

TRAINING COURSE FOR IMPROVEMENT OF SKILLS, COMPETENCES AND KNOWLEDGE OF WORKER IN CONSTRUCTION SECTOR

Construction sector

Construction is the second largest industrial ecosystem in the European Union (EU), both in economic and employment terms.

EU construction industry employs 6.1% of total EU workforce (**12.7 million people**), and the EU construction ecosystem itself employs approximately 24.9 million people¹.

It is a **major contributor to economic growth** and job creation in Europe, and provides important solutions to social, climate and energy challenges.

It is also one of the **most resource intensive sectors** of the economy, with the greatest need to develop more productive practices and improved use of secondary materials.

Key challenges

Improving environmental sustainability: Europe's building stock is rapidly aging and suffers from a low rate of renovations. Promoting energy efficiency, reuse and recycling of primary materials and accelerating renovations is essential to reduce emissions across the ecosystem.

Rising Construction Industry Costs combined with rising interest rates, these escalating costs are exerting additional pressure on the industry. Introduction of innovative materials, while promising long-term savings and sustainability benefits, could initially drive costs even higher.

Supply Chain and Material Shortages: construction is largely dependent on other, mostly energy intensive ecosystems. Since the beginning of the COVID-19 pandemic in 2020, the construction industry has faced ongoing supply chain disruptions and price volatility. These challenges have resulted in material

¹ https://pact-for-skills.ec.europa.eu/about/industrial-ecosystems-and-partnerships/construction_en



shortages, including steel, lumber, concrete, drywall, insulation, and HVAC equipment, leading to project delays and rising costs. To mitigate these risks, companies should diversify their supplier networks, increase stockpiles of critical materials, and explore local sourcing options

Workforce availability and skills: Construction is labour intensive and currently lacking in skilled labour due to ageing workers retiring and challenges in attracting younger workers, skills related green and digital transition².

Enhancing Construction Worker Safety

Traditionally, construction companies have focused on minimizing labor costs, but there is now an increasing emphasis on worker safety and strict adherence to safety regulations, to prioritize the well-being of every worker.

European Union's priorities (1)

The European Union approved the goal set out in the European Green Deal (2020) – for Europe's economy and society **to become climate-neutral by 2050**.

This means achieving net zero emissions for EU countries as a whole, mainly by cutting emissions, investing in green technologies and protecting the natural environment.

The act will ensure that all EU policies contribute to this goal and that all sectors of the economy and society play their part.

European Union's priorities (2)

The European Commission, together with stakeholders from across the construction ecosystem published a **Transition Pathway for Construction**³ in March 2023.

This dynamic roadmap sets out the conditions and actions needed for Construction Ecosystem to become:

- 1) a greener
- 2) more digital
- 3) more resilient.

² https://single-market-economy.ec.europa.eu/document/3a5c3e39-6722-4c26-8ecb-919c19640d31_en

³ <https://ec.europa.eu/docsroom/documents/53854>



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It also addresses the transition towards safer buildings and affordable housing for all Europeans.

European Union's priorities (3)

The Pact for Skills in construction⁴ launched 2022 by the EU social partners:

- 1) FIEC -European Construction Industry Federation
- 2) EFBWW - European Federation of Building and Woodworkers
- 3) EBC - European Builders Confederation.

Main directions:

- 1) Building strong partnerships, including with VET institutions
- 2) Monitoring occupational supply/demand and anticipating knowledge, skills and competences needs
- 3) Working against discrimination
- 4) Attracting more young people and women in the sector
- 5) Promoting a culture of lifelong learning for all, supported by adapted incentives

The initiative aims / commits to **train at least 30% of the workforce in the construction industry annually by 2030.**

Circular economy and sustainable products

Innovative construction products - high performance and quality, in addition to having a lower environmental impact compared to already existing products. Products based on novel, hybrid or secondary materials, or products manufactured from energy and resource-efficient processes. There is also potential for wood based innovative construction products.

The construction industry is rapidly evolving with the adoption of innovative materials and techniques aimed at enhancing sustainability, efficiency, and durability.

