, learning** and **communication**. These skills could support employees in this occupation to also tackle anticipated future skill challenges (see drivers of change below).

Figure 1: Most important skills required for metal, machinery and related trades workers



From Cedefop's European skills and jobs survey

Where are they mostly in demand?

The labour market dynamics for this occupation differ across EU Member States:

Figure 2: Shortages and surpluses for metal, machinery and related trades workers across the EU

Shortage
Surplus



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Metal, machinery and related trades workers appear to be highly demanded in Europe. According to [Cedefop](#), employers in Bulgaria, Germany, Latvia, Hungary, Malta, Netherlands, Austria, Slovakia and the United Kingdom encounter difficulties in finding qualified workers. At the other end, Greece, Italy, Portugal and Slovenia are experiencing a [surplus](#) of these workers.

What are the trends for the future? ^[2]

Employment levels fell by 10% between 2005 and 2015 and are projected to continue doing so by the same rate over the next decade.

However, almost two million job opportunities are forecast to be available to these workers by 2025, due to 'replacement demand' ^[3]. Increasingly, these jobs will be filled by people with higher levels of educational attainment than previously: although the share of workers with medium-level qualification will remain dominant (about 70%), roughly 9% of the workers are expected to hold high-level qualifications in 2025, demonstrating a significant percentage increase of circa 45%.

Metal machinery workers are found across a range of sectors, but work predominantly in manufacturing

and construction: wholesale and retail employs around one third of metal machinery workers, and the basic metals and metal products sector employs roughly one fifth; other machinery & equipment employs almost one in ten; while construction accounts for 6% of this occupational group. The industrial structure of employment and the importance of these sectors as employers are forecast to remain unchanged by 2025.

More information on employment trends for this occupation can be found on the Skills Panorama [here](#).

Which drivers of change will affect their skills?

The decline in employment levels of metal, machinery and related trades workers can be attributed to a range of inter-related factors that will continue to affect employment developments and skill needs:

- the **fall in employment in the manufacturing sector** more broadly ^[4], where many metal machinery and related trades workers are concentrated;
- **globalisation of trade and business networks**, which has seen many manufacturing jobs transferred out of Europe. Jobs which entail more routine and less abstract service tasks, such as those within this occupational group, have been found to be offshored most often ^[5];
- **technological change** has seen machinery / robots carrying out many of the roles previously filled by skilled manual workers ^[6]. This has also led to changes in the materials and methods being used on the job. However, many workers in this occupational group will still be required to set up, monitor, and maintain automated systems ^[7]. These workers will need to have sufficient digital skills ^[8], which will need to be continuously updated in line with technological advancements ^[9]. Technological change affects production processes as well as maintenance issues. While there is an increasing degree of automation involved in the production process, the skills required by those working in monitoring and maintaining systems, and in diagnosing and repairing faults, will also increase as more technologies are embedded into a variety of products and the production process itself. For example, technical change is seen as potentially affecting the role of maintenance fitters (see box).

“New types of maintenance fitting jobs are likely to be created in the future, following the growing automation of the production process. Technologies such as 3D printing and silicon technology are also likely to result in more complex machines being employed, which in turn will require regular maintenance and monitoring, thus boosting employment in certain areas despite the overall number of maintenance fitter jobs falling. In the future, the role of maintenance fitters is expected to become more service-focused, as manufacturers outsource more complex machine calibration and system setting to specialist machine maintenance companies. This will result in maintenance fitters requiring greater skills in customer service, relationship management and a broader understanding of the application of manufacturing equipment”.

Source: UK CES (2015) *Sector insights: skills and performance challenges in the advanced manufacturing sector*. Evidence Report No.93 ^[10]

Digitisation of machinery processes and tools already reshape construction as well. Metal, machinery and related workers employed in construction will also see changes in their tasks and/or the skills needed to perform these tasks. For example, “smart” sensors will be used in machinery in construction

sites. These sensors will be able to detect and communicate maintenance requirements or alerts on upcoming issues ^[11]. Workers in this occupation will, therefore, need the skills to interpret the sensors' data and overall be well-adjusted to the internet of things side of construction.

Those attempting to meet skills needs in this occupational group face the problem that many young people choose not to train and become skilled metal machinery trades workers, despite having the level of educational attainment required do so. Rather than enter the vocational pathway through upper secondary school by, for instance, working towards completion of an apprenticeship, many prefer to stay in the general educational pathway that gives a more direct entry to tertiary level education. ^[12] This has implications for meeting projected replacement demand. An ageing workforce, with substantial retirements on the horizon, has been cited as a major factor underlying 'bottleneck vacancies' or skill shortages in this occupation. Gender is also considered an important element affecting labour supply to the occupation, as the workforce is principally comprised of men ^[13].

How can these skill needs be met?

There are a number of ways in which the sector can respond to the skill challenges it will face in the future. Ensuring that the supply of training is sufficient to meet future demand, so to avoid skills mismatches occurring, is difficult to achieve in an occupation seen to be in long-running decline. This is despite the fact that replacement demand is likely to be high, which may result in many job openings in the future. The provision of labour market information has an important role to play in highlighting likely job openings, which will emerge over the medium-term, to young people, who are making the transition from school to work. Furthermore, if skills supply is to be improved, it would be important to attract more women in this occupation. Tailored labour market information could have again a key role to play in helping to develop a positive image of the occupation that is attractive across genders. To attract more young female workers, VET providers but also the labour market could re-think the occupation and the required equipment beyond gender restrictions and preconceptions.

Spawaczka - Welding girl



Many female welders face the challenge of the lack of equipment that fits them. Such an example of a female welder in Poland is narrated in a short film by Tomas Suski (in Polish).

[video:<https://www.youtube.com/watch?v=05gy398bMIs>]

3M responded to this problem by [making welding helmets that fit women](#)

[video:https://www.youtube.com/watch?v=Ml3XYWI_i7w]

Source: [Euroskills Facebook account](#), uploaded 25 April 2016

Apprenticeships have an important role to play in meeting the skill needs of the occupation. This means persuading more employers to provide apprenticeships and more young people to take them up. Given that the level of educational attainment for those working in the occupation has been increasing, it may well be that vocational education and training / apprenticeships at a higher level will be increasingly able to satisfy this demand. ^[14] Vocational education and training will also need to encompass a range of soft skills, given the increasing importance of customer-service skills in the occupation.

A further challenge involves ensuring existing workers' skills are kept up to date, in order to avoid skills obsolescence, given the fact that such significant changes are taking place in terms of the skill needs of the occupation. Those already working in the occupation will need to have access to continuing vocational education through on-the-job training. ^[15]

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[1] Defined as ISCO 08 groups 72 Metal machinery and related trade workers. ILO, (2012), [International Standard Classification of Occupations ISCO-08](#). Available here. More information on the occupation can be found [here](#).

[2] 2016 [Cedefop forecast](#)

[3] The need to replace workers leaving a profession for various reasons, such as retirement. More information on replacement demand and how it drives employment across sectors can be found on the Skills Panorama [here](#).

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