⁴ https://pact-for-skills.ec.europa.eu/about/industrial-ecosystems-and-partnerships/construction_en



Renovating Europe's stock of buildings Taken as a whole, the stock of Europe's buildings is the single largest energy consumer in Europe. Around three quarters of the EU's buildings are energy inefficient, and 35% are over 50 years old. In its proposal to recast the Energy Performance of Buildings Directive the Commission set out how Europe can achieve a zero-emission and fully decarbonised building stock by 2050 - action will be needed to ensure the availability of skilled labour for the necessary works and installations.

Addressing climate change The Commission is developing a 2050 roadmap to reduce whole life cycle emissions of buildings. A push to address life cycle emissions should help to stimulate innovation in products, processes, design and construction practices and tools.

Digital transition

Enabling the digital transition as lever of resilience The construction ecosystem is rapidly digitalising in various areas. Construction companies are increasingly working with Building Information Models, while building permits are increasingly handled digitally by local governments. Building owners, tenants and facility managers are increasingly using smart metering to optimise water consumption, energy consumption, air quality and comfort. Digital technologies generating substantial amounts of data are increasingly used in construction, such as robots, drones, 3D printing and 3D-scanning.

Virtual, augmented, and mixed reality are revolutionizing the construction industry by enabling professionals to visualize job sites anytime, anywhere. These technologies allow for virtual walkthroughs, offering clients and stakeholders detailed views of projects even if they cannot visit the site in person.

Moreover, [research indicates](#) that integrating augmented reality (AR) into construction planning can lead to a significant 90% decrease in errors and a substantial 30% boost in efficiency.

Digitization and AI in Construction - AI algorithms optimize project scheduling, resource allocation, and risk management, enabling construction companies to make data-driven decisions. Key applications of machine learning and AI include:

- **Safety Monitoring:** Using AI to detect and predict safety hazards, ensuring a safer work environment.



- **Cost Prediction:** Analyzing historical data to forecast costs and manage budgets effectively.
- **Generative Construction:** Improving designs by generating multiple design options based on specific criteria and constraints.
- **Risk Identification and Mitigation:** Identify potential risks early and suggest mitigation strategies to prevent delays and additional costs.

Training needs

The construction industry is dealing with a **significant labor shortage**, which has become a central challenge shaping the sector's dynamics.

This shortage of skilled labor is prompting collaborative efforts among industry stakeholders, educational institutions, and governments to bridge the skills gap. These initiatives focus on **promoting vocational training** and **attracting new talents**, emphasizing the crucial role of **skilled workers in tandem with advanced technology**.

The demand for new skills and roles to carry out the green and digital transition is rising. The need for new infrastructure, e.g. solar and wind farms, and the retrofitting of existing building stock to address the new energy demands are constantly creating new specialisations. This leads to a strong job market for construction, where options are plentiful and pay can be very competitive.

While robots and automation have taken up some slack, **the need for technically skilled workers** to manage and interpret data from these technologies **is growing**.

Robot usage in construction companies is predicted that:

- Over 60% for 3D printing, concrete placement, and rebar installation
- Approximately 65% for welding, cutting, and surface finishing tasks
- 50% of major construction sites for bricklaying, tiling, and material handling.
- 60% for painting, plastering, and insulation installation.
- Over 65% for roofing, siding, and window installation.



- Over 70% of construction equipment manufacturers will offer robotic solutions tailored to earthmoving, excavation, and grading.
- The use of autonomous mobile robots for material transportation and logistics on construction sites will likely see a 40% growth from 2023.

Robotics in construction boosts project productivity and decreases labor needs while ensuring safety in performing hazardous tasks. Robots designed like mechanical arms can take over menial and repetitive tasks, such as bricklaying, thereby speeding up construction and reducing human-induced mistakes.⁵

Despite the significant potential of construction robotics, there are still some limitations. Current robotic systems may struggle with navigating certain obstacles or operating in adverse weather conditions.

Industrial stakeholders often stress the need to invest **in lifelong learning and digital working practices**, in **better working conditions and social protection**, in a healthier and **safer working environment** and in better **promotion of career opportunities**.

Group/ individual task: Please, describe and present within group which of tasks is/will be replaced by robots and AL in your company.

Construction professions in demand

What professions are in demand in Europe? Based on the findings of the **EURES Report on labour shortages and surpluses 2022**⁶, here are the top construction professions in demand in Europe:

- **Bricklayers (and related workers):** Belgium, Switzerland, Czech Republic, Denmark, Estonia, Finland, France, Croatia, Hungary, Italy, Lithuania, Latvia, the Netherlands, Norway, Poland, Portugal, Sweden, Slovenia, Slovakia.
- **Builders (using traditional materials):** Slovakia.

⁵ https://openasset.com/blog/construction-industry-trends/#The_Future_of_the_Construction_Industry

⁶ <https://www.ela.europa.eu/sites/default/files/2023-09/ELA-eures-shortages-surpluses-report-2022.pdf>



- **Building construction labourers:** Belgium, Switzerland, Czech Republic, Denmark, Finland, Croatia, Hungary, Italy, Latvia, Malta, the Netherlands, Poland, Portugal, Slovenia, Slovakia.
- **Building finishers:** Slovenia.
- **Construction managers:** Belgium, Denmark, France, Italy, Lithuania, the Netherlands, Norway, Romania.
- **Construction supervisors:** Belgium, Switzerland, Denmark, Estonia, Germany, Finland, France, Italy, the Netherlands, Slovenia.

Predictions

There are several key trends and factors including population growth, urbanisation, infrastructure programs, increased demand for sustainable and green building practices and advanced technology integration, the industry is evolving, and so are the job opportunities within it.

With all that in mind, here are the top 10 construction jobs that are projected to be in-demand for 2024 and beyond:

- 1) **Green Construction Specialists** - the demand for specialists in green building practices is on the rise. These professionals are adept at implementing eco-friendly materials, energy-efficient systems, and environmentally conscious construction techniques.
- 2) **BIM (Building Information Modeling) Managers** - with the increasing adoption of BIM technology, there's a growing need for experts who can manage and oversee the digital representation of a building's physical and functional characteristics.
- 3) **Construction Project Managers** - project managers are arguably the most important people on any successful construction project. Their role involves overseeing the planning, execution, and completion of projects, ensuring they are on time and within budget.
- 4) **Civil Engineers** - civil engineers are essential for designing and overseeing the construction of infrastructure projects like roads, bridges, and water systems.
- 5) **HVAC Technicians** - Heating, ventilation, and air conditioning (HVAC) technicians play a crucial role in maintaining and installing climate control systems. With an increasing emphasis on energy efficiency and indoor air quality, the demand for skilled HVAC technicians is projected to grow especially in the pharma, semiconductor and data centre industries.



- 6) **Electricians** - Technology and automation have ensured electricians remain in high demand worldwide. They are responsible for installing and maintaining electrical systems in buildings, ensuring they meet safety and code requirements.
- 7) **Welders and Metal Fabricators** - these skilled professionals are essential for constructing and repairing metal structures, from bridges to pipelines to manufacturing plants and everything in between.
- 8) **Heavy Equipment Operators** - operating heavy machinery like bulldozers, excavators, and cranes requires specialised skills. These operators are crucial for tasks ranging from excavation to material handling on construction sites
- 9) **Document controllers** - document controllers play a vital role in the whole lifecycle of a complex construction project. They have a wide range of responsibilities including controlling company and project documentation, following and improving document control procedures and ensuring all documentation meets project requirements and required standards.
- 10) **Safety Managers and Inspectors** - safety remains a top priority in the construction industry. Safety managers and inspectors are responsible for ensuring compliance with regulations and implementing safety protocols to prevent accidents and injuries on construction sites⁷.

Group/ individual task: Please, describe and present within group which profession is in most demand in your company.

Promotion of green practices

Sustainability is a cornerstone of the construction industry. Companies are adopting eco-friendly practices by using green building materials and integrating energy-efficient technologies.

Sustainability in construction refers to the practice of designing, constructing, and operating buildings with a focus on minimising their environmental impact while maximising their social and economic benefits. This involves using eco-friendly materials, implementing energy-efficient systems, reducing waste generation, and creating healthy indoor environments.

⁷ <https://www.eidasolutions.com/the-top-10-in-demand-construction-jobs-for-2024/>



The primary aim of sustainable construction is to minimise the depletion of natural resources, reduce greenhouse gas emissions, and promote the well-being of both occupants and the surrounding community.

Energy-Efficient Design and Materials

Utilizing smart design principles that maximize natural light, optimize heating and cooling systems, and reduce overall energy consumption sets the stage for an eco-friendly building. Examples include south-facing windows, spray foam insulation, natural ventilation, and smart home technology.

Additionally, using [energy-efficient building materials](#) with low embodied energy and high recyclability reduces your environmental impact.

Implementing the Practice:

- Conduct energy audits during the design phase.
- Prioritize materials with eco-friendly certifications.
- Explore innovative materials with low environmental impact.

Water Conservation Measures

Water scarcity is a growing concern globally, making water conservation a critical aspect of sustainable building practices. Construction companies can adopt measures to minimize water wastage, both during the construction process and in the operational phase of the building. Examples include rainwater harvesting systems, such as cisterns, rain gardens, and low-flow fixtures.

Implementing the Practice:

- Install water-efficient fixtures and appliances.
- Incorporate rainwater harvesting systems.
- Implement landscaping designs that require minimal irrigation.

Waste Reduction and Recycling

Construction projects often generate a substantial amount of waste that requires proper recycling. Furthermore, waste left out on a worksite can also lead to pollution via stormwater runoff.



Implementing waste reduction and recycling initiatives ensures that materials are reused whenever possible, reducing the overall environmental footprint of a project.

Implementing the Practice:

- Sort and recycle construction waste on-site.
- Store waste materials properly in sealed containers.
- Partner with recycling facilities for proper disposal.
- Encourage the reuse of materials from demolition processes.

Green Roof and Sustainable Landscaping

Integrating green spaces into building design contributes to improved air quality, reduced urban heat island effects, and enhanced biodiversity. Green roofs and sustainable landscaping not only offer aesthetic benefits but also play a crucial role in creating environmentally responsible structures.

Implementing the Practice:

- Design roofs with vegetation to improve insulation.
- Use native plants that require minimal maintenance.
- Incorporate permeable surfaces to reduce stormwater runoff.

Renewable Energy Integration

Transitioning to renewable energy sources is a key component of sustainable construction. Construction companies can explore options like solar panels, wind turbines, or geothermal systems to generate on-site renewable energy, reducing reliance on traditional power sources. Renewable energy can be used for multiple applications, including general electricity use and water heating.

Implementing the Practice:

- Assess the feasibility of on-site renewable energy systems.
- Integrate solar panels into the building's design.
- Explore partnerships with renewable energy providers.

LEED Certification and Other Green Building Standards

Seeking certification from reputable organizations such as the Leadership in Energy and Environmental Design (LEED) demonstrates a commitment to high



environmental performance. Adhering to green building standards ensures that a construction project meets specific criteria for sustainability.

Implementing the Practice:

- Familiarize teams with LEED certification requirements.
- Integrate LEED criteria into project planning.
- Celebrate and market LEED-certified projects to showcase commitment.

Employee Training and Community Engagement

Sustainable building practices go beyond construction sites; they involve the entire construction team and the communities in which projects are situated. Providing training for employees on sustainable practices and engaging with the local community fosters a culture of environmental responsibility.

Implementing the Practice:

- Conduct regular training sessions on sustainable practices.
- Collaborate with local communities on eco-friendly initiatives.
- Educate clients on the benefits of sustainable construction.

Creating sustainable buildings confers several benefits to builders and their clients. Research these best practices to begin implementing them at your worksite and reach out to a certified consultant to assist you in implementation⁸.

Task: Please, describe and present within group how is/ can be used green practices in your company.

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⁸ <https://www.pathlightpro.com/7-sustainable-building-best-practices-for-builders/>